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Final Environmental Impact Statement

Granite Creek Watershed Mining Project

North Fork John Day Ranger District
Umatilla National Forest

Whitman Ranger District
Wallowa-Whitman National Forest

Baker and Grant Counties, Oregon

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Abstract

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Final Environmental Impact Statement

Baker and Grant Counties, Oregon
March 2016

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Abstract

This Final Environmental Impact Statement (FEIS) documents the analysis of proposed mining activities in the Granite Creek Watershed. This FEIS has been prepared to determine the potential environmental impacts from 28 proposed mining Plans of Operations. The Granite Mining analysis area (approximately 94,480 acres) is located on the Whitman Ranger District of the Wallowa-Whitman National Forest, and the North Fork John Day Ranger District of the Umatilla National Forest, near the towns of Granite, Oregon in Baker County and Ukiah, Oregon in Grant County. The preferred alternative is Alternative 3 which incorporates additional Forest Service resource protection measures and requirements to prevent or minimize impacts from the proposed activities. The Decision Framework in Chapter 1 includes stipulations for Plan approval for those Plans that 1) propose activities that may result in a discharge of a pollutant (sediment), or 2) that have the potential to increase stream temperatures, or 3) propose suction dredging in streams under the 2016 moratorium imposed from Senate Bill 838.

List of Acronyms

ATV	All-Terrain Vehicle
BA	Biological Assessment
BE	Biological Evaluation
BLM	Bureau of Land Management
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CTUIR	Confederated Tribes of the Umatilla Indian Tribe
DCH	Designated Critical Habitat
DEIS	Draft Environmental Impact Statement
DOGAMI	Department of Oregon Geology and Mineral Industries
DSL	Department of State Lands
EE/CA	Engineering Evaluation/Cost Assessment
EFH	Essential Fish Habitat
ESH	Essential Salmon Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
GIS	Geographic Information Systems
HUC	Hydrologic Unit Code
IDT	Interdisciplinary Team
INFISH	Inland Fish Environmental Assessment and Direction
LWD	Large Woody Debris
MA	Management Area
MCR	Middle Columbia River
MIS	Management Indicator Species
MOU	Memorandum of Understanding
MUYSA	Multiple-Use Sustained-Yield Act of 1960
NEPA	National Environmental Policy Act
NFJD	North Fork John Day
NFMA	National Forests Management Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System

NRHP	National Register of Historic Places
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OHV	Off highway vehicle
OWRD	Oregon Water Resources Department
PACFISH	Interim Strategy for Managing Fish-Producing Watersheds in Eastern Oregon, Washington, Idaho, and portions of California
PETS	Proposed, Endangered, Threatened or Sensitive Species
PFC	Proper Functioning Condition
RNA	Research Natural Area
RHCA	Riparian Habitat Conservation Area
ROD	Record of Decision
RMO	Riparian Management Objectives
SB	State Bill
SHPO	State Historic Preservation Officer
SI	Site Investigation
SMCRA	Surface Mining Control and Reclamation Act of 1977
SOPA	Schedule of Proposed Actions
SWS	Subwatershed
TES	Threatened and Endangered Species
TEUI	Terrestrial Ecological Unit Inventory
TMDL	Total Maximum Daily Load
TMP	Travel Management Plan
UNF	Umatilla National Forest
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WQMP	Water Quality Management Plan
WRPM	Water Resources Protection Measure
WWNF	Wallowa-Whitman National Forest

Changes from Draft to Final EIS

Many of the changes made between the Granite Creek Watershed Mining Draft EIS and Final EIS were minor in nature and focused on grammatical corrections, editorial formatting, and clarification of data previously presented. The changes were driven by public comment and a comprehensive internal review.

Other changes include:

Changes Made in Final EIS	Location in Draft EIS
Corrected water withdrawal requirements for Belvadear.	**Summary pg. S-9 and Chapter 2**
Changed language under Decision Framework regarding 401 cert and valid water rights with clarification from ODEQ and OGC. FSH 2817.23 states: "*Pursuant to CWA, the Forest Service cannot authorize a Plan of Operations until the 401 certification has been obtained or waived by the designated entity*." Therefore, in order to comply with the CWA, any activity that would not comply with the CWA must be removed from the proposed Plan (and an amended Plan submitted to the Forest Service) prior to Plan approval. This change is described in more detail in Appendix 10, Response 4b.	**Chapter 1**
Clarified Decision Framework. Added requirements for Plans proposing to withdraw water from stream that may result in increased stream temperatures, clarified requirements for authorizing Plans that need 401 certification, and added information about the suction dredging moratorium and how that may impact Plan approval	**Chapter 1, Decision Framework**
Changed "Plans proposed in this document would be in effect from 2014 to 2024" to the following: "Plans proposed in this document would be in effect for ten years after the date of the signed Record of Decision".	**Chapter 1, pg. 3**
Updated information regarding the moratorium on suction dredging in Essential Salmon Habitat streams has been added to Chapter 1 and the Fisheries section of Chapter 3.	**N/A**
Combined all Water and Soil Resource Protection measures with other resource protection measures from Chapter 2 in a new appendix – Appendix 11. This appendix lists by Plan, all Plan-specific protection measures, and the specific General Requirements from Appendix 2 that do not apply to each Plan. The Water and Soil Resource Protection Measures document that was Appendix 1A in the DEIS, can now be found in the project file and accessed through the Forest website for this project.	**Chapter 2 and Appendix 1A**
Adjusted # of existing fords for Alternatives 2 and 3 due to error	**Chapter 2**

Changes Made in Final EIS	Location in Draft EIS
Some acres in Table 2-2 were adjusted for rounding errors. Also, due to an error, Royal White acres of proposed activity were changed from 10 acres to 3 acres.	**Chapter 2, Table 2-2**
Added Authorized State Water Withdrawals as an ongoing activity for the WWNF and UNF in Table 3-1	**Chapter 3**
Changed information for Royal White adit. Currently no discharge from adit. This is in response to Comment 64 from EOMA.	**Chapter 3, Table 3-6**
The statement, "For a more extensive description of inventories and reclamation plans see the hydrology report", has been replaced with the following: "A full listing of sites identified for investigation under the CERCLA Act can be found in the project file."	**Chapter 3, pg. 165**
Corrected Table 3-22. Under Alt. 1, two Plans have potential for discharge of sediment, not four.	**Chapter 3, Table 3-22, pg. 134**
Modified Table 3-22. Presented the information by subwatershed, and renamed it 3-22A.	**Chapter 3, Table 3-22, pg. 134**
Corrected error: For Olive Tone, changed 8cfs to 4cfs.	**Chapter 3, Table 3-38, pg. 179**
Removed Belvadear and Olive Tone from Table 3-20 because no bull trout or chinook salmon in Olive Creek	**Chapter 3**
Changed ford for Eddy Shipman to Granite Creek. Incorrectly identified as Olive Creek in DEIS.	**Chapter 3, Table 3-51, pg. 235**
Added summary of cumulative effects and additional Table 3-22B	**Chapter 3, Water and Soil Resources**
The Magnuson-Stevens Act, defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." In January 2015 the National Marine Fisheries Service removed EFH for chinook in the Granite Creek watershed and is no longer included in this analysis. This is a change between the draft and final EIS.	**Chapter 3, Fisheries and Aquatic Species**
Clarified distinction between Essential Fish Habitat and Essential Salmon Habitat	**Chapter 3, Fisheries and Aquatic Species**
Clarified General Requirement L-3 to specify that testing will occur at a Forest Service approved facility and will follow DOGMI protocol.	**Appendix 2**
In response to comment #74c, General Requirement G22 will be removed from the FEIS, as it will not change the environmental effects or how claims are administered.	**Appendix 2**

Changes Made in Final EIS	Location in Draft EIS
In response to comment #81, deleted General Requirement L10 as it is already covered through CERCLA.	**Appendix 2**
In response to comment #79, changed General Requirement IS5 to the following: "All ground disturbing activities will avoid inventoried (as identified on the map provided in IS1) noxious weed infestations 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."	**Appendix 2**
In response to comment #86, changed General Requirement R12 to the following: "Following re-contouring of the ground, the ground will be seeded with an appropriate seed species mix or locally appropriate native trees and shrubs. Appropriate seed mixes will be created through consultation with the Forest Service."	**Appendix 2**
In response to comment #88, changed General Requirement R16 to the following: "In mid to late fall, after completion of operations, the miner will distribute certified weed-free straw, 3 inches thick over approximately two-thirds of the area leaving small open patches distributed across the site. Seeding will not take place at this time, but will occur the following year when the straw has partially dried."	**Appendix 2**
To be consistent with Oregon Department of Fish and Wildlife requirements for fish screens ORS 496.141, changed General Requirement G23 to the following: "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."	**Appendix 2**
Added Table 7-15B - cumulative effects sorted by SWS	**Appendix 7**
For Tetra Alpha Placer: protection measure regarding fords has been clarified to notify the Forest Service when ford construction will occur. This protection measure can now be found in Appendix 11 – Resource Protection Measures.	**Appendix 1A**
The text throughout both documents has been corrected to read as follows: The distance between the back edge of the berm and the mining area is at least 136 feet (paced).	**Appendix 3 and 7**

Changes Made in Final EIS	Location in Draft EIS
To reduce the size of the FEIS, DEIS Appendix 10 is no longer an appendix to the FEIS, but is included in the project file as the Wilderness and Undeveloped Lands Report. It can be accessed through the Forest website for this project.	**Appendix 10**

FEIS Summary

Location of Project Area

The Granite Creek Watershed (approximately 94,480 acres) is located in the Blue Mountains of eastern Oregon and is primarily within the administrative boundaries of the Whitman Ranger District, Wallowa-Whitman National Forest (40,624 acres), and the North Fork John Day Ranger District, Umatilla National Forest (49,539 acres). Approximately 4,150 acres in the watershed are privately held. The Granite Creek Watershed is located approximately 30 miles west of Baker City, in Baker County, Oregon, and 40 miles southeast of Ukiah, in Grant County, Oregon.

Approximately 167 acres of the Granite Creek Watershed are located within the administrative boundaries of the Malheur National Forest, however, none of the proposed activities or roads in this project is located within the Malheur National Forest, therefore those 167 acres will not be included in the decision for this analysis.

The legal description for the watershed is:

Township 8 South, Range 34, 35, 35½ and 36 East
Township 9 South, Range 34, 35, 35½, and 36 East
Township 10 South, Range 34, 35, 35 ½, and 36 East, Willamette Meridian.

Granite Creek is a tributary to the North Fork John Day River, which is a tributary to the John Day River. Granite Creek originates near the North Fork John Day Wilderness on the Wallowa-Whitman National Forest.

Purpose and Need for Action

Existing Condition

A number of mining Plans were previously approved in the early 1980s. Since then, regulatory conditions have changed, such as Endangered Species Act (ESA) fish were listed and streams were listed under Section 303(d) of the Clean Water Act (CWA), requiring that the Plans address these changes. In addition to these changed regulatory conditions, all of the Plans have either expired or completed their activities and require additional authorization for mining activities.

Two streams in the watershed (Bull Run Creek and Granite Creek) are currently listed as water-quality limited for sedimentation by the Oregon Department of Environmental Quality (DEQ) under section 303(d) of the CWA. All of Bull Run Creek is listed, and Granite Creek is listed upstream of its confluence with Boulder Creek.

On July 10, 1998, Columbia River bull trout (Salvelinus confluentus) were listed as threatened under ESA and critical habitat was designated in 2010. On May 24, 1999, Mid-Columbia River steelhead (Oncorhynchus mykiss) were listed as threatened under the ESA and critical habitat was designated in 2005. Both of these species are found in streams located within the Granite Creek Watershed and both

have designated critical habitat within the project area. Westslope cutthroat trout (Oncorhynchus clarkia lewisi), which exists in the watershed, is on the 2011 Regional Forester's list of sensitive species; and Columbia spotted frog (Rana luteiventris) has a documented population in the watershed and is on the 2011 Regional Forester's sensitive species list.

One proposed Plan of Operations has a very rare (but not currently listed as sensitive) biscuitroot species, Lomatium tarantuloides, located within the footprint of one of the proposed Plan of Operations (Royal White), and protection of these plants may be required. Also, there are approximately two dozen locations for Region 6 Sensitive Botrychium plant species located within the Granite Creek Watershed on both the Wallowa - Whitman and Umatilla National Forests. However, no Botrychium plants were located at any of the proposed Plans of Operations during site-specific surveys for this analysis.

Desired Condition

Desired conditions for the surface resources on the mining claims in the Granite Creek Watershed are derived from goals, objectives, standards, and guidelines from the Wallowa-Whitman and Umatilla National Forests Land and Resource Management Plans (Forest Plans), public scoping, recovery plans for ESA listed Middle Columbia River (MCR) steelhead and Columbia River (CR) bull trout, and interdisciplinary team input. Desired conditions provide a future vision for the area and can help in development of management options for the mining operations in the Granite Creek Watershed over time.

Twenty-eight Plans of Operations would be approved for the mining operations in the Granite Creek Watershed that include requirements and protection measures to ensure that adverse impacts to water quality and surface resources (including special status fish, wildlife, and plant species described above) are minimized.

- Watershed values are protected to the fullest extent possible under existing laws in evaluating and developing mineral operating plans (*WWNF Forest Plan, page 4-25).*

- During development of operating plans or plan modifications, reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the minerals operator (miner). The test for operating plan requirements is "reasonableness" (*UNF Forest Plan, page 4-81*).

- During development of operating plans or plan modifications, reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the minerals operator (miner). The test for operating plan requirements is "reasonableness" (*UNF Forest Plan, page 4-81*).

Purpose and Need

The Forest Service needs to ensure adverse environmental effects on National Forest surface resources have been reasonably minimized where mining claimants propose to conduct operations authorized by mining laws. Plans of Operation submitted by the miners, as specified in 36 CFR 228.4(a), should be reviewed to consider the Forest Service's responsibility to approve or require modifications to these Plans

in accordance with federal mining and environmental laws. As described above, previous Plans in the area were approved prior to the ESA listing of bull trout and steelhead as threatened, as well as designation of critical habitat for both species. Because regulatory requirements have changed, previous plans either expired or mining activities were completed, and new plans have been submitted, there is a need to ensure all reasonable measures are taken by the authorized officer to disclose and minimize the environmental impacts of the proposed operations prior to approving the operating plan, as specified in 36 CFR 228.4(e).

Based on the number and nature of mining operations in the drainage, the existence of two ESA listed fish species, and the current water quality-limited status of two streams in the watershed, the responsible officials determined that potential significant environmental impacts may occur in the Granite Creek Watershed, and therefore an EIS is required to disclose those impacts in detail, to analyze alternatives to the proposals, and to determine possible mitigation of those impacts.

This EIS analyzes the direct, indirect, and cumulative effects of mining operations and of management requirements designed to reduce adverse environmental effects from those operations.

Issues

Significant issues are those points of concern that would change among the alternatives. A Forest Service interdisciplinary team (IDT) of resource specialists used comments gathered at internal and public scoping meetings and from letters from interested parties to help define significant issues. Alternatives to the proposed action are based on changes of impacts to these issues.

Significant Issue 1: Water Quality and Quantity

Water quality in the Granite Creek Watershed has been impaired by past timber harvest and road building, beaver trapping, grazing and hydraulic, placer, and dredge mining. These activities have altered stream channel morphology, abundance and distribution of riparian vegetation, runoff patterns and volumes, the stream-valley floor surface hydrologic connection, and type of ground cover. The result has been changes in flow regimes, the movement and storage of sediment, release of toxic metals, the movement and storage of water in the watershed, bank stability, and substrate composition. Water quality parameters affected by these changes are stream temperatures, concentrations of heavy metals, and water clarity (turbidity). Some types of mining activities proposed in Plans of Operations have the potential to cause further degradation to water quality. For example, several Plans withdraw water for their operations. Water withdrawals can negatively impact water quality and quantity.

The Forest Service has monitored summer stream temperatures for 12 streams in the Granite Creek watershed. All of these streams have temperatures that exceed the applicable state water quality standard of 53.6°F for bull trout spawning and rearing (FEIS Appendix 5). Prior to 2010, four of these streams (Beaver, Bull Run, Clear and Granite) were 303(d) listed by Oregon Department of Environmental Quality (ODEQ) as water quality limited for temperature and in two cases for sedimentation. As a result of the completion of the John Day River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) in 2010 (ODEQ 2010), the four streams were delisted listed for temperature. Delisting does not mean that the stream temperatures are now acceptable, but that all feasible steps will be made to decrease the elevated stream temperatures and prevent further rises, as required by the TMDL. As such, Plans were evaluated for potential impacts to stream temperatures. With respect to

sedimentation, Bull Run and Granite Creeks remain 303(d) listed as sediment impaired and Plans were evaluated for the potential to increase sedimentation on these streams.

Table S-1: 303(d)-Listed Streams in the Granite Creek Watershed (ODEQ, 2010)

Stream Name	Subwatershed Location	Reason for Listing
Bull Run Creek	(170702020201)	Sedimentation (river mile 0 to 9.3)
Granite Creek	(170702020202)	Sedimentation (river mile 11.2 to 16.2)

Key Indicators

Measurements used to compare the alternatives in relation to this issue:

1. **Sediment input** – number of Plans that have the potential for a discharge.
2. **Heavy metal input** – number of Plans that have the potential for a discharge of heavy metals via groundwater or directly via surface water.
3. **Warm water input** - number of Plans that have the potential for a discharge of warm water via groundwater flow.
4. **Creosote input** -- number of Plans that have the potential for a discharge of creosote into surface water
5. **Stream temperature** – number of Plans that have the potential to locally alter stream temperatures from a water withdrawal, input of warm water, or a groundwater flow reversal.
6. **Stream flow** – number of Plans that have the potential to locally reduce stream flow from a water withdrawal or groundwater flow reversal.

Significant Issue 2: Fish Habitat and Species

Fish species listed as threatened under the Endangered Species Act and their designated critical habitat occurring within the Granite watershed are Columbia River bull trout and Middle Columbia River steelhead.

Approximately 40 percent (37,445 acres) of the Granite Mining analysis area occupies Management Area 18 (Anadromous Fish Emphasis) on the WWNF. Approximately 17 percent (16,242 acres) of the Granite Mining analysis area occupies Management Area C7 (Special Fish Management Area) on the UNF. These management areas are intended to achieve and maintain optimum conditions for anadromous fish. Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied. Emphasis is placed on protecting fish habitat and habitat investments through reasonable provisions in plans of operation and in reclamation requirements.

Past placer mining operations, in an effort to expose placer deposits in the Granite Creek Watershed, have removed trees, shrubs, and ground cover in the flood-prone areas immediately adjacent to the Granite,

Clear, Bull Run, Boulder, Last Chance, Ten Cent, Olive, Ruby, Lightning, McWillis, Quartz and Lucas Gulch creeks, and their tributaries. This past mining-caused ground disturbance has altered:

- Instream habitat such as pool frequency and distribution, altered substrate composition (including a loss of fine material), off channel habitat, and instream large woody material (LWM), and
- Riparian habitat such as canopy cover adjacent to stream reaches and bank stability.

Water quality has been affected by past placer mining operations. The exposed soil on the mining access roads and the disturbed flood-prone areas immediately adjacent to Granite, Clear, Bull Run, Boulder, Ten Cent, Olive, Salmon, Ruby, Lightning, Quartz and Lucas Gulch creeks and their tributaries could increase the amount of sediment entering these streams, resulting in degradation of existing summer steelhead, and redband trout spawning, incubating, and rearing habitat in these streams. Activities proposed in Plans of Operations have the potential to further reduce the quality of fish habitat in the project area. For example, instream disturbance from building and use of stream fords, suction dredging activities and water withdrawals can negatively affect fish. Quality of fish habitat is linked to water quality, and Significant Issue 1, Water Quality and Quantity, directly relates to aquatic species and fish habitat.

Key Indicators

Acres of areas with risk to riparian resources related to:

1. **Instream habitat** (i.e. pool frequency and distribution, substrate composition, and channel complexity) and
2. **Riparian habitat** (i.e. riparian vegetation type and distribution that influence shade, bank stability, and large woody recruitment).

Plans with proposed activities with risk to fish species:

1. **Stream fording** (frequency and timing of crossing)
2. **Suction dredging**
3. **Water quality** (i.e. sediment inputs, heavy metal inputs, water withdrawals, and water temperature increases)

Table S-2: Streams with Listed Fish Species

Stream name	Forest	Mid-C Summer Steelhead	Columbia River Bull trout
Granite Creek	UNF and WWNF	Present	Present
Boulder Creek	WWNF	Present	Present
Last Chance Creek	WWNF	-	-
Bull Run Creek	WWNF	Present	Present
Clear Creek	UNF	Present	Present
Ruby Creek	UNF	Present	Assumed in lower reaches
Lightning Creek	UNF	Present	Present
Lucas Gulch	UNF	-	-
Olive Creek	WWNF	Present	-
McWillis Gulch	WWNF	Assumed in the lower reaches	-
Quartz Gulch	WWNF	Probable	-
Ten Cent Creek	UNF	Present	-

- = not present, ?= unknown

Alternatives

Alternative 1 - No Action/No Change in Present Situation

- **Includes 27 areas covered by the Proposed Plans of Operation**

A "No Action" alternative is required by regulation in 40 CFR 1502.14(d). It is used in part to measure action alternatives to determine the effects of not implementing an action alternative. In this analysis, this alternative maintains the current situation; it allows the ongoing Notice of Intent activities to continue in the watershed. None of the proposed Plans would be approved. This alternative does not meet the purpose and need to ensure reasonably minimized adverse environmental effects on National Forest surface resources where mining claimants propose to conduct operations authorized by mining laws because no Plans of Operations would be considered for approval. This alternative cannot be implemented, since Forest Service Regulations in 36 CFR 228, Subpart A, does not provide for denying a reasonable Plan of Operations. The Plans of Operations included in this alternative are in the analysis file.

The tables and maps in the FEIS display the proposed Plans of Operations under Alternative 1.

The development of this alternative is in response to NEPA regulations 36 CFR 220.5(d) and 40CFR1502.14 (d). It is the result of not implementing the proposed action, therefore none of the proposed Plans of Operation in the Granite Creek Watershed would be approved. However, the Forest Service mining regulations (36 CFR Part 228) do not provide for the denial of a reasonable Plan of Operation on areas open to mineral extraction. Because of this, the no action alternative would not meet the purpose and need and will be used as a base line for comparison of the effects.

For analysis purposes only, selection of the No Action Alterative would result in the following:

- Miners who have proposed to continue with activities previously approved in a Plan of operations would initiate reclamation and closure requirements on their existing mining sites, structures and user-created roads, in accordance with the requirements of their previously authorized Plan of Operation.

- Miners who have proposed an initial Plan of Operations would not receive authorization.

- Prospecting would continue as described under 36 CFR 228.4 provided it complies with federal and state laws. In areas open to mineral extraction, other activities would continue as defined by 36 CFR 228.4(a)&(a)(1).

Alternative 2 - Proposed Action (Plans of Operations as submitted by the Miners)

The following activities are proposed under this alternative:

- Authorizing approval of 28 mining Plans of Operations as submitted by the miners

(*Note that Tetra Alpha Placer, Mill and Lode has been split into 2 Plans under this alternative (Tetra Alpha Placer and Tetra Alpha Mill & Lode) (FEIS Table 2-2), therefore the change from 27 Plans in Alternative 1, to 28 Plans in Alternative 2*)

- Authorizing use of 4.71 miles of previously closed or decommissioned Forest Service roads 4.26 closed and 0.45 decommissioned)
- Authorizing use of 8.98 miles of existing miner-created temporary roads
- Authorizing use of 0.3 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 11 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 2 new fords (2 fords at Tetra Alpha Placer)
- Authorizing placement of 2 temporary bridges to be removed at the end of each operating season (Bull Run Site #2 and Ruby Group)
- Authorizing installation of 3 new gates on non-system miner created roads (East Ten Cent Creek and Hopeful 2&3)

Alternative 2 would authorize the approval of the Plans of Operations (Plans) as submitted by the miners. The total number of Plans proposed for approval under this alternative is 28 (FEIS Table 2-2). The Plans of Operations included in this alternative are in the analysis file. Summaries and sketch maps of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, State suction dredging requirements, and all applicable State and Federal fire regulations.

Alternative 3 – Plans of Operations as submitted by the Miners with Forest Service Requirements

The following activities are proposed under this alternative:

- Authorizing approval of 28 mining Plans of Operations, pending any 401 certifications and valid water rights deemed necessary as a result of this analysis
- Inclusion of Forest Service Requirements in Plans of Operations for protection of water quality, soils, fisheries and other resources (Appendices 2 and 12)
- Inclusion of Monitoring Measures in Plans of Operations
- Authorizing use of 4.18 miles of previously closed or decommissioned Forest Service roads (3.73 closed and 0.45 decommissioned)
- Authorizing use of 8.21 miles of existing miner-created temporary roads
- Authorizing use of 0.43 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 10 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 1 new ford (1 ford at Tetra Alpha Placer)
- Authorizing placement of 1 temporary bridge to be removed at the end of each operating season (Ruby Group)
- Authorizing installation of 3 new gates (East Ten Cent Creek and Hopeful 2&3)

This alternative includes the 28 Plans identified in Alternative 2. The Plans of Operations included in this alternative are in the analysis file. Summaries of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, and all applicable State and Federal fire regulations.

Monitoring requirements are specific to each Plan, except where State and Federal laws and regulations apply.

FEIS Map 3 displays locations of the Plans of Operations under Alternative 3.

401 Certification for Activities with the Potential for a Discharge

When an activity in a proposed Plan has been identified by the project hydrologist as having the potential for a discharge, 401certification from ODEQ must be presented to the Forest Service prior to approval and commencement of that mining activity. Any additional terms and conditions included in the 401 certification related to that activity will be incorporated into the Plan. To ensure consistency with Section 401 of the CWA and Forest Service Handbook 2817.23, if a 401 certificate is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed activity(s) requiring 401 certification.

Valid Water Rights for Plans proposing Water Withdrawals that may Increase Stream Temperatures

When an activity in a proposed Plan has been identified by the project hydrologist as having the potential to increase stream temperatures, such as water withdrawals from a stream, prior to Plan approval, the Forest Service will consult with Oregon Water Resources Department (OWRD) for documentation of a valid water right. To ensure consistency with Section 401 of the CWA and Forest Service Handbook 2817.23, if a valid water right is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed water withdrawal.

Use of Closed, Decommissioned and Temporary Access Roads

FEIS Table 2-3 displays a list of roads proposed for use under each alternative. The approved Plan of Operations will include a list of all access roads authorized for use by the miner.

Plan Expiration

Approval of all Plans would expire 10 years from the date the ROD is signed. Approval may be extended if the miners are operating within their terms and NEPA compliance is still adequate and current at the time of extension. Prior to any extension, compliance with ESA Section 7 consultation will be evaluated,

and re-initiation may be necessary. The complete Plans of Operations are available in the analysis file. Map 3 displays locations of the Plans of Operations under Alternative 3, and summaries and sketch maps of the Plans can be found in Appendix 8.

Inclusion of Forest Service General Requirements

In addition to the protection measures and reclamation plans submitted by the miners under Alternative 2, each Plan would include General Requirements to meet minerals regulation 36 CFR 228 Subpart A (228 Regulations) that are specific to each Plan's activities (Appendix 2).

Inclusion of Forest Service Plan-Specific Resource Protection Measures

Unlike Alternative 2, under Alternative 3, additional Forest Service Requirements would be added to the Plans of Operations for protection of water quality, soils, fisheries and other resources. These Requirements include: General Requirements (Appendix 2), and the Plan-specific Resource Protection Measures which are included in Appendix 11.

Inclusion of USFWS and NMFS Terms and Conditions

As a result of consultation for this project, final Terms and Conditions are expected to be received from U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) in spring of 2016. The final Terms and Conditions will be incorporated into the Plans of Operations prior to Plan approval.

Suction Dredging Requirements

The suction dredging requirements are the same as described for Alternative 2.

Monitoring

Monitoring and annual inspections by the Forest Service are the same as described under Alternative 2, with the following two additional monitoring measures:

Monitoring protection measures and requirements

During annual inspections, the Forest Service will determine if the miner has implemented all measures and requirements in Appendices 2 and 12, and that they are achieving the desired results. Also, a daily monitoring log (as identified in the 2015, 700PM permit) must be legible and made available to the Forest Service upon request.

Monitoring Closed Sites

Once an operation is closed (all proposed actions are complete), annual inspections by a Forest Service biologist or minerals administrator would occur the first three years and then once at 5 years, and then finally at10 years after closeout, depending on the type of reclamation work done, to ensure that reclamation activities are complete and successfully implemented.

Comparison of Alternatives

The difference between Alternative 2 and Alternative 3 is the difference between what was proposed in the Miner's Plan of Operations, as submitted by the miner, and what the Forest Service proposes as changes to the miner's proposal to meet requirements of 36 CFR 228. Under Alternative 3, all Plans would include Forest Service Requirements: General Requirements (Appendix 2), and Plan-Specific Resource Protection Measures (Appendix 11). Alternatives 2 and 3 also include proposals for use of Forest Service roads for mine access that are currently either closed or decommissioned, or are temporary non-system roads. Some of the roads proposed for use differ between Alternatives 2 and 3.

Refer to FEIS Table 2-2 for a comparison of the operations by alternative.

Tables S-3 through S-5 below display a summary of impacts to issues and resources through implementation of each alternative.

Table S-3: Comparison of Effects to Water Quality Issues/Key indicators for Water Quality

	Alternative 1	Alternative 2	Alternative 3
# of Plans Operations with potential to discharge sediment into a creek	3	16	2
# of Plans Operations with potential to discharge heavy metals into a creek	0	3	0
# of Plans of Operations with potential to discharge warm water	0	1	0
# of Plans of Operations with potential to discharge creosote	2	0	0
# of Plans Operations with potential to alter stream temperatures	0	5	5
# of Plans Operations with potential to alter stream flow	0	5	5

Table S-4: Comparison of Alternatives for Fish Issues/Key indicators for Fish

Key Indicator	Alternative 1	Alternative 2	Alternative 3
# of Plans of Operations with stream fording	0	9	9
# of Plans of Operations with suction dredging in fish habitat (acres of habitat)	0	5	5

Table S-5: Effects on Threatened, Endangered, and Sensitive Fish Species

Key Indicator		Alternative 1	Alternative 2	Alternative 3
# Plans of Operations Likely to Adversely Affect /LAA ESA Listed Fish Species and/or their Designated Critical Habitat	Bull trout # of Plans	0	11	9
	Steelhead # of Plans	0	18	11

Preferred Alternative

Alternative 3 is the agency preferred alternative.

Chapter 1 – Purpose of and Need for Action

Document Structure

The Forest Service has prepared this Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

Chapter 1. Purpose and Need for Action: This chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded, including issues generated by the public and from resource specialists.
Chapter 2. Alternatives, including the Proposed Action: This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on issues raised by the public and other agencies. This chapter is a mini-summary of the effects section, highlighting some of the impacts and associated calculations related to potential implementation. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the affected resource, followed by the environmental effects of implementing the proposed action and other alternatives on that resource. This chapter is organized by impacts generated by the alternatives on the issues, then on resource areas, then by individual operating plans. Key issues are addressed first.
Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
Appendices. The appendices provide more detailed information to support the analyses presented in the environmental impact statement.
Index. The index provides page numbers by document topic.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the office of the Whitman Ranger District, Baker City, Oregon.

This Final Environmental Impact Statement (FEIS) for the Granite Creek Watershed Mining Plans (Granite Mining EIS) documents the site-specific direct, indirect, and cumulative environmental effects from authorizing the approval of proposed mining Plans of Operations (Plans) in the Granite Creek Watershed. The project area includes the entire Granite Creek Watershed in northeastern Oregon (Wallowa-Whitman and Umatilla National Forests). Plans proposed in this document would be in effect for ten years after the date of the signed Record of Decision.

Introduction

According to the 36 CFR 228.4 *(Plan of Operations/Notice of Intent Requirements*) should the operator or the District Ranger determine that a mining proposal/operation is causing or will likely cause significant disturbance of the surface resources the operator must submit a proposed plan of operations or a modification to an existing Plan of Operations. In the Granite Creek Watershed, a number of mining Plans were previously approved in the early 1980s. Since then, regulatory requirements have changed in this watershed, such as streams were listed under section 303(d) of the Clean Water Act (CWA), and Endangered Species Act (ESA) fish were listed, requiring that the Plans address these changes. In addition to these changed regulatory conditions, all of the old Plans have either expired or completed their activities and require authorization for additional mining activities, and some new plans have been submitted. As with any other project proposed on Forest Service Land, an environmental analysis must be done in conjunction with the proposed operating plan(s) (36 CFR 228.4 (f). As per 36 CFR 228.5 (a), the Authorized Officer will review the proposal and the accompanying environmental analysis in order to determine the reasonableness of the requirements for surface resource protection. This EIS documents the potential environmental effects of 28 proposed Plans of Operations submitted to the Forest Service for approval.

Location of Project Area

The Granite Creek Watershed (approximately 94,480 acres) is located in the Blue Mountains of northeastern Oregon and is primarily within the administrative boundaries of the Whitman Ranger District, Wallowa-Whitman National Forest (40,624 acres), and the North Fork John Day Ranger District, Umatilla National Forest (49,539 acres). Approximately 4,150 acres in the watershed are privately held. The Granite Creek Watershed is located approximately 30 miles west of Baker City, in Baker County, Oregon, and 40 miles southeast of Ukiah, in Grant County, Oregon.

Approximately 167 acres of the Granite Creek Watershed are located within the administrative boundaries of the Malheur National Forest, however, none of the proposed activities or roads in this project is located within the Malheur National Forest, therefore those 167 acres will not be included in the decision for this analysis.

The legal description for the watershed is:

Township 8 South, Range 34, 35, 35½ and 36 East
Township 9 South, Range 34, 35, 35½, and 36 East
Township 10 South, Range 34, 35, 35 ½, and 36 East, Willamette Meridian.

Granite Creek is a tributary to the North Fork John Day River, which is a tributary to the John Day River. Granite Creek originates near the North Fork John Day Wilderness on the Wallowa-Whitman National Forest.

Six HUC (Hydrologic Unit Code) 12 subwatersheds are included in the Granite Creek HUC 10 Watershed. Watershed and subwatershed numbers and subwatershed names have undergone two reviews since 1990 resulting in some changes in subwatershed boundaries, numbers and names. The first review and modification resulted in new numbers in 2005 and some new boundaries. This layer was updated in 2008. In 2009 the new changes were published with some updating in 2010. The result was changes in

subwatershed names and small changes in boundaries**.** A crosswalk table is available in the project file which shows the changes that have occurred since 1990. The crosswalk table provides a way to utilize earlier reports that referenced the early subwatershed names and numbers.

For the Granite Creek Mining EIS, the 2010 National Hydrography Data (NHD) watershed and subwatershed names, numbers, and boundaries are used in this document and shown in Table 1-1.

Table 1-1: Project Area Subwatershed Acres (2010 NHD layer)

HUC 12 Subwatersheds of the Granite Creek Watershed			
Subwatershed Name and #	**WWNF Acres**	**UNF Acres**	**Private/Other Acres**
Upper Granite Creek #170702020201	7,138	2,003	173
Lower Granite Creek #170702020206	1,055	17,954	1,274
Clear Creek #170702020204	1,562	17,682	Private: 1,057 Malheur NF: 167
Lake Creek #170702020205	0	11,884	53
Beaver Creek #170702020203	12,104	16	958
Bull Run Creek #170702020202	18,765	0	635
TOTAL ACRES	**40,624**	**49,539**	**4,317**

Two claims, Hopeful 1 and Hopeful 2& 3, are partially located within the North Fork John Day (NFJD) Wilderness Area, but are not proposing any activities in that portion of their claims.

Other features of the Granite Creek Watershed include an inactive range allotment (Camp Creek Cattle and Horse Allotment*)* the small towns of Granite and Greenhorn (known for their historic mining), and a moderate amount of dispersed recreation use.

The Granite Creek Watershed includes the North Fork John Day Wilderness Area, the Greenhorn Mountain and Twin Mountain Roadless Areas, the Vinegar Hill Scenic Area, the Vinegar Hill Research Natural Area, a portion of the Elkhorn Scenic Byway, Olive Lake Recreation Area and the Historic Fremont Power House, and a small portion of the NFJD Wild and Scenic River (at the confluence of Granite Creek).

Table 1-2: Granite Creek Watershed Special Interest Areas

Special Interest Area	Acres in Project Area
Vinegar Hill	3229.5
Twin Mountain Roadless Area	2930.4
North Fork John Day Wilderness	25217.4
Greenhorn Mountain Roadless Area	2488.5
Special Fish Management Area	16241.6
Olive Lake - Fremont Powerhouse	1001.4
Vinegar Hill RNA	179.0
Greenhorn Historical Area	83.7
North Fork John Day Wild & Scenic River	1.6
Ah Hee Diggings Interpretive Site	60.0

The maps at the end of this document display the analysis area and management areas (MA) from the Umatilla and Wallowa-Whitman Forest Plans, and streams, fish habitat and subwatersheds in the analysis area.

Past Mining

The Oregon Department of Geology reports gold was discovered in Granite Creek in 1861(project file). Initially gold production in this area was placer gold mined from the gravel and bars of streams. During the late 1860s and 1870s, mining districts were established as placer miners scattered about the territory. Counties had not yet been established, so the districts were used to keep track of specific claim locations. Vein deposits were discovered soon after the advent of placer mining. Quartz mines were worked as early as the 1870s in the Granite area. In the late 1880s, lode mining began to develop rapidly with the advent of equipment such as the pneumatic drill, the stamp mill for crushing ore, and new chemical methods to extract gold from its alloys. There were several major lode mines with over 100 feet of underground workings in the watershed. Mining operations such as Red Boy, Black Jack, Cougar, New York, Independence, La Bellview, and Eureka were established in the area by the early 1900s.

In 1938, the Porter Brothers dredge was built near Granite. During the next several years, portions of Granite, Bull Run, Clear and Olive creeks were dredged. Numerous rock piles, the result of the dredging operations, are still visible along these streams. These areas were again dredged in the 1950s by local residents with a “doodle bug” (bucket dredge). During the mining boom, several small towns such as Robinsonville, Lawton, Alamo and Wilsonville developed and then quickly disappeared. Granite and Greenhorn are still small communities inhabited by a mix of year-round and seasonal residents and visited by tourists. The Porter Brother’s dredge is currently on display in Sumpter, Oregon.

In 1942, War Production Board Order L-208 closed many precious metals mines, however mines in the Granite area were not shut down because the mining activity there was so minimal. Inflation and high gold prices in the early 1980s caused renewed interest in gold mining and a number of Plans of Operations were approved by the Forest Service at that time.

Current Mining

Today the most common placer equipment includes the use of hand tools and Oregon Department of Environmental Quality regulated equipment, such as small suction dredges and sluice boxes. In 2013, according to the Bureau of Land Management, there were approximately 225 registered claims in the Granite watershed. While some of these claims are associated with the Proposed Plans of Operations, the majority of these claims are for prospecting and future speculations. The miners/ prospectors have either not made their intents known or are operating within the guidelines established in Forest Service mining regulations 36 CFR 228.4 (notice of intent level activities).

There are a number of operators in the in the Granite Creek watershed that are proposing to extend or develop new operations. Under the 36 Code of Federal Regulations (CFR) 228.4 an operator is required to submit if a Plan of Operations (Plan) if the proposed activity is likely to cause significant disturbance of surface resources. 36 CFR 228.5 further requires this proposal will be analyzed by the authorized officer to determine the reasonableness of the requirements for surface resource protection before it can be implemented.

In addition to the current mining actives on National Forest System land, there is a potential for connected mining activities on private land. According to the Department of Oregon Geology and Mineral Industries (DOGAMI) records (accessed June 4, 2012) only one private miner in the area (the private Buffalo mine) has proposed an operation large enough to file a permit with the state office to conduct mining. Permits are required for projects over 5 acres in size and/or moving over 5,000 yards a year. As of 2014 this operation is on hold pending court mitigation over bankruptcy.

Historic and Abandoned Mines

From local information, surveys, and data from the Department of Oregon Geology and Minerals Industries (DOGAMI), it is estimated that over 100 historic or abandoned mines exist in the Granite Creek Watershed. Inventory and assessment of these mines is an ongoing project and occurs as funding allows.

Because of 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) (1980 and 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.

The CERCLA act provides a standard framework and recording process for the evaluation of areas in order to determine if there is a need for cleanup and, what the cleanup would entail. CERCLA funding was used for the initial pipe work on the Blue Bird and Black Jack mines to divert the waste water through the settling ponds. This act provides the funding for clean-up and remediation of these sites.

The only proposed Plan in the Granite Mining project that overlaps a site currently identified for investigation under the CERCLA Act is Eddy Shipman (Table 1-3). The investigation is funding dependent, therefore no specific date for initiating the investigation has been established. A full listing of sites identified for investigation under the CERCLA Act can be found in the project file. The CERCLA process is independent of this NEPA process, and won't be included in the Granite

Mining project decision. However, the potential direct/indirect and cumulative effects from the past, ongoing and future CERCLA activities are considered in the Fisheries section of Chapter 3 of this document.

Table 1-3: Past Mining Sites associated with Proposed Plans identified for Investigation

Past Mining Area		Reports	Location	Potential Hazards/Recommended Action	Comments
Central		EE/CA*	T-08 / R-35½ / s23	Metal concentration near clean-up level in waste rock, tailings and soil. Provide on-site containment.	The lower central adit is adit A in the proposed Eddy Shipman plan. The other adits in this plan are upstream of this proposal.
New York Independence and East Eddy		SI**	T-08 / R-35½ s22, 23, 27	Elevated metals in waste rock, tailings and soil.	East Eddy and the west side of Eddy Shipman have the same adits

*EE/CA – Engineering Evaluation/Cost Assessment – This is the final evaluation in the CERCLA process.
**SI – Site Investigation – This is a more detailed site evaluation, and involves a detailed sampling program to ascertain the contaminant of concern, the potential pathways, and the potential risks (human health and/or ecological).

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 for the Umatilla and, http://www.fs.usda.gov/detail/wallowa-whitman/landmanagement/projects/?cid=stelprdb5287229 for the Wallowa Whitman. 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 (ODEQ) 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 ODEQ has determined that no further action is required. This is working information used by ODEQ's Environmental Cleanup Section. Complete information can be found at http://www.deq.state.or.us/lq/ecsi/ecsi.htm. This site also contains some of the same information that can be found at the Forest Service web sites listed with Table 1-3. As with the CERCLA sites identified in Table 1-3, the only proposed plan that overlaps a site identified by ODEQ for investigation under the CERCLA Act is Eddy Shipman.

Purpose and Need for Action

Existing Condition

As stated in the Introduction above, in the Granite Creek Watershed, a number of mining Plans were previously approved in the early 1980s (refer to above discussion of past, current and historic mining).

Since then, regulatory conditions have changed, such as Endangered Species Act (ESA) fish were listed and streams were listed under Section 303(d) of the Clean Water Act (CWA), requiring that the Plans address these changes. In addition to these changed regulatory conditions, all of the Plans have either expired or completed their activities and require additional authorization for mining activities.
Two streams in the watershed (Bull Run Creek and Granite Creek) are currently listed as water-quality limited for sedimentation by the Oregon Department of Environmental Quality (DEQ) under section 303(d) of the CWA. All of Bull Run Creek is listed, and Granite Creek is listed upstream of its confluence with Boulder Creek.

On July 10, 1998, Columbia River bull trout *(Salvelinus confluentus)* were listed as threatened under ESA and critical habitat was designated in 2010. On May 24, 1999, Mid-Columbia River steelhead *(Oncorhynchus mykiss)* were listed as threatened under the ESA and critical habitat was designated in 2005. Both of these species are found in streams located within the Granite Creek Watershed and both have designated critical habitat within the project area. Westslope cutthroat trout (*Oncorhynchus clarkia lewisi*), which exists in the watershed, is on the 2011 Regional Forester's list of sensitive species; and Columbia spotted frog (*Rana luteiventris*) has a documented population in the watershed and is on the 2011 Regional Forester's sensitive species list.

One proposed Plan of Operations has a very rare (but not currently listed as sensitive) biscuitroot species, *Lomatium tarantuloides,* located within the footprint of one of the proposed Plan of Operations (Royal White), and protection of these plants may be required. Also, there are approximately two dozen locations for Region 6 Sensitive *Botrychium* plant species located within the Granite Creek Watershed on both the Wallowa - Whitman and Umatilla National Forests. However, no *Botrychium* plants were located at any of the proposed Plans of Operations during site-specific surveys for this analysis.

Desired Condition

Desired conditions for the surface resources on the mining claims in the Granite Creek Watershed are derived from goals, objectives, standards, and guidelines from the Wallowa-Whitman and Umatilla National Forests Land and Resource Management Plans (Forest Plans), public scoping, recovery plans for ESA listed Middle Columbia River (MCR) steelhead and Columbia River (CR) bull trout, and interdisciplinary team input. Desired conditions provide a future vision for the area and can help in development of management options for the mining operations in the Granite Creek Watershed over time.

Twenty-eight Plans of Operations would be approved for the mining operations in the Granite Creek Watershed that include requirements and protection measures to ensure that adverse impacts to water quality and surface resources (including special status fish, wildlife, and plant species described above) are minimized.

- Watershed values are protected to the fullest extent possible under existing laws in evaluating and developing mineral operating plans (*WWNF Forest Plan, page 4-25).*

- During development of operating plans or plan modifications, reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the minerals operator (miner). The test for operating plan requirements is "reasonableness" (*UNF Forest Plan, page 4-81*).

Purpose and Need

The Forest Service needs to ensure adverse environmental effects on National Forest surface resources have been reasonably minimized where mining claimants propose to conduct operations authorized by mining laws. Plans of Operation submitted by the miners, as specified in 36 CFR 228.4(a), should be reviewed to consider the Forest Service's responsibility to approve or require modifications to these Plans in accordance with federal mining and environmental laws. As described above, previous Plans in the area were approved prior to the ESA listing of bull trout and steelhead as threatened, as well as designation of critical habitat for both species. Because regulatory requirements have changed, previous plans either expired or mining activities were completed, and new plans have been submitted, there is a need to ensure all reasonable measures are taken by the authorized officer to disclose and minimize the environmental impacts of the proposed operations prior to approving the operating plan, as specified in 36 CFR 228.4(e).

Based on the number and nature of mining operations in the drainage, the existence of two ESA listed fish species, and the current water quality-limited status of two streams in the watershed, the responsible officials determined that potential significant environmental impacts may occur in the Granite Creek Watershed, and therefore an EIS is required to disclose those impacts in detail, to analyze alternatives to the proposals, and to determine possible mitigation of those impacts.

This EIS analyzes the direct, indirect, and cumulative effects of mining operations and of management requirements designed to reduce adverse environmental effects from those operations.

Proposed Action (Plans of Operations as submitted by the Miners)

The Proposed Action would authorize the approval of 28 proposed Plans of Operations in the Granite Creek Watershed, as submitted by the miners. They are listed in Table 2-2 in Chapter 2.

Approval of the Plans as submitted would require that they meet all current legal and administrative requirements.

Summaries and photos of each proposed Plan can be found in Appendix 8. The actual Plans of Operations as submitted to the Forest Service can be found in the project file. A detailed map of the proposed action can be found at the end of this document.

Proposed Plan Activities Excluded from Analysis under 36 CFR 228.4

When addressing proposed Plans of Operations, some of the activities as described in the proposal do not require analysis or approval as they are exempted by 36CFR 228.4(a)(1) from the requirement to submit a Plan of Operations. Specifically:

- Operations limited to the use of vehicles on existing public road or roads used and maintained for National Forest System purposes.
- Prospecting or sampling a small amount of material generally removed by hand.
- Marking and monumenting a mining claim.
- Operations completely underground which will not cause significant surface resource disturbance.
- Operations /activities involving the disturbance of surface resource that are not substantially different than other forest users without special authorizations.
- Operations which will not involve the use of mechanized earthmoving equipment or the cutting of trees.

In a review of the Plans of Operations for the Granite Mining EIS, the following activities do not require approval thorough a Plan of Operations. The miners were notified that approval was not needed at this time for these proposed and specific mining activities. (see project file for the *Determination of Significant Surface Resource Disturbance* for this analysis).

- **Camping or seasonal occupancy incidental to mining** when described in the Plan of Operations as portable temporary quarters such as a travel trailer or similar equipment typically used by recreationists on the national forest. This type of temporary or seasonal occupancy would be similar to the public's cumulative summer use of an area, on the National Forest area, for which the public would not be required to obtain special use authorization, contract, or other written authorization (36 CFR 228.4 (a) (1) (v)). Alternatively, any camping or occupancy that might cause a significant disturbance of surface resources, such as extensive or year-round occupancy, improper disposal of refuse, poor sanitation practices, soil compaction, or loss of vegetation in a riparian area, were not exempted.

- **Prospecting, pick and shovel work, handwork** for sampling activity when described in the Plan of Operations as only removing a reasonable amount of mineral deposit for analysis and study. Based on past experience for the proposed locations and the National Forest resources involved, these types of activities are not likely to cause a significant disturbance of resource resources.

As noted above, these determinations relied on a combination of past experience, direct evidence, and sound scientific projection. The ranger districts' minerals program managers supplied site inspections from past mining operations documented annually for all known mining operations on the district. Hundreds of mining inspections were documented and summarized for the last 4

years on both forests, documenting any surface disturbances. Notes were also included regarding effects from camping, and work with hand tools, and no significant disturbance of surface resources were noted.

The list below shows the Plans of Operation submitted for the Granite Creek Watershed and the specific proposed mining activities that were included in the Plans and now exempted from Forest Service authorization or approval and NEPA analysis as a result of the information and findings/determinations (project file).

Table 1-4: Proposed Activities Excluded from NEPA Analysis

Proposed Mining Operation –	Camping	Prospecting Pick & Shovel work/Handwork	Notes
Altona	N/A	Yes	No camping identified in Plan.
Belvadear	N/A	Yes	No camping proposed - Will stay in town of Granite.
Blue Sky/Bullrun	Yes	Yes	Camping in seasonal self-contained RV
Blue Smoke	N/A	Yes	No camping proposed - Staying at Muffin claim
Bunch Bucket	Yes	Yes	Camping - Not requested in proposed Plan, but assumed by FS, but would be the same as allowed by the general public
City Limits	Yes	Yes	Camping - Requested in proposed Plan, but would be the same as allowed by the general public
East Ten Cent Creek	No	Yes	Cabin-shed, Requested in proposed Plan and included in NEPA analysis
Eddy Shipman	No	Yes	Cabin, Requested in proposed Plan and included in NEPA analysis
Grubsteak	Yes	Yes	Camping - Requested in proposed Plan and included in NEPA analysis, but would be the same as allowed by the general public
Hopeful 1	No	Yes	Cabin - Requested in proposed Plan and included in NEPA analysis
Hopeful 2&3	No	Yes	Cabin - Requested in proposed Plan and included in NEPA analysis
L&H Placer	Yes	Yes	Camping - Requested in proposed Plan, but would

Proposed Mining Operation -	Camping	Prospecting Pick & Shovel work/Handwork	Notes
			be the same as allowed by the general public
Lightning Creek	No	Yes	Cabin – Requested in proposed Plan and included in NEPA analysis
Little Cross 1	N/A	Yes	No camping proposed - Will stay in town of Granite
Lucky Strike	No	Yes	Cabin – Requested in proposed Plan and included in NEPA analysis
Make it	Yes	Yes	Camping - Requested in proposed Plan, but would be the same as allowed by the general public
Muffin Placer	Yes	Yes	Camping - Requested in proposed Plan, but would be the same as allowed by the general public
Old Eric 1&2	Yes	Yes	Camping - Requested in proposed Plan, but would be the same as allowed by the general public
Olive Tone	Yes	Yes	Camping - Requested in proposed Plan, but would be the same as allowed by the general public
Rosebud 1-4	Yes	Yes	Camping - Not requested in plan, assumed by FS, but would be the same as allowed by the general public
Royal White	No	Yes	Cabin – Requested in proposed Plan and included in NEPA analysis
Ruby Group	No	Yes	Cabin – Requested in proposed Plan, but would be the same as allowed by the general public
Sunshine Group	No	Yes	Cabin – Requested in proposed Plan
Tetra Alpha Placer	Yes	Yes	Camping - Not requested in Plan, assumed by FS, but would be the same as allowed by the general public
Tetra Alpha Mill & Lode	Yes	Yes (Lode)	Camping - Not requested in Plan, assumed by FS for Lode site, but would be the same as allowed by the general public

Proposed Mining Operation -	Camping	Prospecting Pick & Shovel work/Handwork	Notes
Troy D	Yes	Yes	Camping - Requested in proposed Plan, but would be the same as allowed by the general public
Yellow Gold	Yes	Yes	Camping – Requested in proposed Plan, but would be the same as allowed by the general public
Yellow Jacket 1, 2, 3	N/A	Yes	No camping proposed - Adjacent personal Home

Source: USDA FS 2014.05.14. [This table was created from the information provided in the proposed plan of operation, and the home location of the miner for that proposal.]

After reviewing the Plans for the above listed proposed mining operations, and taking into consideration the activities that do not cause a significant disturbance of surface resources, the Whitman and North Fork John Day District Rangers concluded the remaining activities outlined in each Plan would result in impacts to National Forest System (NFS) lands that can be avoided or ameliorated by means such as reclamation bonding, timing restrictions, or other mitigation measures to minimize adverse environmental impacts to NFS resources. Based on past experience, direct evidence, and sound scientific projection, each of these activities meet the definitions of 36 CFR 228.4 as Plan of Operation activities require a NEPA decision and Plan of Operations approval. They are included in the Proposed Action, are analyzed in this document, and require a NEPA decision.

Decision Framework

The District Rangers of the Whitman Ranger District of the Wallowa-Whitman National Forest and the North Fork John Day Ranger District of the Umatilla National Forest are the Responsible Officials for review, analysis, and selecting an alternative from the choices in the Final Environmental Impact Statement (FEIS). The Responsible Officials' decision is documented in a Record of Decision (ROD). In the ROD, the Responsible Officials may decide to:

1. Adopt the No Action/No Change Alternative (Alternative 1).
2. Authorize the approval of the Plans of Operations as submitted by the miners (Alternative 2).
3. Approve the Plans of Operations with additional Plan-specific Protection Measures and General Requirements (Alternative 3).

Decisions based on this analysis will comply with Forest Plan standards and guidelines, and other applicable laws, regulations and policies. The potential effects described in Chapter 3 would not preclude current or potential opportunities to conduct minerals, energy, or special use activities in this area. The alternatives would not affect how current State and BLM regulations and law regulate or evaluate the minerals, energy or special uses in the area.

Once the ROD is signed and issued, reclamation bonds and any 401 certifications and valid water rights deemed necessary to be consistent with the CWA, shall be presented to the Forest Service

before the Plans of Operation are approved and prior to commencement of mining activities (FSH 2817.23a(1) and 36 CFR 228.8). PACFISH (which amended both Forest Plans in 1995) Minerals Management standard #1 requires a reclamation plan and reclamation bond for mineral operations in riparian habitat conservation areas (RHCAs).

To ensure consistency with Section 401 of the CWA, for those Plans requiring a 401 certificate as a result of this analysis, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed activity(s) requiring 401 certification. The 401 certification is granted by the state of Oregon (ODEQ) and allows for a regulated discharge of pollutants (sediment, heavy metals, warm water, chemicals, etc.) into waters of the state, and ensures compliance with section 401 of the Clean Water Act (CWA).

For those Plans proposing to withdraw water from streams, prior to Plan approval, the Forest Service will consult with Oregon Water Resources Department (OWRD) to ensure that the water right presented with the proposed plan is valid. It is the State of Oregon that confirms the validity of a water right. To ensure consistency with Section 401 of the CWA, if a valid water right is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed water withdrawal (Table 1).

Valid water rights are issued by the Oregon Water Resources Department, and are required for activities that withdraw water from a stream. The USFS has consulted with ODEQ and reviewed the Oregon Department of Environmental Quality John Day River Basin Total Maximum Daily Load/Water Quality Plan (TMDL[1]). The TMDL includes goals for maintaining and restoring flows where possible. New water right applications will be reviewed by ODEQ and conditioned based on TMDL flow restoration goals.

Plans proposing suction dredging in excluded waters as per the State of Oregon, including 303d listed streams and Essential Salmon Habitat (ESH) streams, or streams with naturally reproducing populations of bull trout will not be approved until the moratorium on suction dredging is lifted (see Senate Bill 838 below). In this case, an amended Plan excluding suction dredging can be submitted to the Forest Service (Table 1). Once the state moratorium is lifted, the miner can submit a supplement to their Plan of Operations to incorporate suction dredging into their Plan.

Additional permits may be required by other agencies depending on the type and extent of the operations. In order to insure that all operations are conducted in a manner that will minimize adverse environmental impacts on National Forest surface resources, the operators must comply with applicable state and federal requirements when conducting their mining operations. (36 CFR 228.8).

Laws, Regulations, Policies, and Plans

This analysis tiers to the 1990 Wallowa-Whitman National Forest Land and Resource Management Plan as amended (WWNF Forest Plan), Final Environmental Impact Statement

[1] A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that load among the various sources of that pollutant. Pollutant sources are characterized as either point sources that receive a wasteload allocation (WLA), or nonpoint sources that receive a load allocation (LA)." - U.S. Environmental Protection Agency, 2011

(FEIS) and Record of Decision (ROD); the Umatilla National Forest Land and Resource Management Plan as amended (UNF Forest Plan), FEIS and ROD; The 1990 North Fork John Day Motorized Access and Travel Management Program (NFJD TMP) Environmental Assessment (EA) and Decision Notice/Finding of no Significant Issues (DN/FONSI); the 2001 Roadless Area Conservation Rule; the 2005 Pacific Northwest Region Invasive Plant Program FEIS and ROD; the 2010 WWNF Invasive Plants Treatment Project FEIS and ROD; and the 2010 UNF Invasive Plant FEIS and ROD.

Oregon State Bill 838 and Suction Dredging

In 2013 the Oregon Legislature passed Senate Bill 838, which imposed a 5-year moratorium on motorized mining (such as suction dredging) in streams containing essential indigenous anadromous salmonid habitat or naturally reproducing populations of bull trout beginning in January 2016 and is scheduled to sunset in 2021. The moratorium includes motorized mining in-stream 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 moratorium on these activities went into effect in January 2016, and is scheduled to sunset in 2021.

A July 16, 2015 news release from the State of Oregon provides additional information about the moratorium. As stated in the news release, the Oregon Department of Environmental Quality (DEQ) and Department of State Lands (DSL) will work over the next six months to inform miners, natural resource agencies and others on how/where placer mining operations may lawfully take place.

The Granite Mining FEIS will be in effect for 10 to 15 years. Analysis completed in the Granite Mining EIS will inform discussions and decisions on where the mining activity and associated actions result in removal or disturbance of vegetation in a manner that may impact water quality. All decisions made in Granite Mining Record of Decision will be consistent with Oregon State Law. As information is provided by the State of Oregon over the next six months on how and where placer mining operations may lawfully take place and what State permits are required, mining Plans of operations authorized by the Forest Service will be modified to be consistent with State of Oregon DEQ and DSL regulations.

Laws in Oregon regarding suction dredge mining have changed over the past several years. Senate Bill 838, which implemented the moratorium in Essential Salmon Habitat or streams with naturally reproducing populations of bull trout, went into effect if a new bill did not pass during the 2015 Oregon legislative session. Senate Bill 830, which would have consolidated State regulation of placer mining in 2016, did not advance in the 2015 session, so the moratorium on these activities went into effect January 2, 2016. To add to the complexity of the situation, a group of Oregon miners have challenged the legality of Senate Bill 838 in Bohmker et al v. Oregon, filed in the U.S. District Court of Oregon October 19, 2015. Plaintiffs request injunctive relief restraining defendants from enforcing Senate Bill 838 and declaring it to be preempted by federal law.

The State moratorium is effect until 2021, or until the Oregon State legislature changes the law. The Granite Mining EIS will extend beyond the 2021 moratorium, and activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations.

Compliance with Current State of Oregon Law Senate Bill 838

Interpretation of current State of Oregon law is found in the July 16, 2015 news release. The following information documents compliance of Granite Mining EIS with the moratorium. The moratorium states motorized mining will be prohibited in the following circumstances:

- In all streams above the lowest extent of spawning habitat in rivers and tributaries containing Essential Salmon Habitat (ESH) or naturally reproducing populations of bull trout.

- 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.

Essential Salmon Habitat in the Granite Mining Project Area

The moratorium prohibits motorized mining in ESH as described above from January 2, 2016 until 2021. The news release includes an interactive map displaying areas of the moratorium (http://www.deq.state.or.us/wq/wqpermit/mining.htm). Suction dredge mining will not be allowed in those areas until 2021 or until State law is changed. Should the moratorium be lifted prior to 2021, all requirements for Section 7 of ESA consultation for proposed suction dredging and the terms and conditions listed in the ODEQ 700PM suction dredging permit that is in place at that time will be adhered to prior to approval of those activities. Permits and requirements may change as Senate Bill 838 is implemented and the State of Oregon provides additional direction.

Mining and Claim Management

Many laws, regulations, policies, and plans direct the Forest Service to support and facilitate mineral extraction while protecting surface resources to the extent possible. The direction in these laws, regulations, policies and plans is incorporated by reference in this analysis.

The **1872 Mining Law** states that all valuable mineral deposits in land belonging to the United States are to be free and open to exploration. Under this law, a mine locator "shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations and of all veins, lodes, and ledges throughout the entire depth."

The **Organic Administration Act of 1897** grants authority to the Forest Service to regulate surface resources of National Forest System lands.

The **Multiple Use Mining Act of 1955** directs that any mining claim located after July 23, 1955 shall not be used, prior to issuance of patent, for any purposes other than prospecting, mining or processing operations and uses reasonable incident thereto, and that such claims shall be subject to the right of the United States to manage and dispose of the vegetative surface resources thereof and to manage other surface resources thereof, and right of the United States, its permittees, and licenses, to use so much of the surface thereof as may be necessary for such purposes or for access to adjacent land.

The **Multiple-Use Sustained-Yield Act of 1960** (or MUSYA) (Public Law 86-517) is a federal law passed by the United States Congress on June 12, 1960. This law authorizes and directs the Secretary of Agriculture to develop and administer the renewable resources of timber, range,

water, recreation and wildlife on the national forests for multiple use and sustained yield of the products and services.

The **Mining and Mineral Policy Act of 1970** directs the Federal Government to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs.

The **National Forest Management Act of 1976 (NFMA)** recognizes the fundamental need to protect and, where appropriate, improve the quality of soil, water, and air resources. The Act also recognizes the interrelationships between and interdependence within renewable resources.

The **Federal Land Policy and Management Act of 1976 (FLPMA)** states that public lands will be managed recognizing the need for domestic sources of minerals.

The **Surface Mining Control and Reclamation** Act of 1977 (SMCRA) 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.

The **Forest Service Surface Use Regulations (36 CFR Part 228, Subpart A) –** also known as the 228 Regulations**)** set forth rules and procedures for use of the surface of National Forest System lands in connection with mineral operations. The regulations direct the Forest Service to prepare the appropriate level of NEPA analysis and documentation when proposed operations may significantly affect surface resources. These regulations do not allow the Forest Service to deny entry or preempt the miners' statutory right granted under the 1872 Mining Law. The regulations require the Forest Service to develop measures to minimize adverse impacts on National Forest resources. The 228 regulations include requirements for reclamation.

The **Forest Service Manual (FSM) 2800** discusses specific responsibilities and considerations for dealing with Plans of Operations. It states that the Forest Service should minimize or prevent adverse impacts related or incidental to mining by imposing reasonable conditions that do not materially interfere with operations. It also requires the Forest Service to evaluate proposals for road construction and reconstruction and consider alternatives that may be less damaging to surface resources (*FSM 2817.25*).

The Forest Service direction also includes the **National Environmental Policy Act of 1970 (***42 U.S.C. 4332*), the **Council of Environmental Quality regulations (CEQ) at 40 CFR 1502**; the **Federal Water Pollution Control Act (Clean Water Act)**; and the **Clean Air Act** as amended.

The Mining Law Administration program is managed by the Bureau of Land Management (BLM) as authorized by the Secretary of the Interior, and involves recordation, maintenance (annual assessment requirements), and mineral patents. Joint administration of the mining laws on National Forest Systems lands is provided for in a Memorandum of Understanding (MOU) between the BLM and Forest Service. The purpose of the MOU is to ensure coordination between the general surface resource management of the Forest Service and the administration of the mining laws by the BLM.

2012 National Best Management Practices (BMPs) for Water Quality is a standardized National BMP Program initiated in 2012 that integrated individual State and Forest Service regional BMPs under one umbrella to facilitate an agency-wide BMP monitoring program. The national core set provides general, non-prescriptive BMPs for the broad range of activities that occur on NFS lands. Nearly every BMP in the national core set of BMPs already exists in current regulations, guidance, or procedures. They do not change the substance of site-specific BMP prescriptions. This standardization is intended to improved consistency, and to ensure that Forest Service professionals use best available science to develop site-specific BMP prescriptions, and ultimately, improve water quality on and downstream of NFS lands.

The Plan-specific Resource Protection Measures (RPM) (Appendix 11), and General Requirements (Appendix 2), included in the Granite Creek Watershed Mining EIS meet the guidelines and intent of the 2012 BMPs.

The 2012 National Core BMP technical guide is located at http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf (project file).

The Treaty of 1855 is a treaty with the Walla Walla, Cayuse and Umatilla Tribes, 12 Stat. 945, signed June 9, 1855, ratified March 8, 1859.

Water Rights

The miners have the responsibility to obtain valid water rights from the State Water Resources Department, or develop other acceptable means for obtaining the water necessary to support their operations. The Forest Service makes the decision to approve or not approve the proposed Plan of Operations, but it is the miner's responsibility to secure whatever other State or Federal agency permits they require.

Several options exist for miners without a valid water right to obtain the water necessary for proposed operations. If surface water is fully or over-appropriated for a given stream, as determined by the Oregon Water Resources Department, the miner may be able to obtain water from a user with legal rights through the transfer process. It may also be possible for the miner to obtain exempt ground water for operations (small groundwater uses are exempt from the requirement to obtain a water right). This would be accomplished by constructing an off-channel pond or pit for which groundwater would be the only source. The miner also has the option of trucking water to the site from another source as approved by the Forest Service.

Unpatented Mining Claims

An unpatented mining claim is a claim to the locatable minerals as described in 36 CFR 228.4. Its location must be based on the discovery of these locatable minerals, and the law of *pedis possessio* (establishes a right by possession that allows the exclusive right to remove of minerals from a claim) allows for exploratory activities on mining claims in the diligent effort to perfect the claims by making a discovery on each as defined under the mining law. Thus, a claim properly located and diligently worked provides a protection on the miner's investments from appropriation by other miners, and provides the rights of the miner to work his or her recorded

claim with the intent of perfecting the claim. To operate on a mining claim, patented or unpatented, the claimant must comply with all Federal and State laws and regulations.

Wallowa-Whitman and Umatilla National Forest Plans

The 1990 Wallowa-Whitman Forest Plan goals for minerals are:

- To provide for exploration, development, and production of a variety of minerals on the Forest in coordination with other resource objectives, environmental considerations, and mining laws (*pg. 4-2*).
- To encourage and assist, whenever possible, in the continuation of regional geologic mapping and mineral resource studies on the Forest in cooperation with other natural resource agencies (*pg. 4-2*).

The 1990 Umatilla Forest Plan goal for minerals are:

- To provide for exploration, development, and production of a variety of minerals on the Forest in consistent with various resource objectives, environmental quality and cost efficiency(*pg. 4-3 # 19*).

The WWNF and UNF Forest Plans were amended in 1995 to include PACFISH (*USDA and USDI 1995*). PACFISH is an Aquatic Conservation Strategy (ACS) that uses a whole watershed strategy to protect and restore anadromous fish habitat, while also indirectly protecting non-anadromous fish, including bull trout. The WWNF Forest Plan Regional Forester's Amendment #4 specifically includes INFISH (almost identical to PACFISH but covers non-anadromous fish and its habitat). The Granite watershed is an anadromous watershed and therefore falls under the PACFISH strategy. This approach is consistent with INFISH, and thus the proposed activities in the WWNF portion of the Granite watershed under Alternative 3 are in compliance with INFISH and Amendment #4. Only PACFISH will be addressed in the rest of this document, and compliance with INFISH can be assumed whenever compliance with PACFISH is noted.

The PACFISH Standards and Guidelines for Minerals Management relevant to the Granite Mining project are: PACFISH MM-1: Avoid adverse effects to listed species and designated critical habitat from mineral operations. If the Notice of Intent indicates that 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, approved Plan of Operations (or other such governing document), and reclamation bond. For effects that cannot be avoided, such plans and bonds must address the costs of removing facilities, equipment, and materials; recontouring disturbed areas to near pre-mining topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvage and replacement of topsoil; and seedbed preparation and revegetation to attain Riparian Management Objectives and avoid adverse effects on listed anadromous fish. Ensure Reclamation Plans contain measurable attainment and bond release criteria for each reclamation activity.

WO Direction regarding PACFISH MM-1, March 6, 2002 (project file):

1. "The MM-1 standard and guideline applies only when the proposed activity is likely to cause significant surface disturbance."
2. "To apply this standard and guideline to activities not meeting the "likely cause significant surface disturbance" test (in the 36 CFR 228 Regulations), is not appropriate, and is contrary to law and regulation."

- PACFISH MM-2: Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to citing facilities in Riparian Habitat Conservation Areas exists, construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on listed anadromous fish and inland native fish. 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.

- PACFISH MM-3: Prohibit solid and sanitary waste facilities in Riparian Habitat Conservation Areas. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in Riparian Habitat Conservation Areas exists, and releases can be prevented and stability can be ensured, then:
    a. Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.
    b. Locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Habitat Conservation Areas.
    c. Monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to listed anadromous fish and inland native fish, and to attain Riparian Management Objectives.
    d. Reclaim and monitor waste facilities to assure chemical and physical stability and revegetation to avoid adverse effects to listed anadromous fish and inland native fish and to attain the Riparian Management Objectives.
    e. Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.

- PACFISH MM-6: Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to eliminate impacts that prevent attainment of Riparian Management Objectives and avoid adverse effects on listed anadromous fish and inland native fish.

- PACFISH RMOs: PACFISH also identifies Riparian Management Objectives (RMOs) (USDA and USDI 1995). Mining activities were analyzed for potential impacts to the RMO parameters. The RMO parameters are Pool Frequency, Water Temperature, Large Woody Debris, Bank Stability, Lower Bank Angle, and Width/Depth ratio. In addition to the above six RMO parameters, Substrate Sediment was included in this analysis because it was an additional parameter identified in the PACFISH/INFISH/ Screens Information Guide for the Wallowa-Whitman National Forest (USDA Forest Service 1995a, Table 1).

WWNF Management Direction in the Granite Creek Watershed

The WWNF Forest Plan includes the following Minerals Standards and Guidelines (*WWNF Forest Plan, Chapter 4, page 4-33*):

1. Access. Permit claimants reasonable access to their claims as specified in the United States Mining Laws.
2. Operating Plans. Require operating plans in accordance with 36 CFR 228 Subpart A when operations are proposed, which involve significant disturbance of the surface resources.
3. Operating plans will include reasonable and operationally, feasible requirements to minimize adverse environmental impacts on surface resources.
4. Analyze operating plan proposals and alternatives, including alternatives for access, reclamation, and mitigation, using Forest Service NEPA process.
5. Reclamation. Develop reclamation standards using an interdisciplinary process to ensure lands are in productive condition to the extent reasonable and operationally feasible. Reasonable opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs and formulated using technical and other resource input.

WWNF Forest Plan Management Areas (MA) within the watershed are (*WWNF Forest Plan, Chapter 4*):

<u>MA 1 – 48 acres – Timber Emphasis</u>
Management emphasizes wood fiber production on suitable timberlands while providing relatively high levels of forage and recreational opportunities. Forest-wide minerals standards and guidelines apply. The Forest Plan recommends that open road densities be 2.5 miles per square mile (mi/mi^2).

<u>MA 4 -6 acres - Wilderness</u>
The intent is to preserve the wilderness qualities of these areas. These areas will be managed in accordance with the Wilderness Act of 1964, P.L. 94-199, the Oregon Wilderness Act of 1984, and the 2320 section of the Forest Service Manual. Designated wilderness is withdrawn from further mineral entry, but mining on valid claims that existed prior to December 31, 1983, or establishment of the wilderness (whichever is later) may continue. No existing plans of operations are approved in this management area.

<u>MA 6 – 984 acres – Backcountry</u>
Management emphasizes opportunities for those dispersed recreation activities usually recognized within the relatively high elevation areas (upper forest, subalpine, or alpine areas). Extra emphasis is placed on minimizing surface resource impacts from mining, and on high standard reclamation.

<u>MA 15 – 1,646 acres - Old Growth Preserve</u>
These areas are intended to maintain habitat diversity, preserve aesthetic values, and to provide old-growth habitat for wildlife. Forest-wide minerals standards and guidelines apply, with the additional guideline to avoid disturbance to the extent practical. If old-growth stands are lost due to mining activities, replacement stands will be selected.

MA 18 – 37,445 acres - Anadromous Fish Emphasis
This area is intended to achieve and maintain optimum conditions for anadromous fish and provide near-optimum conditions for big game. Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied. In most instances, it is expected that near-optimum habitat for big game can be provided simultaneously with anadromous fish habitat. Providing quality fish habitat takes priority over big-game habitat where conflicts occur. Emphasis is placed on protecting fish habitat and habitat investments through reasonable provisions in plans of operation and in reclamation requirements.

UNF Management Direction in the Granite Creek Watershed

The UNF Forest Plan includes the following Minerals Standards and Guidelines (*UNF Forest Plan, page 4-81)*:

1. Mineral exploration and mineral removal are permitted throughout the Forest except in withdrawn areas.
2. Under the mining laws, claimants are entitled to access to their mining claims. Access for exploration and development of locatable mineral resources will be analyzed in response to a proposed operating plan. A decision on approval of reasonable access will be made as a result of appropriate environmental analysis.
3. When claimants propose mining activities which involve disturbance of the surface resources, a notice of intent and/or a proposed plan of operation must be submitted. The proposal will be processed in a timely manner in accordance with 36 CFR 228.
4. During development of operating plans or plan modifications. Reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the mineral miner. The test for operating plan requirements is 'reasonableness.'
5. Reclamation standards will be developed using an interdisciplinary process to insure land restoration to a productive condition to the extent reasonable and practicable. When reasonable, opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs.

UNF Forest Plan Management Areas (MA) within the watershed are (*UNF Forest Plan, Chapter 4*) :

MA A3 – 2,646 acres – Viewshed 1:
Description: The strategy applies to all or parts of the defined Sensitivity Level 1 travel routes, use areas, or water bodies. Sensitivity levels are defined in the Umatilla National Forest landscape management text, and viewshed boundaries are defined on the Forest Visual Quality Objective (VQO) maps.

Minerals and Energy direction: Meet the visual quality objectives within the intent of the Forest-wide Standards and Guidelines for minerals and energy. Utilize existing access routes to

developments where possible. Provide for reclamation on completion of all projects within the viewshed corridors.

MA A4 – 40 acres – Viewshed 2:
Description: The strategy applies to all or parts of the defined Sensitivity Level 2 travel routes, use areas, or water bodies. Sensitivity levels are defined in the Umatilla National Forest landscape management text, and viewshed boundaries are defined on the Forest Visual Quality Objective (VQO) maps.

Minerals and Energy direction: Meet the visual quality objectives within the intent of the Forest-wide Standards and Guidelines for minerals and energy. Utilize existing access routes to developments where possible. Provide for reclamation on completion of all projects within the viewshed corridors.

MA A8 – 3,028 acres – Scenic Area
Description: Scenic areas are areas of natural variety where unique physical characteristics give viewing pleasure and dispersed recreation opportunities to the forest user. The strategy applies to all or part of the current scenic areas and other identified selected forest areas with high scenic values.

Minerals and Energy direction: Meet Forest-wide Standards and Guidelines. Operating plans are to include reasonable, operationally feasible requirements to meet scenic area objectives.

MA A9 – 1,085 acres - Special Interest Area
Description: Several unique areas (generally small in size) have been identified for their special features. The areas may be classified under 36 CFR 294.9, and managed to protect the special features in their natural condition, and to foster public use and enjoyment of those features.

Minerals and Energy direction: Protection of SIA areas will be required during mineral exploration and development activities. An area may be recommended from withdrawal for mineral entry in situations where mitigation measures do not adequately protect management area values, and all values (including minerals) have been evaluated. Removal of common mineral material within the management area will not be permitted.

MA B1 – 2,5016 acres – Wilderness
Description: One of the three designated wildernesses in the Umatilla National Forest the North Fork Joh Day, is partially located within the Granite Mining analysis area:
Specific management direction for the North Fork John Day wilderness is summarized in the Umatilla Forest Plan, Appendix 6.

Minerals direction: The wilderness is closed to mineral entry and mineral leasing, subject to valid existing rights. Occupancy, structures and use of motorized and mechanized equipment related to mining activities are permitted to the extent allowed by law and regulations. Every reasonable effort should be made through the Operating Plan to minimize their effect on the wilderness resource, compatible with rights of claimants and lessees.

MA B2 – 145 acres – RNA in Wilderness
Description: Research Natural Area (RNA) in wilderness.
Minerals direction: For an RNA(s) established in wilderness, management direction for wilderness will take precedence. Research on RNA's in wilderness will be related to wilderness.

Minerals direction: Valid claims existing prior to Research Natural Area designation may be developed. Valid claims existing prior to any withdrawal from mineral entry shall be required to have an operating plan providing the least amount of impact. Mineral leases will require 'No Surface Occupancy' stipulation. Research Natural Areas may be recommended for withdrawal from mineral entry in situations where mitigation measures do not adequately protect management area values. The mineral potential of the area shall be assessed before withdrawal is recommended.

MA B7 – 51 acres – Wild and Scenic River in Wilderness
Description: Wild and Scenic River in wilderness. River sectors located within wilderness will be managed under wilderness or Wild and Scenic River principles and standards and guidelines, whichever is most restrictive.

Minerals direction: Subject to valid existing rights, minerals that constitute the bed or bank or are situated within one-quarter mile of the bank of any river designated a Wild river are withdrawn from appropriation. On other river sections, through analysis and consideration of all public values, including minerals values, rivers may be recommended for withdrawal from mineral entry where appropriate and necessary. Protect river and corridor from common materials mining. Common mineral materials will not be removed pending completion of the river management plans.

MA C1 – 1,244 acres – Dedicated Old Growth Forest Habitat
Description: Designated mature and old growth forest stands will be located and retained to distribute suitable habitat throughout the Forest for wildlife species dependent upon this habitat type. Forest stands will meet ecological, biological, size and distribution criteria as suitable old growth for survival and reproduction of indicator species.

Minerals direction: Meet Forest-wide Standards and Guidelines.

MA C7 – 16,242 acres – Special Fish Management Area
Direction: The special fish management area includes all land within a watershed, subwatershed, or other manageable area. The management area applies to much of the Umatilla National Forest portion of the North Fork John Day River drainage (referred to in Senate Report No. 98-465, dated May 18, 1984). The management area is located on the North Fork John Day Ranger District, as shown on management area maps.

Minerals Direction: Meet Forest-wide Standards and Guidelines while protecting fish habitat investments.

MA D2 – 34 acres – RNA
Direction: Eight areas have been identified and are managed as research natural areas. Two (Pataha and Rainbow Creek) have been established by Chief's order. The other six candidate areas are: Elk Flats Meadow, Elk Flats-Wenaha Breaks, Kelly Creek Butte, Mill Creek Watershed, Vinegar Hill, and Birch Creek Cove. Establishment reports and management plans for each area may contain more specific constraints or permitted uses.

Minerals direction: Valid claims existing prior to Research Natural Area designation may be developed. Valid claims existing prior to any withdrawal from mineral entry shall be required to have an operating plan providing the least amount of impact. Mineral leases will require 'No Surface Occupancy' stipulation. Research Natural Areas may be recommended for withdrawal from mineral entry in situations where mitigation measures do not adequately protect

management area values. The mineral potential of the area shall be assessed before withdrawal is recommended.

Public Involvement

Public involvement is a part of the process mandated by NEPA (*40 CFR 1501.7*), in order to identify issues and concerns related to the environmental impacts of the proposed action. On October 13, 2011, the Whitman Ranger District of the Wallowa-Whitman National Forest (WWNF) and the North Fork John Day Ranger District of the Umatilla National Forests (UNF) mailed a scoping letter for the Granite Creek Watershed Mining Plans proposal to interested parties, tribes, agencies, and miners in the Granite Creek Watershed. The Notice of Intent (NOI) to prepare this EIS was published in the Federal Register on October 11, 2011. The project was first listed in the April 2010 Wallowa-Whitman National Forest Schedule of Proposed Actions (SOPA).

Both forests had previously initiated environmental analyses for proposed mining Plans of Operation (Plans) in the portions of the Granite Creek Watershed under their administration. As issues identified by each forest were similar, the responsible officials decided that combining the analysis into one EIS would be the most efficient way to complete the task.

Requests for comments (scoping) for the preparation of the analysis began in October 2011. Scoping letters were sent to approximately 200 interested parties, including: individuals, groups, miners, county, State and Federal agencies, and local tribes. A list of interested parties to whom both letters were mailed and copies of the letters are located in the analysis file, as is a copy of the NOI. The letter included a table with a list of the mining operations that would be included in the EIS. Information obtained as a result of the scoping process is located in the Granite Creek Watershed Mining Plans EIS analysis file and was used to develop the issues and alternatives for this FEIS.

During the scoping process the following concerns and comments were received: impacts from road work, excavation, and water use; impacts to water quality, wildlife, management indicator species and threatened and endangered species (TES) and habitat; impacts to native vegetation, roadless areas and wilderness; potential spread of weeds; impacts from OHV use and camping; and adequacy of ESA Section 7 consultation.

Several miners who submitted proposals for the DEIS requested Applicant Status (as authorized under the Endangered Species Act) to review and provide comment on the draft Granite Creek Watershed Mining Project Biological Assessment. A meeting between the Forest Service and the applicant status miners was held July 2, 2014 in La Grande, Oregon to clarify the contents of the draft biological assessment, and to discuss corrections to the miners' proposed Plans. Follow up field visits with several of the miners and Forest Service personnel occurred in July 2014 to further clarify proposed activities. Two applicant status miners submitted comments to the Forest Service on the March 2015 draft Biological Opinion (BO) from USFWS and draft Terms and Conditions from National Marine Fisheries Service (NMFS). The Forest Service forwarded those comments to USFWS and NMFS for their consideration.

A Draft Environmental Impact Statement (DEIS) was released to the public with a legal notice of a 45-day public comment period published in the Baker City Herald February 20, 2015. A Notification of Availability of the DEIS was published in the Federal Register on February 20,

2015. Comments received from the public, interested organizations, State and Federal agencies, in accordance with 40 CFR 1503.4, have been responded to in the FEIS, Appendix 10.

Tribal Consultation

On October 13, 2011, the Whitman Ranger District of the Wallowa-Whitman National Forest (WWNF) and the North Fork John Day Ranger District of the Umatilla National Forests (UNF) mailed a scoping letter for the Granite Creek Watershed Mining Plans proposal to the Nez Perce Tribe, the Warm Springs Tribe, and the Confederated Tribes of the Umatilla Reservation (CTUIR). Comments received from CTUIR during the analysis process were addressed. The DEIS was mailed to the same tribes on February 20, 2015. No comments on the February 20, 2015 DEIS were received from local tribes.

The Granite Mining project was presented at the following meetings (USFS = Wallowa-Whitman, Umatilla, and Malheur National Forests):

USFS & CTUIR Wildlife and Cultural Committees/Program of Work Staff Meeting – 10/13/15
USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting – 7/10/15
USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting – 5/5/15
WWNF & Nez Perce Tribe Staff/Program of Work Staff Meeting – 2/11/15
USFS & CTUIR Staff/Project Specific Staff Meeting to discuss CTUIR comments – 11/17/14
USFS & CTUIR Board of Trustees/Program of Work Government-to-Government Meeting – 9/19/14
USFS & CTUIR Wildlife and Cultural Committees/Program of Work Staff Meeting – 7/15/14
USFS & CTUIR Natural Resource Committee /Program of Work Staff Meeting – 6/4/14
WWNF, UNF, Malheur NF, Mt.Hood NF, Willamette NF, & Confederated Tribes of Warm Springs Staff and Council/Program of Work Government-to-Government Meeting – 10/30/13
USFS & CTUIR Board of Trustees/Program of Work Government-to-Government Meeting – 8/23/13
USFS & CTUIR Wildlife and Cultural Committees/Program of Work Staff Meeting – 6/25/13
WWNF & CTUIR Staff/Project Specific Staff Meeting – 6/13/2013
USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting – 5/20/13
WWNF & Nez Perce Tribe Staff/Program of Work Staff Meeting – 4/4/13
USFS & CTUIR Board of Trustees/Program of Work Government-to-Government Meeting – 5/9/12
WWNF & Nez Perce Tribe Staff/Program of Work Staff Meeting – 4/24/12
USFS & CTUIR Wildlife and Cultural Committees/Program of Work Staff Meeting – 3/27/12
USFS & CTUIR Natural Resource Committee/Program of Work Staff Meeting - 2/22/12

Issues

Significant issues are those points of concern that would change among the alternatives. A Forest Service interdisciplinary team (IDT) of resource specialists used comments gathered at internal and public scoping meetings and from letters from interested parties to help define significant issues. Alternatives to the proposed action are based on changes of impacts to these issues.

Significant Issue 1: Water Quality and Quantity

Water quality in the Granite Creek Watershed has been impaired by past timber harvest and road building, beaver trapping, grazing and hydraulic, placer, and dredge mining. These activities have altered stream channel morphology, abundance and distribution of riparian vegetation, runoff patterns and volumes, the stream-valley floor surface hydrologic connection, and type of ground cover. The result has been changes in flow regimes, the movement and storage of sediment, release of toxic metals, the movement and storage of water in the watershed, bank stability, and substrate composition. Water quality parameters affected by these changes are stream temperatures, concentrations of heavy metals, and water clarity (turbidity). Some types of mining activities proposed in Plans of Operations have the potential to cause further degradation to water quality. For example, several Plans withdraw water for their operations. Water withdrawals can negatively impact water quality and quantity.

The Forest Service has monitored summer stream temperatures for 12 streams in the Granite Creek watershed. All of these streams have temperatures that exceed the applicable state water quality standard of 53.6°F for bull trout spawning and rearing (FEIS Appendix 5). Prior to 2010, four of these streams (Beaver, Bull Run, Clear and Granite) were 303(d) listed by Oregon Department of Environmental Quality (ODEQ) as water quality limited for temperature and in two cases for sedimentation. As a result of the completion of the John Day River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) in 2010 (ODEQ 2010), the four streams were delisted listed for temperature. Delisting does not mean that the stream temperatures are now acceptable, but that all feasible steps will be made to decrease the elevated stream temperatures and prevent further rises, as required by the TMDL. As such, Plans were evaluated for potential impacts to stream temperatures. With respect to sedimentation, Bull Run and Granite Creeks remain 303(d) listed as sediment impaired and Plans were evaluated for the potential to increase sedimentation on these streams.

Table 1-5: 303(d)-Listed Streams in the Granite Creek Watershed (ODEQ, 2010)

Stream Name	Subwatershed Location	Reason for Listing
Bull Run Creek	(170702020201)	Sedimentation (river mile 0 to 9.3)
Granite Creek	(170702020202)	Sedimentation (river mile 11.2 to 16.2)

Key

Indicators

Measurements used to compare the alternatives in relation to this issue:

7. **Sediment input** – number of Plans that have the potential for a discharge.
8. **Heavy metal input** – number of Plans that have the potential for a discharge of heavy metals via groundwater or directly via surface water.
9. **Warm water input -** number of Plans that have the potential for a discharge of warm water via groundwater flow.

10. **Creosote input --** number of Plans that have the potential for a discharge of creosote into surface water
11. **Stream temperature** – number of Plans that have the potential to locally alter stream temperatures from a water withdrawal, input of warm water, or a groundwater flow reversal.
12. **Stream flow** – number of Plans that have the potential to locally reduce stream flow from a water withdrawal or groundwater flow reversal.

Significant Issue 2: Fish Habitat and Species

Fish species listed as threatened under the Endangered Species Act and their designated critical habitat occurring within the Granite watershed are Columbia River bull trout and Middle Columbia River steelhead.

Approximately 40 percent (37,445 acres) of the Granite Mining analysis area occupies Management Area 18 (Anadromous Fish Emphasis) on the WWNF. Approximately 17 percent (16,242 acres) of the Granite Mining analysis area occupies Management Area C7 (Special Fish Management Area) on the UNF. These management areas are intended to achieve and maintain optimum conditions for anadromous fish. Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied. Emphasis is placed on protecting fish habitat and habitat investments through reasonable provisions in plans of operation and in reclamation requirements.

Past placer mining operations, in an effort to expose placer deposits in the Granite Creek Watershed, have removed trees, shrubs, and ground cover in the flood-prone areas immediately adjacent to the Granite, Clear, Bull Run, Boulder, Last Chance, Ten Cent, Olive, Ruby, Lightning, McWillis, Quartz and Lucas Gulch creeks, and their tributaries. This past mining-caused ground disturbance has altered:

- Instream habitat such as pool frequency and distribution, altered substrate composition (including a loss of fine material), off channel habitat, and instream large woody material (LWM), and
- Riparian habitat such as canopy cover adjacent to stream reaches and bank stability.

Water quality has been affected by past placer mining operations. The exposed soil on the mining access roads and the disturbed flood-prone areas immediately adjacent to Granite, Clear, Bull Run, Boulder, Ten Cent, Olive, Salmon, Ruby, Lightning, Quartz and Lucas Gulch creeks and their tributaries could increase the amount of sediment entering these streams, resulting in degradation of existing summer steelhead, and redband trout spawning, incubating, and rearing habitat in these streams. Activities proposed in Plans of Operations have the potential to further reduce the quality of fish habitat in the project area. For example, instream disturbance from building and use of stream fords, suction dredging activities and water withdrawals can negatively affect fish. Quality of fish habitat is linked to water quality, and Significant Issue 1, Water Quality and Quantity, directly relates to aquatic species and fish habitat.

Key Indicators

Acres of areas with risk to riparian resources related to:

3. **Instream habitat** (i.e. pool frequency and distribution, substrate composition, and channel complexity) and
4. **Riparian habitat** (i.e. riparian vegetation type and distribution that influence shade, bank stability, and large woody recruitment).

Plans with proposed activities with risk to fish species:

4. **Stream fording** (frequency and timing of crossing)
5. **Suction dredging**
6. **Water quality** (i.e. sediment inputs, heavy metal inputs, water withdrawals, and water temperature increases)

Table 1-6: Streams with Listed Fish Species

Stream name	Forest	Mid-C Summer Steelhead	Columbia River Bull trout
Granite Creek	UNF and WWNF	Present	Present
Boulder Creek	WWNF	Present	Present
Last Chance Creek	WWNF	-	-
Bull Run Creek	WWNF	Present	Present
Clear Creek	UNF	Present	Present
Ruby Creek	UNF	Present	Assumed in lower reaches
Lightning Creek	UNF	Present	Present
Lucas Gulch	UNF	-	-
Olive Creek	WWNF	Present	-
McWillis Gulch	WWNF	Assumed in the lower reaches	-
Quartz Gulch	WWNF	Probable	-
Ten Cent Creek	UNF	Present	-

- = not present, ?= unknown

Other Resource Concerns

Issues that were not considered significant, but help to better understand the consequences of proposed activities were considered as issues to be tracked throughout the document. These issues are generally of high interest or concern to the public, or are necessary to understand the full extent of the alternatives. These issues provide additional information for the analysis but do not drive the formulation of alternatives.

Wildlife

The analysis area contains documented occurrences or habitat for several TES (Threatened, endangered or sensitive) wildlife species and Management Indicator species identified in the WWNF and UNF Forest Plans. Proposed mining activities areas are in most cases adjacent to or within ¼ mile of open public travel areas.

Noxious Weeds

Although not a significant issue, noxious weeds can develop into a major concern if appropriate mitigations are not applied.

Exposure of mineral soil caused by mining operations can create ideal conditions for the spread of noxious weeds. High priority noxious weeds are invasive, persistent, and prolific reproducers.

They displace desirable vegetation and currently occur at scales that make treatment difficult. It is anticipated that many more infestations actually occur than are inventoried.

Mining operations have the potential to spread many of the noxious weeds known to exist in the analysis area or introduce others. Precautions are needed to prevent spread when ground-disturbing activities and vehicular traffic occur near known locations of noxious weeds.

Cultural Resources

Section 106 of The National Historic Preservation Act compels federal agencies to take into account the effect of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. Executive Order 11593 includes direction about the identification and consideration of historic properties in federal land management decisions. It directs federal agencies to inventory cultural resources under their jurisdiction, to nominate to the National Register of Historic Places federally owned properties that meet the criteria, to use caution until the inventory and nomination processes are completed, and to ensure that federal plans and programs contribute to preservation and enhancement of non-federally owned properties. The significance of any cultural resources that are located during the inventory will be evaluated in consultation with the State Historic Preservation Office (SHPO). Cultural resources that are eligible or potentially eligible for the National Register of Historic Places will be protected during project implementation. Should unexpected cultural resources be encountered during project implementation, these resources will be protected from disturbance and will also be evaluated for eligibility for inclusion on the National Register. Significant resources will be protected, generally through avoidance, or mitigated following consultation with the SHPO and in some cases the Advisory Council on Historic Preservation.

Sensitive Plants

The analysis area does not contain documented occurrences or habitat for any ESA threatened, endangered, candidate or proposed plant species.

There are approximately two dozen locations for Region - 6 sensitive *Botrychium* species located within the Granite Creek Watershed on both the Wallowa - Whitman and Umatilla National Forests. The sites are represented by the following species: *Botrychium crenulatum, B. montanum, B. minganense, B. lanceolatum, B. lunaria* and *B. pinnatum*.

Visual Quality

Scenery Resources are a critical element of the social perception of Forest Service Management. The appearance and sustainability of scenery attributes viewed from access routes and viewpoints are what the public uses to initially evaluate the condition of the forest landscape. The landscape character of an area is the sustainable visual and cultural image of an area. Management of these scenery resources uses two indicators to evaluate the appearance and sustainability of the landscape character. Scenic integrity or Visual Quality Objectives determine the limits of acceptable human alterations, and scenic sustainability determines the limits of acceptable risk of loss of attributes.

The viewshed from Grant County Road 24, Forest Service Road 73 and 10 is analyzed in this EIS. These routes are designated concern level one routes and are used as viewing platforms by the majority of the public traveling in the area.

Social/Economic

Early federal minerals legislation encouraged the settlement and economic development of western lands. The General Mining Law of 1872 opened the public domain to mining activities. In the early 1980's the public's ability to sell gold on the open market resulted in increasing gold prices. This has resulted in a renewed interest in gold mining. It is believed that gold, silver and other precious metals/minerals still exist in the area in sufficient quantities to be profitably extracted in small scale operations such as those that have taken place in the recent past. As many people are requesting to re-work past workings, there is also the potential for reclamation of past disturbances.

Chapter 2 - Alternatives

Introduction

This chapter describes and compares the alternatives considered for the Granite Creek Watershed Mining Plans. For a description and map of each proposed Plan considered, see Appendix 8 – Plan Summaries and Maps. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision-maker and the public.

Chapter 2 describes the management alternatives developed for the Granite Mining Plans of Operations. Alternatives encompass the range of management options from which the District Rangers can select a preferred alternative and make a decision. This chapter includes a description of the following:

- The alternative development process
- Alternatives considered but eliminated from detailed study
- Alternatives analyzed in detail, including elements common to all alternatives
- Requirements and Protection Measures for the alternatives
- Monitoring Measures
- Alternative comparisons related to resource area issues

Alternative Development

The proposed action was developed from the proposed Plans of Operations as submitted by the miners. A Forest Service interdisciplinary team (IDT) of resources specialists used comments and suggestions gathered at internal meeting and through the public scoping process to help define the key issues. The alternatives carried forward for detailed study are designed to resolve issues surrounding the proposed action.

Alternatives Considered But Eliminated from Detailed Study

No Mining, Reclamation Only, Existing Claims Bought Out

An alternative was considered that outlined a no-mining scenario and included a proposal for buying out existing claim owners. In this scenario, mining operations would cease, reclamation would be required, a validity examination would be made for each claim, and a dollar amount calculated for the minerals that would not be extracted. Claimants would be compensated for the taking, and the area would be withdrawn from mineral entry. This alternative was not carried forward as a viable alternative because it would be in conflict with the 1872 Mining Law and other laws that direct the Forest Service to support and facilitate mineral extraction. Also, there is currently no mechanism by which the Forest Service can buy a claimant out. Additionally, withdrawing an area from mineral entry is not within the jurisdiction of the Forest Service. This

alternative does not meet the purpose and need of authorizing the approval of mining Plans of Operations in the Granite Creek Watershed.

Addressing Water Quality Problems in the Granite Watershed through road closures and decommissionings

An alternative was considered to address both water quality concerns and road density issues by closing and/or decommissioning roads. Although managing road density for public use and other resource benefits is a goal of national forest management, many of the open roads in the watershed are not reasonably connected to the proposed mining operations. Consequently, analyzing this alternative in this context adds complexity and expands the scope of the decision beyond what is needed to make a decision on the proposed mining operations.

Alternatives Considered in Detail

Three alternatives were considered in detail.

Alternative 1 represents the "No Action/No Change" Alternative. The proposed Plans of Operations included in this EIS would not be approved or extended.

Alternative 2 is the Proposed Action, which is the proposed Plans of Operations as submitted by the miners.

Alternative 3 is the proposed Plans of Operations as submitted by the miners, with additional Forest Service Requirements designed to protect water quality, fish habitat, soils and other resources.

Alternative 1 - No Action/No Change in Present Situation

- **Includes 27 areas covered by the Proposed Plans of Operation**

A "No Action" alternative is required by regulation in 40 CFR 1502.14(d). It is used in part to measure action alternatives to determine the effects of not implementing an action alternative. In this analysis, this alternative maintains the current situation; it allows the ongoing Notice of Intent activities to continue in the watershed. None of the proposed Plans would be approved. This alternative does not meet the purpose and need to ensure reasonably minimized adverse environmental effects on National Forest surface resources where mining claimants propose to conduct operations authorized by mining laws because no Plans of Operations would be considered for approval. This alternative cannot be implemented, since Forest Service Regulations in 36 CFR 228, Subpart A, does not provide for denying a reasonable Plan of Operations. The Plans of Operations included in this alternative are in the analysis file. Table 2-1 displays the proposed Plans of Operations under Alternative 1.

The development of this alternative is in response to NEPA regulations 36 CFR 220.5(d) and 40CFR1502.14 (d). It is the result of not implementing the proposed action, therefore none of the proposed Plans of Operation in the Granite Creek Watershed would be approved. However, the Forest Service mining regulations (36 CFR Part 228) do not provide for the denial of a reasonable Plan of Operation on areas open to mineral extraction. Because of this, the no action alternative

would not meet the purpose and need and will be used as a base line for comparison of the effects.

For analysis purposes only, selection of the No Action Alterative would result in the following:

- Miners who have proposed to continue with activities previously approved in a Plan of operations would initiate reclamation and closure requirements on their existing mining sites, structures and user-created roads, in accordance with the requirements of their previously authorized Plan of Operation.

- Miners who have proposed an initial Plan of Operations would not receive authorization.

- Prospecting would continue as described under 36 CFR 228.4 provided it complies with federal and state laws. In areas open to mineral extraction, other activities would continue as defined by 36 CFR 228.4(a)&(a)(1).

The following table gives a brief description of the No Action Alternative for each area described in the proposed Plan of Operations in the Granite Creek Watershed. All of these sites are currently in a stable condition, and are waiting for approval of their proposal Plan of Operations prior to commencing operations included in that Plan. There is currently no large scale mining activity on any of these sites; large equipment has been removed or parked. Disturbed areas of soil have been grass seeded. Sites are annually checked to insure that ponds, roads and other structures are safe and do not present an erosion problem. Current mining activities on these sites have been limited to assessment work and NOI work as described in 36 CFR228.4.

Table 2-1: Description of Operations under Alternative 1

Proposed Plan	Alternative 1	Forest	Drainage
Altona	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Quartz Gulch
Belvadear Group	Equipment would be removed	WWNF	Olive Creek
Blue Sky/Bull Run	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Bull Run Creek
Blue Smoke	Site would remain as is. There is nothing to clean up or equipment to be removed.	UNF	Granite Creek
Bunch Bucket	Site would remain as is. There is nothing to clean up or equipment to be removed.	UNF	Clear Creek
City limits	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Granite Creek
East Ten Cent Creek	Cabin and road would be removed	UNF	East Ten Cent Creek
Eddy-Shipman	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF/UNF	Granite Creek
Grubsteak	Bridge equipment,& shed removed, the large hole would be filled in.	UNF	Clear Creek
Hopeful 1	Cabin would be removed	UNF	Granite Creek

Proposed Plan	Alternative 1	Forest	Drainage
Hopeful 2&3	Cabins and road would be removed.	UNF	Granite Creek
L&H	Shed would be removed	WWNF	Olive Creek
Lightning Creek	Bridge removed, Cabins maintained as historical structure.	UNF	Lightning Creek
Little Cross 1	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Granite Creek
Lucky Strike	Cabins maintained as historical structure	WWNF/ UNF	Lightning Creek
Make It	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Granite Creek
Muffin	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Last Chance Creek
Old Eric 1&2	Site would remain as is. There is nothing to clean up or equipment to be removed.	Umatilla	Granite Creek
Olive Tone	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Olive Creek
Rose Bud 1-4	Site would remain as is. There is nothing to clean up or equipment to be removed.	UNF	Granite Creek
Royal White Group	Cabins would be removed, Adits would be gated.	WWNF	Irish Gulch
Ruby Group	Cabin would be removed	UNF	Ruby & Clear Creek
Sunshine/McWillis	Cabins and road would be removed	WWNF	McWillis Gulch
Tetra Alpha Placer and Tetra Alpha Mill & Lode	Equipment and roads would be removed.	WWNF	Boulder Creek and Last Chance Creek
Troy D	Equipment and gates would be removed	WWNF	Granite Creek
Yellow Gold	Site would remain as is. There is nothing to clean up or equipment to be removed.	WWNF	Last Chance Creek
Yellow Jacket	Spring development and sheds would be removed. Site would remain as is.	WWNF	Orofino Gulch

Alternative 2 - Proposed Action (Plans of Operations as submitted by the Miners)

The following activities are proposed under this alternative:

- Authorizing approval of 28 mining Plans of Operations as submitted by the miners (*Note that Tetra Alpha Placer, Mill and Lode has been split into 2 Plans under this alternative (Tetra Alpha Placer and Tetra Alpha Mill & Lode) (Table 2-2), therefore the change from 27 Plans in Alternative 1, to 28 Plans in Alternative 2*)
- Authorizing use of 4.71 miles of previously closed or decommissioned Forest Service roads 4.26 closed and 0.45 decommissioned)
- Authorizing use of 8.98 miles of existing miner-created temporary roads
- Authorizing use of 0.3 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 11 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 2 new fords (2 fords at Tetra Alpha Placer)
- Authorizing placement of 2 temporary bridges to be removed at the end of each operating season (Bull Run Site #2 and Ruby Group)
- Authorizing installation of 3 new gates on non-system miner created roads (East Ten Cent Creek and Hopeful 2&3)

Alternative 2 would authorize the approval of the Plans of Operations (Plans) as submitted by the miners. The total number of Plans proposed for approval under this alternative is 28 (Table 2-2). The Plans of Operations included in this alternative are in the analysis file. Summaries and sketch maps of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, State suction dredging requirements, and all applicable State and Federal fire regulations.

Table 2-2: Proposed Plans of Operations under Alternatives 2 and 3

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Altona (Placer) WWNF	T. 10 S.- R. 35 E. Sec 03 Quartz Gulch- (5 acres)	150 gpm for wash plant/ adit	Backhoe, dump truck, wash plant, pickup	**Action:** Placer mining and gravity processing along the north side of the creek. Construct 2 ponds. Dig and rehab a series of test pits throughout the area (20'x20'x10'deep).	**Access:** Decommissioned FS roads, along with the development of existing and designated temporary roads to work the site. Gate temporary road access.	**Action:** Same as Alt 2, **Access:** Use existing rather than decommissione d roads to access area. (see Table 2-3)	WRPMs (site-specific water resource protection measures) All General Requirements except lode requirements
Belvadear Group (Placer) WWNF	T. 09 S.- R. 35 E. Sec 35 Olive Creek- (3 acres)	4 cfs:80gpm / Olive Creek - 1937 water right	Backhoe, dozer, dump truck, highbanker, pump, trommel, compressor, hand tools.	**Action:** Placer mining and gravity processing along the east side of the creek. Use of existing ponds. Up to ¼ acre could be worked at a time.	**Access:** Existing FS roads, existing temporary road, development of new designated temporary roads to work the site.	Same as Alt 2	All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Blue Sky/Bull Run (Placer) WWNF	T. 09 S.- R. 35½ E. Sec 13 T. 09 S.- R. 36 E. Sec 18,19 Bull Run Creek- (1.7 acres)	150 gpm Trommel / Existing dredge ponds	Backhoe, trommel, pump, atv's dump-bed trailer, suction dredge, hand tools.	**Action:** Placer mining and gravity processing of revegetated dredge tailings. Up to $^{1}/_{5}$ acre will be worked at a time to process up to 5 cubic yards a day. Use of existing ponds. Suction dredging in Bull Run Creek.	**Access:** County road 24, existing FS roads, development of existing and designated temporary roads to work each site. Placement of a temporary flatbed bridge. 2 existing fords on Bull Run & Swamp Creek. **Ford Use** (2-3 months in summer) **Heavy equipment:** 2-4 round trips per season **Other vehicles (pickup truck):** 2-5 round trips per day	**Action:** Same as Alt 2, **Access:** Alternate access roads would replace the need for the temporary flatbed bridge proposed under Alt 2(see Table 2-3)	WRPMs, Transportation Protection Measure, Cultural Resource Protection Measure (Blue Sky 2), Wildlife Protection Measure All General Requirements except lode requirements

Plan/Type/ Forest	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities Alternative 2**	**Proposed Access Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Blue Smoke (Placer) UNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek (1.75 acres)	Trommel / Existing dredge ponds	Backhoe, dozer, dump truck, tommel, atv, pump, suction dredge, hand tools,	**Action:** Placer mining and gravity processing of the high bank area on the north side of the powerline road. A series of holes 20'x25'x10'deep will be dug. Use of existing ponds. Suction dredge in Granite Creek	**Access:** Existing power line access road on FS land.	Same as Alt 2	WRPM (processing site), Wildlife Protection Measure All General Requirements except lode requirements
Bunch Bucket (Placer) UNF	T. 09 S.- R. 35 E. Sec 22 Clear Creek- (10 acres)	Unspecified/ miner created ponds.	Crawler-loader with backhoe attachment, trommel, wash plant.	**Action:** Placer mining and gravity processing. Trenches (2'x200'x8') deep will be dug in order to process 600 cubic yards per year.	**Access:** Existing FS roads, existing temporary roads, and new designated temporary roads to work the site.	Same as Alt 2	WRPM, Cultural Resource Protection Measure, All General Requirements except lode requirements
City Limits (Placer) WWNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek- (1 acre)	80-100 gpm / Old dredge ponds in tailings area.	bobcat or backhoe, wash plant, sluices, highbankers, pumps, hand tool	**Action:** Placer mining of the high bank along the gravel and gravity processing at existing dredge ponds. Pits will be dug (20'x30x8' deep) in order to processing 3-5 cubic yards per day. .	**Access:** Existing FS roads and existing temporary roads	Same as Alt 2	Wildlife Protection Measure All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
East Ten Cent (Placer) UNF	T. 08 S.- R. 35½ E. Sec 28 East Ten Cent Creek- (2 acres)	Unspecified / miner created pond	Backhoe, Trommel, highbanker, dredge, water pumps, Generator, ATV's	**Action:** Placer mining along the west side of the creek. Pits will be dug (12'x10' deep) in order to get processing material. Continued use of existing structures.	**Access:** Existing FS roads (UNF closed), existing temporary roads and develop a new temporary road to work site. Two gates for temporary road access.	Same as Alt 2	WRPMs, Wildlife Protection Measure All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Eddy Shipman (Lode & Placer) **UNF & WWNF**	T. 08 S.- R. 35½ E. Sec 23 Granite Creek- (2.5 acres)	100-150 gpm / Chipman Gulch	Backhoe, mucker, dump truck, water pumps, compressor, and hand tools.	**Action:** Lode exploration & placer mining. Gravity processing of placer material. Milling (with an arrastra) and gravity processing of underground lode material. Some off-Forest processing. Existing ponds. Development of Mill site in order to process 5 cubic yards per day. Continued use of existing structures.	**Access:** Existing FS roads along with the development of existing temporary roads to work the site. Existing ford on Olive Creek. Existing FS gate & barricade. **Ford Use** (2-4 months of summer) **Heavy equipment:** 2-4 round trips per season to bring equipment in and out. 1-2 round trips per week to haul material to processing site. **Other vehicles:** 2-4 round trips per month for fuel and other maintenance items.	Same as Alt 2	WRPMs, Transportation Protection Measure All General Requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Grubsteak (Placer) UNF	T. 09 S.- R. 35 E. Sec 14 Clear Creek- (2 acres)	Unspecified / Existing miner created pond.	Backhoe or excavator, trommel or shaker, pumps, sluices, hand tools, and generator.	**Action:** Placer mining and gravity processing at two sites. Each less than $^{1}/_{8}$ acre in size. Existing pond. Continued use of shed.	**Access:** Existing temporary road, existing miner's bridge and gate to work the site. Existing equipment ford across Clear Creek. **Ford Use** (intermittent use during summer) **Heavy equipment:** 0-4 round trips per season	Same as Alt 2	WRPMs All General Requirements except lode requirements
Hopeful 1 (Placer) UNF	T. 08 S.- R. 35 E. Sec 29 Granite Creek (1 acre)	Sluice box/ existing dredge pond	Trommel (12"x5'drum), sluice, pickup, small backhoe, pumps, generator, RV trailer.	**Action:** Placer excavations and gravity processing of the high bank area (less than ¼ acre) along the old dredge tailings (approx. 2 yards per year). Continued use of existing structures.	**Access:** Existing FS road, existing temporary road. (UNF closed)	Same as Alt 2	Cultural Resource Protection Measure, Wildlife Protection Measure All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Hopeful 2&3 (Placer) UNF	T. 08 S.- R. 35 E. Sec 28 Granite Creek- (3.5 acres)	Unspecified / miner constructed ponds and an unnamed tributary.	Backhoe or cat, pickup, grader, dump truck, hand tools, water filtration building.	**Action**: Placer mining on the North and south sides of the creek. Pits will be dug (6'x3'x10'deep) in order to process 15 cubic yards a year. 2 existing ponds. Continued use of existing structures.	**Access:** Existing FS roads, existing temporary roads, development of temporary roads to work the site. Use 2 existing fords on Granite Creek. Gate temporary access. **Ford Use** (intermittent use during summer) **Heavy equipment:** 0-4 round trips per season **Other vehicles:** 1-2 round trips per week with a pickup for fuel and other maintenance items.	**Action:** Same as Alt 2 **Access:** Change ford use to only one (west side)	WRPMs, Fish Protection Measure, Wildlife Protection Measure All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
L&H (Placer/Lode) WWNF	T. 10 S.- R. 35 E. Sec 10,11 Olive Creek- (8 acres)	60 gpm/ Adit snow, runoff to miner created ponds.	Backhoe, wash plant, pickups, pumps, hand tools.	**Action:** Placer mining, gravity processing; and re-open existing adits for testing. Placer digs will be 20'x30'x10'deep in order to collect material for processing. Use of existing ponds.	**Access** Existing FS roads along with the development of existing temporary roads to work the site. **Heavy equipment:** Occasional use, (1-4 round trips) will bring in at beginning and end, occasional trips for repairs etc. **Other vehicles:** Daily access to campsite with a pickup or ATV.	Same as Alt 2	WRPMs (lode), Cultural Resource Protection Measure All General Requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Lightning Creek (Placer) UNF	T. 09 S.- R. 35 E. Sec 28,33 Lightning Creek- (5 acres)	100 gpm /Existing Water right to the creek, miner created ponds.	Backhoe, excavator, dump trucks, washing plant, trommel, suction dredge, generator, pumps, hand tools.	**Action:** Placer mining and gravity processing of 3 sites along the highbanks on the south side of the creek. Pits will be 50'x100'x15'deep and process 20-50 cubic yards per day when working. Continued use of existing structures. Suction dredging in Lightning Creek.	**Access:** Existing FS roads (UNF open), existing temporary roads, existing miner's bridge and equipment ford on Lightning Creek. **Ford Use** (only during ODFW in-water work period July15-Aug15) **Heavy equipment:** 1-4 round trips per season. **Other vehicles:** None (bridge)	Same as Alt 2	Fish Protection Measures, Cultural Resource Protection Measure, Wildlife Protection Measure All General Requirements except lode requirements
Little Cross 1 (Placer) WWNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek- (1 acre)	Unspecified / miner created pond.	Backhoe, highbanker, suction dredge, hand tools	**Action:** Placer mining and gravity processing at one site on the north side of Granite creek. The total site is less than ¼ acre in size. Suction dredging in Granite Creek.	**Access:** Existing temporary road on FS land.	Same as Alt 2	WRPMs All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Lucky Strike (Placer/Lode/ Mill) **UNF &WWNF**	T. 10 S.- R. 35 E. Sec 03 Pete Man Ditch & Lightning Creek- (2 acres)	Unspecified / spring	Backhoe, generator, rotohamer, chainsaw, hand tools, pickup	**Action:** Placer testing and reclamation of existing adits and shafts. Continued use of existing structures and repair old mill.	**Access:** Existing FS roads.	Same as Alt 2	Cultural Resource Protection Measure All General Requirements
Make it (Placer) **WWNF**	T. 08 S.- R. 35½ E. Sec 27 Granite Creek- (2 acres)	100 gpm / Granite Creek side channel pond.	hand tools, gold spinner, backhoe, trommel, pump	**Action:** Placer mining and gravity processing of the highbank along the east side of the creek. 15-20 cubic yards per year will be processed from holes 15'x20'x10'deep.	**Access:** Existing FS roads along with the development of existing and designated temporary roads to work the site. Existing miner's gate	Same as Alt 2	WRPMs, Cultural Resource Protection Measure, Wildlife Protection Measure All General Requirements except lode requirements
Muffin (Placer) **WWNF**	T. 09 S.- R. 35½ E. Sec 34 Last Chance Gulch- (2.5 acres)	Not specified / Dammed pond on Last Chance Ck.	Backhoe, wash plant, trommel, handtools, dumptruck	**Action:** Placer mining and gravity processing on the east side of the creek. (approx. 10 cubic yards per year). Existing ponds and processing site.	**Access:** Existing FS roads along with the development of existing and designated temporary roads to work the site.	Same as Alt 2	WRPM, Wildlife Protection Measure All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Old Eric 1&2 (Placer) UNF	T. 09 S.- R. 35½ E. Sec 04 Granite Creek- (1 acre)	Not specified / Surface collection	Backhoe, sluice, suction dredge, handtools, camptrailer	**Action:** Placer mining and gravity processing of the high bank area along granite creek. Max of 5 cubic yards per year will be processed from this single ¼ acre work site. Suction dredging in Granite Creek..	**Access:** Existing temporary road.	Same as Alt 2	WRPM, Wildlife Protection Measure All General Requirements except lode requirements
Olive Tone (Placer) WWNF	T. 10 S.- R. 35 E. Sec 02 Olive Creek- (2 acres)	4cfs:80gpm / Olive Creek - 1937 water right	Backhoe, trommel, wash plant, generator, pump, camp trailer	**Action:** Placer mining of the highbank areas along Olive Creek. Holes 30'x30'x10' will be worked at a time. Two ponds (20'x10'x10' will be constructed	**Access:** Existing FS road, existing temporary road. Existing access ford on Olive Creek. **Ford Use** (2-3 months of summer) **Heavy equipment:** 2-4 round trips) will bring in at beginning and end, occasional trips for repairs etc. **Other vehicles:** 1-2 round trips per day with an ATV to access the travel trailer.	Same as Alt 2	WRPM All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Rose Bud 1-4 (Placer) UNF	T. 09 S.- R. 35 E. Sec 01 Granite Creek- (5 acres)	Not specified / Old dredging ponds	Backhoe, trommel, water pump, gold spinner, and 3-yard dump truck	**Action:** Placer mining of the high bank area north of the powerline road. (Processing 2-10 cubic yards per year)	**Access:** Existing power line access road on FS land.	Same as Alt 2	WRPM, Fish Protection Measure, Wildlife Protection Measure All General Requirements except lode requirements
Royal White Group (Lode) WWNF	T. 10 S.- R. 35 E. Sec 03 Pete Man Ditch & Irish Gulch and Olive Creek (10 acres total claim – 3 acres proposed activity)	100 gpm / adit, snow melt, spring, storage reservoir, hauled from off site	Backhoe/bobcat, dozer, dump truck, ball mill, crusher, compressor, mucker, pumps, timber saw	**Action**: Underground mining of existing adits, processing at mill, and continued use of existing structures. (Up to 5 tons will be crushed and milled per day) Continued use of structures.	**Access**: Existing FS roads, private roads, and existing temporary roads to work the site. Existing miner's gate	Same as Alt 2	Botanical Protection Measure All General Requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Ruby Group (Placer) UNF	T. 09 S.- R. 35 E. Sec 16,22 Ruby Creek/Lightning Creek- (2.5 acres)	Not specified	Backhoe, trommel, pumps, generator, hand tools, pickup	**Action:** Exploration of the bank area along Ruby creek. Will process 1-2 cubic yards per 8'deep hole for a total of 2-5 yards per year. Continued use of the existing structures.	**Access:** Existing FS roads along with the development of existing and designated temporary roads to work the site. 2 existing fords on Clear and Ruby Creek. New miner's temporary ATV bridge on Clear Creek. **Ford Use (**June-August) **Heavy equipment:** 2-4 round trips per season **Other vehicles:** 0-2 round trips per week with a pickup for fuel and other maintenance items, but most of the crossings would be on the bridge with the ATV .	Same as Alt 2.	WRPMs, Transportation Protection Measure, Cultural Resource Protection Measures All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Sunshine/ McWillis (Placer and Lode) WWNF	T. 10 S.- R. 35 E. Sec 02 -McWillis Gulch (2.5 acres)	20-80 gpm / existing reservoir on Mcwillis Gulch.	Backhoe, trommel, suction dredge	**Action:** Placer excavations. Up to ¼ acre will be worked at a time. @ 1000 cubic yards a year will be processed. Continued use of existing structures. Suction dredging on McWillis Gulch.	**Access:** Existing FS roads, existing temporary road. Existing miner's bridge and gate.	Same as Alt 2	WRPMs Cultural Resource Protection Measure All General Requirements
Tetra Alpha (Placer) WWNF	T. 08 S.- R. 35½ E. Sec 25,34 and 35 Boulder Ck. (8 acres)	150 gpm / Boulder Creek.	Dozer, excavator, Loader dump truck, drills, air compressor, pumps, jaw & vibrator crusher, Chain saws, generator, trommel, welder, conveyors and final recovery	**Action:** Placer mining along the south side of Boulder creek with gravity processing on the north side. Up to ½ acre will be worked at a time and @ 100 cubic yards will be processed per day. Continued use of existing structures. **Access:** Existing FS roads, existing and temporary, development of designated temporary roads to work the site. Ford (Boulder Creek) 1 existing and 2 proposed. Existing Miner's gate.	**Ford Use:** 1 existing, and 2 proposed fords – middle and upper fords (2-3 months during summer) **Heavy equipment:** 1-3 round trips per day will haul loads of material when working. **Other vehicles:** 2-4 per round trips week with a pickup or ATV.	Access: the existing ford, and the proposed upper ford would be approved for use. The proposed middle ford would not be approved for use.	WRPMs, Fish Protection Measures, Cultural Resource Protection Measure, Wildlife Protection Measure All General Requirements except lode requirements

Plan/Type/ **Forest**	**Legal Description /Stream Drainage / approx. acres**	**Water use/source**	**Proposed Equipment**	**Proposed Activities** **Alternative 2**	**Proposed Access** **Alternative 2**	**Proposed Activities/ Access Alternative 3**	**Protection Measures for Alternative 3**
Tetra Alpha (Mill & Lode) WWNF	T. 08 S.- R. 35½ E. Sec 25,34 and 35 Last Chance or Boulder Ck. (2 acres)	150 gpm / Last Chance Creek or Boulder Creek.	Dozer, excavator, Loader dump truck, drills, air compressor, pumps, jaw & vibrator crusher, Chain saws, generator, trommel, welder, conveyors and final recovery	**Action:** Milling and gravity processing of underground lode material. (@ 10 cubic yards, or until settling ponds fill in) No clean out of settling ponds is planned. Continued use of existing structures.	**Access:** Existing FS roads along with the development of existing temporary roads to access the adit. Existing miner's gate.	Same as Alt 2	Fish Protection Measures, Cultural Resource Protection Measure (Mill), Wildlife Protection Measure All General Requirements except placer requirements
Troy D (Placer) WWNF	T. 09 S.- R. 35 E. Sec 01 Granite Creek- (8 acres)	Unspecified/ Miner constructed ponds in old dredging.	Backhoe or excavator, Trommel, dump truck, Wash plant, Cat, generator, travel trailer	**Action:** Placer mining and gravity processing of the old dredge tailings. (50 yards per day). A water filtration plant (semi-trailers) will filter the water from the settling ponds. Final mineral recovery will take place on private land. Placement of @600 ft of power line.	**Access:** Existing temporary roads, development of designated temporary roads to work the site. Existing miner's gate.	Same as Alt 2	WRPMs, Wildlife Protection Measures All General Requirements except lode requirements

Plan/Type/ Forest	Legal Description /Stream Drainage / approx. acres	Water use/source	Proposed Equipment	Proposed Activities Alternative 2	Proposed Access Alternative 2	Proposed Activities/ Access Alternative 3	Protection Measures for Alternative 3
Yellow Gold (Placer) WWNF	T. 08 S.- R. 35½ E. Sec 27,34 Last Chance Creek- (9 acres)	15 gpm for High banker and 80 gpm for Trommel. / Dammed Last Chance Ck. Reservoir.	Backhoe, Dozer, Loader, dump truck, Wash plant, trommel, highbanker, sluice, and pump. .	**Action:** Placer mining and gravity processing at the ponds. Several families will work 2 holes (50'x30'x12'deep) at a time.	**Access:** Existing FS roads along with the development of existing and designated temporary roads to work the site.	Same as Alt 2, except do not use road 7355055 from the 7355020 road (@ ½ mile)	WRPMs, Transportation Protection Measure, Wildlife Protection Measure All General Requirements except lode requirements
Yellow Jacket (Placer) WWNF	T. 09 S.- R. 35 E. Sec 27,34 Orofino Gulch (7.5 acres)	60 gpm / adit on adjacent private land.	Backhoe, dozer dump truck, trommel, pump, suction dredge, compressor, hand tools	**Action:** Placer mining on FS land and gravity processing on private land. Up to ¼ acre will be worked at a time. Suction dredging in Orofino Gulch.	**Access:** Existing FS roads, miner's private road, existing temporary roads, development of designated temporary roads to work the site.	Same as Alt 2	WRPM All General Requirements except lode requirements

FS = Forest System
CK = Creek
gpm = Gallons per minute
UNF – Umatilla National Forest
WWNF – Wallowa-Whitman National Forest
Ft – Feet

Table 2-3: Forest Service Closed, Decommissioned or Temporary Roads Proposed for Use by Miners under Alternatives 2 and 3

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
Altona	1042E1a	1042E1c	1042E1b	0.56	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042E1b	1042E1a	1042M1a	0.59	Native	Temporary -E	Y	Y	
	1042E1c	1305098	1042E1a	0.21	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042M1a	1042E1b	Processing	0.05	Native	Temporary -P	Y	Y	Proposed
	1305098	1305092	1041E1c	0.20	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305099	1305080	1305092	0.30	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305092	1305099	1305098	0.03	Native	FS Closed	y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
Belvadear	1305-E2	1305080	Claim	0.15	Native	Temporary - E	Y	Y	
	7300-E4a	Co 24	7300-E4b	0.11	Native	Temporary -E	Y	Y	Existing Ford on bull run Access disperse campsite
Blue Sky/Bull Run	7300-E4b	7300-E4a	Processing	0.15	Native	Temporary -E	Y	Y	Existing Ford on Swamp Creek
	7300-E4c	7300-E4a	Site 2 Blue Sky	0.02	Tailings	Temporary -E	Y	Y	
	7300-M4a	7300-E4a	Site 3 Blue Sky	0.07	Native	Temporary -P	Y	Y	
	7300-M4b	Co 24	Site 2 Bull Run	0.07	Native	Temporary -P	Y	N	Proposed Temporary Bridge – In Alt 3, replaced with 7375-M1a because placement and removal of

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
									bridge would result in a discharge.
	7375-M1a	7375-000	Site 1 Bull Run	0.05	Native	Temporary -E	Y	Y	Alt 3-gate during use
	7375-M1b	7375-M1a	Site 2 Bull Run	0.20	Native	Temporary-P	N	Y	Alt 3 only. Instead of bridge on 7300-M4b.
Blue Smoke	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road
Bunch Bucket	1310-E2a	1310000	Site 1	0.08	Aggregate	Temporary -E	Y	Y	Access dispersed campsite
	1310-E2b	Site1,2	Processing	0.09	Native	Temporary -E	Y	Y	
	1310-E2c	Proces-sing	Site 2	0.08	Native	Temporary -E	Y	Y	
City Limits	7300-E3a	7300000	Claim	0.11	Tailings	Temporary -E	Y	Y	
	7300-E3b	7300000	Claim	0.02	Tailings	Temporary -E	Y	Y	
East Ten Cent Creek	7350050	7350000	Claim	0.06	Aggregate	FS Closed	Y	Y	OHV Trail
	7350070	7350000	Claim	0.39	Aggregate	FS Closed	Y	Y	OHV Trail
	7350-E1a	7350070	Pond	0.12	Aggregate	Temporary -E	Y	Y	Miner Install new Gate
	7350-M1a	7350050	Shed	0.32	Native	Temporary -E	Y	Y	Miner Install new Gate
Eddy Shipman	7300590	7300000	7300-E1a	0.04	Native	FS Closed	Y	Y	Existing FS Gate
	7300680	7300000	7300-E1d	0.10	Native	FS Closed	Y	Y	Existing FS Barricade.
	7300-E1a	7300590	Cabin/Adit B	0.42	Native	Temporary -E	Y	Y	Old County Road
	7300-E1b	7300-E1a	7300-E1c	0.10	Native	Temporary -E	Y	Y	
	7300-E1d	7300680	Adit A	0.07	Native	Temporary -E	Y	Y	Existing ford, Olive Creek
Grubsteak	1300-M1a	Co 24	Dig Site	0.19	Native	Temporary -E	y	Y	Existing Miner's Bridge & Gate
Hopeful 1	1035-E2a	1035012	Cabin/Claim	0.17	Aggregate	Temporary - E	Y	Y	
	1035012	1035011	Claim	0.70	Aggregate	FS Closed	Y	Y	
Hopeful 2-3	1035-E1a	1035000	1035-E1b	0.21	Aggregate	Temporary -E	Y	Y	Old Road 1035-015 Miner install new gate
	1035-E1b	1035-E1a	1035-E1d/cabins	0.08	Aggregate	Temporary -E	Y	Y	
	1035-E1c	1035-E1a	1035-E1d/filter plant	0.27	Native	Temporary -E	Y	Y	Old Road 1035-015

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
	1035-E1d	1035-E1b	1035-E1c	0.19	Native	Temporary -E	Y	Y	Existing Ford (Alt 2 = 2) (alt 3 = 1) Granite Creek
L&H	1305-E5a	1042950	1305200	0.29	Native	Temporary -E	Y	Y	Continuation of Rd 950
	1305-E5b	1305200	Adit	0.06	Native	Temporary -E	Y	Y	
Lightning Creek	1305-E6a	1305100	Final Pond	0.07	Native	Temporary - E	Y	Y	
	1305-E6b	1305100	Dig Site	0.10	Native	Temporary - E	Y	Y	
Little Cross	1000-E3a	Co 24	Campsite	0.03	Tailings	Temporary - E	Y	Y	
Lucky Strike	Only using open FS roads								
Make-it	7300-E2a	7300700	Cabin	0.37	Native	Temporary - E	Y	y	Existing Miner's gate
Muffin	7355012	7355000	Claim	0.18	Native	FS Closed	Y	y	
	7355M1a	7355012	Work Site	0.08	Native	Temporary - E	Y	y	Existing - miner will rehab
Old Eric 1&2	10000-E2a	Co 24	Campsite	0.40	Tailings	Temporary - E	Y	y	Dispersed Camp site
Olive Tone	1305-E4a	1305082	1305-E4b	0.02	Native	Temporary - E	Y	y	
	1305-E4b	1305-E4A	Pond/Mining Site	0.16	Native and Tailings	Temporary - E	Y	y	Existing Ford on Olive Creek
Rosebud 1-4	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road
Royal White	1042-E2a	Pvt Rd	Upper Adit	0.11	Native	Temporary - E	Y	Y	Extension of 1042-982
	1042-E2b	Pvt Rd	Mine Bldings	0.14	Native	Temporary - E	Y	Y	Behind existing private gate
	1042-E2c	1042982	Shafts	0.06	Native	Temporary - E	Y	Y	
Ruby Group	1310-E1a	1310000	Cabin/Sites 1,2,3	0.62	Native	Temporary - E	Y	Y	2 existing fords, (Clear & Ruby) Miner proposed ATV Bridge
	1310-E1b	1310-E1a	Site 2, staging area	0.03	Native	Temporary - E	Y	Y	
	1310-E3a	1310000	Site 4,5	0.07	Native	Temporary - E	Y	Y	
	1310-E3b	1310-E3a	Site 6	0.06	Native	Temporary - E	Y	Y	
	1310-E3c	1310-E3a	Site 7	0.02	Native	Temporary - E	Y	Y	
	1310-E4a	1310000	Site 8	0.09	Native	Temporary - E	Y	Y	

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
Sunshine/McWillis	1305054	1305050	1305-M1s	0.40	Native	FS Closed	Y	Y	Existing miner's gate
	1305-M1a	1305054	Claim site	0.18	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab Existing Miner's Bridge, McWillis
	1305130	1305120	Diversion Dam	0.45	Native	Decommis-sioned	Y	Y	Use as Temporary Road
Tetra Alpha Lode	7355- M5a	7355020	adit	0.01	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Mill	7355011	7355000	7355011-M4a	0.31	Native	FS Closed	Y	Y	
	7355-M4a	7355011	Top Mill	0.05	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
	7355-M4b	7355-M4a	7355011	0.03	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Placer	7355011	7355000	7355011-M4a	0.72	Native	FS Closed	Y	Y	
	7533012	7355000	7355011-M4a	0.42	Native	FS Closed	Y	Y	
	7355-M3a	7355011	Processing	0.27	Native	Temporary - E	Y	Y	proposed Boulder Crk ford in Alt 2 only
	7355-M3b	7355-M3a	Claim	0.06	Native	Temporary - P	Y	Y	Proposed road
	7355-M3c	7355011	Claim	0.03	Native	Temporary - P	Y	Y	Proposed Ford, Boulder
	7355-M3d	7355011	Claim	0.02	Native	Temporary - P	Y	Y	Proposed Ford on Boulder
Troy	1000-E4a	Co 24	Claim	0.05	Tailings	Temporary - E	Y	Y	Existing Gate
	1000-E4b	1000-E4a	Claim	0.11	Tailings	Temporary - E	Y	Y	
Yellow Gold	7355025	7355020	7355026	0.05	Native	FS Closed	Y	Y	
	7355026	7355025	Alternate Processing	0.11	Native	FS Closed	Y	Y	
	7355050	7355000	Claim Trail	0.61	Native	FS Closed	Y	Y	Alt 3 preferred use (gate during use)
	7355055	7355050	Claim	0.37	Native	FS Closed	Y	Y	
	7355-E2a	7355055	Processing site	0.11	Native	Temporary - E	Y	Y	
Yellow Jacket	1305-E1a	1305035	Claim	0.11	Native	Temporary - E	Y	Y	
	1305-E1b	1305-E1a	Claim/House	0.15	Tailings	Temporary - E	Y	Y	

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments

E = Existing non-system road
P = Proposed, miner created road, no cut or fill.

Use of Closed, Decommissioned and Temporary Access Roads

Table 2-3 displays all roads proposed for use under each alternative. The approved Plans of Operations would include a list of all access roads authorized for use by the miners.

Plan Expiration

Approval of all Plans would expire 10 years from the date the ROD is signed. Approval may be extended if the miners are operating within their terms and NEPA compliance is still adequate and current at the time of extension. Prior to any extension, compliance with ESA Section 7 consultation will be evaluated, and re-initiation may be necessary. The complete Plans of Operations are available in the analysis file. Map 3 at the end of this document displays locations of the Plans of Operations under Alternative 2, and summaries and sketch maps of the Plans can be found in Appendix 8.

Suction Dredging Requirements Under Alternative 2

A State moratorium prohibits motorized mining in Essential Salmon Habitat from January 2, 2016 until 2021. Suction dredge mining will not be allowed on those claims containing ESH or naturally reproducing populations of bull trout until 2021 or until State law is changed. Should the moratorium be lifted prior to 2021, the miners will adhere to the terms and conditions listed in the ODEQ 700PM permit that is in place at that time. Refer to Chapter 1, Oregon State Bill 838 and Suction Dredging for more detailed information.

For Plans of Operations in areas not included in the moratorium, all coverage and eligibility requirements, and terms, conditions, and requirements listed in the May 2015 700PM General Discharge Permit (Appendix 4B) would be adhered to by those miners proposing suction dredging in their Plan of Operations.

Monitoring Under Alternative 2

The Whitman Ranger District and North Fork John Day Ranger District Minerals Administrators are responsible for completing the annual minerals inspections and review to determine if Forest Plan standards and guides, as well as the requirements in the Plans of Operations are being met. If operations are found to be non-compliant, the Minerals Administrator is responsible for assuring corrective action is taken. Depending on complexity of the operation, some of these operations are inspected twice, if not more, during the operating season. Perennial streams in the claim shall be monitored by the Forest Service for water quality, sediment, and temperature through normal compliance inspections, and reclamation inspections.

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. A 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 improved to meet Forest Service standards.

At the same time, the implementation of the PACFISH standards and guidelines for Minerals Management (MM-1, MM-2, MM-3 and MM-6) would also be monitored during annual inspections (Table 2-4). If there are any noticeable impacts to resources, including a discharge of fine sediment into live streams, the operations would be stopped immediately and not allowed to resume until corrected. Screening for annual monitoring includes verification that:

- Applicable standards and guides and other regulations have been incorporated into Plans of Operation.
- Requirements developed during project-specific consultation have been incorporated into Plans.
- The Plans contain stipulations for modification, including reclamation requirements and bond amounts.
- For surface-disturbing activities, that reclamation requirements are included, and that a bond is in place.
- Reclamation requirements in the permit provide for needed short- or long-term monitoring and maintenance of the reclaimed project site.
- The Plans of Operation do not prevent attainment of PACFISH riparian management goals and objectives (RMOs) and avoid adverse impacts to listed species and their habitat.
- Terms and conditions in the NMFS and USFWS Biological Opinions have been met

Annual inspections would also examine the following:

Table 2-4: Annual Inspection Items

Item	Action
Equipment and Structures	List sizes and take photos of all
Earthwork	A) Excavations (testing and mining hole sizes and note if current work) B) Processing site (size of compacted area not including settling ponds) C) Settling ponds (sizes, if they are holding water, if they have been cleaned out, and if there is vegetation) D) Camp area (size of area being compacted by camping) E) Roads (lengths of any accesses to sites, condition)
Water	List if there are any overflows, muddy water, distance of workings to water, etc. Inspect fords to ensure fish passage is not impaired or blocked.
Suction Dredging	Inspections will ensure compliance with federal laws, regulations and policies (eg. 36CFR 228.4

Item	Action
	(a) (4), and 228.4 (e)). Resource concerns and damage will be documented in every inspection. The state of Oregon (DEQ and DSL) is responsible for ensuring compliance with its permits.
Weeds	List if there are weeds, identify if possible, take picture if you are unsure, take a measurement of area, and GPS
Access	List all the roads and numbers to get to the site
Sketch Map	Include conversations, any campers on site, any other uses of sites for records. This is also an area for photo references from the sketch map. Also list any non-compliance issues.

Current regulations allow the district ranger to stop all operations that are noncompliant with the operating plan or the result of an unforeseen significant disturbance (36CFR 228.4 (a) (4), and 228.4 (e)). An example of an unforeseen significant disturbance could be a discharge of sediment into the stream as the result of a large flood. A discharge of this nature would be determined if the inspectors observed sediment discharging into streams or saw evidence of discharge, such as rills and gully development, from the operating area to adjacent streams, or the development of seepage zones along streambanks related to ponds.

BMP Monitoring

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

The draft National Core BMP Monitoring Technical Guide (Volume 2, FS-990b, in prep) was made available in 2015, with plans to finalize in 2016. The draft protocols will be publically available when the Draft monitoring guide is released for review. When the monitoring protocols are finalized they will be posted on the webpage for the Granite mining project.

A description of Best Management Practices monitoring is found in the Biological Assessment Appendix G). The minerals forms were recently revised in January 2015, and are available at the following link: http://fsweb.wo.fs.fed.us/wfw/watershed/national_bmps/bmp_docs-minerals.html

Stream Monitoring

The Forest Service will conduct a random sampling inspection of suction dredging activities during each season to ensure that the miners are in compliance with their Plan of Operations. A daily monitoring log referenced in the May 2015 700PM permit is required to be kept by all miners conducting suction dredging activities, and must be legible and made available to the State upon request.

Plan disturbance levels shall be monitored to assure applicable components of the Plan of Operations are adhered to.

Method: Inspection
Frequency: Ongoing throughout the operating season, no less than one inspection annually.
Duration: All active periods of operations
Coordinator: Minerals Administrator
Threshold: If disturbance levels are exceeded, the occurrence shall be documented and appropriate action taken to correct the situation.

Monitor to determine if prescribed erosion control methods are in place and effective.

Method: Partial inspection, concentrating on areas with high probability of failure
Frequency: preseason, at seasonal closure, and after major rain events.

Duration: Until disturbed areas have revegetated
Coordinator: Minerals Administrator
Threshold: If combination of failure of cross drains and/or seeding is leading to gully erosion, appropriate maintenance shall be performed.

Noxious Weeds Monitoring (Implementation and Effectiveness)

1) Frequency of Monitoring and Responsible Party

Meet the requirements of the Region 6 - 2005 Preventing and Managing Invasive Plants EIS and ROD.

- The District/Zone Minerals Program Administrator shall be responsible for the monitoring for compliance with prevention standards outlined in the Region 6 - 2005 Preventing and Managing Invasive Plants EIS and ROD.

- The miner, the District/Zone Minerals Program Administrator, and the District/Zone Invasive Species Coordinator shall share responsibility for annual inspections of the site and haul routes for noxious weed infestations. The inspections shall continue for five years after a plan has terminated.

- The District/Zone Invasive Species Coordinator shall be responsible for the inventory of all noxious weed infestations that occur on the project site which are reported to him/her.

- The District/Zone Invasive Species Coordinator shall be responsible for monitoring noxious weed presence (following initial report), population size, density, new occurrence, and treatment.

- The District/Zone Invasive Species Coordinator shall inspect all roads to be closed for noxious weed infestations (and inventory/early treatment if necessary) prior to road closure.

2) Effectiveness of Noxious Weeds prevention, monitoring and mitigation

The District/Zone Invasive Species Coordinator will provide cursory evaluation of mitigation measure and treatment effectiveness as district/zone wide data is compiled for reporting purposes. Periodic (5-10 year) Forest reviews will provide in-depth evaluation of mitigation measure/treatment effectiveness.

Alternative 3 – Plans of Operations as submitted by the Miners with Forest Service Requirements

The following activities are proposed under this alternative:

- Authorizing approval of 28 mining Plans of Operations, pending any 401 certifications and valid water rights deemed necessary as a result of this analysis
- Inclusion of Forest Service Requirements in Plans of Operations for protection of water quality, soils, fisheries and other resources (Appendices 2 and 12)
- Inclusion of Monitoring Measures in Plans of Operations
- Authorizing use of 4.18 miles of previously closed or decommissioned Forest Service roads (3.73 closed and 0.45 decommissioned)
- Authorizing use of 8.21 miles of existing miner-created temporary roads
- Authorizing use of 0.43 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 10 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 1 new ford (1 ford at Tetra Alpha Placer)
- Authorizing placement of 1 temporary bridge to be removed at the end of each operating season (Ruby Group)
- Authorizing installation of 3 new gates (East Ten Cent Creek and Hopeful 2&3)

This alternative includes the 28 Plans identified in Alternative 2. The Plans of Operations included in this alternative are in the analysis file. Summaries of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, and all applicable State and Federal fire regulations.

Monitoring requirements are specific to each Plan, except where State and Federal laws and regulations apply.

Map 3 at the end of this document displays locations of the Plans of Operations under Alternative 3.

401 Certification for Activities with the Potential for a Discharge

When an activity in a proposed Plan has been identified by the project hydrologist as having the potential for a discharge, 401certification from ODEQ must be presented to the Forest Service prior to approval and commencement of that mining activity. Any additional terms and conditions included in the 401 certification related to that activity will be incorporated into the Plan. To ensure consistency with Section 401 of the CWA and Forest Service Handbook 2817.23, if a 401 certificate is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed activity(s) requiring 401 certification.

Valid Water Rights for Plans proposing Water Withdrawals that may Increase Stream Temperatures

When an activity in a proposed Plan has been identified by the project hydrologist as having the potential to increase stream temperatures, such as water withdrawals from a stream, prior to Plan approval, the Forest Service will consult with Oregon Water Resources Department (OWRD) for documentation of a valid water right. To ensure consistency with Section 401 of the CWA and Forest Service Handbook 2817.23, if a valid water right is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed water withdrawal.

Use of Closed, Decommissioned and Temporary Access Roads

Table 2-3 displays a list of roads proposed for use under each alternative. The approved Plan of Operations will include a list of all access roads authorized for use by the miner.

Plan Expiration

Approval of all Plans would expire 10 years from the date the ROD is signed. Approval may be extended if the miners are operating within their terms and NEPA compliance is still adequate and current at the time of extension. Prior to any extension, compliance with ESA Section 7 consultation will be evaluated, and re-initiation may be necessary. The complete Plans of Operations are available in the analysis file. Map 3 at the end of this document displays locations of the Plans of Operations under Alternative 3, and summaries and sketch maps of the Plans can be found in Appendix 8.

Inclusion of Forest Service General Requirements

In addition to the protection measures and reclamation plans submitted by the miners under Alternative 2, each Plan would include General Requirements to meet minerals regulation 36 CFR 228 Subpart A (228 Regulations) that are specific to each Plan's activities (Appendix 2).

Inclusion of Forest Service Plan-Specific Resource Protection Measures

Unlike Alternative 2, under Alternative 3, additional Forest Service Requirements would be added to the Plans of Operations for protection of water quality, soils, fisheries and other resources. These Requirements include: General Requirements (Appendix 2), and the Plan-specific Resource Protection Measures which are included in Appendix 11.

Inclusion of USFWS and NMFS Terms and Conditions

As a result of consultation for this project, final Terms and Conditions are expected to be received from U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) in spring of

2016. The final Terms and Conditions will be incorporated into the Plans of Operations prior to Plan approval.

Suction Dredging Requirements

The suction dredging requirements are the same as described for Alternative 2.

Monitoring

Monitoring and annual inspections by the Forest Service are the same as described under Alternative 2, with the following two additional monitoring measures:

Monitoring protection measures and requirements

During annual inspections, the Forest Service will determine if the miner has implemented all measures and requirements in Appendices 2 and 12, and that they are achieving the desired results. Also, a daily monitoring log (as identified in the 2015, 700PM permit) must be legible and made available to the Forest Service upon request.

Monitoring Closed Sites

Once an operation is closed (all proposed actions are complete), annual inspections by a Forest Service biologist or minerals administrator would occur the first three years and then once at 5 years, and then finally at10 years after closeout, depending on the type of reclamation work done, to ensure that reclamation activities are complete and successfully implemented.

Comparison of Alternatives

The difference between Alternative 2 and Alternative 3 is the difference between what was proposed in the Miner's Plan of Operations, as submitted by the miner, and what the Forest Service proposes as changes to the miner's proposal to meet requirements of 36 CFR 228. Under Alternative 3, all Plans would include Forest Service Requirements: General Requirements (Appendix 2), and Plan-Specific Resource Protection Measures (Appendix 11). Alternatives 2 and 3 also include proposals for use of Forest Service roads for mine access that are currently either closed or decommissioned, or are temporary non-system roads. Some of the roads proposed for use differ between Alternatives 2 and 3.

Refer to Table 2-2 above for a comparison of the operations by alternative.

Tables 2-5 through 2-7 display a summary of impacts to issues and resources through implementation of each alternative.

Table 2-5: Comparison of Effects to Water Quality Issues/Key indicators for Water Quality

	Alternative 1	Alternative 2	Alternative 3
# of Plans Operations with potential to discharge sediment into a creek	3	16	2
# of Plans Operations with potential to discharge heavy metals into a creek	0	3	0
# of Plans of Operations with potential to discharge warm water	0	1	0
# of Plans of Operations with potential to discharge creosote	2	0	0
# of Plans Operations with potential to alter stream temperatures	0	5	5
# of Plans Operations with potential to alter stream flow	0	5	5

Table 2-6: Comparison of Alternatives for Fish Issues/Key indicators for Fish

Key Indicator	Alternative 1	Alternative 2	Alternative 3
# of Plans of Operations with stream fording	0	9	9
# of Plans of Operations with suction dredging in fish habitat (acres of habitat)	0	5	5

Table 2-7: Effects on Threatened, Endangered, and Sensitive Fish Species

Key Indicator		Alternative 1	Alternative 2	Alternative 3
# Plans of Operations Likely to Adversely Affect /LAA ESA Listed Fish Species and/or their Designated Critical Habitat	Bull trout # of Plans	0	11	9
	Steelhead # of Plans	0	18	11

Preferred Alternative

Alternative 3 is the agency preferred alternative.

Chapter 3 – Affected Environment and Environmental Effects

Chapter 3 describes the environment and environmental effects as described by the existing condition, direct, indirect, and cumulative effects relevant to this analysis and concludes with a discussion of specifically required disclosures.

This chapter presents the relevant resource components of the existing environment – the base line environment. It describes the resources of the area that could be affected by the alternatives and discloses the environmental effects of implementing the alternatives. These form the scientific and analytical basis for comparing the alternatives described in Chapter 2.

It focuses on the resources that are relevant to or affected by the scope of the analysis: Water Quality and Soils, Fisheries, Wildlife, Invasive Species, Botany, Access/Transportation, Recreation, Roadless and Potential Wilderness Areas, Visuals, Social/Economics, and Cultural Resources. Acre totals are approximate within tables and text due to rounding.

This FEIS incorporates by reference the Resource Specialist Reports in the Project Record (40 CFR 1502.21). These reports contain the detailed data, executive summaries, regulatory framework, assumptions and methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach conclusions in the FEIS.

Cumulative Actions and Activities

Cumulative effects are analyzed in this chapter. Each resource area identifies the specific actions and activities that were considered to overlap with the direct and indirect effects of the proposal and alternatives. The actions and activities considered for cumulative effects are shown in the following table.

Table 3-1: Past, Present and Reasonably Foreseeable Actions within the Analysis area

(P = Past, O = Ongoing, F = Future)

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
P	Bull run Culverts Decision signed 6/24/13	WWNF	**Bull Run Culvert/Corrigal Springs (7375 Road) T. 9 S, R. 36 E., Sec. 19):** The existing culvert was removed and disposed of off National Forest System land and replaced with an appropriately sized structure to meet a 100-year flood event and allow fish passage. New culverts have an open bottom design with concrete footings.
P	Culverts on 10 Cent Creek	UNF	Three culverts on Ten Cent Creek were replaced in 2012 for fish improvement.

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
F	Granite Culvert Replacements	WWNF	This project proposes to remove and replace 7 culverts with fish passage friendly structures throughout the area around the town of Granite, OR. Projected implementation summer 2015.
P	Storm Damage Risk Reduction (SDRD)	UNF	SDRD – (Storm Damage Risk Reduction). Culvert replacement and other drainage improvements on the 1035 1038, and the 7335 road systems. (Fortifying road edges, planting trees and shrubs, improving ditch lines and drainage dips, and restoring unusable roads beds to forested land.)
P, O	Road use and Road Maintenance	WWNF & UNF	The analysis area has an extensive Forest Service road system that was built during the period of large-scale logging which took place in the 1960s and 1970s Road maintenance is an ongoing activity. The main gravel roads receive surface maintenance usually once a year. On about a 5-year schedule, all other roads get inspected for deferred maintenance. Problems identified during inspections are taken care of within the year. Over 6 miles of road were decommissioned (full obliteration) with Legacy Road funds in 2008 in Lower Granite Creek.
P, O, F	Invasive Species Management	WWNF & UNF	The WWNF and UNF both completed Invasive Plants Treatment FEIS's and ROD's in 2010. The WWNF ROD is currently under litigation, but certain types of treatments are still allowed (see Invasive Species section below). Both forests will continue to implement treatments to prevent the introduction and spread of noxious weeds.
P, O	Fire, Fuels Reduction and Timber Harvest	WWNF & UNF	Greenhorn Thinning (ongoing) and Granite Interface (past – 2004) Granite WUI – Ten Cent fuels area – Blue Mtn Forests fuels reduction project: This work may include; setting of prescribed fires to improve the composition, structure, condition and health of stands or improve wildlife habitat, removing vegetation or other activities to promote healthy forests, reduce fire hazards, or achieve other land management objectives, watershed restoration and maintenance, restoration and maintenance of wildlife and fish habitat, control of noxious weeds and exotic weeds, and re-establishment of native plant species.
O	Dispersed Recreation	WWNF & UNF	

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			The project area is used recreationally for hunting, hiking, berry picking, firewood cutting, dispersed camping and picnicking, snowmobiling, cross country skiing, and OHV use. A portion (3,021 acres) of the Vinegar Hill/Indian Rock Scenic Area lies within the analysis area, and includes several hiking (non-motorized) trails.
O	Developed Recreation – Olive Lk. Campground,	UNF	Olive Lake Campground is the only developed campground within the analysis area. There are 26 campsites, 2 day use sites, a fishing platform, boat ramp/dock and a 2.5 mile hiking trail around the perimeter of the lake. Fishing, boating, picnicking, overnight camping, and hiking are popular activities at this site.
O	Trailheads	UNF	The Saddle Camp/Lost Creek Trailhead (T9S, R35E, s14) is the only developed trailhead accessing the scenic area within the analysis area. Facilities include a graveled parking pad, signing and a bulletin board. Granite Creek Trail Head (T8S, R35E, s20) access the wilderness area. Has a gravel parking area and a bulletin board Ben Harrison Trail Head (T9S, R35E, s22) this is an undeveloped site which access the wilderness. Olive Lake Trail Head (T9S, 34E, s15) this trail head is located in the Olive lake Campground and access Saddle camp and the lost Creek trail.
O	Recreation Rentals – Fremont Powerhouse	UNF	The turn of the century Fremont Powerhouse site is a popular location for visitors to learn more about the area's early mining history. The four old employee houses are part of the cabin rental program and are available for rent thought out the year. The site will continue to have occasional administrative use as well and all houses may not be available for rent at one time.
P, O, F	Recreational Special Use Permits	WWNF & UNF	Throughout the years there have been occasional Special Use Permits (SUP) for a recreational event and/or outfitter guide services. To date, there are currently no SUP's authorized in the analysis area. As new request are received they will be evaluated and analyzed at that time.
O	Long-term Special Use Permits	WWNF & UNF	Currently, there are only a few lands related Special Uses in the Granite watershed area. These consist of power, electrical and water transmission lines to the local communities and residences of the area. They include the City of Greenhorn Water transmission line, Pine Telephone phone transmission line, and OTEC (Oregon Trails Electric Company) power transmission line (project file).

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
O	OHV use	WWNF & UNF	On the WWNF, with the exception of the North Face Vehicle Closure, the entire area is open to motorized travel including off-road travel. All maintenance level 1 roads (closed roads) are open to off-road vehicles. On the Umatilla NF, there are no designated OHV (Off Highway Vehicle) trails in the area. However, OHV activity is permitted and does occur on open roads in the analysis area. This includes riding motorcycles (Class III) and four-wheelers (Class I) on these roads. With the exception of Forest Service Road 10, all open roads within the analysis area are open to OHV travel, per the 2001 Interim Program for ATV/OHV Strategy on the Umatilla National Forest (UNF). Additionally, the 1000460, 1000520, 1010370, 1035060, 1035080, 1038060, 7350050, 7350052 and 7350070 are forest system roads open seasonally to OHV use but closed to other motorized trails. Note that State law does not allow ATV use on two lane roads. All double digit roads 73, 10 etc are considered two lane roads and not useable to ATV's unless they are highway certified.
O	Snowmobiling	WWNF & UNF	On the WWNF, several miles of designated snowmobile trails occur within the area. These trails utilize snow-covered forest system roads that are mechanically groomed (snow-packed). The designated trails are used by snowmobiles during the winter months, generally December through the middle of March. Occasionally, snowmobilers use non-designated roads. On the Umatilla NF, Forest Service Road 10 is groomed for snowmobile use from the junction of Rd. 13 and Rd. 10 to Desolation Guard Station. All of FS Rd. 10 within the analysis area serves as a groomed snowmobile trail during the winter months. A local snowmobile club grooms the trail (Rd. 10) when there is adequate snow coverage, typically between the months of December and March. Because snowmobile use would occur outside of the time when miners typically operate, there would be no measurable impact to snowmobile activity from the action alternatives.
P	Grazing	WWNF & UNF	Inactive Range Allotment – Camp Creek C&H Allotment. No ongoing grazing in the watershed.
P, O, F	Notice Level Mining	WWNF & UNF	Approximately 1 – 4 Notice of Intent (NOI) requests for mining operations are submitted to the Forests per year. These are typically small- scale activities and last for one summer or less (testing, panning, pick and shovel work). Activities larger in scale and longer term are required to provide Plans of Operations. Due to the current gold market, it is

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			expected that NOI's will continue to be submitted in the future and they will be reviewed by the District Rangers as they are received.
P, O	Private Land activities	WWNF & UNF	Granite and Greenhorn – Cabins, Residences, Past Harvest small-scale timber harvest. ODF regulates timber harvest on private land. Private lands within and immediately adjacent to the Granite Mining analysis area are forested tracts, similar to Forest Service and BLM ownership lands. These areas generally experience minimal harvest. Some mining activities occur on private land, and are mostly limited to what the land owners can do on their own. Oregon Department of Environmental Quality issued a revised 700PM General Permit for Small-Scale, In-Water Mining May 15, 2015. In addition, effective January 1, 2014, Oregon Department of State Lands issued new administrative rules for the General Authorization for Recreational Placer Mining. Placer and suction dredge mining can occur if appropriate permits are acquired and regulations are followed. This includes a minimum distance of 500 feet maintained between motorized dredge equipment. Additional mining could occur on private lands within the Granite Mining project area, and based on activities in the recent past activities would be small-scale.
P, O, F	Redboy, Bluebird, and Black Jack Mine Restoration Improvements - NFJD Watershed Council and Forest Service	UNF	Ongoing maintenance and repair of the pipeline and settling ponds. 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. Blue Bird and Black Jack Mines - Annual maintenance on the outlet pipes and the settling ponds for the acid drainage from the

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
			adits. Protection measures in Alternative 3 are designed to prevent a cumulative effect from maintenance or any potential restoration failure at Blue Bird and Black Jack. Additional evaluations are needed and the site was placed on Confirmed release list in 2003.
F	CERCLA investigations	WWNF & UNF	CERCLA site identified for investigation that overlap proposed Plans include Eddy Shipman from the historic Central and the East Eddy adits.
P, O	AML mine restoration and reporting	WWNF & UNF	State and local agencies are continuing clean up and conduct rehabilitation work areas outside of the proposed Plans in the Granite Creek watershed. Watershed monitoring and assessment work is being conducted through a contractor on Clear Creek. Work at the Red Boy Mine continues. Granite Creek received some stream side restoration in 2013 and other areas are being considered for future restoration. The Beaver Creek and Clear creek junction received soil in which vegetation and trees were planted in order to restore that area. • Over 100 historic and or abandon mines exist in the Granite Creek Watershed. Inventory and assessment work of these mines is ongoing. • Between 2001 and 2007, 2 miles of Granite Creek and 3 miles of Clear Creek had restoration work done on the dredge trailing in order to return them to a more natural condition and improve stream habitat. Restoration included planting of 5000 shrubs, hardwoods, and conifers, and approximately 400 lbs of native seed. • In 2013 the Watershed council and the CTU did a stream restoration project on the private land section of Granite Creek near the junction with Clear Creek. • Redboy Mine (see above). • Blue Bird and Black Jack Mines - Annual maintenance on the outlet pipes and the settling ponds for the acid drainage from the adits. • In accordance with the CERCLA act a number assessment reports have already been completed in this area but there is still more to do.

Past, Ongoing, or Future Project	Name of Project	Forest(s)	Notes
P, O	Ditches	WWNF & UNF	Approximately 30 miles of existing ditchlines, mostly on WWNF used for irrigation, none of which are currently under special use permits with the Forest Service.
O	Authorized State Water Withdrawals	WWNF & UNF	Mining operators with valid water rights issued by the State of Oregon in the Granite Creek watershed.
P	Historic Towns – private land	WWNF & UNF	The historic mining towns of Granite and Greenhorn still exist today, but currently cater more to tourist and summer homes. Sumpter to the south has a state park, and along with the Fremont Power House is part of the historic dredge tour.
O	Olive Lake Dam Improvement	UNF	In 2013 all debris was removed from the entrance of the Olive Lake spillway. A new debris boom replaced the old debris boom at the same location. The log boom was placed with two 75-foot floats linked in a "V" shape. In the future, as funding is available, the spillway will be reshaped to its original elevation and configuration and then lined with riprap. Vegetation will be cleared from the spillway; currently, vegetation is trapping sediment, which reduces the spillways capacity. The lakeside face of the dam will also be lined with riprap. This maintenance work will include in-water work or placement of material along the face of the dam and spillway locations.
O	Vinegar Fire & recovery	UNF	About 1500 acres burned from a lightning caused fire in the Vinegar Hill and Salmon Creek area in the fall of 2013. A number of restoration measures were put into place before winter and the area was monitored in 2014 for any additional needs.
P,O, F	Noxious Weed control	WWNF & UNF	Yearly weed treatments of known sites is conducted on the WWNF and UNF through a programmatic EIS. As new sites are found, they are documented, monitored and treated.

To understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environments to the present.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on

individual actions would be less accurate than looking at existing conditions because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions may risk ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

The cumulative effects analysis in this EIS is also consistent with Forest Service National Environmental Policy Act (NEPA) regulations (36 CFR 220.4(f), July 24, 2008), which states in part:

> CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal of agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered, (including past, present, and reasonable foreseeable future actions) on the affected environment). With respect to past actions, during the scoping process and subsequent preparation for the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some context be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalog or exhaustively list and analyze all individual past actions. Simply because information about past may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision-making (40 CFR 1508.7).

For these reasons, the analysis of past actions in this section is based on current environmental conditions unless otherwise noted.

Water and Soil Resources

Introduction

This section describes the existing condition of the Water and Soil resources in the Granite Creek Mining Analysis Area based on field visits and information from the Granite Creek Watershed Analysis Report (*USDA Forest Service 1997)* in which the historic and current conditions of the soil and water resources are discussed.

Scale of Analysis and Affected Environment

Watershed

The Granite Creek Mining Analysis Area is located in northeastern Oregon, in the Granite Creek Watershed (10th field HUC 1707020202). The Granite Creek Watershed is comprised of 40,857 acres on the Wallowa-Whitman National Forest (WWNF), 49,262 acres on the Umatilla National Forest (UNF), and 4,407 of private land and 167 acres of Malheur NF. This watershed centers around Granite Creek, a headwater tributary to North Fork John Day River, which lies within the John Day River Basin (6th field HUC 170702). The Granite Creek HUC 10 watershed consists of six HUC 12 subwatersheds (**Table 3-2**). Location of the 2010 NHD subwatersheds are shown in Map 4 at the end of this document.

Table 3-2: 2010 NHD Subwatersheds within the Granite Watershed

SWS Name	SWS Number	SWS TOTAL Acres	SWS TOTAL sq. miles	WWNF Acres	UNF Acres	Private/ Other Acres	% NFS Lands
Beaver Creek	170702020203	13,078	30.31	12,104	16	958	92.7
Bull Run Creek	170702020202	19,400	31.98	18,765	0	635	96.7
Clear Creek	170702020204	20,468	18.65	1,562	17,682	Private: 1,057 and Malheur NF: 167	94.8
Lake Creek**	170702020205	11937	31.69	0	11,884	53	96.8
Lower Granite Creek	170702020206	20,283	14.55	1,055	17,954	1,274	93.7
Upper Granite Creek	170702020201	9,314	147.63	7,138	2,003	173	98.2
TOTAL ACRES		**94,480**	**20.43**	**40,624**	**49,539**	**4,317**	

****** The Lake Creek subwatershed has no proposed Plans of Operation and therefore is not discussed further. Plans of Operation are proposed in the other five subwatersheds.

Current and Historic Land use

The primary human impacts to the watershed include historic and ongoing beaver trapping, mining (lode and placer), water diversions, timber harvest, road construction, historic domestic livestock grazing, ongoing motorized recreation, and human habitation. Hazardous fuels and Wildland Urban Interface

(WUI) designation in the vicinity of Granite (extreme hazard rating) make this area a priority for fuels reduction. There is no livestock grazing currently permitted on the National Forest (the Camp Creek allotment was vacated in 2006). Effects from natural disturbances including wildfires and insect and disease epidemics are also present in the 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 ongoing.

Restoration and reclamation work has been ongoing in the Granite Creek watershed for more than three decades, yet much remains to be done. Some actions may be one-time investments, but others will require long term investment because chronic conditions and/or severe impacts. Portions of the watershed were severely altered by dredging, hydraulic, placer and lode mining activities from the late 1890s up to WWII and on into the 1950s. Mining effects on watershed function are variable, highly complex, and fully described elsewhere in numerous reports and scholarly articles. In the 1970s and 1980s, restoration activities focused on improving instream habitat to increase pools and help ensure survival during the late summer low flow period. Numerous instream structures (log-rock weirs) were installed in tributaries to improve late summer pool habitat and hold fish. During the same time period, efforts to reclaim abandoned mines with known toxic discharge focused on diverting discharge into off-channel settling ponds. With passage of the CERCLA Act, both forests have initiated the required reporting and analysis for the abandoned mine sites in this watershed. Activities that have been or will be implemented to address priority sites is listed at http://www.fs.fed.us/r6/uma/projects/index.shtml and http://www.fs.fed.us/r6/umatilla/landmanagement/planning/?cid=stelprdb5208004 for the Umatilla sites, and http://www.fs.usda.gov/detail/wallowawhitman/landmanagement/projects/?cid=stelprdb5287229 for the Wallowa-Whitman sites.

Restoration projects were initiated in the Granite Creek watershed in the 1970s. Between 2001 and 2007, 2 miles of Granite Creek and 3 miles of Clear Creek had dredge tailing restoration, including planting of 5000 shrubs, hardwoods, and conifers, and approximately 400 lbs of native seed mix. Over 6 miles of road were decommissioned (full obliteration) with Legacy road funds in 2008 in Lower Granite Creek, and several aquatic organism passage projects are in the planning stages (upper Granite Creek) (*USDA Forest Service 2008).*

Landform Characteristics

The Granite Creek watershed begins in the Elkhorn and Greenhorn Mountains at elevations over 8000 feet. Granite Creek and its tributaries flow to the southwest, and at its junction with Bull Run Creek, turns in a northwesterly direction to join the North Fork John Day River at an elevation of 3900 feet. The geology includes ancient seafloor volcanics and crustal ultramafics, a mix of sedimentary and metamorphic complexes, granite intrusions, a more recent series of surface volcanic flows (Columbia River Basalts), glacial moraines, and recent alluvial deposits. Minerals of interest are not limited to any one geologic formation or rock type, but can be found in all of them.

Vegetation communities in the watershed reflect the influences of climate, topography, and geologic setting, and are characterized by mixed dry pine plant communities in the lower elevations and cool-moist subalpine fir/whitebark pine in the higher elevations. Fuel conditions vary widely across the watershed but trend toward the high end of loadings partly as a result of fire suppression. Riparian vegetation types include conifer communities in smaller tributaries, grass-forb meadow types, and mixed forb-shrub communities, including black cottonwood, aspen, willow, red-osier dogwood, rocky mountain maple, wetland forbs, sedges, and a variety of grass species. The general condition of vegetation varies across the landscape depending in part on past management of the specific area (*USDA Forest Service 1997).*

Channel Morphology and Drainage Network

Drainage density is the miles of stream channel per square mile of drainage. Generally, as drainage density increases so does flow response and the size of a flood peak. Roads increase drainage densities by intercepting precipitation and subsurface flows and routing them in places directly to the channels (Wemple 1994).

Granite Creek Watershed has 221.7 miles of perennial stream and 167.44 miles of intermittent streams based on the existing Forest Service GIS layer (**Table 3-3**). As a result of past land use activities, most if not all of the streams have widened, incised, and straightened and over one third of the streams in the watershed go seasonally dry. Active floodplains are much narrower than the historic floodplains as a result of these channel changes with streams no longer flooding their valley floors on a 1-2 year basis. In some place placer tailings line the stream channel and keep it confined. In other places, such as along Bull Run Creek, roads confine the stream. Restoration work has occurred along Clear Creek and Granite Creek resulting in a redistribution of the old tailings such that portions of the channels are no longer confined between the old placer tailings piles. However, existing streams still remain isolated from these restored valley floors because the channels remain over wide and incised.

Table 3-3: Stream drainage density by subwatersheds within the Analysis Area (Forest Service GIS layer 2012).

Subwatershed	TOTAL SWS (sq. miles)	Stream Type	Stream Miles	TOTAL Stream Drainage Density (miles/sq. mile)
Beaver Creek	20.43	Intermittent Streams	15.31	
		Perennial Streams	25.59	
		TOTAL	**40.9**	**2**
Bull Run Creek	30.31	Intermittent Streams	15.95	
		Perennial Stream	58.82	
		TOTAL	**74.78**	**2.47**
Clear Creek	31.98	Intermittent Streams	43.43	
		Perennial Stream	39.82	
		TOTAL	**83.25**	**2.6**
Lower Granite Creek	31.69	Intermittent Streams	66.76	
		Perennial Streams	45.5	
		TOTAL	**112.27**	**3.54**
Upper Granite Creek	14.55	Intermittent Streams	7.24	
		Perennial Stream	27.63	
		TOTAL	**34.87**	**2.4**
	128.96	**Grand Total Miles**	**346.07**	**2.68**

The amount of road length that contributes to drainage density varies depending on road drainage structure spacing and effectiveness and on the topographic setting (e.g. does the road drain into the stream from both sides or from one side). For this analysis, a conservative estimate of 200 feet of road per stream crossing (or 100 feet per side) was used when calculating the increase in drainage miles and thus drainage density as a result of road-stream crossings.

The road-stream crossings added 18.49 miles of drainage length in the five subwatersheds with the miles distributed over the five subwatersheds within the Analysis Area. The amount of percent increase in the drainage density for a given subwatershed varied from 3.8 to 9.5 % (**Table 3-4).**

Table 3-4: Expansion of the Drainage Density by Subwatersheds within the Analysis Area as a function of road and stream crossing interaction (Forest Service GIS layer 2012).

SWS Name	TOTAL SWS Drainage Area (sq. miles)	Total Road miles*	Stream miles	# Stream crossings	Drainage miles added due to road-stream crossings	Stream miles plus Road-stream crossing miles	Drainage Density without Roads (miles/sq. mile)	Drainage density with Roads (miles/sq. mile)	Drainage Density increase as a result of road crossings (%)
Beaver Creek	20.43	125.68	40.9	103	3.9	44.8	2	2.19	9.5
Bull Run Creek	30.31	146.25	74.78	132	5	79.8	2.5	2.6	4
Clear Creek	31.98	38.69	83.25	57	2.16	85.4	2.6	2.7	3.8
Lower Granite Creek	31.69	59.39	112.27	106	4.02	116.3	3.5	3.7	5.7
Upper Granite Creek	14.55	70.94	34.87	90	3.41	38.3	2.4	2.6	8.3
TOTAL	**128.96**	**440.95**	**346.07**	**488**	**18.49**	**364.6**			

*Road miles and road densities calculations based on Forest Service open and closed roads, county, state and private road miles

Precipitation

Precipitation within the Granite Creek Watershed varies with elevation and time of year **(Table 3-5).** The climate is dominated by snow during the winter season and augmented by spring rains. Precipitation records are in the watershed are limited to a site at the town of Granite (ID CHCND:USC00353430). The period of record is 7/2/1948 to 10/16/1967 (Western Regional Climate Center). The site is 4944 feet above sea level.

Table 3-5: Precipitation and Snow fall data from a site at Granite, Oregon in Grant County in inches

	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec	TOTAL
Av. Total PPT	3.66	2.93	2.73	1.87	2.33	1.76	0.6	.071	1.08	1.93	2.93	3.84	26.37
Av. Total snow fall	40.6	31.5	29.7	10.5	3.9	0.6	0	0	0.7	3.7	17.5	35.4	174.1

Water Quality

Aspects of water quality considered in this analysis are stream temperature, turbidity via sediment inputs from off channel, and heavy metals from adit discharges. Both stream temperature and heavy metal input issues are the result of historic land use activity. Sediment inputs are the result of both historic and current activities.

Air temperature has become the most important variable for predicting both the mean and maximum daily water temperatures and patterns of temperature changes because current streams are over-widened, incised, straightened and disconnected from their historic floodplains (valley floors). As a result groundwater tables have dropped and no longer contribute cool base flows to the streams during the summer. In addition, the loss of riparian vegetation and over-widening of the channels has eliminated much of the shade component on the rivers.

Stream Temperature

Existing stream temperature conditions are the result of historic land uses. Factors contributing to elevated stream temperatures include 1) channel incision, widening and straightening as a result of past land use activities, 2) the loss of riparian vegetation resulting from historic placer mining, beaver trapping, timber harvest, and grazing, and 3) the loss of groundwater inputs due to loss of floodplain access and groundwater recharge during flooding.

Summer stream temperatures have been collected on 12 streams in analysis area. The 7-day moving average of the daily maximum stream temperatures for all of these streams exceed the applicable state water quality standard of 53.6°F for bull trout spawning and rearing (**Appendix 5A**). A map showing the location of these stream temperature sites is found at the beginning of **Appendix 5A.**

It is the responsibility of the Forest Service to address 303(d) listed waters on National Forest System lands and to develop strategies that will improve water quality, based on the specific parameters listed. Prior to 2010, four streams in the analysis area (Beaver, Bull Run, Clear and Granite) were 303(d) listed by Oregon Department of Environmental Quality (ODEQ) as water quality limited for temperature and in two cases, sedimentation. With the completion of the John Day River Basin Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) (ODEQ 2010), these four streams are no longer 303(d) listed for temperature. The TMDL calls for all feasible steps toward flow restoration and protection (J.Dadoly, personal communication 8/2014). The principal causes of stream heating in the basin are near stream vegetation removal, channel reconfiguration, and instream flow loss (ODEQ 2010). The temperature target as determined by the John Day River Basin TMDL and WQMP for streams in this

watershed is 53.6°F (ODEQ 2010, p. 61). All twelve streams continue to exceed this standard (**Appendix 5A)**.

Sedimentation

Bull Run and Granite Creeks are listed as water quality impaired for sedimentation under Section 303(d) of the Clean Water Act by the State of Oregon. All of Bull Run Creek is listed for sedimentation, but Granite Creek is only listed upstream of its confluence with Boulder Creek (Map 4 and Table 1-4). This listing did not change as a result of the John Day TMDL and WQMP.

Turbidity

Turbidity measurements were taken in July and August 2014 of streams in the Granite watershed. Values were low except where culverts and/or channel realignment was occurring (**Appendices 5A and 5B**). However, repeat measurements on Deep Creek and on Bull Run Creek where activity had recently occurred found that turbidity values dropped quickly (within hours) after activity was completed and had returned to background levels when remeasured six days later.

Heavy metals

Heavy metals are common in lode material and include antimony, arsenic, beryllium, cadmium, chromium, copper, iron, lead, low-level mercury, manganese, nickel, silver, selenium, and zinc. Of these 14 metals, arsenic, iron and manganese are the main metals of concern for human receptors and cadmium, iron, manganese, and mercury are the main metals of concern for aquatic organisms (Cascade Earth Sciences 2008). The threshold standards related to these five heavy metals are found in Table 3-6a and are a mix of proposed and recommended criteria (see footnotes at end of Table 3-6a).

Table 3-6a: Heavy Metals of Concern
(HH = Human health. AO = Aquatic organisms)

Operation	Arsenic, TR	Cadmium, TR	Iron, TR	Manganese, TR	Mercury, TR
Proposed Standards/Criteria, corrected for hardness where applicable					
Oregon – Aquatic life[1]	150	0.3	1000	NS	0.012
Oregon – Ecological Screening Level Values[2]	NS	22	1000	120	0.77
Oregon – Human Health[3]	0.018	NS	300	50	NS
EPA – Aquatic Life (CCC)[4]	150	0.268	1000	NS	0.77
EPA – Human Health (water + Organism)[5]	0.018	NS	300	50	NS
ORNL – Surface Water PRG[6]	NS	1.10	1000	120	1.3

STANDARD NOTES:
1 - State of Oregon proposed Aquatic Life criteria (Toxic Compounds Criteria, May 2004), underline - corrected for hardness, *italics* - expressed as dissolved
2 - State of Oregon Level II Ecological Screening criteria (ODEQ, December 2001), *italics* - expressed as dissolved
3 - State of Oregon proposed Human Health criteria, water+organism (Toxic Compounds Criteria, May 2004), underline - corrected for hardness, *italics* - expressed as dissolved
4 - EPA (Environmental Protection Agency) recommended chronic ambient water quality criteria for freshwater aquatic life used (EPA, 2002), underline - corrected for hardness, *italics* - exp
5 - EPA recommended ambient water quality criteria for protection of human consumption of water and fish (EPA, 2002 NTR), *italics* - expressed as dissolved
6 - ORNL (Oakridge National Laboratory) Preliminary Remediation Goals for Ecological Endpoints (ORNL, 1997)
NS = No Standard

Past Mining Activity

Portions of the watershed were severely altered by lode and placer mining activities from the late 1800s up to 1950s. Mining effects on watershed function are variable, highly complex, and fully described elsewhere in numerous reports and scholarly articles. Since the 1970s restoration efforts were made to reclaim abandoned mines with known toxic discharge focused on diverting discharge into off-channel settling ponds and old dredge tailings. However, as demonstrated in the plugged pipes that occurred at the Bluebird Lode Mine in August 2015, restoration efforts can fail *(see Fisheries BA for details)*. Failures would result in potential increases in the heavy metal loading of creeks in the Granite Watershed. The period of decreased water quality would vary depending on how quickly the restoration failure is caught and repaired.

The potential human health and ecological risks associated with mining-related contamination at the Monumental, Cap Martin, Sheridan, Tillicum, and Central Mines (collectively referred to as the Granite Creek Mines) within the Granite Creek watershed (Site) were assessed by Cascade Earth Science and a report was submitted in 2006 (Cascade Earth Sciences 2006). The Site is located in the upper portion of the Granite Creek watershed, 5 to 8 miles north of Granite, Oregon in Grant County in the Wallowa Whitman National Forest. A portion of the Executive Summary is provided below.

Human Health Risk Assessment Summary:

- Current and future potential receptors were identified as hunters, hikers, and campers.
- Arsenic and lead were identified as the soil/wasterock, sediment, and surface water noncarcinogenic
- contaminants of potential concern (COPCs).
- No unacceptable non-carcinogenic health effects are anticipated under both the central tendency
- exposure (CTE) and reasonable maximum exposure (RME) conditions.
- Arsenic was the only carcinogenic COPC identified at the Site.
- Carcinogenic risks were predicted from exposure to arsenic-impacted surface water and
- soil/wasterock under both the CTE and the RME exposure conditions.
- No carcinogenic risks were predicted from exposure to sediment.
- No hot spots were identified at the Site.

Ecological Risk Assessment Summary

- Ecological impacts were predicted for immobile species, primarily plants and terrestrial
- invertebrates, due to contaminants of potential ecological concern (COPECs) in soil and

- wasterock. Local and regional populations of these and other terrestrial species are unlikely to
- be significantly impacted.
- Ecological impacts were also predicted for aquatic life and wildlife exposed to COPECs in
- surface water and pore water. However, the lack of background samples makes it more difficult
- to predict the potential for impacts.
- Benthic invertebrates and wildlife appear to have the potential to be impacted by total arsenic,
- cadmium, and zinc, which are present at elevated concentrations at nearly all sediment sample
- locations. The lack of background sediment samples likely results in an overestimation of these
- potential impacts.
- The Monumental and Tillicum Mines appear to have more locations with elevated COPEC
- concentrations in soil/wasterock than the other mines.
- Multiple ecological hot spots were identified at nearly every mine.

Only the proposed Eddy Shipman Plan overlaps one of the past mines referenced in the 2006 report, Central Mine. Refer to Chapter 1 and the Fisheries section of this chapter for more information about historic placer and lode mining activity in the Granite Creek watershed.

Proposed Mining Activity

Four Plans in the analysis area have adits proposed for activity: Eddy Shipman, L&H, Royal White, and Tetra Group. Of the four, only L&H operation has an adit currently discharging water (**Table 3-6b**). The adit water has not been tested for water quality. L&H does not propose to use the adit water for processing or human consumption. However, mining in the adit may alter the amount of water that exits the adit and discharges into Olive Creek. This potential effect is discussed in the Water Resources Effects section titled "*Water Quality: Clean Water Act, Section 401*.

Table 3-6b: Plans that propose to Lode mine and current hydrology of the Adits

Operation	Number of Portals	Adit name on project map	Site Hydrology	Proximity to a Creek
Eddy Shipman Lode/ Placer (East portal)	1	A	Adit A: Dry	About 150 feet from Granite Creek and elevationally above the creek
Eddy Shipman Lode/ Placer (West portals)	1	B	Adit B: Dry	About 150 feet from Granite Creek and 250 feet from Chipman Gulch and elevationally above both
L and H Placer/Lode	3	Adit 1: North side Adit 2: North side Adit 3: South side	Adit 1: dry. Adit 2: dry. Adit 3: Water discharging out of adit	Adit 1: Above the access road Adit 2: Above the access road Adit 3: Less than 50 feet from Olive Creek
Royal White Group Lode	4	Blackhawk Lower Blackhawk Upper	Blackhawk Lower adit: Currently has water in adit. Water will be used for mining.	All adits more than 300 feet from any creek or channel as they are on a ridge.

Operation	Number of Portals	Adit name on project map	Site Hydrology	Proximity to a Creek
		Royal White upper Royal White Lower	Royal White Upper adit: Dry. Primary adit to be mined. Royal White Lower adit: Runoff seasonally enters the adit portal. This water is used for mining.	
Tetra Alpha Mill and Lode	1	Upper adit	Adit portal is collapsed. Dry	Adit is more than 200 feet from Boulder Creek and elevationally above the creek

There is no known human consumption proposed for water discharging from the L&H adit. The adit is not public water sources as defined by the Safe Drinking Water Act of 1974 (SDWA). The SDWA defines public water systems as "a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals" (Safe Drinking Water Act, 1974, 300f, Definitions). Since there would be no effect on public water sources from any of the proposed Plans, the proposed Plans would comply with the Safe Drinking Water Act of 1974.

Flow Characteristics

No active or discontinued stream gages occur within the Granite Creek watershed though there is a stream gage within the North Fork John Day Subbasin (17070202). However, the NFJD gage (OWRD 14046000) is located at Monument, Oregon below the confluence of the NFJD with the Middle Fork John Day. The stream gage captures water from drainage area of 2520 sq. miles. However, based on the limited precipitation and snowfall records and stream gage data from other watersheds in the area (i.e. North Fork Burnt River USGS gage 13269300), the runoff-streamflow regime is dominated by spring snowmelt with peaks occurring in May and June and water levels dropping in the summer.
The Pete Mann Ditch diverts water from the Granite Watershed to the Burnt River Watershed. Two subwatersheds are affected by this ditch: Clear Creek and Beaver Creek. The downstream flows to Clear Creek and ultimately to Granite Creek are affected.

While no historic data exists about the stream flow magnitudes, timing, and durations for streams in this area, flows would have changed in response to changes in channel morphology, erosion of upland soils as a result of past land uses and therefore their water holding capacities, and the development of a road network which routes surface water and near surface groundwater more quickly to the streams. Current spring snowmelt peaks therefore likely have higher magnitudes and shorter durations than historically. Summer base flows are lower as a result of a decrease in groundwater contributions due to channel incision and road interception of groundwater that previously contributed to summer baseflow.

Stream Surveys

Streams in the Granite Watershed have had stream habitat surveys done since 1990. Some of the larger streams were resurveyed in 2007, 2009, and 2012 (**Table 3-7**). The surveys provide a snapshot of stream conditions and parameters measured include pools and riffles, width/depth ratios, bankfull widths, large and small wood. The methodology for measuring select stream features varied throughout the years as

protocol changed. Some stream survey measurements vary as a function of discharge and definitions have changes over the years about what size wood to include in the count. Therefore, data collected one year cannot be compared against future years without first carefully examining measurement protocols and reach boundaries. Stream survey results are presented in the *Fisheries section* in Chapter 3.

Table 3-7: Stream surveys in the Analysis Area

Forest	SWS name	Stream Name	Most recent survey year
Wallowa-Whitman National Forest			
	Beaver	Beaver Creek	2007
		Olive Creek	1990
		Olive Creek	2007
		S FK Beaver	1992
		S FK Beaver	2007
		S FK Beaver -3rd tributary	1992
	Bull Run	Beagle	1993
		Bull Run	1991
		Channel	1993
		Corral	1993
		Gutridge	1993
		Onion Gulch	1993
		Pasture	1993
	Upper Granite	Granite Creek	1990
		Granite Creek	1991
		Granite Creek	2009
		S FK Boulder	1993
Umatilla National Forest			
	Lower Granite	Rabbit Creek	1999
	Lower Granite	Squaw Creek	2012
		Ten Cent Creek	2012
	Clear Creek	Spring Creek	1997
		Lightning Creek	1997
		Clear Creek	1997
		Dry Creek	1997
		E FK Clear Creek	1997
		Granite Creek	2005
		N FK Ruby Creek	1998
		Salmon Creek	1997
		W Fork Clear Creek	1997

Forest	SWS name	Stream Name	Most recent survey year
		S Fork Ruby Creek	1998

Existing Beaver Dams

Beaver dams were noted in 1991 stream survey on Bull Run Creek. No current beaver activity or beaver dams were observed in the streams along any of the proposed mining operations by the hydrologist during the 2004, 2010, 2011, and 2012 field seasons. Some beaver activity has, however, been recently observed by the Forest Service in the Granite Creek watershed.

Wetlands and Floodplains

Wetlands and floodplains occur throughout the Granite Watershed, including within the project boundaries of mining operations. The wetlands are mainly springs or seeps associated with draws or slumps, or associated with old dredge sites. Active floodplains (1 to 2 year event) occur along the streams within the project area and there are several areas where there are areas flooded less frequently but every 5 to 10 years based on the vegetation present.

Executive Order 11990: Protection of Wetlands was signed in 1977 in order to "minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands." Wetlands are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils. Wetlands generally include swamps, marshes, bogs, and similar areas."

Executive Order 11988 (Protection of Floodplains) requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Executive Order 11988 defines the term "floodplain" as follows: "…that area subject to a one percent or greater change of flooding in any given year." This equates to the 100 year flood.

Water/Roads Interaction

Roads within the analysis area provide the benefit of access for management activities and public use, but also have adverse impacts to the function of the watershed. Roads can alter physical processes in stream, leading to changes in flow regimes, the movement and storage of sediment, bank stability and substrate composition. Roads also intercept near-surface groundwater converting it to surface water which can then be more rapidly routed to the stream and removed from the watershed or evaporates. These changes can have important biological consequences, affecting all stream ecosystem components (Furniss et al., 1991). Sediment that erodes from roads enters the streams at road-stream crossing sites. Road maintenance and construction of drainage features on the roads often limits the length of road that can contribute sediment to a road-stream crossing point to about 100 feet per side. As road maintenance decreases so does the effectiveness of the drainage features and the length of road that can contribute sediment increases. However, the amount of sediment potentially contributed at a stream crossing is small compared to road failures which can rapidly input large volumes of sediment into a creek.
There are 440.95 miles of roads of all jurisdictions (Forest Service open and closed, private, County and State) within the five subwatersheds in the Analysis Area. Ninety-six percent (424.8 miles) of the total road miles are Forest Service road miles (**Table 3-8).**

The *Total SWS acres* presented below are less than the acres listed in **Table 3-2** because the Lake Creek subwatershed was removed from further discussion due to the lack of Plans in that subwatershed**.** Road miles in Lake Creek subwatershed are also not included in **Table 3-8.**

Table 3-8: Total road miles by TOTAL SWS and by SWS on NFS lands within the Analysis Area. Roads include Forest Service open and closed roads, private roads, and County and State roads. (Forest Service GIS data 2013)

SWS Name	TOTAL SWS (acres)	TOTAL SWS (sq. miles)	TOTAL Existing Road Miles	TOTAL Existing Road Density (miles/sq. mile)	Forest Service SWS (acres)	Forest Service SWS (sq. miles)	Forest Service Road miles	Forest Service Road Density (miles/sq. mile)
Beaver Creek	13077.22	20.43	125.68	6.15	12119.39	18.9	121.6	6.4
Bull Run Creek	19399.47	30.31	146.25	4.82	18764.96	29.3	140.9	4.8
Clear Creek	20467.89	31.98	38.69	1.21	19410.69	30.3	35.6	1.2
Lower Granite Creek	20283.21	31.69	59.39	1.87	19009.71	29.7	56.2	1.9
Upper Granite Creek	9313.59	14.55	70.94	4.87	9141.07	14.3	70.5	4.9

Soils

According to the 2012 Forest Service Terrestrial Ecological Unit Inventory (TEUI) data base, the Granite Creek Watershed has about 221 soil map units. The most common soils types (almost 50% of the watershed) are derived from the metavolcanic and metasedimentary bedrocks. Basalt and/or andesites, andesitic tuffs, and Alluvial-derived soils each make up about 17% of the watershed. Granite rocks are the parent materials of about 11% of the soils in the Granite Creek Watershed. Glacial till is about 4% of the watershed (*USDA Forest Service 1997).*

Metavolcanics and Metasediments

Partially metamorphosed sedimentary rocks like argillite make up almost 40% of the watershed, compared to about 11% for metavolcanic rocks. This rock-weathering group occurs in all subwatersheds of the area. Argillites are the most common metasedimentary rock and have a tendency to weather to coarse-textured soils with low water-holding capacity. Because they are highly fractured, metasediments allow greater penetration of water than most volcanic rocks in the area. Water is more available to trees

and shrubs growing on the highly fractured metasediment- and metavolcanic- derived soils than for soils derived from other less fractured rock types (*USDA Forest Service 1997).*

Soft Clay-Producing Tuffs

The soft andesitic tuffs of the Clarno, and in some cases the John Day formation, weather rapidly to clay textures. They make up about 15 percent of the watershed and are generally at lower elevations and on gentle slopes. These have the most distinctive slope stability properties of all the rock-weathering groups. Sites with steep slopes and abundant water are prone to mass failure. Rotational slumps and flows occur in these materials in several parts of the watershed and create significant problems to road construction and maintenance. They tend to have a lower potential for gully erosion than soils derived from granitic rocks or argillites because the clays make them more cohesive (*USDA Forest Service 1997).*

Hard Intermediate and Basic volcanic Rocks

Soils derived from basalt and andesite are generally the most stable of the volcanic group. Their fertility is intermediate between the coarse granitics with low nutrient levels and the soft tuffs with the highest water-holding capacity. They make up about 17% of the watershed (*USDA Forest Service 1997).*

Existing Detrimental Soil Conditions (DSC)

Historically, the Granite Creek watershed has been extensively logged, mined, grazed and roaded. Therefore, existing detrimental soil conditions (DSC) are expected to be high in some areas. However, actual existing DSC values for each subwatershed were not determined because no measureable change in existing condition is expected to occur as a result of the proposed activities based on the following Plan characteristics:

1. The Analysis Area for each Plan is 10 acres or less and is based on areas proposed for use (**Table 3-9)**.

2. Many of the Plans propose to rework a mix of previously mined and new sediments

3. The areas proposed for activity are scattered throughout five subwatersheds

4. There is a large size difference between the size of the subwatershed (9,313 to 20,467 acres) and the size of the areas proposed for mining activity. The result is that the total area proposed for activity within any one subwatershed is 0.31 % or less.

Table 3-9: Analysis area for each Plan by Subwatershed

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	Percent of SWS
Beaver Creek SWS (13,077.22 acres)			
	Altona	5	0.038
	Belvadear Group	3	0.023

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	Percent of SWS
	Bunch Bucket	10	0.076
	L&H	8	0.061
	Olive Tone	2	0.015
	Royal White	3	0.023
	Sunshine McWillis	2.5	0.019
	Yellow Jacket	7.5	0.057
SWS TOTAL		**41**	**0.312**
Bull Run Creek SWS (19,399.47 acres)			
	Blue Sky/Bull Run	1.7	0.009
SWS TOTAL		**1.7**	**0.009**
Clear Creek SWS (20,467 acres)			
	Grubsteak	2	0.010
	Lightning Creek	5	0.024
	Lucky Strike	2	0.010
	Ruby	2.5	0.012
SWS TOTAL		**11.5**	**0.056**
Lower Granite Creek SWS (20,283 acres)			
	Blue Smoke	1.75	0.009
	East 10 Cent	2	0.010
	Hopeful 1	1	0.005
	Hopeful 2&3	3.5	0.017
	Little Cross	1	0.005
	Rosebud	5	0.025
	Troy D	8	0.039

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	Percent of SWS
	City Limits	1	0.005
SWS TOTAL		**23.25**	**0.115**
Upper Granite Creek (9,313 acres)			
	Eddy Shipman	2.5	0.027
	Make it	2	0.021
	Muffin	2.5	0.027
	Old Eric	1	0.011
	Tetra Alpha Placer	8	0.086
	Tetra Alpha Mill and Lode	2	0.021
	Yellow Gold	9	0.097
SWS TOTAL		**27**	**0.290**
PROJECT AREA TOTAL		**104.45**	0.126

Environmental Effects

This section describes the direct, indirect and cumulative effect on the Water and Soil Resources in the Granite Creek Mining Analysis Area.

Water Resources – Effects Analysis

Alternative 1 – No Action Alternative

Direct and Indirect Effects

Under Alternative 1 of the Granite Mining Project, the Forest Service would not change management in the project area but would require that past NEPA decisions related to these Plans be implemented. While there would be no proposed mining under this alternative, there are connected reclamation activities.

Potential effects to water resources from these reclamation activities are shown in **Table 3-10**. Direct/indirect effects would be limited to two subwatersheds: Clear Creek and Upper Granite. Grubsteak, Lightning, and Ruby Group occur within the Clear Creek subwatershed and have the potential for a discharge of sediment and/or creosote into the adjacent creek. Tetra Alpha Placer occurs within the Upper Granite subwatershed and has the potential to discharge sediment into Boulder Creek, a tributary of Granite Creek.

Table 3-10: Effects to Water Resources under Alternative 1 by Subwatershed

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
Beaver Creek SWS					
	Altona	Quartz Gulch	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Belvadear Group	Olive Creek	Equipment would be removed	NO EFFECT to water resources related to equipment removal because the creek would not be crossed during removal.	None
	L&H	Olive Creek	Shed would be removed	NO EFFECT to water resources related to shed removal because the creek would not be crossed during removal.	None
	Olive Tone	Olive Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Royal White Group	Irish Gulch	Cabins would be removed. Adits would be gated.	NO EFFECTS to water resources because no creeks in the area.	None

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
	Sunshine/ McWillis	McWillis Gulch	Cabins and road 1305-M1a would be removed	NO EFFECT to water resources related to cabin or the road removal because removing cabin would be via roads that do not cross McWillis Gulch, and TA 1305-M1a is separated from the Gulch by 50 feet or more of vegetated ground.	None
	Yellow Jacket	Orofino Gulch	Spring development and sheds would be removed. Site would remain as is.	NO EFFECT to water resources because shed removal does not require crossing a creek and removal of spring development would not alter spring area.	None
Bull Run Creek SWS					
	Blue Sky/Bull Run	Bull Run Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
Clear Creek SWS					
	Bunch Bucket	Clear Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Grubsteak	Clear Creek	Bridge, equipment,& shed removed, the large hole would be filled in.	POTENTIAL EFFECT to water resource effect related to bridge removal due to possible input of creosote logs into the creek and input of sediment related to use of the ford during bridge and shed removal. NO EFFECT to water resources related to filling in the large hole because hole is more than 200 feet from the creek.	Sediment and creosote
	Lightning Creek	Lightning Creek	Bridge removed, Cabins maintained as historical structure.	POTENTIAL EFFECT to water resource effect related to the input of creosote bridge logs into the creek and input of sediment related to use of the ford during bridge removal.	creosote
	Lucky Strike	Lightning Creek	Cabins maintained as historical structure	NO EFFECTS because no activity proposed.	None
	Ruby Group	Ruby & Clear Creek	Cabin would be removed	POTENTIAL EFFECT to water resources due to sediment inputs by equipment when removing the cabin from use of the Clear Creek and Ruby Creek fords and the TA road 1310-E1a	Sediment
Lower Granite SWS					

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
	Blue Smoke	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	East Ten Cent Creek	East Ten Cent Creek	Cabin and road 7350-M1a would be removed	NO EFFECT to water resources related cabin and road removal because removal would not require crossing the creek and there is a vegetative berm between the road and the creek that would effectively trap any sediment.	None
	Hopeful 1	Granite Creek	Cabin would be removed	NO EFFECT to water resources from cabin removal because removal would not require crossing the creek.	None
	Hopeful 2&3	Granite Creek	Cabins and road 1035-E1b would be removed.	NO EFFECT to water resources related to cabin or road removal because both cabin and road are on the north side of the creek and removals do not require crossing Granite Creek. TA 1035-E1b is separated from the creek by at least 50 feet of vegetated ground.	None
	Little Cross 1	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Rose Bud 1-4	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Troy D	Granite Creek	Equipment and gates would be removed	NO EFFECT to water resources related to equipment removal because removals do not require crossing Granite Creek.	None
Upper Granite SWS					
	City limits	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Eddy-Shipman	Granite Creek	Cabins would need to be removed. The adits would remained caved in.	NO EFFECT to water resources related cabin removal because removal would not require crossing the creek.	None
	Make It	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None

SWS Name	Plan	Creek	Alternative 1	Water Resources Effects	Pollutant
	Muffin	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Old Eric 1&2	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None
	Tetra Alpha Placer	Boulder Creek	Equipment and roads 7355-M3a, and 7355-M3b would be removed.	POTENTIAL effects to water resources due to inputs of sediment during use of the existing ford because these two roads are located on the south side of Boulder Creek. Removal of these roads would require that heavy equipment cross the creek, potentially multiple times, to do the reclamation.	Sediment
	Tetra Alpha Mill & Lode	Last Chance & Boulder Creek	Equipment and roads 7355-M4a and 7355-M4b would be removed.	NO EFFECT to water resources related to road removals because the roads are on the north side of Boulder Creek and reclamation work would not require crossing the creek.	None
	Yellow Gold	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO EFFECTS because no activity proposed.	None

Cumulative Effects

There would be no cumulative effects because no proposed actions would be implemented.

Alternatives 2 and 3

Introduction

In this section, the effects of Alternative 2 and Alternative 3 are combined to help the reader track the changes between the two alternatives. Alternative 2 is the Plan of Operation (Plan) as proposed by the miners. Alternative 3 is the Plan with additional Forest Service RPMs (RPMs) and General Requirements designed to decrease or eliminate water resource impacts.

The Forest Service Water Resource Protection Measures (WRPMs) and selected Fish Protection Measures related to water quality are found in Appendix 11, and the General Requirements are found in Appendix 2.

Under Alternatives 2 and 3, there are 28 Plans. The Plans are distributed over five subwatersheds and two National Forests. The analysis area is areas proposed for mining activity in each Plan. The analysis areas are 10 acres or less **(Table 3-11)**.

Many of the Plans have multiple sites proposed for activity. Each site was individually analyzed for effects to Water Resource and for compliance with the WWNF and Umatilla NF Forest Plans, and State and Federal laws and policies. The detailed effects analysis for each Plan is found in **Appendix 7**. This Chapter summarizes the direct, indirect and cumulative effects of the 28 proposed Plans.

Table 3-11: Analysis area for Each Plan by Subwatershed (SWS)

SWS Name/ Acres	Plan	Analysis Area for Each Plan (Acres)	Plan type	National Forest
Beaver Creek SWS (13,077.2 acres)				
	Altona	5	Placer	WWNF
	Belvadear Group	3	Placer	WWNF
	L and H	8	Placer and Lode	WWNF
	Olive Tone	2	Placer	WWNF
	Royal White	3	Lode	WWNF
	Sunshine McWillis	2.5	Placer	WWNF
	Yellow Jacket	7.5	Placer	WWNF
SWS TOTAL		**41**		
Bull Run Creek SWS (19,399.5 acres)				
	Blue Sky/Bull Run	1.7	Placer	WWNF
SWS TOTAL		**1.7**		
Clear Creek SWS (20,467 acres)				
	Bunch Bucket	10	Placer	UNF
	Grubsteak	2	Placer	UNF
	Lightning Creek	5	Placer	UNF
	Lucky Strike	2	Placer and Lode	UNF and WWNF
	Ruby	2.5	Placer	UNF
SWS TOTAL		**11.5**		
Lower Granite Creek SWS (20,283 acres)				
	Blue Smoke	1.75	Placer	UNFMA
	City Limits	1	Placer	WWNF
	East 10 Cent	2	Placer	UNF
	Hopeful 1	1	Placer	UNF
	Hopeful 2&3	3.5	Placer	UNF
	Little Cross	1	Placer	WWNF

SWS Name/ Acres	Plan	Analysis Area for Each Plan (Acres)	Plan type	National Forest
	Rosebud	5	Placer	UNF
	Troy D	8	Placer	WWNF
SWS TOTAL		**23.25**		
Upper Granite Creek (9,313 acres)				
	Eddy Shipman	2.5	Placer and Lode	UNF and WWNF
	Make it	2	Placer	WWNF
	Muffin	2.5	Placer	WWNF
	Old Eric	1	Placer	UNF
	Tetra Alpha Placer	8	Placer	WWNF
	Tetra Alpha Mill & Lode	2	Lode	WWNF
	Yellow Gold	9	Placer	WWNF
SWS TOTAL		**27**		
PROJECT TOTAL		**104.45**		

Direct and Indirect Effects

Water Quality: Clean Water Act, Section 401 (potential for a discharge)

Under Alternatives 2 and 3, the 28 Plans of Operation were evaluated for the potential for a discharge of a pollutant, as defined by the Clean Water Act, and thus a change in water quality. Aspects of the Plans evaluated for discharge potential were 1) mining activity, 2) fords and bridges, 3) roads, and 4) ponds. Pollutants evaluated were sediment, heavy metals and warm water. Results of the analysis are summarized in Table 3-12 and detailed effects by Plan are found in Appendix 7.

Under Alternative 2, 18 Plans have one or more activities with the potential for a discharge (**Table 3-12).** As a result, portions of these 18 Plans would not be in compliance with Section 401 of the CWA.

Under Alternative 3, the number of Plans with the potential for a discharge decreases from 18 to two as a result of the addition of Forest Service RPMs (Appendix 11) and General Requirements (Appendix 2). In the two remaining Plans with a discharge potential, both have a reduction in the number of proposed activities that result in a potential for a discharge. This is the result of the addition of Forest Service RPMs and General Requirements that would eliminate some or all of the discharge potential.

Table 3-12: Plans with the Potential for a Discharge under Alternative 2 and 3 by Subwatershed (SWS)
(*Detailed effects by Plan are found in Appendix 7*)

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	**Alternative 3**	**Alt 2**	**Alt 3**
Beaver Ck SWS						
Altona (Placer)	WWNF	Quartz Gulch	1. Potential discharge of **sediment** via surface flow related to mining activity. 2. Potential discharge **of heavy metals** via surface and subsurface flow related to use of adit water could NOT be evaluated due to lack of information regarding location. 3. Potential discharge related to pond location <u>could not be evaluated</u> because location is tied to adit discharge and adit location is unknown.	1. No discharge potential because of addition of FS WRPMs and GRs. 2. No discharge potential if adit location is found and used because of addition of FS WRPMs and GRs. 3. Same as Alternative 2. Potential could not be evaluated for ponds.	Sediment	None
Belvadear (Placer)	WWNF	Olive	Potential discharge of sediment via subsurface flow related to mining activity.	Same as Alternative 2. Discharge potential exists.	Sediment	Sediment
L and H (Placer and Lode)	WWNF	Olive	Potential discharge of sediment via surface flow related to 1. Reclamation activity in adit 3. Potential discharge of heavy metal via surface flow related to: 2. Mining and reclamation activity in adit 3	1. None because discharge potential of sediment eliminated related to reclamation at adit 3 as a result of the addition of FS WRPMs and GRs. 2. None because discharge potential of heavy metals eliminated related to mining and	Sediment and Heavy metals	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	**Alternative 3**	**Alt 2**	**Alt 3**
			3. Use of water that is discharging from adit 3	reclamation at adit 3 as a result of the addition of FS WRPMs and GRs. 3. None because discharge potential of heavy metals eliminated related to use of adit water as a result of the addition of FS WRPMs and GRs.		
Olive Tone (Placer)	WWNF	Olive	Potential discharge of sediment from ponds and stream banks via subsurface flow as a result of use of the proposed settling ponds.	None because discharge potential eliminated as a result of the addition of FS WRPMs.	Sediment	None
Royal White (Lode)	WWNF	n/a. On a ridge	None	None	None	None
Sunshine McWillis (Placer)	WWNF	McWillis Gulch	Potential discharge of sediment via surface flow related to: 1. Mining at site 2 2. Activity at Processing Site 2	None because discharge potential eliminated for all activities identified under Alternative 2 as a result of the addition of FS WRPMs and GRs.	Sediment	None
Yellow Jacket (Placer)	WWNF	Orofino Gulch	None	None	None	None
Bull Run Creek SWS						
Blue Sky/Bull Run (Placer)	WWNF	Bull Run	Potential discharge of sediment via surface flow related to: 1. Mining at Blue Sky site 2, Blue Sky site 3, Blue Sky site 4, Bull Run site 1	1. Discharge potential related to mining activity remains BUT decreases and is restricted under Alternative 3 to Blue Sky site #3. No discharge potential at the other sites due to the addition of FS WRPMs and GRs.	Sediment	Sediment

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	**Alternative 3**	**Alt 2**	**Alt 3**
			2. Use of ford across Swamp Creek 3. Proposed placement and removal of a temporary bridge at Bull Run site 2 4. Construction of proposed TA roads 7300-M4a and M4b.	2. Discharge potential eliminated as a result of the addition of FS WRPMs. 3. Discharge potential eliminated because the bridge dropped and replaced by a temporary two-track road (7300-M1b). The road has no discharge potential as a result of the additional of FS WRPMs and GRs. 4. Discharge potential eliminated as a result of the addition of FS WRPMs and GRs.		
Clear Creek SWS						
Bunch Bucket (Placer)	UMA	Clear	Potential discharge of sediment via surface flow related to activity in the small channel.	None because discharge potential eliminated as a result of the addition of FS WRPMs and GR	Sediment	None
Grubsteak (Placer)	UMA	Clear	Potential discharge of sediment related to: 1. Mining at site B 2. Use of ford across Clear Creek. 3. Potential discharge related to proposed settling ponds could not be evaluated under Alternative 2 because locations not specified by the miner.	1. None because discharge potential related to mining at Site B eliminated as a result of the addition of FS WRPMs 2. None because discharge potential related to ford use eliminated as a result of the addition of FS WRPMs 3. None because discharge potential related to ford use	Sediment	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	**Alternative 3**	**Alt 2**	**Alt 3**
				eliminated as a result of the addition of FS WRPMs		
Lightning (Placer)	UMA	Lightning	None	None	None	None
Lucky Strike (Placer and Lode)	UMA and WWNF	n/a. One a ridge	None	None	None	None
Ruby Group (Placer)	UMA	Ruby Creek and Clear Creek	Potential discharge of sediment via surface flow related to: 1. Mining activity at Sites 1, 2, 3, 4,5,6,8 2. Use of the existing Ruby Creek ford 3. Use of the existing Clear Creek ford 4. Use of existing TA road 1310-E1a. 5. Seasonal installation and removal of proposed ATV bridge	None because discharge potential eliminated for all activities identified under Alternative 2 as a result of the addition of FS WRPMs and GRs.	Sediment	None
Lower Granite SWS						
Blue Smoke (Placer)	UMA	Granite	None	None	None	None
East 10 Cent (Placer)	WWNF	East 10 Cent	Potential discharge of sediment via surface flow related to mining activity.	None because discharge potential eliminated as a result of the addition of FS WRPMs and GRs.	Sediment	None
Hopeful 1 (Placer)	UMA	Granite	None	None	None	None
Hopeful 2&3 (Placer)	UMA	Granite	Potential discharge of sediment via surface flow related to: 1. Use of east ford across Granite Creek NOT evaluated under Alternative 2 based on miner's	None because discharge potential eliminated for all activities as a result of the addition of FS WRPMs and GRs.	Sediment	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	**Alternative 3**	**Alt 2**	**Alt 3**
			protection measure which stated would work with FS in minimizing impacts. 2. Construction and use of the North processing ponds 3. Use of TA road 1035-E1d used to access the south side processing site. 4. Crossing of the unnamed tributary on the south side to access the south processing site via TA road 1035-E1d.			
Little Cross (Placer)	WWNF	Granite	Potential discharge of sediment via surface and subsurface flow related to: 1. Mining activity 2. Construction and use of pond (pond and test hole are the same).	None because discharge potentials for mining activity and pond uses and construction eliminated as a result of the addition of FS WRPMs and GRs.	Sediment	None
Rosebud 1-4 (Placer)	UMA	Granite	None	None	None	None
Troy D (Placer)	WWNF	Granite	Potential discharge of sediment via subsurface flow related to use of the settling ponds.	None because discharge potential eliminated as a result of the addition of FS WRPMs.	Sediment	None
Upper Granite SWS						
City Limits	WWNF	Granite	None	None	None	None
Eddy Shipman (Placer and Lode)	UMA and WWNF	Granite	Potential discharge of **sediment** via surface flow related to: 1. Lode mining and construction	1. None because discharge potential eliminated as a result of the addition of FS GR L5.	Sediment and heavy metals	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	**Alternative 3**	**Alt 2**	**Alt 3**
			2. Use of proposed source water pond and settling ponds for processing 3. Use of existing ford that crosses Granite Creek via FS road 7300-680 4. Use of FS closed road 7300-680 5. Use of existing TA road 7300-E1d.	2. None because discharge potential eliminated as a result of the addition of FS WRPMs. 3. None because discharge potential eliminated as a result of the addition of FS WRPMs and GRs. 4. None because discharge potential eliminated as a result of the addition of FS WRPMs 5. None discharge potential eliminated as a result of the addition of FS WRPMs and GRs.		
Make It (Placer)	WWNF	Granite	None	None	None	None
Muffin (Placer)	WWNF	Last Chance	None	None	None	None
Old Eric 1 and 2 (Placer)	UMA	Granite	Potential discharge of warm water via subsurface flow related to use of settling pond.	None because discharge potential of warm water eliminated as a result of the addition of FS WRPMs.	Warm water	None
Tetra Alpha Placer	WWNF	Boulder	Potential discharge of sediment via surface flow related to: 1. Mining at Stage 1 area 2. Mining at Stage 2 area 3. Use of existing downstream (west) ford across Boulder Creek	None because discharge potential eliminated for all activities identified under Alternative 2 as a result of the addition of FS WRPMs and GRs. Middle ford dropped under Alternative 3.	Sediment	None

Plan	National Forest	Creek	Discharge potential		Pollutant	
			Alternative 2	**Alternative 3**	**Alt 2**	**Alt 3**
			4. Construction and use of proposed middle ford across Boulder Creek 5. Construction and use of proposed upstream (east) ford across Boulder Creek, 6. Construction and use of a portion of the proposed TA road 7355-M3d which crosses a meadow.			
Tetra Alpha Mill and Lode	WWNF	Boulder	Lode portion: None Mill portion: Potential discharge of **heavy metals** from lode material via subsurface flow related to: 1. Use of the existing settling ponds adjacent to Boulder Creek.	Lode portion: None Mill portion: None because discharge potential eliminated for heavy metals as a result of the addition of FS GRs.	Heavy metals	None
Yellow Gold (Placer)	WWNF	Last Chance	Potential discharge of sediment related to mining at the East site. NOTE: Potential discharge related to the proposed settling ponds could not be determined because locations not provided in the Plan.	None because discharge potential eliminated related to mining and construction and use of the proposed ponds as a result of the addition of FS WRPMs.	Sediment	None

Roads Proposed for Used by Miners (Existing or Proposed)

Miners propose to use a mix of existing Forest Service (FS) closed and decommissioned roads and existing temporary mine access roads (non-system roads), as well as create some new mine-access roads. The roads are distributed over five subwatersheds (SWS) (**Table 3-13**). The roads proposed for use for each Plan, and their surface type (native, gravel, aggregate, tailings) are found in **Appendix 6.** The effects analyses for each road were based on road distance from the creek, topography, and ground cover, and are discussed in **Appendices 3 and 7.**

Under Alternative 2, a total of 13.99 miles of road are proposed for use by the miners, with all but 0.3 miles using existing templates. All roads would be native surface roads.

Under Alternative 3, the miles of road proposed for use decreases from 13.99 miles to 12.82 miles, with all but 0.3 miles using existing templates. Under Alternative 3, a reduction in miles (1.3 miles) occurs in the Beaver Creek SWS, while in the Bull Run SWS 0.2 miles of miner access road would be added (7375-M1b), which incorporates the 0.07 miles for TA road 7300-M4b into TA road 7375-M1b. The 0.2 miles of new TA road (7375-M1b) would occur in the Blue Sky/Bull Run Plan to allow access to Bull Run site 2 instead of the combination of the proposed bridge and the proposed 7300-M4b.

Table 3-13: Distribution of miles of FS closed/decommissioned, Existing, or Proposed Temporary Access Road by Subwatershed under Alternatives 2 and 3 by Subwatershed (SWS)

	Forest Service				Temporary Access Road					
	Closed		Decommissioned		Existing		Proposed		TOTAL	
SWS Name	**Alt 2**	**Alt 3**	**Alt 2**	**Alt 3**	**Alt 2**	**Alt 3**	**Alt 2**	**Alt 3**	**Alt 2**	**Alt 3**
Beaver	0.93	0.4	0.45	0.45	2.64	1.87	0.05	0.05	4.07	2.77
Bull Run	0	0	0	0	0.33	0.33	0.14	0.27	0.47	0.6
Clear	0	0	0	0	1.5	1.5	0	0	1.5	1.5
Lower Granite	0.84	0.84	0	0	2.47	2.47	0	0	3.31	3.31
Upper Granite	2.49	2.49	0	0	2.04	2.04	0.11	0.11	4.64	4.64
TOTAL	**4.26**	**3.73**	**0.45**	**0.45**	**8.98**	**8.21**	**0.3**	**0.43**	**13.99**	**12.82**

Under Alternative 2, 1.2 miles of 13.99 miles was identified as having the potential for a discharge of sediment into a channel. The discharge potential for the two proposed Blue Sky/Bull Run roads (0.14 miles) could not be determined because the road locations were not clearly identified in the Plan (**Table 3-14)**.

Under Alternative 3, road miles with the potential for a discharge decrease from 1.2 miles to zero (**Table 3-14)** because of the addition of Forest Service WRPMs and GRs. In addition, there would be no discharge potential from the two proposed Blue Sky/Bull Run Plan roads (0.14 miles) because of the addition of Forest Service WRPMs and GRs. These WRPMs would require that two proposed roads be located with input from the Forest Service and appropriate protection measures put into place. The Forest Service GRs provide directions for minimizing impacts to the soils and vegetation resources.

Table 3-14: Proposed (P) or Existing (E) Roads Proposed for Use with a Potential for a Discharge under Alternative 2 versus Alternative 3 by Subwatershed (SWS)

SWS	Plan	Road Number	Length (miles)	Existing Condition	Site accessed	Discharge Potential	
						Alternative 2	Alternative 3
Bull Run Creek							
	Blue Sky/Bull Run	7300-M4a	0.07	Temporary - P	Blue Sky Site 3	Unknown because location with respect to Bull Run Creek not provided	None because of the addition of FS WRPMs
	Blue Sky/Bull Run	7300-M4b	0.07	Temporary - P	Bull Run Site 2	Alt 2 only. Unknown because location with respect to Bull Run Creek not provided	N/A. Incorporated into 7375-M1b. M1b has no discharge potential (see below)
	Blue Sky/Bull Run	7375-M1b	0.2	Temporary - P	Bull Run Site 2	N/A. Alt. 3 only	None because of the addition of FS WRPMs
Clear Creek							
	Ruby Group	1310-E1a	0.62	Temporary - E	Sites 1, 2, and 3	A portion of this road becomes part of Ruby Creek during high flows.	None because of the addition of FS WRPMs
Lower Granite							
	Hopeful 2, 3	1035-E1d	0.19	Temporary - E	Site 4 & south processing site	A portion of this road is steep and rutted and channeling water and sediment into Granite Creek	None because of the addition of FS WRPMs
Upper Granite							
	Eddy Shipman	7300680	0.1	FS Closed	East side (Adit A)	Road is sloped towards Granite Creek and has fines. Activity will generate sediment which will be transported into the creek during runoff periods.	None because of the addition of FS WRPMs
	Eddy Shipman	7300-E1d	0.07	Temporary - E	East side (Adit A)	Potential for a discharge for same reason as 7300-680	None because of the addition of FS WRPMs
	Tetra Alpha Placer	7355-M3d	0.02	Temporary - P	Stage 2 area	A portion crosses a meadow composed of fine grained sediments and Boulder Creek. Construction of road and ford across the meadow expected to generate sediment. The road	None because of the addition of FS WRPMs

SWS	Plan	Road Number	Length (miles)	Existing Condition	Site accessed	Discharge Potential	
						may rut and erode in the areas close to the creek.	

Water Quality: Clean Water Act, Section 303 (d) (antidegradation)

Stream Temperature

Prior to 2010, four streams were 303(d) listed for elevated stream temperatures (Granite, Beaver, Bull Run, and Clear). With the completion of the John Day Total Maximum Daily Load (2010), these four streams were delisted for elevated stream temperatures. However, the stream temperatures still exceed State standards (53.6°F) on all streams with temperature data, and several Plans have the potential to locally increase temperatures either as a result of an input of warm water from a settling pond, water withdrawals, or groundwater flow reversal. The potential impact to temperature from the input of warm water is discussed in the section above titled *Water Quality: Clean Water Act, Section 401 (potential for a discharge)*. The potential impacts from water withdrawals are discussed in the section below titled *Other Potential Water Resource Impacts*.

Sedimentation

Granite Creek and Bull Run Creek are 303(d) listed for sedimentation (ODEQ, 2014). Granite Creek is 303(d) listed for sedimentation from river mile 11.2 to 16.2 (ODEQ 2014). Bull Run Creek is 303(d) listed for sedimentation by ODEQ (2014) from river mile 0 to 9.3 or along its entire length. The John Day TMDL (2010) did not address sedimentation and therefore Bull Run Creek and the upper section of Granite Creek are still 303(d) listed for sedimentation.

Under Alternative 2, 16 Plans have the potential to discharge **sediment** into a stream (**Table 3-12)**. Of the 16, four Plans would potentially discharge into Granite Creek (Eddy Shipman, Hopeful 2& 3, Little Cross, Troy D) and one Plan would discharge into Bull Run Creek (Blue Sky/Bull Run). However, inputs of sediment would not alter existing sedimentation conditions because the sediment would either move through as suspended load or settle out within 300 feet, depending on the size of the sediment that enters (clay, silt vs. sand, gravel or cobbles). The remaining 11 Plans with a potential to discharge **sediment** would discharge into streams that are not 303(d) listed. Again, the discharge of sediment would not lead to a listing related to sedimentation because the sediment that might enter the streams would also move through as suspended load or settle out within 300 feet, depending on the sediment size.

Under Alternative 3, the number of Plans with the potential to discharge **sediment** into a stream decreases from 16 to two (**Table 3-12**) as a result of the addition of Forest Service WRPMs and General Requirements. They are the Blue Sky/Bull Run Plan (Bull Run Creek) and Belvadear Plan (Olive Creek). The potential for a discharge into Granite Creek has been eliminated as the Forest Service protection measures. The addition of Forest Service protection measures for the Blue Sky/Bull Run Plan has reduced the discharge potential to only activities at Blue Sky site 3. As described under Alternative 2, a discharge of sediment would not alter existing sedimentation conditions on Bull Run Creek. The other Plan that still has the potential for a discharge of sediment is Belvadear and it would discharge into Olive Creek, which is not listed.

Other Potential Water Resource Impacts

Several Plans have the potential to impact water quality (temperature or turbidity) in ways not related to the potential for a discharge of a pollutant. With respect to stream temperature, proposed mining activities could increase stream temperature through 1) water withdrawals, 2) reversal of groundwater flows away from the creek, 3) channel width increase, and 4) shade reduction. The lower the stream

flows the higher the potential impact. Whether the impact would be measureable would vary depending on the stream flows at the time of activity. With respect to turbidity, removal of beaver dams would result in a rapid release of sediment of various grain sizes with the potential to increase turbidity and fill in ponds downstream of the dam. The potential impacts are summarized below.

Table 3-15: Plans with the Potential to Increase Stream Temperatures by Subwatershed (SWS)

SWS	Plan	Creek	Action	Amount proposed for withdrawal	Alt 2	Alt 3	Notes
Beaver Creek							
	Belvadear	Olive	water withdrawal	100 gpm or 0.2 cfs	High	High	
	Olive Tone	Olive	water withdrawal	100 gpm or 0.2 cfs	High	High	
Clear Creek							
	Grubsteak	Clear	Groundwater water reversal	N/A	High	None	
	Lightning	Lightning	water withdrawal	100 gpm or 0.2 cfs	High	High	
Lower Granite							
	Hopeful 1	Granite	water withdrawal	40 gpm or 0.09 cfs	None	None	
Upper Granite							
	Eddy Shipman	Chipman Gulch	water withdrawal	100 gpm to 150 gpm or 0.2 to 0.3 cfs	None	None	
	Make It	Side channel of Granite Ck	water withdrawal	100 gpm or 0.2 cfs	None	None	Water comes from a pond that is connected to Granite Creek via a side channel
	Tetra Alpha Placer	Boulder (make up water)	water withdrawal	100 gpm or 0.2 cfs	High	High	Make up water if off channel pond goes dry or doesn't have enough water
	Tetra Alpha Mill and Lode	Boulder (make up water)	water withdrawal	100 gpm or 0.2 cfs	High	High	Make up water if pond in Last Chance

SWS	Plan	Creek	Action	Amount proposed for withdrawal	Alt 2	Alt 3	Notes
							Creek isn't enough.

Stream temperature

Water Withdrawals

Water withdrawals reduce stream flows which in turn reduce stream velocity and water depths. The result is that a greater percent of the water column is warmed and stream temperatures increase. In addition, water withdrawals can result in a stream going dry for all or a portion of its length, depending on where the withdrawal occurs relative to other incoming tributaries. If a portion of the stream goes dry downstream, water temperatures could increase as a result of a reduction in flow.

Under Alternatives 2 and 3, eight Plans propose withdrawing water from a creek. They are: Belvadear, Eddy Shipman, Hopeful 1, Lightning, Make It, Olive Tone, Tetra Alpha Placer, and Tetra Alpha Mill and Lode (**Table 3-15**). Water withdrawal effects for each Plan are found in **Appendix 7** and are summarized below. No information was provided by the miner as to how long they would be withdrawing water. Therefore, the analysis of the effects of withdrawals was based on a continuous withdrawal during daylight hours.

Three of the eight Plans (Hopeful 1, Make It, and Eddy Shipman) would not have measurable impacts to stream temperatures or stream flow under either alternative for the following reasons. Hopeful 1 and Make It, which both withdraw from Granite Creek are 1) more than seven miles apart and 2) the amounts withdrawn (0.09, 0.2 cfs) are much less than summer flows on Granite Creek. Eddy Shipman, proposes to withdraw 0.2 to 0.3 cfs from Chipman Gulch, a tributary of Granite Creek. However, the point of withdrawal would be near its confluence with Granite Creek and therefore the withdrawal would have little impact on Chipman Gulch for most of its length. The impact on flows on Granite Creek would be non-measurable because the Chipman Gulch flows are small compared to Granite Creek. Therefore these three Plans are not discussed further in Chapter 3.

The remaining five Plans (Belvadear, Lightning, Olive Tone, Tetra Alpha Placer, and Tetra Alpha Mill and Lode) have potential impacts to stream temperatures and stream flow related to withdrawing water because they would withdraw from small tributary streams (Boulder, Lightning and Olive Creeks). These three streams have low flows and shallow water depths during the summer. All of these streams exceed the ODEQ State stream temperature of 53.6°F (**Appendix 5**). The limited discharge data available for Lightning Creek and Olive Creek, when combined with stream gage hydrograph data from other areas in close proximity to the analysis area, show, regardless of gage examined, that stream flow drops rapidly in the summer months and flows vary from year to year.

Based on the site conditions, withdrawals under Alternatives 2 and 3 could lead to local increases stream temperatures and sections of the streams going dry, depending on flows that year, in July and August. The amount of impact would vary as a function of the timing of withdrawals, the amount of withdrawal, existing stream flow, and the continuity of the withdrawal (e.g. just to fill a pond vs. continuous withdrawal. However, under Alternative 3, there would be a reduction in the length of time where there would be potential impacts due to the addition of Forest Service Fish Protection Measures related to water

quality for Lightning (Lightning Creek), Tetra Alpha Placer (Boulder Creek) and Tetra Alpha Mill and Lode (Boulder Creek) (**Appendix 11**). These protection measures would limit withdrawals to before August 15 and prevent withdrawals anytime that the stream is dry below the operation. As a result, potential impacts to stream temperatures and stream flow would be reduced to the time period of about July 1 to August 15[2]. While the length of time with potential impacts to stream temperature and flow would be decreased under Alternative 3, the withdrawals would be occurring when stream temperatures tend to be the highest so that the impact to stream temperatures remains (**Appendix 5C**). The Fish Protection Measures were not added to Belvadear and Olive Tone because there are no bull trout or chinook salmon in Olive Creek (T. Hickman, Forest Service Fisheries Biologist, email, 8/15/2014).

Under Alternative 2, these five Plans have the potential to locally increase stream temperatures. Under Alternative 3, these five Plans would still have the potential to locally increase stream temperatures. However, the length of effects would be shorter for Lightning, Tetra Alpha Placer and Tetra Alpha Mill and Lode because of the addition of the Forest Service Fish Protection Measure.

Reversal of Groundwater Flow

Activity that changes the direction of groundwater flow from towards the stream to away from the stream or intercepts groundwater inputs to the stream can result in a reduction in stream flows Dunne and Leopold 1978; Driscoll 1986) . Reductions in stream flow would lead to downstream increases in stream temperature (ODEQ 2010).

Under Alternative 2, the Grubsteak Plan (Clear Creek SWS) has the potential to alter the direction of groundwater flows at Site B as a result of digging a hole that is less than 50 feet from Clear Creek, 10 to 15 feet deep and 20 to 25 feet in diameter **(Table 3-15).** This depth of hole would place it below the existing stream bed. Because Clear Creek was historically placer mined, the sediments between the test hole and the creek are expected to be dominated by cobbles and coarse gravels and very permeable, based on the large pore sizes. If groundwater flows were to reverse direction (from towards the creek to towards the hole), there is the potential for a section of Clear Creek to go dry, if flows are low. The impact would be an increase in stream temperatures downstream.

Under Alternative 3, the potential to alter the direction of groundwater flows at Site B are eliminated as a result of the addition of Forest Service WRPMs. This WRPM requires that the miner monitor the hole for groundwater. If ground water becomes visible then the miner would limit further deepening until other protection measures were put into place to prevent the stream from going dry and stream temperatures from increasing.

Increases in Channel Widths

None of the activities proposed in the Plans of Operation under either alternative would alter stream bank stability because any activities that might destabilize a stream bank would be located at least 25 feet from the stream bank. Therefore, there would be no increases in channel widths related to any proposed activity and no impact on stream temperatures.

[2] In 2008 the State of Oregon Department of Fish and Wildlife has established timeframes for when in-water work will have the least impact on fish, wildlife and habitat. (http://www.dfw.state.or.us/lands/inwater/oregon_guidelines_for_timing_of_%20InWater_work2008.pdf)

Tree Removal and Loss of Shade

While a number of Plans propose to remove select trees during their activity, none of the removals would influence stream temperature under either alternative because the number and size of the trees are small and not casting any shade. Therefore, removal of the trees would not alter stream temperatures.

Beaver Dams

Beaver have been present in the Granite Creek watershed. Stream surveys for 1991 in Bull Run Creek identified beaver dams present. Currently, no dams exist in the areas where mining activity is proposed. However, the distribution and number of beaver dams could increase over time as existing and proposed restoration activities in the Granite watershed improve key riparian woody species needed to build and maintain their dams. Beaver dams provide fish habitat (pools, side channels etc) and increase inchannel complexity (Pollock et al 2004; Demmer and Beschta 2008).

Under Alternative 2, no breaching or removing beaver dams is proposed. If beaver were to create dams, breaching or removing a beaver dam to avoid flooding the operation would not be in compliance with PACFISH MM-2 because dam failure would result in a loss of complexity and quality of fisheries habitat, a reduction in conditions favorable to the expansion of riparian vegetation and increased streamside shade, and a loss of surface and groundwater storage (Apple et al 1984; Demmer and Beschta 2008; Hood and Bayley 2008; Pollock et al 2004).The sediment eroded from behind the dams would result in a short-term increase in turbidity.

Under Alternative 3, if beavers were to build dams in the mining areas, Forest Service General Requirement G-14 states that the beaver dams would not be breached However, this requirement also provides a means of minimizing potential problems related to beaver activity by identifying methods that limit the height of the pond water such as use of a pond leveler (Boyle and Savitzky 2008; Brown and Brown (eds), no date; Lisle 1996; 2003). And therefore there would be no increase in turbidity and loss of channel complexity under this alternative.

Suction Dredging

Suction dredging is currently not permitted in Essential Salmon Habitat, and streams with naturally reproducing populations of bull trout, but its analysis is included here in the event that the moratorium is lifted through new legislation. Also, two Plans proposing suction dredging are not located in streams under the moratorium. See Chapter 1, Laws, Regulations, Policies and Plans.

The analysis below assumes that the miners would be in compliance with the May 2015 700PM permit (Appendix 4B) and all its requirements. The analysis area for suction dredging is the Plan area boundary. It is explicitly specified because the May 2015 700PM permit only asks the miner for a Township, Range and Section.

Under Alternatives 2 and 3, eight Plans propose to suction dredge (**Table 3-16**). Details of the analysis related to suction dredging for each Plan is found in **Appendix 7** and is summarized below.

Table 3-16: Plans proposing to Suction Dredge, the stream's 303(d) status and essential salmon habitat status by Subwatershed (SWS)

SWS Name	Plan	Creeks	Stream Length Authorized for Suction Dredging (feet)	Width of Stream Disturbance (ft)	303d listed in area of proposed activity	In essential salmon habitat
Beaver Creek SWS						
	Sunshine McWillis	McWillis Gulch	1500	10	No	No
	Yellow Jacket	Orofino Gulch	1000	10	No	No
Bull Run SWS						
	Blue Sky/Bull Run	Bull Run	12000	10	0 to 9.3 RM for sedimentation	Yes
Clear Creek SWS						
	Lightning	Lightning	3000	15	No	Yes
Lower Granite SWS						
	Blue Smoke	Granite	300	15	No	Yes
	Little Cross 1	Granite	500	15	No	Yes
Upper Granite SWS						
	Old Eric 1&2	Granite	500	4	No	Yes

Site Characteristics

The channel beds of the five streams in the areas proposed for suction dredging are predominantly cobbles with some gravels and sands. Because these streams were historically placer mined, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the May 2015 700PM permit (Schedule C.7, 8, 9, and 10). The abundance of cobbles makes the channel bed highly stable and not prone to headcutting.

Impacts to Channel Morphology and Water Quality

The following stream channel morphology and water quality parameters were evaluated for potential changes as a result of suction dredging: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, and beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability. A literature review of suction dredging impacts to channel morphology and water quality is found in **Appendix 4A.** <u>The potential impacts are the same for all Plans because stream characteristics are similar.</u>

Pool frequency and distribution: Localized changes in pool frequency and locations related to suction dredging as dredging would create pools and loosen the substrate. The pool created by suction dredging would persist (except in the case of a large flood event) because the amount of bedload moving

through these streams is limited based on the composition of the channel beds (dominated by cobbles), the amount of historic placer mining of the streams, and the fact that any inputs from the stream banks would be predominantly sands, gravels, silts and clays. Fine sediment entering the streams from the banks and the sediment disturbed by suction dredging would be redistributed downstream during spring high flow.

Habitat complexity: Potential local change to habitat complexity because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be p be permanent because the boulders and habitat structures would have been permanently moved.

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) would therefore remain intact, thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local change on water clarity could occur, as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the May 2015 700PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed, and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact would be limited to the when the miner is suction dredging.

Existing beaver dams or future dams would be protected because they would be considered structures based on the description provided under Schedule C.10 of the ODEQ May 2015 700PM suction dredging permit. Schedule C.10 states "*Removal of habitat structure that extends into the stream channel from the stream bank is also prohibited*". Beaver dams meet these criteria as they extend from the stream bank into the stream channel and provide habitat for fish. Schedule C.10 requirement eliminates the concern about increased turbidity because it ensures that the sediment behind the beaver dams would remain stored.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, passes it up through a suction hose, and runs it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location, with respect to existing condition, would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability are expected, even though dredging would create pools, because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

In summary, suction dredging would have the same impact under Alternatives 2 and 3. Suction dredging would have a localized impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. Impacts to turbidity would be restricted to the time an area was being dredged. Changes to pool frequency and distribution, habitat complexity and substrate would likely persist beyond a couple of seasons. However, the changes would not result in any measureable impact to water quality, channel complexity or channel stability under Alternatives 2 or 3 because they would be so localized.

PACFISH

Compliance with MM-2

Structures located inside Riparian Habitat Conservation Areas (RHCA) were evaluated for compliance with PACFISH MM-2 as it pertains to potential impacts to 1) streams and 2) RHCAs (terrestrial impacts). Compliance with MM-2 as it pertains to FISHERIES is found in the *Fisheries Section* of Chapter 3.

> **MM-2:** *Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to siting facilities in Riparian Habitat Conservation Areas exists, locate and construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on listed inland native fish [or anadromous fish].*
>
> *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.*

The following features are considered structures:

a) Ponds: Source water ponds (used to withdraw water from for processing) and settling ponds (would receive sediment created by processing)
b) Roads: Temporary mine-access roads and Forest Service closed or decommissioned roads
c) Bridges: Proposed and existing bridges.

Ponds inside RHCAs

All but seven Plans have existing or proposed ponds located inside an RHCA under both alternatives. The Plans with ponds outside the RHCA are Bunch Bucket, Lucky Strike, Rosebud, Royal White, Ruby, and Yellow Jacket. Field observations and Plan descriptions for all the ponds are found in **Appendix 3,** along with a conclusion that addresses compliance with MM-2.

With respect to locating a pond inside RHCA

Plans with ponds inside the RHCA are in compliance with <u>respect to locating a pond inside</u> an RHCA under Alternatives 2 and 3 for the following reasons:

1. Ponds on the flat valley floor where groundwater, the dominant source of pond water, is accessible at shallow depths,
2. Ponds dug into the ground,
3. Ponds are in highly stable locations,

If the ponds were to be moved outside the RHCA, they would be placed on hillsides where soils are shallow and slopes are steeper. This alternate location (on hillslopes) creates a risk of pond failure because the shallow hillside sediments would become saturated. As pore pressure builds up at the interface between the sediments and a less porous zone (i.e. underlying bedrock), the sediments become mobile, resulting in a small debris flow or gullying. The relocated ponds would also be less likely to tap into shallow groundwater, would eliminate the miner's water source for the ponds (groundwater), and be more distant from their mining activity. This would require additional equipment and/or disturbance to bring the water to the mining site or materials to the ponds.

With respect to water quality or activity inside an RHCA

Under Alternative 2, nine Plans have ponds that would NOT be in compliance with MM-2 as it pertains to water quality or activity inside an RHCA (**Table 3-17)**. These ponds either have 1) the potential to discharge sediment and/or heavy metals into a creek during use and/or construction and therefore locally alter water quality, or 2) locations that were not identified by the miner, therefore a compliance call could NOT be made.

Under Alternative 3, all Plans with ponds would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs and/or General Requirements.

Table 3-17: Comparison of Ponds inside RHCAs that are NOT in compliance with MM-2 under Alternative 2 versus Alternative 3 by Subwatershed (SWS)

SWS Name	Plan	Pond	Alternative 2	Alternative 3	National Forest
Beaver Creek SWS					
	Olive Tone	Proposed settling ponds	Construction: Construction of proposed ponds would be in compliance with MM-2. Use: Use of ponds would NOT be in compliance because pond has the potential to discharge sediment into Olive Creek via subsurface flow and by remobilizing bank sediment when pond water re-emerge along the bank.	Construction: Same as Alt. 2. Construction in compliance with MM-2. Use: Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	WWNF
	Sunshine McWillis	Proposed source water and settling pond at	Construction and use of the proposed pond would NOT be in compliance because pond would be in McWillis Gulch and	Dropped under Alt. 3	WWNF

SWS Name	Plan	Pond	Alternative 2	Alternative 3	National Forest
		processing site 2	discharge sediment into the Gulch and Olive Creek downstream during high flows.		
Lower Granite SWS					
	Hopeful 2, 3	Proposed construction and use of source water and settling ponds on North side of Granite Creek	Construction and use of the proposed pond would NOT be in compliance because protection measures are not in place to prevent sediment from reaching Granite Creek.	Construction and Use: Different than Alt. 2. Construction and Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	UNF
	Little Cross	Proposed source and settling pond	Use NOT in compliance because pond would be in road that slopes towards Granite Creek. Potential for discharge during construction and use.	Different than Alt. 2. Pond use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	WWNF
	Troy D	Existing settling ponds	Use of ponds would NOT be in compliance because ponds have the potential to discharge sediment from the pond into Granite Creek via subsurface flow and by remobilizing bank sediment when pond water re-emerge along the bank.	Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	WWNF
Upper Granite SWS					
	Eddy Shipman (lode portion)	Existing source and settling ponds	Use NOT in compliance because the lower ends of the existing ponds are not bermed sufficiently to prevent water, sediment, and heavy metals from entering into the adjacent wet meadow and into the creek.	Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs and General Requirements.	WWNF side
	Old Eric	Existing settling pond	Use NOT in compliance because pond has the potential to discharge warm water into Granite Creek.	Different than Alt. 2. Pond use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs	UNF
	Tetra Alpha Mill and Lode	Existing settling ponds	Use NOT in compliance because ponds have potential to dischargeheavy metals in solution into Boulder	Different than Alt. 2. Use would be in compliance with MM-2 under Alt 3 as a result of the addition of FS WRPMs and	WWNF

SWS Name	Plan	Pond	Alternative 2	Alternative 3	National Forest
			Creek as pond water seeps through fill.	General Requirements.	
	Yellow Gold	Proposed settling ponds	Unknown. Compliance could not be analyzed because no location provided	Different than Alt. 2. Construction and use would be in compliance as a result of the addition of FS WRPMs.	WWNF

Roads inside RHCAs

All Plans, except Lucky Strike, Royal White, and Yellow Jacket have at least one road that is inside an RHCA (**Appendix 6**). The assessment of effect (**Appendix 7**) and compliance with PACFISH MM-2 (**Appendix 3**) were based on road distance from the creek, topography, and ground cover.

Under Alternative 2 there are six operations with roads inside RHCAs that would not be in compliance with MM-2 (**Table 3-18).** The roads would not be in compliance because there was the potential for a discharge and/or there would be new detrimental soil disturbance inside the RHCA, and no provisions were made for minimizing disturbance and restoring road bed once mining was done.

Under Alternative 3, all roads would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs and/or General Requirements.

Table 3-18: Comparison of Roads proposed for Use that would NOT be in Compliance with PACFISH MM-2 under Alternative 2 versus Alternative 3 by Subwatershed (SWS).

(E = Existing non system road. P = Proposed, miner created road. None are cut and fill)

SWS Name	Plan	Road Number	Existing Condition	Creek	RHCA type	RHCA width (ft)	Compliance with MM-2		Reason for non-compliance
							Alt 2	Alt 3	
Beaver Creek SWS									
	Altona	1042M1a	Temporary - P	Quartz Gulch	Intermittent, fish bearing	300	no	Yes	Alt. 2: There would be new detrimental soil condition (DSC) but no provisions for minimizing disturbance and restoring road bed once mining is done. Alt 3: FS General Requirements would minimized disturbance and restore the road
Bull Run SWS									
	Blue Sky/Bull Run	7300-M4a	Temporary - P	Bull Run	Perennial, fish bearing	300	no	Yes	Alt. 2: Potential for a discharge of sediment and there would be new detrimental soil conditions but without provision for minimizing disturbance and restoring road bed. Alt. 3: Potential discharge **would be eliminated** as a result as FS WRPMs and FS General Requirements would minimized disturbance and restore the road
	Blue Sky/Bull Run	7375-M1a	Temporary - E	Bull Run	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be potential for a discharge of sediment and new detrimental soil conditions but without provision for minimizing disturbance and restoring road bed.

SWS Name	Plan	Road Number	Existing Condition	Creek	RHCA type	RHCA width (ft)	Compliance with MM-2		Reason for non-compliance
							Alt 2	Alt 3	
									Alt. 3: Potential discharge **would be eliminated** as a result as FS WRPMs and FS General Requirements would minimized disturbance and restore the road bed
Clear Creek SWS									
	Ruby Group	1310-E1a	Temporary - E	Ruby and Clear	Ruby Ck = Intermittent, fish bearing, Clear Ck = Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential **would be eliminated** with the addition of FS WRPMs
	Ruby Group	1310-E1a	Temporary - E	Ruby and Clear	Ruby Ck = Intermittent, fish bearing, Clear Ck = Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential **would be eliminated** with the addition of FS WRPMs
Lower Granite SWS									
	Hopeful 2, 3	1035-E1d	Temporary - E	Granite	Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential **would be eliminated** with the addition of FS WRPMs
Upper Granite SWS									
	Eddy Shipman	7300680	FS Closed	Granite	Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential **would be eliminated** with the addition of FS WRPMs
	Eddy Shipman	7300-E1d	Temporary - E	Granite	Perennial, fish bearing	300	no	Yes	Alt 2: Potential for a discharge. Alt 3: Potential **would be eliminated** with the addition of FS WRPMs

SWS Name	Plan	Road Number	Existing Condition	Creek	RHCA type	RHCA width (ft)	Compliance with MM-2		Reason for non-compliance
							Alt 2	Alt 3	
	Tetra Alpha Placer	7355-M3b	Temporary - P	Boulder	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be new detrimental soil condition but no provisions for minimizing disturbance and restoring road bed once mining is done. Alt 3: FS General Requirements would minimized disturbance and restore road bed
	Tetra Alpha Placer	7355-M3c	Temporary - P	Boulder	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be new detrimental soil condition but no provisions for minimizing disturbance and restoring road bed once mining is done. Alt 3: FS General Requirements would minimized disturbance and restore road bed
	Tetra Alpha Placer	7355-M3d	Temporary - P	Boulder	Perennial, fish bearing	300	no	Yes	Alt. 2: There would be potential for a discharge of sediment and new detrimental soil conditions but without provision for minimizing disturbance and restoring road bed. Alt. 3: Potential discharge **would be eliminated** as a result as FS WRPMs and FS General Requirements would minimized disturbance and restore the road bed

Proposed and Existing Bridges

Under Alternative 2, nine bridges are proposed for use (**Table 3-19**). Six are existing bridges and three are proposed. Of the nine bridges, two would not be in compliance with MM-2 as a result of the potential for a discharge during placement and removal (**Appendices 3 and 7)**.

Under Alternative 3, all of the bridges would be in compliance with MM-2.

Table 3-19: Plans proposing use of bridges inside the RHCA. Comparison of Compliance with MM-2 under Alternatives 2 and 3 by SWS

			Compliance with MM-2	
SWS Name	**Plan**	**Bridge**	**Alt 2**	**Alt 3**
Beaver Creek SWS				
	Sunshine McWillis	Existing bridge across McWillis Gulch	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
Bull Run SWS				
	Blue Sky/Bull Run	Proposed temporary bridge across Bull Run Creek to access Bull Run site 2	no	Dropped under Alt 3. Replaced with TA road 7375-M1b which is in compliance.
	Blue Sky/Bull Run	Existing wooden bridge across Swamp Creek	Yes because is an existing stable bridge and required to access the site.es	Same as Alt. 2. Would be in compliance
Clear Ck SWS				
	Grubsteak	Existing bridge across Clear Creek	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
	Lightning	Existing bridge across Lightning Creek	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
	Ruby	Proposed temporary ATV bridge across Clear Creek	no	Yes as a result of the addition of FS WRPMs
Lower Granite SWS				
	East Ten Cent	Existing foot bridge across East Ten Cent	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
Upper Granite SWS				
	Old Eric 1&2	Existing bridge across Granite Creek	Yes because is an existing stable bridge and required to access the site.	Same as Alt. 2. Would be in compliance
	Yellow Gold	Proposed foot bridge	yes because planks would be hand placed and no soil disturbance or discharge potential	Same as Alt. 2. Would be in compliance

Riparian Management Objectives (RMOs)

Each Plan was evaluated to determine if there would be changes to any of the RMOs (**Appendix 7**). The mining areas are considered points along the stream because the areas proposed for mining are all less than 10 acres, with most less than 5 acres and the length of stream that they could potentially influence in all cases is less than 300 feet. Therefore, the values assigned to the RMOs do not apply because they are intended to be used at the watershed scale not at a specific point along the stream. Instead, the activities were examined for potential impacts to the RMO parameters. The RMO parameters identified in PACFISH (USDA and USDI 1995) are Pool Frequency, Water Temperature, Large Woody Debris, Bank Stability, Lower Bank Angle, and Width/Depth ratio. In addition to the above six RMO parameters, Substrate Sediment was included in this analysis because it was an additional parameter identified in the PACFISH/INFISH/ Screens Information Guide for the Wallowa-Whitman National Forest (USDA Forest Service 1995a, Table 1).

Under Alternative 2, ten Plans have the potential to locally (300 feet or less) affect one or more RMO parameters (**Table 3-20)**. RMO parameters affected are 1) pool frequency and substrate related to suction dredging and/or erosion of a road and 2) stream temperature related to input of warm water, reversal of groundwater flow, or water withdrawal.

Under Alternative 3, nine Plans have the potential to locally (300 feet or less) affect one or more parameters (**Table 3-20**). The addition of Forest Service WRPMs for Grubsteak eliminated its potential to impact the stream temperature RMO as a result of groundwater flow reversal. The addition of Forest Service WRPM for Old Eric 1&2 eliminated its potential to impact stream temperature RMO as a result of the input of warm water. The remaining RMO parameters affected are 1) pool frequency and substrate related to suction dredging and/or erosion of a road and 2) stream temperature related to water withdrawals. A brief description of the potential impacts to the RMO parameters under Alternatives 2 and 3 is found following **Table 3-20.**

Table 3-20: Plans with the Potential to alter a Riparian Management Objective (RMO) Parameter under Alternatives 2 and 3 by Subwatershed (SWS)

SWS Name	Plan	RMO affected	Alternative 2	Alternative 3
Beaver Creek SWS				
	Belvadear	Stream temperature	Water withdrawal: Potential increase in stream temperature	Same as Alternative 2.
	Olive Tone	Stream temperature	Water Withdrawal: Potential increase in stream temperature	Same as Alternative 2.
Bull Run SWS				
	Blue Sky/Bull Run	Pool frequency and Substrate	Suction Dredging: Potential local changes	Same as Alt. 2
Clear Creek SWS				
	Grubsteak	Stream temperature	Groundwater Flow Reversal: Potential local increase in stream temperature downstream	Different than Alt. 2. Potential increase in stream temperatures prevented as a result of the addition of FS WRPMs.

SWS Name	Plan	RMO affected	Alternative 2	Alternative 3
	Lightning	Pool frequency, Substrate, and Stream temperature	Suction Dredging: Potential local changes to pool frequency and substrate Water withdrawals: Potential increase in stream temperature	Suction Dredging: Same as Alt. 2 Water withdrawals: Different than Alt. 2. Potential increase in stream temperatures remains but restricted to July 1 to August 14 as a result of FS Fish Protection Measures
Lower Granite SWS				
	Blue Smoke	Pool frequency and Substrate	Suction Dredging: Potential local changes	Same as Alt. 2
	Little Cross	Pool frequency and Substrate	Suction Dredging: Potential local changes	Same as Alt. 2
Upper Granite SWS				
	Old Eric 1 & 2	Pool frequency, Substrate and Stream temperature	Suction Dredging: Potential local changes in pool frequency and substrate Input of Warm Water: potential increase in stream temperature	Suction Dredging: Same as Alt. 2 Input of Warm Water: Different than Alt. 2. Potential input of warm water causing local increases in stream temperatures prevented as a result of the addition of FS WRPM
	Tetra Alpha Placer	Stream temperature	Water Withdrawal: Potential increase in stream temperature	Different than Alt. 2. Potential increase in stream temperatures remains but restricted to time period prior to August 15 because water withdrawals would not occur after August 14.
	Tetra Alpha Mill and Lode	Stream temperature	Water Withdrawal: Potential increase in stream temperature	Different than Alt. 2. Potential increase in stream temperatures remains but restricted to time period prior to August 15 because water withdrawals would not occur after August 14.

Pool Frequency: Under both alternatives, pool frequency changes related to suction dredging would be localized to where dredging creates pools and loosens the substrate. The pool created by suction dredging would persist (except in the case of a large flood event) because the amount of bedload moving through these streams is limited based on the composition of the channel beds (dominated by cobbles), the amount of historic placer mining of the streams, and the fact that any inputs from the stream banks would be predominantly sands, gravels, silts and clays. Fine sediment entering the streams from the banks and the sediment disturbed by suction dredging would be redistributed downstream during spring high flow.

Substrate sediment: Under both alternatives, local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, passes it up through a suction hose, and runs it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. These dredge tailings would be mobilized during the spring high flow and redistributed downstream.

While a number of Plans have the potential to discharge sediment into creeks from mining activities on land, this discharge would not alter substrate because inputs would be largely sands, silts and clays move through the system as suspended load.

Stream temperature: Under Alternative 2 the potential to alter stream temperatures exists as a result of 1) water withdrawals by Belvadear (Olive Creek), Lightning (Lightning Creek), Olive Tone (Olive Creek), Tetra Alpha Placer (Boulder Creek) and Tetra Alpha Mill & Lode (Boulder Creek) Plans, 2) warm water inputs from Old Eric 1&2 (Granite Creek), or 3) groundwater reversal at Grubsteak (Clear Creek). The temperature changes related to input of warm water or groundwater reversal would occur locally. Temperature changes related to water withdrawals at the five Plans noted above have the impact to affect downstream temperatures. The changes would not be permanent but tied to the period when the mining activity was occurring. The potential exists anytime during the summer.

Under Alternative 3, the number of Plans that could alter stream temperatures decreases. The potential to impact stream temperatures as a result of inputs of warm water (Old Eric 1&2) or groundwater reversals (Grubsteak) would be eliminated as a result of the addition of Forest Service WRPMs to these two Plans. However, potential impacts to temperatures from the five Plans that propose to withdraw water from Boulder, Lightning, or Olive Creeks remains. However, the period of time in which changes in stream temperatures related to water withdrawals could occur would decrease as the result of Forest Service Fish Protection Measures for Boulder and Lightning Creeks but not for Olive Creek because the Fish Protection Measures do not apply due to lack of bull trout and chinook salmon. These Fish Protection Measures limit withdrawals to the time period prior to August 15. However, the water withdrawals would still occur during the warmest part of the summer and have the potential to affect stream temperatures and stream flows during that period of time.

Effects on Wetlands and Floodplains

Executive Order 11990 (Protection of Wetlands) requires government agencies to take actions that "avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands." EO 11990 (Sec 2 (a)(1 and 2) further states "shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such constructions, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use…"

Executive Order 11988 (Protection of Floodplains) requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Executive Order 11988 defines the term "floodplain" as follows: "…that area subject to a one percent or greater change of flooding in any given year."

Under Alternatives 2 and 3, five operations propose some activity in either wetlands and/or floodplains (**Table 3-21**). These portions of their Plans are examined for compliance with Executive Order 11990 (Protection of Wetlands) and Executive Order 11988 (Protection of Floodplains).

Under Alternative 2, one Plan would not be in compliance with EO 11988 (Floodplains) and two Plans would not be in compliance with EO 11990 (Wetlands) for the reasons listed in **Table 3-21.**

Under Alternative 3, all Plans would be in compliance with EO 11990 (Floodplains) and EO 11988 (Wetlands). The reduction is the result of the addition of Forest Service WRPMs and/or General Requirements W1-3 (**Table 3-21**).

Table 3-21: Plans with Activity Proposed in Wetlands and Floodplains

Compliance with Executive Orders Protecting Wetlands and Floodplains under Alternatives 2 and 3 by Subwatershed (SWS)

SWS	Plan	Wetland or Floodplain	Alternative 2	Alternative 3
Beaver Creek SWS				
	Belvadear	Mining would occur in a wetland that has developed between the berm along Olive Creek and the road. Abundant riparian vegetation and ponds exist in this area. The wetland area is connected via subsurface flow to Olive Creek. Wetlands in the area are limited as a result of past mining activity.	Not in compliance with EO 11990 (Wetlands) because the Plan does not clearly state what miner proposed to do to "minimize hard to the wetlands" and ensure restoration of their function once mining activity is completed.	Different than Alt. 2. Plan would be in compliance with EO 11990 as a result of the addition of FS General Requirements W1, 2, and 3 (Appendix 2) which would "minimize harm to the wetlands" and ensure restoration of their function to the extent possible once mining activity is completed.
Bull Run SWS				
	Blue Sky/Bull Run	Mining activity at Blue Sky Site 3 would be in the active to 5 year floodplain of Bull Run Creek.	Not in compliance with EO 11988 (Floodplains) because Plan does not ensure that mining in this area would not have impacts beyond a season as it pertains to floodplain function. Because vegetation would be removed during mining, there is the potential for the spring high flows to erode some of the material mined and create a new channel in the floodplain, as well as discharge sediment into the creek.	Different than Alt. 2. Plan would be in compliance with EO 11988 as a result of the addition of FS WRPM which requires that the hole be filled at the end of the season and the disturbed area seeded and covered with straw
Upper Granite SWS				
	Tetra Alpha Placer	A two-track road would be created across a wet meadow/floodplain to access a portion of the	Not in compliance with EO 11990 (Wetlands) or EO 11988 (Floodplains) because the Plan does	Different than Alt. 2. Plan would be in compliance with Executive Order 11988

SWS	Plan	Wetland or Floodplain	Alternative 2	Alternative 3
		Stage 2 mining area on the south side of Boulder Creek.	not clearly state what miner proposed to do to "minimize hard to the wetlands" and ensure restoration of their function once mining activity is completed. Plan does not ensure that the two-track road would not lead to the development of a channel related to road erosion. A new channel could alter groundwater flows and potentially trigger gully development in the wet meadow.	(Protection of Floodplains) and Executive Order 11990 (Protection of Wetlands) as a result of the addition of Forest Service WRPMs and General Requirements (Z1 through Z14). These requirements eliminate the potential for road erosion by rocking portions of the road, locating the rock with input from Forest Service personnel, and ensuring appropriate reclamation when no longer needed.

Comparison of Alternatives

The effects to water resources for the three alternatives are summarized below in **Table 3-22a** and discussed in detail in Appendix 7. The reduction of effects under Alternative 3 is the result of the addition of Forest Service RPMs (Appendix 11) and General Requirements (Appendix 2).

Table 3-22a: Comparison of Direct/Indirect Effects to Water Resources by Subwatershed

SWS	Direct/Indirect Effects	Alt 1	Alt 2	Alt 3
Beaver Creek SWS				
	Clean Water Act, Section 401 (Tables 3-10 and 3-12)			
	Plans with potential to discharge sediment into a creek	0	5	1
	Plans with potential to discharge heavy metals into a creek	0	1	0
	Plans with potential to discharge warm water into a creek	0	0	0
	Plans with potential to discharge creosote into a creek	0	0	0
	Clean Water Act, Section 303(d) (antidegradation)			
	Plans NOT in compliance with respect to sedimentation	0	0	0
	PACFISH: Compliance with MM-2 (structures inside the RHCA, see also Appendix 3)			
	Plans NOT in compliance with respect to Ponds (Table 3-17)	0	2	0
	Plans NOT in compliance with respect to Roads (Table 3-18)	0	1	0
	Plans NOT in compliance with respect to Bridges (Table 3-19)	0	0	0
	PACFISH: Riparian Management Objectives (RMOs)			
	Plans with impacts to RMOs (Table 3-20)	0	2	2

SWS	Direct/Indirect Effects	Alt 1	Alt 2	Alt 3
	Compliance with Executive Order 11988 (Floodplains) and/or Executive Order 11990 (Wetlands)			
	Plans NOT in compliance (Table 3-21)	0	1	0
	Other Water Resource impacts (revised Table 3-15)			
	Plans with potential to alter stream temperatures due to water withdrawals leading to reduction in stream flow	0	2	2
	Plans with potential to alter stream temperature due to groundwater flow reversal leading to reduction in stream flow	0	0	0
Bull Run Creek SWS				
	Clean Water Act, Section 401 (Tables 3-10 and 3-12)			
	Plans with potential to discharge sediment into a creek	0	1	1
	Plans with potential to discharge heavy metals into a creek	0	0	0
	Plans with potential to discharge warm water into a creek	0	0	0
	Plans with potential to discharge creosote into a creek	0	0	0
	Clean Water Act, Section 303(d) (antidegradation)			
	Plans NOT in compliance with respect to sedimentation	0	0	0
	PACFISH: Compliance with MM-2 (structures inside the RHCA, see also Appendix 3)			
	Plans NOT in compliance with respect to Ponds (Table 3-17)	0	0	0
	Plans NOT in compliance with respect to Roads (Table 3-18)	0	1	0
	Plans NOT in compliance with respect to Bridges (Table 3-19)	0	1	0
	PACFISH: Riparian Management Objectives (RMOs)			
	Plans with impacts to RMOs (Table 3-20)		1	1
	Compliance with Executive Order 11988 (Floodplains) and/or Executive Order 11990 (Wetlands)			
	Plans NOT in compliance (Table 3-21)	0	1	0
	Other Water Resource impacts (revised Table 3-15)			
	Plans with potential to alter stream temperatures due to water withdrawals leading to reduction in stream flow	0	0	0
	Plans with potential to alter stream temperature due to groundwater flow reversal leading to reduction in stream flow	0	0	0
Clear Creek SWS				
	Clean Water Act, Section 401 related (Tables 3-10 and 3-12)			
	Plans with potential to discharge sediment into a creek	2	3	0
	Plans with potential to discharge heavy metals into a creek	0	0	0
	Plans with potential to discharge warm water into a creek	0	0	0
	Plans with potential to discharge creosote into a creek	2	0	0
	Clean Water Act, Section 303(d) (antidegradation)			
	Plans NOT in compliance with respect to sedimentation	0	0	0
	PACFISH: Compliance with MM-2 (structures inside the RHCA, see also Appendix 3)			
	Plans NOT in compliance with respect to Ponds (Table 3-17)	0	0	0
	Plans NOT in compliance with respect to Roads (Table 3-18)	0	1	0
	Plans NOT in compliance with respect to Bridges (Table 3-19)	0	1	0
	PACFISH: Riparian Management Objectives (RMOs)			
	Plans with impacts to RMOs (Table 3-20)	0	2	1
	Compliance with Executive Order 11988 (Floodplains) and/or Executive Order 11990 (Wetlands)			
	Plans NOT in compliance (Table 3-21)	0	0	0

SWS	Direct/Indirect Effects	Alt 1	Alt 2	Alt 3
	Other Water Resource impacts (revised Table 3-15)			
	Plans with potential to alter stream temperatures due to water withdrawals leading to reduction in stream flow	0	1	1
	Plans with potential to alter stream temperature due to groundwater flow reversal leading to reduction in stream flow	0	1	0
Lower Granite SWS				
	Clean Water Act, Section 401 (Tables 3-10 and 3-12)			
	Plans with potential to discharge sediment into a creek	0	4	0
	Plans with potential to discharge heavy metals into a creek	0	0	0
	Plans with potential to discharge warm water into a creek	0	0	0
	Plans with potential to discharge creosote into a creek	0	0	0
	Clean Water Act, Section 303(d) (antidegradation)			
	Plans NOT in compliance with respect to sedimentation	0	0	0
	PACFISH: Compliance with MM-2 (structures inside the RHCA, see also Appendix 3)			
	Plans NOT in compliance with respect to Ponds (Table 3-17)	0	3	0
	Plans NOT in compliance with respect to Roads (Table 3-18)	0	1	0
	Plans NOT in compliance with respect to Bridges (Table 3-19)	0	0	0
	PACFISH: Riparian Management Objectives (RMOs)			
	Plans with impacts to RMOs (Table 3-20)	0	2	2
	Compliance with Executive Order 11988 (Floodplains) and/or Executive Order 11990 (Wetlands)			
	Plans NOT in compliance (Table 3-21)	0	0	0
	Other Water Resource impacts (revised Table 3-15)			
	Plans with potential to alter stream temperatures due to water withdrawals leading to reduction in stream flow	0	0	0
	Plans with potential to alter stream temperature due to groundwater flow reversal leading to reduction in stream flow	0	0	0
Upper Granite SWS				
	Clean Water Act, Section 401 related (Tables 3-10 and 3-12)			
	Plans with potential to discharge sediment into a creek	1	3	0
	Plans with potential to discharge heavy metals into a creek	0	2	0
	Plans with potential to discharge warm water into a creek	0	1	0
	Plans with potential to discharge creosote into a creek	0	0	0
	Clean Water Act, Section 303(d) (antidegradation)			
	Plans NOT in compliance with respect to sedimentation	0	0	0
	PACFISH: Compliance with MM-2 (structures inside the RHCA, see also Appendix 3)			
	Plans NOT in compliance with respect to Ponds (Table 3-17)	0	4	0
	Plans NOT in compliance with respect to Roads (Table 3-18)	0	2	0
	Plans NOT in compliance with respect to Bridges (Table 3-19)	0	0	0
	PACFISH: Riparian Management Objectives (RMOs)			
	Plans with impacts to RMOs (Table 3-20)	0	3	3
	Compliance with Executive Order 11988 (Floodplains) and/or Executive Order 11990 (Wetlands)			
	Plans NOT in compliance (Table 3-21)	0	1	0
	Other Water Resource impacts (Table 3-15)			

SWS	Direct/Indirect Effects	Alt 1	Alt 2	Alt 3
	Plans with potential to alter stream temperatures due to water withdrawals leading to reduction in stream flow	0	2	2
	Plans with potential to alter stream temperature due to groundwater flow reversal leading to reduction in stream flow	0	0	0

Cumulative Effects

Cumulative effects under Alternatives 2 and 3 are summarized in Table 3-22b and discussed in detail in Appendix 7, Table 7-15.

Under Alternative 2, there would be the potential for cumulative effects to stream temperatures in three subwatersheds (Beaver Creek, Clear Creek and Upper Granite) and turbidity in one subwatersheds (Clear Creek). Similar to the direct/indirect effects described previously and in Appendix 7, cumulative effects would be localized and not be measureable upstream of the confluence of the first incoming tributary.

With respect to heavy metals in the Upper Granite subwatershed, there could be a potential cumulative effect to Granite Creek related to the discharge of heavy metals from Tetra Alpha Mill settling ponds into Boulder Creek which flows into Granite Creek and from Eddy Shipman settling ponds which are adjacent to Granite Creek. See Table 3-22b below for details.

With respect to mining activities on private land, the cumulative effects would be the same as described for Fisheries (Chapter 3, Fisheries section).

Under Alternative 3, the potential for cumulative effects decreases as a result of the Forest Service RPMs found in Appendix 11, and becomes limited to stream temperature. Potential cumulative effects to stream temperature while remaining for the three subwatersheds would be less in two of the subwatersheds (Clear Creek and Upper Granite). Similar to the direct/indirect effects described previously and in Appendix 7, cumulative effects would be localized and not be measureable upstream of the confluence of the first incoming tributary. The potential for a cumulative effect related to water quality and heavy metals due to adit discharges and processing of ore is eliminated as a result of the Forest Service General Requirements (Appendix 2: L3, 4, and 5). Therefore, even if a restoration failure such as the Bluebird Lode Mine were to occur, there would be no cumulative effect as it pertains to heavy metal loading from any of the proposed Plans due to these protection measures.

Note that in Table 3-22B, “None” under Alternative 2 and Alternative 3 means that there are no cumulative effects as a result of that Plan. However, there may be direct and indirect effects, which were described earlier in this Chapter.

Table 3-22b: Cumulative Effects Summary by Subwatershed and Plan.

SWS Name	Plan	Cumulative Effects Summary	
		Alternative 2**	**Alternative 3****
Beaver Creek SWS			
	Altona	None	None
	Belvadear	POTENTIAL for a cumulative effect if a discharge of silts and clays occurs into Olive Creek.	POTENTIAL for cumulative effect to stream temperatures remains.

SWS Name	Plan	Cumulative Effects Summary	
		Alternative 2**	**Alternative 3****
		POTENTIAL for a cumulative effect to stream temperature if water withdrawal occurs.	
	L&H	None	None
	Olive Tone	POTENTIAL for a cumulative effect if a discharge of silts and clays occurs into Olive Creek. POTENTIAL for a cumulative effect to stream temperature if water withdrawal occurs.	POTENTIAL for cumulative effect to stream temperatures remains.
	Royal White	None	None
	Sunshine McWillis	**Potential for a discharge**: Varies depending on if McWillis Gulch has flow. IF McWillis Gulch is dry then NO cumulative effect IF McWillis Gulch has flow then POTENTIAL cumulative effect related to sediment input into Olive Creek.	None
	Yellow Jacket	None	None
Cumulative Effects summary: Under Alternative 2, there would be a potential cumulative effect to stream temperatures as a result of water withdrawals by Olive Tone Placer and Belvadear Placer from Olive Creek. There would also be a potential cumulative effect to water clarity (i.e. turbidity) related to a potential discharge of sediment from both Olive Tone and Belvadear Placers into Olive Creek and by Sunshine/McWillis into McWillis Gulch which is a tributary of Olive Creek. These inputs have the potential to overlap in time and space. However, the magnitudes of the temperature and turbidity effects would not be measurable on Olive Creek just upstream of its confluence with Beaver Creek. Therefore, no potential cumulative effects would extend beyond this point. Under Alternative 3, the cumulative effect to stream temperatures related to water withdrawals remains the same as Alternative 2. The magnitude of the effects would remain localized and not measurable on Olive Creek just upstream of its confluence with Beaver Creek. Therefore, no potential cumulative effects would extend beyond this point. With respect to sediment inputs, the cumulative effect to water clarity would be eliminated due to the addition of Forest Service WRPMs to Olive Tone and Sunshine/McWillis. These protections would eliminate inputs of sediment from Olive Tone and Sunshine/McWillis and therefore there would be no overlap in time and space with potential sediment inputs from Belvadear which would remain.			
Bull Run Creek SWS			
	Blue Sky/Bull Run	None	None
Cumulative Effects summary: There would be no cumulative effects under Alternatives 2 or 3.			
Clear Creek SWS			
	Bunch Bucket	None	None
	Grubsteak	POTENTIAL for a cumulative effect to stream temperature related to reversal of the direction of groundwater flow.	None
	Lightning	POTENTIAL for a cumulative effect to stream temperatures related to withdrawing water from Lightning Creek.	POTENTIAL cumulative effect to stream temperature remains but less.

SWS Name	Plan	Cumulative Effects Summary	
		Alternative 2**	**Alternative 3****
	Lucky Strike	None	None
	Ruby Group	None	None
Cumulative Effects summary: Under Alternative 2, the potential cumulative effects to stream temperature on Lightning Creek (Lightening Placer) and Clear Creek (Grubsteak Placer) would be localized. However, the potential stream temperature effect on Lightning Creek would not be measurable on Lightning Creek just upstream of its confluence with Ruby Creek. At this point the creek becomes Clear Creek. Therefore, no potential cumulative effects would extend beyond this point. As a result, there would not be an overlap in time and space with potential local increases in stream temperatures downstream on Clear Creek from activity on Grubsteak. In addition, the potential temperature effect due to activity on Grubsteak would not be measureable on Clear Creek just upstream of its confluence with Beaver Creek. Therefore, no potential cumulative effects would extend downstream beyond this point. Under Alternative 3, the potential cumulative effect to stream temperatures decreases. The local effect on stream temperatures would be restricted to Lightning Creek as a result of proposed water withdrawals on Lightning Placer and would occur for a shorter period of time due to the addition of Fish Protection Measure. This protection measure limits water withdrawals to before August 15. The potential cumulative effect would not be measurable on Lightning Creek just before its confluence with Ruby Creek. Finally, the addition of Forest Service WRPMs for Grubsteak eliminates the potential for an impact on stream temperatures on Clear Creek.			
Lower Granite SWS			
	Blue Smoke	None	None
	East 10 Cent	None	None
	Hopeful 1	None	None
	Hopeful 2&3	None	None
	Little Cross	None	None
	Rosebud 1-4	None	None
	Troy D	None	None
Cumulative Effects summary: There would be no cumulative effects under Alternatives 2 or 3.			
Upper Granite SWS			
	City Limits	None	None
	Eddy Shipman	POTENTIAL for a cumulative effect related a discharge of heavy metals into Granite Creek.	None
	Make It	None	None
	Muffin	None	None
	Old Eric 1 and 2	POTENTIAL for a cumulative effect to stream temperatures related to a discharge of warm water from the settling pond into Granite Creek.	None
	Tetra Alpha Placer	POTENTIAL for a cumulative effect to stream temperature if water withdrawal occurs from Boulder Creek.	POTENTIAL cumulative effect to stream temperature remains but less.

SWS Name	Plan	Cumulative Effects Summary	
		Alternative 2**	**Alternative 3****
	Tetra Alpha Mill and Lode	POTENTIAL cumulative effect related to a discharge of heavy metals. POTENTIAL cumulative effect to stream temperatures if water were withdrawn from Boulder Creek.	None related to heavy metals. POTENTIAL for cumulative effect to stream temperatures remains but less.
	Yellow Gold	None	None

Cumulative Effects summary: Under Alternative 2, there would be a potential cumulative effect to stream temperatures on Boulder Creek due to potential water withdrawals by Tetra Alpha Placer and Tetra Alpha Mill and Lode. However, the magnitude of the effects is expected to be localized and not measurable downstream on Boulder Creek just above its confluence with Granite Creek. Therefore, no potential cumulative effects would extend beyond this point related to these Plans.

There would also be a potential cumulative effect to stream temperatures on Granite Creek from the potential input of warm water from the Old Eric settling pond. However, the effect would not be measurable downstream on Granite Creek just before its confluence with Bull Run Creek. Therefore, no potential cumulative effects would extend beyond this point related to this Plan.

There could be a potential cumulative effect to Granite Creek related to the discharge of heavy metals from Tetra Alpha Mill settling ponds into Boulder Creek which flows into Granite Creek and from Eddy Shipman settling ponds which are adjacent to Granite Creek. Eddy Shipman is upstream of Tetra Alpha Mill (TAM) and the first major tributary into Granite Creek after Eddy Shipman is Boulder Creek where TAM resides. The upper portion of Granite Creek, where Eddy Shipman is located, has elevated levels of heavy metals from past mining activities (Cascade Earth Sciences 2006). Because Boulder Creek is the first major tributary after Eddy Shipman, there could be a small and possibly measurable increase in heavy metal concentrations in Granite Creek from these Plans below the confluence of Granite Creek and Boulder Creek. Therefore, a possible cumulative effect on Granite Creek remains because inputs of heavy metal concentrations from these two Plans could overlap in time and space.

Under Alternative 3, the potential cumulative effect to stream temperatures on Boulder Creek decreases and would occur for a shorter period of time due to the addition of Fish Protection Measures. These protection measure limit water withdrawals to before August 15 and prior to August 15 if the stream goes dry. The potential cumulative effect would not be measurable downstream on Boulder just above its confluence with Granite Creek. With respect to Old Eric Placer, the potential for a local cumulative effect to stream temperature on Granite Creek from this Plan would be eliminated as a result of the addition of Forest Service WRPMs.

The potential for a cumulative effect related to a discharge of heavy metals from Eddy Shipman and Tetra Alpha Lode and Mill would also be eliminated as a result of the addition of Forest Service General Requirements L1-12, as well as an additional Plan-specific RPM for Eddy Shipman.

Soil Resources – Effects Analysis

All placer mining will occur on alluvial soil that has formed along creeks or on hillslopes. In most cases the areas along the creeks have already been disturbed from past mining activity. For Plans that include placer mining, surface material would be removed and gold bearing material removed and processed through a trommel or similar equipment. However, the scope of proposed activity varies greatly between Plans. Each Plan has a specific reclamation plan; designed to restore the site after mining is completed. Generally topsoil is removed and stocked piled. After mining is complete, excavated areas are refilled with the processed material and are recontoured. The stored topsoil is spread over the surface and grass is seeded. Although the mined sites would be returned to near normal contours and stabilized by seeding, soil structure would be damaged by the operations. It is unknown how long it will take for these soils to return to natural conditions.

Alternative 1

Direct/Indirect Effects

Under Alternative 1 of the Granite Mining Project, the Forest Service would not change management in the project area but would require that past NEPA decisions related to these Plans be implemented. While there would be no proposed mining under this alternative, there are connected reclamation activities.

Potential effects to soil resources from these reclamation activities are shown in **Table 3-23**. There are either no changes to existing conditions despite reclamation activities because no actions were identified that would improve soil productivity or the potential for a localized increase in soil erosion related to removing structures and exposing the underlying soil.

Table 3-23: Effects to Soil Resources under Alternative 1

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
Beaver Creek SWS				
	Altona	Quartz Gulch	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Belvadear Group	Olive Creek	Equipment would be removed	NO CHANGE from existing condition because no activity proposed.
	L&H	Olive Creek	Shed would be removed	POTENTIAL for localized soil erosion where the shed once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
	Olive Tone	Olive Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Royal White Group	Irish Gulch	Cabins would be removed, Adits would be gated.	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
				to reduce cover the bare ground and prevent erosion.
	Sunshine/ McWillis	McWillis Gulch	Cabins and road 1305-M1a would be removed	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity after removal.
	Yellow Jacket	Orofino Gulch	Spring development and sheds would be removed. Site would remain as is.	POTENTIAL for localized soil erosion where the sheds once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
Bull Run Creek SWS				
	Blue Sky/Bull Run	Bull Run Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
Clear Creek SWS				
	Bunch Bucket	Clear Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Grubsteak	Clear Creek	Bridge, equipment,& shed removed, the large hole would be filled in.	POTENTIAL for localized soil erosion where the shed once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil resources related to filling in the large hole because no measures were identified to improve soil productivity of the filled-in hole. NO CHANGE related to removal of the bridge because removal would not alter existing soil conditions except at the bridge and this amount would not alter existing soil conditions at the subwatershed scale.

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
	Lightning Creek	Lightning Creek	Bridge removed. Cabins maintained as historical structure.	NO CHANGE related to removal of the bridge because removal would not alter existing soil conditions except at the bridge and this amount would not alter existing soil conditions at the subwatershed scale.
	Lucky Strike	Lightning Creek	Cabins maintained as historical structure	NO CHANGE from existing condition because no activity proposed.
	Ruby Group	Ruby & Clear Creek	Cabin would be removed	POTENTIAL for localized soil erosion where the cabin once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
Lower Granite SWS				
	Blue Smoke	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	East Ten Cent Creek	East Ten Cent Creek	Cabin and road 7350-M1a would be removed	POTENTIAL for localized soil erosion where the cabin once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity after removal.
	Hopeful 1	Granite Creek	Cabin would be removed	POTENTIAL for localized soil erosion where the shed once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
	Hopeful 2&3	Granite Creek	Cabins and road 1035-E1b would be removed.	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified to reduce cover the bare ground and prevent erosion. NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity after removal.

SWS Name	Plan	Creek	Alternative 1	Soil Resources Effects
	Little Cross 1	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Rose Bud 1-4	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Troy D	Granite Creek	Equipment and gates would be removed	NO CHANGE from existing condition because no activity proposed.
Upper Granite SWS				
	City limits	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Eddy-Shipman	Granite Creek	Cabins would need to be removed. The adits would remained caved in.	POTENTIAL for localized soil erosion where the cabins once stood because no measures were identified to reduce cover the bare ground and prevent erosion.
	Make It	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Muffin	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Old Eric 1&2	Granite Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.
	Tetra Alpha Placer	Boulder Creek	Equipment and roads 7355-M3a, and 7355-M3b would be removed.	NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity of these roads.
	Tetra Alpha Mill & Lode	Last Chance & Boulder Creek	Equipment and roads 7355-M4a and 7355-M4b would be removed.	NO CHANGE from existing soil resources related to road removal because no measures were identified to reduce the soil compaction and improve soil productivity of the road beds.
	Yellow Gold	Last Chance Creek	Site would remain as is. There is nothing to clean up or equipment to be removed.	NO CHANGE from existing condition because no activity proposed.

Cumulative Effects

There would be no cumulative effects because no proposed actions would be implemented.

Alternatives 2 and 3

Direct/Indirect Effects

The amount of soil disturbed as a result of the Plans would not vary between Alternatives 2 and 3 (**Table 3-24**). However, under Alternative 3, there would be the addition of Forest Service General Requirements which are designed to accelerate the recovery of soil productivity and prevent soil erosion (Appendix 2). Therefore, the long-term effects under Alternative 3 would be less than the effects under Alternative 2. However, even with these additional measures, the length of time required to restore soil structure and soil productivity once it has been lost could be on the order of decades.

The Forest Service measures would prevent soil erosion both during the mining activity and after the area has been reclaimed. The importance of preventing soil erosion is two-fold. First, soil loss reduces the productivity of the site by reducing soil depth and therefore water storage capacity, organic- and nutrient-rich surface soils, and possibly rooting depth where soils are already thin. Secondly, a portion of the eroded soil become sediment in area streams, reducing water quality and modifying channel morphology in depositional reaches.

Table 3-24: Potential New Detrimental Soil Disturbances under Alternatives 2 and 3 by Subwatershed

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	New DSC (Acres)	% New DSC for SWS*	
				Alt 2	Alt 3
Beaver Creek SWS (13,077.22 acres)					
	Altona	5	0		
	Belvadear Group	3	1.5		
	Bunch Bucket	10	8		
	L&H	8	1		
	Olive Tone	2	1		
	Royal White	3	0		
	Sunshine McWillis	2.5	1.5		
	Yellow Jacket	7.5	0		
SWS TOTAL		**41**	**13**	**0.10**	**0.10**
Bull Run Creek SWS (19,399.47 acres)					
	Blue Sky/Bull Run	1.7	1.45		
SWS TOTAL		**1.7**	**1.45**	**0.01**	**0.01**
Clear Creek SWS (20,467 acres)					
	Grubsteak	2	2		

SWS Name/Acres	Plan of Operation	Analysis Area for Each Plan (Acres)	New DSC (Acres)	% New DSC for SWS*	
				Alt 2	Alt 3
	Lightning Creek	5	2.5		
	Lucky Strike	2	1		
	Ruby	2.5	2.25		
SWS TOTAL		**11.5**	**7.75**	**0.04**	**0.04**
Lower Granite Creek SWS (20,283 acres)					
	Blue Smoke	1.75	1.5		
	East 10 Cent	2	2		
	Hopeful 1	1	0.25		
	Hopeful 2&3	3.5	3.5		
	Little Cross	1	0		
	Rosebud	5	3		
	Troy D	8	0		
	City Limits	1	1		
SWS TOTAL		**23.25**	**11.25**	**0.06**	**0.06**
Upper Granite Creek (9,313 acres)					
	Eddy Shipman	2.5	2.5		
	Make it	2	0.5		
	Muffin	2.5	2		
	Old Eric	1	0		
	Tetra Alpha Placer	8	8		
	Tetra Alpha Mill and Lode	2	0		
	Yellow Gold	9	9		
SWS TOTAL		**27**	**22**	**0.24**	**0.24**
PROJECT TOTAL		**104.45**	**55.45**		

*source of information is in the project file

Cumulative Effects

There would be a cumulative effect on soils from the proposed activities as a result of a small increase in the amount of detrimental soil conditions and a small reduction in soil productivity, as noted in Table 3-24. However, the amount of new detrimental soil disturbance in each subwatershed is less than one-half percent in all cases.

Forest Plan Compliance

Refer to Appendix 9 for a complete discussion of Forest Plan compliance for water and soil resources. Alternative 3 would be in compliance with all applicable standards and guidelines for water and soil resources in both the WWNF and UNF Forest Plans. Alternative 2 would be in compliance with some, but not all applicable standards and guidelines in both Forest Plans.

Fisheries and Aquatic Species

Introduction

Programs and activities on the Umatilla National Forest and Wallowa-Whitman National Forest are reviewed to determine how they may affect aquatic species listed under the Endangered Species Act (ESA) and the Regional Forester's Special Status Species List (as required under the National Forest Management Act). National Forest Service policy for any ESA or Regional Forester's listed species is stated in FSM 2670 and the U.S. Department of Agriculture Regulation 9500-4.

These responsibilities are implemented through Threatened, Endangered, and Sensitive Species Programs. The primary objectives of the Threatened, Endangered, and Sensitive Species Programs are to recover federally listed and proposed species and for Special Status/Sensitive species, to ensure that actions do not contribute to a loss of viability, or cause a significant trend toward listing under the ESA. The effects of any action authorized, funded, or carried out by the Forest Service on a Federally listed, Federally Proposed, or Special Status/Sensitive species is analyzed in a Biological Evaluation (Region Six Letter of Direction "Update of the Regional Forester's Special Status Species List" December 9, 2011 on file).

This analysis is considered the Fisheries Biological Evaluation and Specialist Report which satisfies all requirements of a Biological Evaluation required for the Granite Mining Project Environmental Impact Statement.

To reduce duplication, this analysis incorporates by reference the Fisheries Biological Assessment (BA) prepared for ESA Section 7 consultation. ESA listed species Middle Columbia River steelhead and Columbia River bull trout are analyzed in the BA. Stream survey information is summarized in the BA (Table 7-11). For a full description of methodology and existing conditions, refer to the Fisheries BA in the project file. The environmental baseline discussion and discussion of effects is based on Forest Service habitat stream survey data, ODFW stream survey data, as well as GIS analysis. The Water Resources analysis provides information on soils and hydrology that informs this analysis. Water temperature data is referenced from the UNF and WWNF monitoring records. The seven-day moving maximum and average summer time water temperatures are measured. Stream surveys follow the Region 6 level II stream survey protocol (following a modified Hankin and Reeves 1988 protocol).

Many streams in the Granite watershed have been classified by agencies to help identify locations of fish and habitat. Different designations and their relevance to the Granite Creek Watershed Mining project are described in the following table (Table 3-25).

Table 3-25: Summary of different stream classifications, their acronym and additional information for the Granite Creek Watershed Mining project.

Designation	Acronym	Additional Information
Designated Critical Habitat	DCH	DCH is listed under the Federal Endangered Species Act. DCH identifies areas with features essential to the conservation of an endangered or threatened species and that may require special management and protection.
Essential Salmonid Habitat	ESH	ESH is defined as the habitat necessary to prevent the depletion of native salmon species listed as threatened or endangered by the State of Oregon or by a federal agency. ESH in the Granite Mining project overlaps with DCH in the

Designation	Acronym	Additional Information
		Granite watershed. Maps of ESH and the ESH mapping tool is found at: http://chetco-new.dsl.state.or.us/esh2015/index.html (accessed Feb 2016)
Essential Fish Habitat	EFH	The Magnuson-Stevens Act, defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." In January 2015 the National Marine Fisheries Service removed EFH for chinook in the Granite Creek watershed and is no longer included in this analysis. This is a change between the draft and final EIS.

Analysis Framework: Statute and Regulatory Environment

Oregon Senate Bill 838 - July 2015

In 2013 the Oregon Legislature passed Senate Bill 838, which implemented a moratorium January2016 in Essential Indigenous Anadromous Salmonid Habitat (aka ESH) or streams containing naturally reproducing populations of bull trout on motorized mining in-stream 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. Refer to Chapter 1, Laws, Regulations and Policies for a more detailed discussion of the moratorium.

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, and activities such as instream suction dredge mining in the streams under the moratorium are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations.

Compliance with Current State of Oregon Law Senate Bill 838

Interpretation of current State of Oregon law is found in a December 31, 2015 frequently asked question document found at this State of Oregon website: http://www.deq.state.or.us/wq/wqpermit/mining.htm (accessed February 2016). The following information documents compliance of Granite Mining EIS with the moratorium. The moratorium states motorized mining will be prohibited in the following circumstances:

- In all streams above the lowest extent of spawning habitat in rivers and tributaries containing Essential Indigenous Anadromous Salmonid Habitat (aka ESH) or naturally reproducing populations of bull trout.

- 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.

Essential Salmon Habitat in the Granite Mining Project Area

The moratorium prohibits motorized mining in ESH as described above. The frequently asked question website http://www.deq.state.or.us/wq/wqpermit/mining.htm includes an interactive map displaying areas of the moratorium. Suction dredge mining will not be allowed in those areas until 2021 or until State law

is changed. Should the moratorium be lifted prior to 2021, the miners will adhere to any terms and conditions listed in the required ODEQ 700PM permit that is in place at that time.

There are two Plans, Yellow Jacket and Sunshine/McWillis, that propose suction dredging in streams that are not listed as ESH and do not fall under the current State of Oregon moratorium.

Water Quality and Removal or Disturbance of Vegetation in the Granite Mining Project Area

The project hydrologist has evaluated potential for changes in water quality for each proposed Plan for the effects analysis in the Granite Mining EIS (Appendix 7). The hydrology and soils analysis is sufficient to evaluate upland areas within 100 yards of these streams, in conjunction with General Requirement G6, to determine if the proposed mining results in the removal or disturbance of vegetation in a manner that may affect water quality.

Water quality parameters evaluated by the project hydrologist were stream temperature, sediment, and heavy metals. Under Alternative 2, the project hydrologist concluded that some Plans have the potential to impact water quality. However, none of these impacts would be the result of the removal or disturbance of vegetation. Instead, they could occur as follows:

1. Eighteen Plans have the potential for a discharge of sediment, warm water, and/or heavy metals into the creeks (Table 3-12).
2. Five Plans have the potential to increase stream temperatures due to water withdrawals (Table 3-15).
3. One Plan has the potential to increase stream temperature by altering the direction of groundwater flow (Table 3-15).
4. Some Plans have multiple impacts (ex. Belvadear has the potential to increase stream temperature due to water withdrawals and discharge sediment from the settling ponds).

Under Alternative 3, the project hydrologist concluded that potential effects to water quality would decrease as a result of the addition of Forest Service Water Resource Protection Measures and General Requirements. Again, none of these impacts would be the result of the removal or disturbance of vegetation. Instead, they could occur as follows: 1) Two Plans have the potential for a discharge of sediment into a creek (Table 3-12), and 2) five Plans have the potential to increase stream temperatures due to water withdrawals (Table 3-15). Additional site-specific review is required in General Requirement G6 to evaluate shade potential.

The analysis by the project hydrologist and project fish biologist indicate that the Plans would be in compliance with the current direction provided by Oregon DEQ and DSL as it pertains to water quality in Essential Salmon Habitat. If direction or definitions are changed by the state of Oregon, then authorization for motorized placer mining would be reevaluated to ensure compliance with Oregon State law. In addition, ESA Section 7 consultation would be re-evaluated and re-initiated as needed.

Endangered Species Act

The Granite Mining BA (project file) was prepared to disclose and analyze effects of the Granite Mining Project on ESA listed species and their designated critical habitat 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, 1998),
- Streamlined Consultation Procedures for Section 7 of the Endangered Species Act (FS, NMFS, BLM,& USFWS 1999)

Middle Columbia River (MCR) summer steelhead, bull trout and their designated critical habitat (DCH) are listed as threatened under the Endangered Species Act (ESA) in the Granite Watershed. Field trips, meetings and reviews of the draft BA was conducted under streamlining procedures. An updated BA was submitted with minor corrections and to include information from SB 838. The original biological assessment was submitted to NOAA Fisheries and USFWS on September 2, 2014, and the updated revised BA was submitted September 22, 2015, November 20, 2015 and December 15, 2015. Biological opinions are expected to be received in winter of 2016.

Recovery Plans for MCR steelhead were completed in 2010 and for CR bull trout in 2015. Recovery Plans helped inform Resource Protection Measures.

Water Quality

Alternative 3 of the Granite Mining Project was designed to meet all water quality regulatory requirements for the UNF and WWNF.

2012 National Best Management Practices (BMPs)

The 2012 National Best Management Practices (BMPs) for water quality management on National Forest System lands enables the agency to readily document compliance with non-point source pollution control management and strategy at national or regional scales. This standardized National BMP Program is an effective tool for the agency to accomplish improved water quality to restore impaired waters, strengthen relationships with EPA, State and the public and improve the agency's ability to use adaptive management in land management plan implementation and improve NEPA analyses and compliance with Federal laws. Lastly, the BMP Program improves the agency's ability to demonstrate results in watershed management. The National BMP program consists of four main components:

- A set of National Core BMP's for specific resource areas
- Standardized monitoring protocols to evaluate implementation and effectiveness of BMP's
- A data management and reporting structure
- Corresponding National direction.

The 2012 National Core BMP technical guide is located at http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf (project file).

Forest Plan Direction

Approximately 40 percent (37,445 acres) of the Granite Mining analysis area occupies Management Area 18 (Anadromous Fish Emphasis) on the WWNF. Approximately 17 percent (16,242 acres) of the Granite Mining analysis area occupies Management Area C7 (Special Fish Management Area) on the UNF. These management areas are intended to achieve and maintain optimum conditions for anadromous fish. Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied. Emphasis is placed on protecting fish habitat and habitat investments through reasonable provisions in plans of operation and in reclamation requirements.

John Day River Basin TMDL

The State of Oregon Department of Environmental Quality (ODEQ) has completed Total Maximum Daily Loads (TMDLs) for the North Fork John Day Subbasin (2010). As a result of the TMDL only two streams within the Granite Creek watershed remain 303(d) listed for sediment (Table 3-26). For more detailed information about the TMDL, refer to the Water Resources section of this chapter.

Table 3-26: 303(d) Listed Streams within the Analysis area

Stream	Sediment
Bull Run Creek	stream mile 0 to 9.3
Granite Creek	stream mile 11.2 to 16.2

Scale of Analysis and Affected Environment

Analysis Area

The analysis area within the North Fork John Day basin in the Granite Creek Watershed (1707020202) encompasses some 94,526 acres in North Eastern Oregon of lands managed by the US Forest Service, the Wallowa-Whitman National Forest (WWNF) (40,878 acres) and Umatilla National Forest (UNF) (49,262) and includes some 3,239 acres of private land (Table 3-27). There are approximately 25,000 acres of NFJD Wilderness, mostly on the UNF, in the Granite Watershed. The Analysis area sub-watersheds include Bull Run Creek, Lower Granite Creek, Upper Granite Creek, Beaver Creek, and Clear Creek. The sub-watershed scale of analysis was selected because effects from the proposed projects would likely be undistinguishable at the larger scale. There is no proposed activity in the Lake Creek subwatershed and it will not be further discussed in the analysis.

Table 3-27: Subwatersheds within the Granite Mining Analysis area

Subwatershed	HUC 6	Ownership			Total Acres
		UNF	WWNF	Other	
Beaver Cr.	170702020203	15	12,104	958	13,077
Bull Run Cr.	170702020202	0	18,765	634	19,399
Clear Cr.	170702020204	17,682	1,561	1,224	20,467
Lake Cr.	170702020205	11,884	0	54	11,938
Lower Granite Cr.	170702020206	17,954	1,055	1,273	20,282
Upper Granite Cr.	170702020201	2,003	7,138	172	9,313

Fish Distribution and Habitat

Middle Columbia River (MCR) summer steelhead, bull trout and their designated critical habitat (DCH) are listed as threatened under the Endangered Species Act (ESA) and are found in the Granite Watershed (Table 3-28 and Map 4). MCR steelhead and interior redband trout are both Forest Management Indicator species (MIS). See Appendix B of the Biological Assessment (BA) for a full description of MCR summer steelhead populations in the Upper North Fork John Day subbasin, and Status of the Species in the BA for further discussion of ESA listed fish.

Additional fish species found in the Granite Watershed include: Chinook Salmon *(Oncorhynchus tshywatscha)*, redsided shiner (*Richardsonius balteatus)*, speckled dace (*Rhinichthys osculus)*, longnose dace (*Rhinichthys cataractae*), sculpin (*Cottus spp.)*, suckers (*Catostomidae spp*.), brook trout (*Salvelinus fontinalis*), mountain whitefish (*Prosopium williamsoni*), Westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and lamprey (*Petromyzontidae spp*.). Several aquatic species, including Westslope Cutthroat Trout, are listed on the Regional Forester's Special Status Species List (see Table 3-36).

Table 3-28: Miles of ESA DCH and verified occupied habitat.

Subwatershed	Steelhead		Bull trout	
	Designated CH	Verified Occupied	Designated CH	Verified Occupied
Beaver Creek	11.3	11.3	0	0
Bull Run Creek	14.7	14.0	17.0	7.0
Clear Creek	18.8	20.0	24.1	17.8
Upper Granite Creek	8.0	7.1	11.8	9.5
Lower Granite Creek	24.0	24.0	9.8	9.8

Proximity of Mining Activities to Aquatic Resources

Each mining claim proposal is presented as a Plan of Operation (Plan). Table 3-29 displays by Plan operation the nearest stream, and the proximity of each Plan to steelhead and bull trout Designated Critical Habitat (DCH) Table 3-29 also summarizes known life history or habitat in the stream nearest to the claim. Table 3-30 displays by Plan operation the proximity of each Plan to steelhead and bull trout DCH, maximum area disturbed by Plan claim, total possible disturbed area over the life of the proposed mine claim and size of new ponds proposed for construction. Table 3-31 displays the distribution of mining activities across the Granite Creek watershed.

The information provided in these three tables gives proximity of the mining activities to known and verified presence of aquatic species, or presumed if unknown but habitat is adequate for spawning and rearing habitat; and magnitude of disturbance of the riparian mining activity (excluding suction dredge mining) and distribution of the mining claims across the Granite watershed.

Suction dredge mining is proposed in seven Plans. It is not included in Tables 3-29 and 3-30 because the effects are not similar and cannot be compared to the other mining activities. Suction dredging is evaluated separately and described in the effects analysis section below.

It is important to note no chemicals are authorized for use (other than petroleum products for fuel, lubricants etc.) for any proposed mining operations. No chemical processing of materials would be allowed for any of the proposed Plans.

Refer to Map 4 at the end of this document for location of DCH and proximity to the proposed Plans.

Table 3-29: Plan of Operation and proximity to Steelhead and Bull Trout Designated Critical Habitat (DCH). Refer to Map 4 for location of DCH and proximity to Plans.

Plan	Nearest Stream	Distance to Steelhead DCH	Distance to Bull Trout DCH (mi)	Mid-C Steelhead DCH		Mid-C Bull trout DCH	
				Rearing	Spawning	Rearing	Spawning
Altona	Quartz Gulch	1.0 mile	>5.0 miles	Unknown[1] Intermittent Stream	Unknown (poor habitat, gradient >10%)	N	N
Belvadear	Olive Creek	20 ft.	>5.0	Y	Y	N	N
Blue Smoke	Granite	>300 ft.	>300 ft.	Y	Y	Y	Y
Blue Sky/Bull Run	Bull Run	30 ft.	30 ft.	Y	Y	Assumed	Assumed*
Bunch Bucket	Clear Creek	150 ft.	150 ft.	Y	Y	Y	Y
City Limits	Granite	200 ft.	200 ft.	Y	Y	Y	Y
East Ten Cent	East Ten Cent Creek	10 ft.	2.0 miles	Y	N	N	N
Eddy Shipman	Granite	10 ft.	10 ft.	Y	Y	Y	Y
Grubsteak	Clear Creek	20 ft.	20 ft.	Y	Y	Y	Y
Hopeful 1	Granite	150 ft.	150 ft.	Y	Y	Y	Y
Hopeful 2 & 3	Granite	50 ft.	50 ft.	Y	Y	Y	Y
L&H Placer	Olive Creek	0.5 miles	>7.0 miles	Y	N	N	N
Lightning Creek	Lightning Creek	150 ft.	150 ft.	Y	Y	Y	Y
Little Cross I	Granite	50 ft.	50 ft.	Y	Y	Y	Y
Make It	Granite	50 ft.	50 ft.	Y	Y	Y	Y
Old Eric 1&2	Granite	150 ft.	150 ft.	Y	Y	Y	Y
Olive Tone	Olive Creek	50 ft.	>5.0 miles	Y	Y	N	N
Rose Bud	Granite	200 ft.	200 ft.	Y	Y	Y	Y

*Unknown-Spawning not documented and few biological surveys to confirm absence/presence, with no barriers they are assumed present. ** temperature concerns

Plan	Nearest Stream	Distance to Steelhead DCH	Distance to Bull Trout DCH (mi)	Mid-C Steelhead DCH		Mid-C Bull trout DCH	
				Rearing	Spawning	Rearing	Spawning
Ruby Group	Ruby Creek/Clear Creek	10 ft.	10 ft.	Y	Y	Clear-Y/ Ruby-N	Clear-Y/ Ruby-N
Sunshine/McWillis	McWillis Gulch	0.25 mile	>5.0 mile	N-Culvert barrier	N-Culvert Barrier	N	N
Tetra Alpha Placer	Boulder Creek	25 ft.	25 ft.	Y	Y	Assumed	Assumed*
Tetra Alpha Lode & Mill	Boulder Creek	25 ft.	25 ft.	Y	Y	Assumed	Assumed*
Troy D	Granite	25 ft.	25 ft.	Y	Y	Y	Y
Yellow Jacket	Orofino Gulch	>0.25 miles	>5.0 miles	N	N	N	N

Table 3-30: Plans, proximity of Plans to steelhead and Bull Trout DCH, maximum area disturbed by Plan claim, total possible disturbed area over the life of the proposed Plan and size of new proposed ponds.

Plan	Distance to Steelhead DCH	Distance to Bull Trout DCH	Maximum Area of Active Surface Disturbance (in acres)	Approximate Total Area Potentially Disturbed from Mining Activities* (in acres)	Ponds E=use existing B=to be built
Altona	1.0 mile	> 5.0 mi.	0.02	5	Build 2 10'x 20' x 6'
Belvadear	20 ft.	>5.0	0.25	10	E
Blue Smoke	>300 ft.	>300 ft.	0.01	2	E
Blue-Sky/Bull Run	30 ft.	30 ft.	0.2	1.2	E
Bunch Bucket	150 ft.	150 ft.	0.01	10	Expand E
City Limits	200 ft.	200 ft.	0.01	2	E
East 10 Cent	10 ft.	2.0 miles	0.01	2	E

Plan	**Distance to Steelhead DCH**	**Distance to Bull Trout DCH**	**Maximum Area of Active Surface Disturbance (in acres)**	**Approximate Total Area Potentially Disturbed from Mining Activities* (in acres)**	**Ponds** **E=use existing** **B=to be built**
Eddy Shipman	10 ft.	10 ft.	0.25	0.25	Build 2 10'x 20' x 6'
Grubsteak	20 ft.	20 ft.	0.25	2	E
Hopeful 1	150 ft.	150 ft.	0.01	1	E
Hopeful 2 & 3	50 ft.	50 ft.	0.25	4	1 E, 1 B 10'x 10' x 10' 1 B 10' x 15' x 4'
L&H Placer	0.5 miles	>7.0 miles	0.01	8	E
Lightning Creek	150 ft.	150 ft.	0.12	5	E
Little Cross I	50 ft.	50 ft.	0.25	0.25	none
Lucky Strike	>2.0 miles	>2.0 miles	0.01	2	none
Make It	50 ft.	50 ft.	0.01	2	E
Muffin	0.25 miles	0.25 miles	0.25	3	E
Old Eric 1&2	150 ft.	150 ft.	0.01	1	E
Olive Tone	50 ft.	>5.0 miles	0.02	2	Build 2 10'x 20' x 6'
Rose Bud	200 ft.	200 ft.	0.01	5	E
Royal White	>2.0 miles	>2.0 miles	0.01	3	Build 2 150' x 10' x 6'
Ruby Group	20 ft.	20 ft.	0.01	10	None
Sunshine/McWillis	0.25 mile	>5.0 mile	0.25	3	E
Tetra Alpha Placer	25 ft.	25 ft.	0.5	8	E
Tetra Alpha Lode & Mill	25 ft.	25 ft.	0.1	1	E
Troy D	25 ft.	25 ft.	0.01	8	E
Yellow Gold	>2.0 miles	>2.0 miles	0.07	10	Build 3 15'x 20' x 6', 1 E
Yellow Jacket	0.25 miles	>5.0 Miles	0.25	10	Private Land
		Total	**2.79 acres**	**1054 acres**	

*this is potential total area disturbed - due to operational size limits displayed in the column to the left, the entire area would not be disturbed at one time; this table does not include suction dredging

Table 3-31a displays the distribution of mining activities across the Granite Creek watershed. As displayed in Table 3-30, the maximum area of surface disturbance in any Plan is ten acres, and no more than 0.25 acres of surface area may be disturbed at any time. The subwatershed with the greatest number of suction dredge claims is in Lower Granite Creek, which has three Plans with proposed suction dredging in the 20,282 acre watershed. Table 3-31b displays the area of disturbance possible from suction dredge activities.

Table 3-31a: Distribution of Mining Activities by sub-watershed in the Granite Watershed

Subwatershed and HUC 6	Claims in subwatershed	Total Acres
Beaver Cr. 170702020203	Altona, Belvadear, Bunch Bucket, L&H, Olive Tone, Royal White, Sunshine McWillis*, Yellow Jacket*	13,077
Bull Run Cr. 170702020202	Blue Sky Bull Run*	19,399
Clear Cr. 170702020204	Grubstake, Lightning Creek*, Lucky Strike, Ruby	20,467
Lower Granite Cr. 170702020206	Blue Smoke*, East 10 Cent, Hopeful 1, Hopeful 2 & 3, Little Cross*, Rosebud, Troy D, City Limits	20,282
Upper Granite Cr. 170702020201	Eddy Shipman, Make It, Muffin, Old Eric*, Tetra Alpha Placer, Tetra Alpha Mill and Lode, Yellow Gold	9,313
* Plan proposes suction dredging		

Table 3-31b: Plans with suction dredging affecting ESA listed species and/or DCH and area of disturbance*.

Name of Plan	Stream Name	Length of Stream Area Authorized for Suction Dredging	Width of Stream Disturbance	Maximum Area Available for Dredging (in square feet)	Maximum Area Allowed for Dredging (in square feet)
Blue Sky – Bull Run	Bull Run Creek	12,000	10	120,000	648
Blue Smoke	Granite Creek	300	15	4,500	648
Lightning Creek	Lightning Creek	3,000	15	45,000	648
Little Cross	Granite Creek	500	15	7500	648
Old Eric	Granite Creek	500	4	2000	648
Total		**16,300**		**179,000**	**3,240**
*all area information is estimated, based on area and location of Plan, all measurements in feet, estimates based on State of Oregon permit requirements					

Regional Forester's Special Status Species List

Special Status Species (also described as Sensitive Species) are those identified by the Pacific Northwest (Region 6) Regional Forester as needing special management to meet Forest Service Manual direction, Department regulations, and National Forest Management Act obligations and requirements (USDA 2011). Special Status/Sensitive Species are species for which population viability is a concern, as evidenced by 1) current or predicted downward trends in population numbers or density; or, 2) current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5). The Forest Service is required to manage National Forest System lands to maintain viable populations of all native and desired nonnative wildlife, fish, and plant species (including Sensitive Species) in habitats distributed throughout their geographic range on National Forest System lands (FSM 2670.22). Forest Service activities are required to be conducted to avoid actions that may cause a species to become threatened or endangered as a result of Forest Service actions (FSM 2670.12, 2670.22).

Sensitive Species on the UNF and WWNF include those that have been documented (valid, recorded observation) or are suspected (likely to occur based on available habitat to support breeding pairs/groups) to occur within or adjacent to the UNF and WWNF boundaries. Sensitive Species included in this analysis are listed in Table 3-32.

Table 3-32: Regional Forester's Special Status Species list of aquatic invertebrate and aquatic vertebrate species present or suspected on the UNF and WWNF

Regional Sensitive Species	Habitat Description*	Habitat Present in Analysis Area	Species Present in Analysis Area	Known Current Distribution
Western Ridged Mussel *(Gonidea angulata)*	Occur in streams of all sizes of low to mid-elevation watersheds. Common in stable stream reaches, tolerant of fine sediments and occupy depositional areas.	Yes	Present in Granite Creek and assumed present in Clear Creek.	Widely distributed west of the Continental Divide, CA to BC. It is mainly distributed east of the Cascades.
Shortface Lanx (*Fisherola nuttalli*)	Occurs in large low to mid-elevation riverine habitats. Common in unpolluted, cold, well oxygenated, perennial streams with cobble-boulder substrate.	Yes	Assumed Presence in Granite Creek.	Found throughout the Snake River, Mid-Columbia basin limited to the Upper and Lower Deschutes, Lower John Day, Upper Columbia (Okanagan R.)
Columbia clubtail (*Gomphus lynnae)*	A variety of river habitats, which can range from sandy or muddy or rocky, shallow rivers with occasional gravelly rapids. Water flow	Yes	Assumed Presence in parts of the Granite Watershed	Yakima River, Benton Co. John Day River, Wheeler and Grant Co. from Twickenham to Monument, Owyhee River, Malheur Co.

Regional Sensitive Species	Habitat Description*	Habitat Present in Analysis Area	Species Present in Analysis Area	Known Current Distribution
	tends to be slow-moving.			
Westslope Cutthroat Trout (*Oncorhynchus clarkia lewisi)*	Cold high mountain streams with complex habitat	Yes	Present throughout the Granite Watershed.	Found in localized areas of the Upper North Fork John Day River subbasin including, Granite, Clear, Wolsey, Lightening, Ten Cent, Dry and Spring creeks.

*Frest and Johannes 1995, Nedeau et al. 2009, Neitzel and Frest 1990, NatureServe Explorer 2009

Environmental Effects

This section describes the direct, indirect and cumulative effects to fisheries and aquatic species in the Granite Creek Mining Analysis Area.

Analysis Methodology

The Granite Mining Project is an evaluation of 28 small actions (the largest is ten acres) in the 94,526 acre Granite Watershed. Tables 3-29 and 3-30 display the proximity and magnitude of activity of the individual Plans. It is important to note that activities displayed are maximum possible disturbance. For purposes of this analysis the maximum amount of disturbance is displayed, but based on past administration of mining permits it is expected lower levels of activities would occur. This section analyzes the direct and indirect effects of the proposed project on listed aquatic species, sensitive aquatic species and native fish populations. Mining activities are closely managed to reduce the potential for impacts to native fish, ESA listed fish and their critical habitats. This is due primarily (but not exclusively) to Best Management Practices and project-specific protection measures applied uniformly across the analysis area. Following the discussion of potential effects, there is a bulleted summary of effects for each category.

For readability, direct, indirect and cumulative effects are summarized by Plan by alternative in tables such as 3-33 and 3-34. Effects with the greatest impact are summarized in these tables. This analysis tiers to the Water Resources analysis prepared for the Granite Mining FEIS, and incorporates by reference all components of the Water Resources analysis. An extensive discussion of the affected environment and effects analysis of soils, sediment, water withdrawals and temperature can be found in the Water Resources analysis. These physical effects, such as water temperature change and sediment discharge result in effects to fish and aquatic species. The effects described in the Water Resources analysis provides much of the framework for the native fish and sensitive aquatic invertebrate analysis because of the cause and effect between effects to habitat and effects to fish and invertebrates. For readability, Plans with predicted effects to water temperature, sediment or other physical environmental impacts that could affect aquatic species are summarized in tables by Plan by alternative.

Plan-specific analysis of each proposed Plan is also presented in the Water Resources effects analysis in Appendix 7, including a discussion of RMO parameters for analysis and compliance with PACFISH Standards and Guidelines. Descriptions of Plan-specific Resource Protection Measures (RPMs) and other requirements are found in Appendix 2, and Appendix 11.

Potential Effects from 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 denser than the sand, rock and gravel deposits they are found in, and they tend to accumulate at the base of placer deposits. These deposits are worked to find the precious metals. This is done by working existing surface deposits (such as hydraulic mining), or by various surface excavating equipment or tunneling equipment.

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 from stream deposits and hillslopes dramatically altered stream channels, riparian zones, and floodplains (Spence et al 1996). Earlier hydraulic mining effects such as mounds on streambanks and abandoned ditches are still visible in the Granite Watershed.

The majority of proposed mining activities in the Granite Mining FEIS are placer mining in old tailings. Some tailings have begun to recover with mature vegetation from historic mining. As described in the Plans, many sites propose to 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 are 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 3-34). Negative effects of sedimentation and turbidity on fish and aquatics 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.

Several Plans have State of Oregon authorized water withdrawals. Water withdrawn from fish bearing streams may affect thermal regimes, quality and quantity of water remaining in streams, and quality of habitat of those streams (Spence 1996). If water withdrawals occur during critical fish life history stages such as spawning migration, reduced flows could impact access to spawning habitats. For example, the Lightning Creek Plan proposes to withdraw water to process material. Oregon Department of Fish and Wildlife conducts surveys of bull trout redds (spawning nests) in the John Day basin. Their counts show sharp declines of bull trout redds since 2001 (see Biological Assessment for additional information). Lightning Creek is designated as spawning and rearing habitat for bull trout. During late summer and early fall, when bull trout are migrating and spawning, water flows are usually at their lowest. The purpose of the fish protection measure of no water withdrawals from Lightning Creek after August 15th is to conserve habitat for bull trout. See Table 3-15 for a summary of Plans with water withdrawals and amount of water proposed for withdrawal.

Mining activities may directly affect 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. To minimize direct effects to streams, each Plan has a no activity buffer between the stream and the proposed activity.

In summary, potential direct and indirect effects of placer mining to fish and other aquatic species include:

- Sediment from disturbed adjacent riparian areas (areas of mining or processing) could be transported to stream channels. This in turn effect quality of stream habitat, both suspended sediment and sediment deposited on streambeds.
- Small quantities of fuels and lubricants used by mining equipment could be transported to stream channels.

- Loss of riparian vegetation could affect bank stability, shade and insects and leaf inputs from trees and shrubs.
- Water withdrawals could affect downstream habitats by altering stream temperature and availability and quality of fish habitat.

Potential Effects from Suction Dredging

Suction dredge mining directly affects fish and their habitat. Although only seven Plans include suction dredging, the potentially greater impact to ESA listed species and their DCH warrants a separate discussion of suction dredging. Effects to spawning gravels include unconsolidating gravels and cobbles, leading to loss of buried fish eggs during high flow events (as these unconsolidated gravels are more easily washed away) (ORAFS 2013). Sediment delivery from suction dredging can substantially exceed the natural level and amounts of sediment deposited and turbidity can be excessive. Excessive fine sediment on the stream bottom eliminates habitat for aquatic organisms such as insects and mollusks, reducing density and biomass (Harvey and Lisle 1986) and reduces the permeability of spawning gravels and can block the interchange of subsurface and surface flows. Excavation by dredging in particular causes significant local changes in channel topography, and this varies with stream size and flow. Dredging can artificially deepen the channel along streambanks and the roughness of streambanks and the adjacent bed (removal of large rocks roots and bank projections) is reduced. Waste material from placer and dredging operations may occupy as much as 20% more volume after it is dredged, is difficult to dispose of, and is often deposited adjacent to streams, forming extremely unstable stream banks. This in turn can negatively affect fish habitat.

Smaller channels would be expected to endure greater impacts given limited spawning habitat and a greater portion of stream bed would be disturbed. Dredging impacts vary between small and large streams. State of Oregon requirements limit disturbance to less than 25 cubic yards per operation in the stream, and an operation could work in up to 0.5 to 1.0 stream miles. Typically, dredgers excavate 3 feet to reach bedrock, equating to a disturbed area of approximately 225 square feet. In a small stream, this area may include high value spawning gravels and action could potentially result in lost production (OAFS 2013).

Dredging near riffle crests can also pose issues for channel stability. Dredging causes riffle crests to erode, spawning sites may be destabilized (Harvey and Lisle 1999), and upstream pools may become shallower. Mine tailings may increase the availability of spawning sites in streams that lacking spawning gravel. However, if tailings are unstable, consequences of dredging could be negative for spawning adults. Increasing the crest can deflect water flow to one side of the channel promoting bank erosion, and scour. This effect can be exacerbated year after year (Harvey and Lisle 1998). Miners commonly pile rocks too large to pass through dredges and these can persist through high flows; however, piles of cobbles probably have only minor, local effects on aquatic organisms.

In some locations there may be temporary improvement of fish habitat. Pools can be temporarily formed to deepen by dredging and deep scour may intersect subsurface flow and create pockets of cool water during summer. However, most of these “habitat improvements” tend to be short lived because they tend to be filled with sediment during high flows (Thomas 1985). It is important to note that a single dredge operation cannot mobilize a significant volume of fine sediment compared with the volume mobilized during high seasonal discharge. However, these impacts could be deleterious if there is temporal and spatial overlap of dredging operations, and juvenile fish are occupying low velocity summer habitat, where they are mostly absent during the spring due to these high flows.

Potential indirect effects to fisheries are associated with dredging, including impaired feeding activity, decreased scope of activity, reduced growth rates, downstream displacement and decreased resistance to other environmental stressors (Harvey 1986, McLeay et al. 1986). Behavioral responses of stream biota to noises and vibrations generated by dredging have not been quantified but studies suggest they are inconsequential to juvenile fish (Thomas 1985, Somer and Hassler 1992). However, even minor disturbances during the summer may harm adult anadromous fish due to limited energy supply and near lethal stream temperatures (Harvey and Lisle 1998). State regulations limit dredging to summer months but dredging can still overlap with fish spawning and incubation of embryos. In some streams, such as ones located in the Upper Granite Watershed, salmonids may not emerge from the substrate until summer, and many non-salmonids have protracted spawning periods extended into summer. Many juvenile and adult fishes are likely to avoid or survive passage through a suction dredge (Harvey and Lisle 1998, Nelson et al. 1991).

The effects of toxic metals in small placer and dredge operations is more difficult to analyze because metals are naturally present in varying concentrations in all surface waters, and many are required by fish in trace quantities. In particular, mercury is highly potent neurotoxin that impacts the function and development of the central nervous system in most aquatic organisms. When mobilized from substrates, mercury is more easily converted to a form that moves through the food chain (ORAFS 2013). High concentrations of mercury can be found in streambed sediments in areas with past history of intensive placer and cinnabar mining such as Northeastern Oregon. Mercury is often buried at depths not normally disturbed by floods, however, suction dredging can exhume deeply buried mercury and if not deposited in the dredge sluice box and removed by miners, this mercury is easily mobilized. (Marvin-Di Pasquale et al. 2011). There are currently no streams within the Granite Watershed that are ODEQ 303d listed for mercury contaminants above state or federal regulatory standards.

In summary, potential direct and indirect effects of suction dredging to fish and other aquatic species include:

- Disturbance and destabilizing of spawning gravels
- Impaired feeding, displacement, etc. if fish are present during suction dredging
- Effects to fish habitat, sedimentation and channel stability
- Mobilized toxic metals that could then harm aquatic species

Potential Effects from 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 to mechanically extract minerals with heavy equipment. Operations are <u>not</u> proposing to extract 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 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. Examples of acid mine waste in the project area are the abandoned mines Red Boy, Blue Bird and Black Jack as described in Table 3-39. These CERCLA sites have acid drainage occurring year round, 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 any residual contamination. An incident report is on file.

BMP's and additional requirements for lode mines in this project area (General Requirements L1-L11) are in place to prevent seepage or toxic effluent discharge into streams from any overburden produced from lode mine operations. Engineering Evaluation and Cost Assessment on abandoned mines on federal and private lands also outline reclamation options with specific mitigations. These mitigations are designed to prevent acid waste discharge.

In summary, the major potential effect of lode mining to fish and other aquatic species is:

- toxic chemicals leached from existing mine tailings or overburden and transported to aquatic habitats negatively affecting water quality and aquatic species.

Potential Effects from Fords

The State of Oregon Department of Fish and Wildlife (ODFW) has established timeframes for when in-water work will have the least impact on fish, wildlife and habitat (see their website:http://www.dfw.state.or.us/lands/inwater/oregon_guidelines_for_timing_of_%20InWater_work2008.pdf). Several of mine operations have proposed stream fords that would be utilized during and outside of the ODFW in-water 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 movement and feeding behavior. Ruts can negatively alter habitat or strand juvenile fish.

The majority of these crossings are on existing fords with only two new proposed ford crossings. General Requirement Z11 (FEIS Appendix 2) and Site Specific Water Resources Protection Measures for fords (for examples see Blue Sky/Bull Run and Hopeful 2 and 3) address direct and indirect effects from these ford crossings. The majority of ford improvements would have short-term effects associated with the hardening of fords. Construction of hardened fords can introduce sediment into stream channels and create a long-term reduction of potential for riparian vegetation. Sedimentation from areas disturbed from fording will be limited by rocking streambanks, burying the fine sediments and eliminating the sediment source that could easily reach the creeks (Appendix 7, pg. 64). Existing road conditions and any proposed temporary road activities are found in Chapter 2 and the project file.

In summary, direct and indirect effects of fords to fish and other aquatic species include:

- Disturbance to fish from fording, including modifying feeding behavior.
- Sedimentation from areas disturbed from fording (limited by rocking streambanks and other protection measures under Alternative 3).

Potential Effects from Reclamation

Surface mining operations can involve varying degrees of alteration of vegetation, soils, and subsurface materials, with accompanying changes in surface and subsurface hydrology. Whether these effects will be temporary or long-term depends on reclamation techniques and site characteristics. 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.

Rehabilitation and reclamation processes for the Granite Mining Operations are part of the planning process. Requirements highlighting ongoing and final reclamation are found in Appendix 2, General Requirements R1 – R 18. Table 3-10 in the Water and Soils Resources report displays reclamation of each Plan and associated effects. These include sediment associated with ground disturbance from removal of buildings and restoration of the site and fording of streams.

In addition, other 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, address legacy effects of past mining and remove artificial barriers for fish passage. WRAPs prioritize projects such as aquatic organism passage projects, road decommissioning, riparian planting, stream reconnection, evaluation of water rights and uses, maintenance of pipe systems of mine operations under CERCLA, and identification and removal of CERCLA actions. The Clear Creek and Bull Run Watershed Restoration Action Plans can be found at http://apps.fs.usda.gov/WCFmapviewer/.

Potential Effects from Connected Actions

Secondary activities associated with mining, such as the creation of access roads and the generation of solid wastes, contribute to long-term environmental impacts before, during, and after mining operations. Mining sites could be occupied for long periods of time with camping in riparian areas, where camps can be difficult to properly maintain. See the Water Resources Report, Tables 3-14 and 3-19 for a list of Plans and a discussion of roads and bridges by alternative.

Annual inspections and implementation and effectiveness monitoring, and the General Requirements H1-H12 (Appendix 2) are designed to reduce and minimize impacts from these connected actions.

Other potential effects from connected actions include existing structures within the RHCA's (Table 4 in the BA). Disturbed areas could be colonized by invasive plant species (see Invasive Plant EIS for the WWNF and the UNF 2011). General requirements IS1 – IS6 are designed to reduce, minimize or eliminate impacts of invasive plants. Any newly established invasive plants would be treated through the Early Detection Rapid Response process in the Invasive Plants EIS.

Plan-Specific Protection Measures, General Requirements and Best Management Practices

When Forest Service Plan-specific Resource Protection Measures (Appendix 11), General Requirements (Appendix 2), and the 2012 Best Management Practices (project file) are followed, placer mining and suction dredge mining are predicted to have localized and short-term direct and indirect effects and impacts to fisheries and other aquatic organisms and aquatic habitat. However, even with the adherence of these measures suction dredge mining activities can lower survival of eggs and early life stages of fishes that use tailings as spawning substrate, detrimentally alter substrates, and mobilize toxic heavy metals. This impact is dependent on size of the stream, a streams hydrologic regime, streams with limited spawning habitat and streams inhabited by ESA-listed and sensitive species.

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 of the activities distributed across the Granite Creek watershed (such as a limited number of fords and stream crossings or trips during the operating season and limited number of Plans proposing to withdraw water). Direct effects from suction dredging are limited by only seven Plans in the Granite Creek watershed proposing the activity, and limits such as seasonal restrictions and distance between suction dredges, as set by the State of Oregon.

Direct, Indirect and Cumulative Effects

Alternative 1 – No Action Alternative

Direct and Indirect Effects

Under Alternative 1, the Forest Service would not change management in the project area; there would be no proposed mining or connected mining activities. Therefore, there would be no mechanism for direct and indirect effects to ESA listed fish species and their DCH, MIS, and USFS R6 sensitive fish and aquatic invertebrates and their critical habitat from the proposed activities.

The existing condition as described in the Affected Environment section above would continue as previously approved mining operations and associated reclamation activities are completed. Until all previously approved activities are completed, impacts to ESA listed fish species and their DCH or FS R6 sensitive fish and aquatic invertebrates and their critical habitat would continue as described in the Affected Environment section.

Cumulative Effects Alternative 1

There would be no cumulative effects because no proposed actions would be implemented.

Alternative 2 - Miner's Proposed Plan of Operation

Direct and Indirect Effects

The column in Table 3-33 titled "Rationale" references earlier discussions of potential effects of mining activities, and for readability full descriptions of effects are not repeated here.

A summary of determination of effects analysis and rationale is presented in Table 3-33. Determinations are made for ESA listed species and their designated critical habitat. Determinations for the ESA listed species and their DCH are combined because effects from Plan activities are in specific locations and because of the overlap between the effects to species and effects to DCH and determinations are the same. A determination of effects to Regional Sensitive Species is displayed in Table 3-36.

Alternative 2 – Miner's Proposed Action

Direct and Indirect Effects

Table 3-33: Determination of Effects to MCR Steelhead (MIS), and Bull trout.

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
Lucky Strike	No Effect	No Effect	Distance from perennial fish bearing waters and DCH.
Muffin	No Effect	No Effect	Distance from perennial fish bearing waters and DCH.
Royal White	No Effect	No Effect	Distance from perennial fish bearing waters and DCH.
Yellow Gold	No Effect	No Effect	Distance from perennial fish bearing waters and DCH.
Altona	NLAA	No Effect	Low probability of effects due to distance from perennial fish bearing waters and DCH.
Bunch Bucket	NLAA	NLAA	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.
City Limits	NLAA	NLAA	Distance of activity from perennial fish bearing waters and DCH. There are existing dredge tailings and USFS 7300 RD between mining 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.
Hopeful 1	NLAA	NLAA	Mining activity is on a developed recreation site, no proposed actions would further impact site stability i.e. sedimentation concerns and no measureable impacts to temperature and instream structures or habitat. There is a large berm of historic tailings separating the work site from Granite Cr.
Sunshine/ McWillis	NLAA	No Effect	There is a culvert barrier at the confluence of McWillis Gulch and Olive Cr. This area has been previously heavily mined, suction dredging would take place when stream conditions are intermittent or at base flow. There is No bull trout or bull trout DCH.
Yellow Jacket	NLAA	No Effect	Distance of activity from occupied habitat during season of operation. There are several mine tailings between activity and stream channel. No proposed actions would further

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
			impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. Potential suction dredging would take place when stream conditions are intermittent. Processing is on Private lands. No bull trout or bull trout DCH.
East Ten Cent	LAA	No Effect	No bull trout or bull trout DCH. Sedimentation concerns and disturbance to the RHCA due to road access issues are not addressed with site specific protection measures and could have water quality impacts.
Grubsteak	LAA	LAA	Sedimentation issues associated with proposed stream crossing and constant stream fording with heavy machinery and flow disturbance to Clear Cr. due to the proximity of mine excavation.
L&H	LAA	No Effect	No bull trout or DCH. Effects from proposed steam fording with heavy machinery. No site specific protection measures to address water quality impacts from chemical contamination from adits.
Make It	LAA	LAA	No site specific protection measures to address water temperature concerns associated with mining activity.
Rose Bud 1-4	LAA	LAA	No site specific protection measures to address sedimentation concerns associated with mining activity and subsurface discharge from settling ponds to Granite Cr.
Belvadear	LAA	No Effect	There are concerns with subsurface sediment discharge and downstream water temperature effects with water withdrawal. There is no bull trout or bull trout DCH.
Blue Sky-Bull Run	LAA	LAA	Bull Run is a 303d listed stream for sediment impairment. Potential direct effects due to proposed suction dredging
Blue Smoke	LAA	LAA	Potential of direct effects due to proposed suction dredging.
Eddy Shipman	LAA	LAA	Potential for minor discharge and disturbance to RHCA and indirect effects due to fording.
Hopeful 2&3	LAA	LAA	Direct effects to due to stream fording. Active area of disturbance is 0.25 acres (Table 3-34).
Lightning Creek	LAA	LAA	Potential direct effects due to proposed suction dredging
Little Cross 1	LAA	LAA	Potential direct effects due to proposed suction dredging

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
Old Eric 1&2	LAA	LAA	Potential direct effects due to proposed suction dredging and an increase in stream temperatures due to warm water from settling pond and subsurface flow into Granite Cr.
Olive Tone	LAA	No Effect	No bull trout DCH, however, indirect temperature effects to steelhead and DCH with maximum water withdrawal (4 cfs) from Olive Creek during time of operation.
Ruby Group	LAA	LAA	Potential for discharge due to fording of Ruby and Clear creeks. Sedimentation concerns from seasonal road use on a closed FS road (not administratively maintained) during the wet season.
Tetra Alpha Placer	LAA	LAA	Potential effects due to newly created temporary roads and constructed fords.
Tetra Alpha Mill & Lode	LAA	LAA	Potential effects from use of settling ponds resulting in discharge of heavy metals into the stream.
Troy D	LAA	NLAA	Possible measurable sediment impacts due to subsurface flow of sediment from settling ponds. May cause increased turbidity.

Alternative 3- Miner's Proposed Plan of Operation with Forest Service Requirements

Direct and Indirect Effects

A summary of determination of effects analysis and rationale is presented in Table 3-34. Determinations are made for ESA listed species and their designated critical habitat. Determinations for the ESA listed species and their DCH are combined because effects from Plan activities are in specific locations and because of the overlap between the effects to species and effects to DCH and determinations are the same. A determination of effects to Regional Sensitive Species is displayed in Table 3-36.

The column in Table 3-34 titled "Rationale" references earlier discussions of potential effects of mining activities, and for readability full descriptions of effects are not repeated here.

Table 3-34: Determination of Effects to MCR Steelhead (MIS) and Bull trout

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
Lucky Strike	No Effect	No Effect	General Requirements (Appendix 2), Distance from perennial fish bearing waters and DCH.
Muffin	No Effect	No Effect	General Requirements, Distance from perennial fish bearing waters and DCH.
Royal White	No Effect	No Effect	General Requirements, Distance from perennial fish bearing waters and DCH.
Yellow Gold	No Effect	No Effect	General Requirements, Distance from perennial fish bearing waters and DCH.
Altona	NLAA	No Effect	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 3-30).
Bunch Bucket	NLAA	NLAA	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 3-30).
City Limits	NLAA	NLAA	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

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
			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.
East 10 Cent	NLAA	No Effect	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) separates the activity from the creek. General Requirements (Appendix 2) and Plan-specific protection measures (Appendix 11) PDC's apply Area of active disturbance is .01 acres.
Grubsteak	NLAA	NLAA	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 3-30)
Hopeful 1	NLAA	NLAA	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.
L&H	NLAA	No Effect	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 3-30).
Make It	NLAA	NLAA	Mining activity is greater than 100 ft from Granite Cr. Only 15-20 cubic yards would be processed in an operating season. Miner would use existing roads and pond. General

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
			Requirements and site specific protection measures apply. Area of active disturbance is .01 acres (Table 3-30).
Rose Bud 1-4	NLAA	NLAA	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 3-30).
Sunshine/ McWillis	NLAA	No Effect	Activity is located 0.5 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 and suction dredging would take place when stream conditions are intermittent or at base flow. No bull trout or bull trout DCH. Active area of disturbance is 0.25 acres (Table 3-30).
Tetra Alpha Mill & Lode	NLAA	NLAA	Low probability of disturbance from mining activities. Impacts from potential limited make-up water withdrawal from Boulder Creek.
Troy D	NLAA	NLAA	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. Miners 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 3-30).
Yellow Jacket	NLAA	No Effect	Distance of activity from occupied steelhead habitat and DCH during season of operation. 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. Potential suction dredging would take place when stream conditions are intermittent. Given 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 3-30).

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
Belvadear	LAA	No Effect	Potential for discharge and disturbance to the RHCA. Removal of existing vegetation. There are concerns with subsurface sediment discharge and downstream water temperature effects with water withdrawal. There is no bull trout or bull trout DCH. Active area of disturbance is 0.25 acres (Table 3-30). General Requirements and site specific protection measures apply.
Blue Sky-Bull Run	LAA	LAA	Potential discharge and direct effects due to suction dredging and fording of the stream. Additionally Bull Run is a 303d listed stream for sediment impairment. Active area of disturbance is 0.2 acres (Table 3-30). General Requirements and site specific protection measures apply.
Blue Smoke	LAA	LAA	Potential of direct effects due to proposed suction dredging. Active area of placer disturbance is 0.25 acres (Table 3-30). 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.
Eddy Shipman	LAA	LAA	Potential for minor discharge and disturbance to RHCA and indirect effects due to fording. Active area of disturbance is 0.25 acres (Table 3-30). General Requirements and site specific protection measures apply.
Hopeful 2&3	LAA	LAA	Direct effects to due to stream fording. Active area of disturbance is 0.25 acres (Table 3-30). General Requirements and site specific protection measures apply.
Lightning Creek	LAA	LAA	Potential direct effects due to proposed suction dredging. Placer activities are >150 away from Lightning Cr. Active area of disturbance is 0.12 acres (Table 3-30). There are historic tailings and a closed road that separate activity from Lightning Cr. Miner would use existing ponds and roads. General Requirements and site specific protection measures apply. Impacts from water withdrawal.
Little Cross 1	LAA	LAA	Potential direct effects due to proposed suction dredging. Placer operations are >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 3-30). General Requirements and site specific protection measures apply.
Old Eric 1&2	LAA	LAA	Potential direct effects due to proposed suction dredging. Placer operations are >150 ft away from Upper Granite Cr. Active area of disturbance is 0.01 acres (Table 3-40). They would move no more than 5 yards in an operating season. General Requirements and site specific protection measures apply.

Plan	Determin-ation of effects on steelhead and their DCH	Determin-ation of effects on bull trout and their DCH	Rationale
Olive Tone	LAA	No Effect	No bull trout or bull trout DCH, however, indirect temperature effects to steelhead and DCH with maximum water withdrawal (4 CFS) from Olive Creek during time of operation. Active area of disturbance is 0.02 acres (Table 3-40) on a previously disturbed landing. Activities are 50 ft away from Olive Cr. General Requirements and site specific protection measures apply.
Ruby Group	LAA	LAA	Potential for direct effects due to fording of the stream. Active area of disturbance is 0.01 acres (Table 3-40). General Requirements and site specific protection measures apply.
Tetra Alpha Placer	LAA	LAA	Potential effects due to newly created temporary roads and constructed fords. Impacts from water withdrawal.

Belvadear and Olive Tone Plans - Water Withdrawals and Aquatic Resources

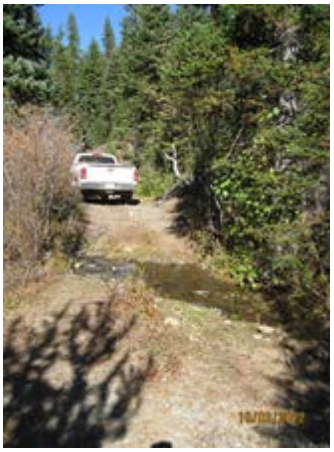
Additional analysis was completed on June 16, 2015 between Suzanne Fouty (project hydrologist) and Tracii Hickman (project fish biologist) regarding water use discussed in the Granite Mining FEIS. Two Plans, Belvadear and Olive Tone, in the Granite Mining FEIS propose water withdrawals for the operations in the Upper Beaver Creek watershed. This additional analysis clarifies the discussion of water withdrawals in upper Beaver Creek in the Granite Mining Draft EIS.

Fish protection measures have been established on streams with fall spawning species; chinook and ESA listed bull trout (for example, see Plans for Lightning Creek and Tetra Alpha Placer). Steelhead in the upper North Fork John Day River spawn in the spring. Olive Tone and Belvadear are located in the headwaters of Olive Creek. This portion of Olive Creek is designated critical habitat for steelhead. No bull trout or chinook are present.

Springs are the primary water source for the ponds. Water is recycled in the ponds during mining operations. As proposed in the Plans, 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).

Water withdrawn from Olive Creek for these two operations will be limited and on an irregular basis. Because of the limited duration of the impacts and intermittent withdrawal, effects to aquatic species will also be limited and of minor duration.

The photos below were taken in October and are from Olive Tone. The photo on left is Olive Creek where it crosses a hardened ford for the road; the photo on the right is the processing pond for Olive Tone.



Cumulative Effects common to Alternatives 2 and 3

Past, present and future activities that may affect native fish populations and their habitat and sensitive aquatic invertebrates and overlap in time and space are discussed in this cumulative effects analysis and displayed in Table 3-35. Complete descriptions of the past, current and future activities

in the Granite Creek Watershed can be found at the beginning of Chapter 3 of this FEIS. Potential cumulative effects of Plans of Operations from the Granite Mining FEIS with private small-scale mining, and potential cumulative effects of Plans of Operations themselves to water quantity and quality and heavy metals are described by narrative.

Existing Mines within the Granite Creek Watershed

It is estimated that over 100 historic and/or abandoned mines exist in the Granite Creek Watershed. These past and ongoing mining activities on state, federal and private lands have greatly impacted or have the potential to impact water resources and fish habitat throughout the Granite Watershed. Inventory and assessment of these mines is an ongoing project for the UNF and WWNF. A full listing of sites identified for investigation under the CERCLA Act can be found in the project file.

For additional information on historic and abandoned sites visit the Forest Service National web page at 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 for the Wallowa Whitman NF (not all sites listed on these web pages are within the Granite Creek watershed).

Cumulative Effects of Private Land Mining

Private small-scale mining activities (including suction dredge mining) could occur on private lands scattered within the Granite Mining project analysis area. Oregon state law and regulations controlling these activities limit their effects. For example, there is a requirement of a minimum distance of 500 feet maintained between motorized dredge equipment under DSL regulations, and the 700PM limits turbidity plumes to 300 feet. It is expected limits such as these expand the distance between instream mining activities and result in no overlap of effects in space. The lack of overlap of effects in space, combined with the irregular distribution of private lands available of instream mining, results in no cumulative effects of the Granite Mining project to native fish populations and their habitat and sensitive aquatic invertebrates from private small-scale mining.

Cumulative Effects of Water Withdrawals from Plans in the Granite Mining EIS

Belvadear Group and Olive Tone are located approximately one-half mile apart, and both propose water withdrawals from Olive Creek. Based on the amount of water proposed for withdrawal for each Plan (100 gpm), there is a potential for a cumulative effect to stream temperatures. Flows in late summer have been measured below 2 cfs (see Water Resources Report and Table 3-22b). This in turn could result in a negative impact to aquatic species and would not extend beyond the confluence of Beaver Creek and Clear Creek (Table 3-22b). Cumulative effects are the same for Alternatives 2 and 3.

Tetra Alpha Placer and Tetra Alpha Mill and Lode are located approximately one half mile apart, and both propose water withdrawals from Boulder Creek. Based on the amount of water proposed for withdrawal for each Plan (100 gpm) there is a potential for a cumulative effect to stream temperatures (see Table 3-22b). This in turn could result in a small negative impact to aquatic species that would not extend beyond the confluence of Boulder and Granite Creeks (Table 3-22b). Cumulative effects are the same for alternative 2 and 3.

There is a potential for a cumulative effect of increased stream temperature in Alternative 2 for Lightning Creek from Lightning Placer and in Clear Creek from Grubsteak Placer and in Granite Creek from Old Eric (Table 3-22b). This effect does not extend beyond the next downstream stream

confluence. There is a potential for a cumulative effect of increased stream temperature in Alternative 3 for Lightning Creek from Lightning Placer and the effect does not extend beyond the next downstream stream confluence (Table 3-22b).

Because of the small magnitude of potential temperature effects, effects of temperature increases to native fish populations and their habitat and sensitive aquatic invertebrates are similar to those as described earlier in the direct and indirect section.

Turbidity and Heavy Metals Cumulative Effects from Plans in the Granite Mining EIS

Table 3-22b also describes possible cumulative effects to turbidity and heavy metals. Under Alternative 2 there is a potential cumulative effect to turbidity in the Beaver Creek watershed (Olive Tone, Belvedear and Sunshine/McWillis) and heavy metals from Eddy Shipman in the Upper Granite subwatershed and Tetra Alpha and Tetra Alpha Mill and Lode (see Table 3-22b). Effects would be localized and not be measureable above upstream of the first incoming tributary. Therefore, cumulative effects to native fish populations and their habitat and sensitive aquatic invertebrates would also be localized and of small magnitude, and effects are similar to those as described earlier in the direct and indirect section.

Under Alternative 3 there are no cumulative effects to turbidity and heavy metals (Table 3-22b).

Table 3-35: Past, Present and Reasonably Foreseeable Actions within the Analysis area

(P = Past, O = Ongoing, F = Future)

Past, Ongoing, or Future Project	Name of Project and Forest	Overlap (yes or no)		Notes
		In Time	In Space	
P	Central Mine	yes	yes	Central Mine has an adit that overlaps with Eddy Shipman. There is a potential for activities in the Eddy Shipman mine to disturb materials in the Central Mine adit. Proposed operation does not have a method or mitigation to prevent sediment discharge into stream and placement of adit waste. The EE/CA of Central mine states that metal concentrations are near clean-up level but specific on-site containment has yet to be provided.
Conclusion: Actions in the Eddy Shipman mine may overlap with residual effects from historic activities in the Central Mine, potentially incrementally increasing the effects of the Eddy Shipman activities.				
P	New York Indepen-dence and East Eddy	yes	yes	New York Independence and East Eddy Mine have an adit that overlaps with Eddy Shipman. There is a potential for activities in the Eddy Shipman mine to disturb materials in the shared adit. Proposed operation does not have a method or mitigation to prevent sediment discharge into stream and placement of adit waste. A site investigation in 1996 found elevated metals in waste rock and tailings and soil, however claims were placed on Confirmed release list in 2004.
Conclusion: Actions in the Eddy Shipman mine may overlap with residual effects from historic activities in the New York Independence and East Eddy Mine Mine, potentially incrementally increasing the effects of the Eddy Shipman activities.				

Past, Ongoing, or Future Project	Name of Project and Forest	Overlap (yes or no)		Notes
		In Time	In Space	
P	Culvert replacements and restoration projects included in Granite, Clear Creek and Bull Run River Watershed Action Plans WWNF and UNF	yes	yes	Includes Clear Creek Watershed Restoration Action Plan (WRAP) and Bull Run River WRAP for potential restoration needs and projects. Common actions include fish barrier culvert replacements, riparian plantings, restoration of disturbed sites, improving existing roads and reducing sediment from roads.
Conclusion: Actions in a WRAP could increase sediment production and turbidity in streams for the short term (up to 2 weeks). Based on previously completed actions, or similar actions in adjacent watersheds, increases should be localized to the site of the action, and effects would occur at the reach scale. These actions could occur near mining activities. Overall risks to aquatic resources are low and benefits are high.				
F	Granite Multiple Culvert Replacement WWNF	yes	yes	This project proposes to remove and replace 7 culverts with fish passage friendly structures throughout the area around the town of Granite, OR. Projected implementation summer 2015. Projects could temporarily (up to 2 weeks) affect access as culverts are replaced.
Conclusion: Culvert replacements could temporarily increase sediment production and turbidity in streams (up to 2 weeks). Based on previously completed actions, or similar actions in adjacent watersheds, increases should be localized to the site of the action, and effects would occur at the reach scale. These actions could occur near mining activities. Overall risks to aquatic resources are low and benefits are high.				
P	Storm Damage Risk Reduction UNF	yes	yes	SDRR – (Storm Damage Risk Reduction). Culvert replacement and other drainage improvements on the 1035 1038, and the 7335 road systems. (Fortifying road edges, planting trees and shrubs, improving ditch lines and drainage dips, and restoring unusable roads beds to forested land.)
Conclusion: These activities occurred near the East 10 Cent mine. As activities weather, risk of sedimentation decreases. Overall risks to aquatic resources are low.				
P, O	Road use and Road Maintenance WWNF & UNF	yes	yes	The analysis area has an extensive Forest Service road system that was built during the period of large-scale logging which took place in the 1960s and 1970s Road maintenance is an ongoing activity. The main gravel roads receive surface maintenance usually once a year. On about a 5-year schedule, all other roads get inspected for deferred maintenance. Dependent on funding, problems identified during inspections are taken care of within the year.
Conclusion: Funding for road maintenance is at low levels, individual actions such as blading can generate road surface sediment, and the scale is small due to limited actions. Overall risks to aquatic resources are low.				
P, O	Fire, Fuels Reduction and	yes	yes	Greenhorn Thinning (ongoing) and Granite Interface (past – 2004)

Past, Ongoing, or Future Project	Name of Project and Forest	Overlap (yes or no)		Notes
		In Time	In Space	
	Timber Harvest WWNF & UNF			Granite WUI – Ten Cent fuels area – Blue Mtn Forests fuels reduction project: This work may include; Road and trail maintenance or obliteration to restore or maintain water quality, soil productivity, habitat for wildlife and fisheries, or other resource values, setting of prescribed fires to improve the composition, structure, condition and health of stands or improve wildlife habitat, removing vegetation or other activities to promote healthy forests, reduce fire hazards, or achieve other land management objectives, watershed restoration and maintenance, restoration and maintenance of wildlife and fish habitat, control of noxious weeds and exotic weeds, and re-establishment of native plant species. *Projects could occur near Granite Mining activities.*
Conclusion: Road maintenance such as blading can generate road surface sediment, but the scale is small due to limited actions. BMPs included in fuels projects protect water quality and riparian vegetation. Overall risks to aquatic resources are low.				
O	Long-term Special Use Permits WWNF & UNF	yes	yes	Currently, there are only a few lands related Special Uses in the Granite watershed area. These consist of power, electrical and water transmission lines to the local communities and residences of the area.
Conclusion: Possible cumulative effects would be from roads used access to facilities on private, poorly maintained roads. If these roads require maintenance this could generate sediments; but due to the low number of facilities and associated roads sediment inputs would be small.				
O	OHV use WWNF & UNF	yes	yes	On the WWNF, with the exception of the North Face Vehicle Closure, the entire area is open to motorized travel including off-road travel. All maintenance level 1 roads (closed roads) are open to off-road vehicles. On the Umatilla NF, there are no designated OHV (Off Highway Vehicle) trails in the area. However, OHV activity is permitted and does occur on open roads in the analysis area. This includes riding motorcycles (Class III) and four-wheelers (Class I) on these roads. With the exception of Forest Service Road 10, all open roads within the analysis area are open to OHV travel, per the 2001 Interim Program for ATV/OHV Strategy on the Umatilla National Forest (UNF). Additionally, the 1000460, 1000520, 1010370, 1035060, 1035080, 1038060, 7350050, 7350052 and 7350070 are forest system roads open seasonally to OHV use but closed to other motorized trails. Note that State law does not allow ATV use on two lane roads. All double digit roads 73, 10 etc are considered two lane roads and not useable to ATV's unless they are highway certified.
Conclusion: Cross county OHV travel on the WWNF could result in stream fording, which may disturb fish or other aquatic species. If fording occurs at sites that are not hardened sedimentation could occur. As stated in the Recreation section of this chapter, most of the observed OHV travel within the area is associated with hunting. Hunting season begins in the late summer early fall. At that time mining operations began to shut down due to lack of water. Because of the low use by OHV's in this area, overall risks to aquatic resources are low.				

Past, Ongoing, or Future Project	Name of Project and Forest	Overlap (yes or no)		Notes
		In Time	In Space	
P, O, F	Redboy Mine, Blue Bird and Black Jack Restoration Improvements - NFJD Watershed Council WWNF and UNF	yes	yes	Ongoing maintenance and repair of the pipeline and settling ponds. 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. Blue Bird and Black Jack Mines - Annual maintenance on the outlet pipes and the settling ponds for the acid drainage from the adits. Protection measures in Alternative 3 are designed to prevent a cumulative effect from maintenance or any potential restoration failure at Blue Bird and Black Jack. Additional evaluations are needed at Redboy Mine and the site was placed on Confirmed release list in 2003.
Conclusion: Under Alternative 2 there would be a potential for cumulative effects related to a discharge of heavy metals from Eddy Shipman and Tetra Alpha Placer and Tetra Alpha Mill and Lode activities downstream at the confluence of Clear Creek and Granite Creek.				

Compliance and Determination of Effects

Regional Forest Special Status Sensitive Species

Table 3-36: Determination of Effects to Regional Forest Special Status Sensitive Species

R6 Sensitive Species	Determination			Rationale
	Alt. 1	Alt. 2	Alt. 3	
Western Ridged Mussel (WRM) *(Gonidea angulata)*	NI[3]	MIIH [4]	MIIH	WRM are assumed present in the analysis area, however, there have been very few observations of WRM in the Granite Watershed. Given WRM prefer stable low to mid-elevation streams with range rarely extending into headwater streams, the majority of proposed isolated mining activities would not overlap with WRM presence or affect downstream habitat. WRM can be more tolerant of fine sediments and may occupy depositional habitats and banks. In Alt 2 instream effects of suction dredge mining will be localized, and General Requirements and site specific protection measures proposed in Alt 3. would minimize short term increases in sediment mobilization from placer and suction dredge mining activities that could impact WRM habitat.
Shortface Lanx (*Fisherola nuttalli*)	NI	MIIH	MIIH	Shortface Lanx are assumed present in the analysis area, however, there have been very few observations of Shortface Lanx in the Granite WS. Given Shortface Lanx occur in large low to mid-elevation riverine habitats that are unpolluted, cold, and well oxygenated, the majority of proposed isolated mining activities are not in proximity of suitable Shortface Lanx habitat or presence. In Alt 2 instream effects of suction dredge mining will be localized, and General Requirements and site specific protection measures proposed in Alt 3 would minimize short term increases in sediment mobilization from placer and suction dredge mining activities that could impact downstream Shortface Lanx habitat.
Columbia clubtail (*Gomphus lynnae)*	NI	MIIH	MIIH	Columbia Clubtail has not been documented in the Granite Watershed but, they are assumed present given Columbia Clubtail can occupy a variety of river habitats, which, can range from large sandy, muddy or rocky shallow rivers. There is a possibility that mining activities could occur in these habitats, however, there should be no measureable impacts to the Columbia Clubtail given season of mining activity, scale of mining operations, and the life history of the Columbia Clubtail.
Westslope Cutthroat Trout (WCT) (*Oncorhynchus clarki lewisi)*	NI	MIIH	MIIH	Westslope Cutthroat Trout (WCT) are found throughout the Granite Watershed where they have coevolved and coexisted with native steelhead/redband trout. Given General Requirements and site specific protection measures and for reasons already stated in Tables 16 and 17, mining impacts that are likely to affect (NLAA and LAA) listed Mid-C River Steelhead and Bull trout may also impact WCT individuals and individual habitat, but is not likely to result in a trend toward federal listing because of the dispersed locations of the mining activities and the low number of suction dredging actions, and continued viability is expected on the UNF and WWNF.

[3] No Impact
[4] May Impact Individuals and Individual Habitat but, is not likely to result in a trend toward federal listing, and continued viability is expected on UNF and WWNF

Management Indicator Species

Given the magnitude of activity, area of disturbance and widespread distribution of activities (Tables 3-29, 3-30 and 3-31), mining activities under Alternative 2 may impact MCR Steelhead and Interior Redband Trout and their habitat but is not likely to result in a trend toward federal listing and continued viability is expected on the UNF and WWNF (Tables 3-33 and 3-34).

Given the magnitude of activity, area of disturbance and widespread distribution of activities (Tables 3-29, 3-30 and 3-31) and Forest Service General Requirements, mining activities under Alternative 3 may impact MCR Steelhead and Interior Redband Trout and their habitat, but is not likely to result in a trend toward federal listing and continued viability is expected on the UNF and WWNF (Tables 3-33 and 3-34).

Forest Plan Compliance

Management Area 18 on the WWNF and Management Area C7 on the UNF are intended to achieve and maintain optimum conditions for anadromous fish. Emphasis is placed on providing anadromous fish habitat at, or near, the maximum potential of the watershed where this area is applied. Emphasis is placed on protecting fish habitat and habitat investments through reasonable provisions in plans of operation and in reclamation requirements.

Alternative 2 does not include reasonable provisions in Plans to protect aquatics and fish habitat. Alternative 3, with provisions provided through Plan-specific Resource Protection Measures and General Requirements, minimize or eliminate disturbance to aquatics and fish and fish habitat. Alternative 3 is in compliance with both Forest Plans. See Table 3-33 for Plan specific rationale of description of effects to aquatic resources. See Table 3-34 for Plan specific rationale of description of effects and how General Requirements and/or Site Specific Requirements provide reasonable provisions to minimize or eliminate impacts to aquatics and aquatic habitat.

Compliance of the Granite Mining Project with PACFISH

Applicable PACFISH 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/inland 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 siting 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 list listed fish.

There are three major components to the Granite Mining project: actual mining activity (lode, suction dredge and placer), road activities/maintenance, and other connected actions such as camping, water withdrawals and reclamation. 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 this analysis. Table 3-37 summarizes reasons for including individual aquatic habitat components in this evaluation.

Table 3-37: Listing of Aquatic Habitat Components found in the Granite Effects Analysis

Habitat Component	PACFISH RMO	*Activities Potentially Affecting Habitat*		
		Mining	Road Construction/Improvement	Other Connected Activities
Pool frequency/Quality	X	X	X	
Water quality				
Temperature	X	X	X	X
Suspended sediment		X	X	X
Chemical contamination		X	X	X
Large woody debris	X	X	X	
Stream Channel conditions				
Bank stability	X*	X	X	
Substrate		X	X	
Flow regime				
Flow timing		X	X	X
Flow volume		X	X	X
Road density and location	Not a habitat parameter. Included because it could affect habitat quality			
Disturbance history regime	Not a habitat parameter. Included because it could affect habitat quality			
*RMOs of bank stability and lower bank angle are applicable only in non-forested systems				

Some of these habitat components are specifically addressed as PACFISH RMOs (USDA and USDI 1995), and are summarized in Table 3-38. These objectives are part of determining the complexity of habitat available for fish within the analysis area. In addition to the six RMOs, Substrate Sediment was included in this analysis because it was an additional parameter identified in the PACFISH/INFISH/ Screens Information Guide for the Wallowa-Whitman National Forest (USDA Forest Service 1995a, Table 1)

Table 3-38: PACFISH RMO's applicable to the project area (UNF and WWNF Forest Plans as amended by PACFISH 1995)

Habitat Feature	RMO's
Pool Frequency	Wetted width (feet): 10, 20, 25, 50, 75, 100, 125, 150, 200 Number pools/mile: 96, 56, 47, 26, 23, 18, 14, 12, 9
Water Temperature	Compliance with Water Quality standard or maximum Temp. <68 ºF
Large Woody Debris	> 20 pieces/mile, >12 inch diameter, >35 ft. length
Width/Depth Ration	<10, mean wetted width divided by mean depth

Under the Section 7 Habitat Monitoring Protocol for the Upper Columbia River Basin (USDA 1994), PACFISH RMO's are intended to apply to Rosgen (1996) C-type channels (McKinney et al 1996). Additional habitat parameters that are important for determining complex aquatic habitat and considered in this analysis include substrate embeddedness/percent fines, habitat accessibility, off channel habitat and refugia, floodplain connectivity, streambank condition, road density and location (measured as mi/mi^2 and percent drainage network increase), and past disturbance to riparian conservation areas.

Alternatives 1 and 3

Alternatives 1 and 3 are consistent with Forest Plan direction regarding native fish populations. None of the potential direct/indirect/cumulative effects are expected to adversely affect PACFISH Riparian Management Objectives (RMOs), prevent attainment of RMOs, or steelhead/redband trout population viability. Application of PACFISH direction would maintain fish habitat conditions in the analysis area per applicable PACFISH Minerals Management standards and guidelines. Forest Service General Requirements (Appendix 2) and Plan-specific RPMs (Appendix 11) are incorporated into Alternative 3 to reduce potential effects as described above in *Direct and Indirect Effects*.

Alternative 2

Alternative 2 meets the purpose and need under 36 CFR 228.4 and 228.5 but does not meet several PACFISH Mining Standards and Guidelines (Table 3-39).

Table 3-39: Compliance with mining PACFISH Standards and Guidelines under Alternative 2. See above for a description of applicable PACFISH Mining standards and guidelines

Plan of Operation	PACFISH Compliance under Alternative 2				Rationale
	MM-1	MM-2	MM-3	MM-6	
Altona	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Belvadear	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp roads and removal of riparian vegetation. There is no proposed method to ensure stability of waste rock and sediment discharge from settling ponds into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Blue Smoke	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's and applicable state permits.
Blue Sky/Bull Run	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temporary roads and instream activity. There is no proposed conventional method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Bunch Bucket	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
City Limits	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
East Ten Cent	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp roads and haul within the RHCA. There is no proposed method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Eddy Shipman	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temporary roads and haul within the RHCA. There is no proposed method to prevent sediment discharge into stream and placement of adit waste. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Grubsteak	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp road with stream crossing. There is no proposed method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Hopeful 1	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Hopeful 2 & 3	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. use of existing roads with stream crossings. There is no adequate

Plan of Operation	PACFISH Compliance under Alternative 2				Rationale
	MM-1	MM-2	MM-3	MM-6	
					inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
L&H Placer	No	Yes	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to ensure the stability of waste rock and adit waste discharge into the stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Lightning Creek	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's and state permits.
Little Cross I	No	No	Yes	No	There is no proposed method to ensure the stability of waste rock and subsurface sediment discharge into the stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Lucky Strike	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Make It	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to address temperature concerns. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Muffin	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Old Eric 1&2	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to address temperature concerns via subsurface flow from settling pond. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Olive Tone	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to address temperature and sediment concerns. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Rose Bud	No	Yes	Yes	No	There is no proposed method to prevent sediment discharge into stream. There is no adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Royal White	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Ruby Group	No	Yes	Yes	No	There is no proposed method to prevent sediment discharge into the stream given the season of use on a closed road to several sites and proposed stream fords. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Sunshine/McWillis	No	No	Yes	No	There is no proposed method to prevent sediment discharge into stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.

Plan of Operation	PACFISH Compliance under Alternative 2				Rationale
	MM-1	MM-2	MM-3	MM-6	
Tetra Alpha (Placer)	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's, i.e. newly constructed temp roads, and constructed fords. There is no proposed method to prevent sediment discharge into stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Tetra Alpha (Mill & Lode)	No	No	No	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's from use of settling ponds. There is no proposed method to prevent heavy metal discharge into the stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Troy D	No	No	Yes	No	Proposed mitigations with bonds would not avoid adverse impacts to listed fish and retard RMO's. There is no proposed method to prevent subsurface sediment discharge from settling ponds into the stream. There is no proposed adequate inspection, monitoring and reporting requirements in place, which may prevent attainment of RMO's.
Yellow Gold	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's
Yellow Jacket	Yes	Yes	Yes	Yes	Compliant with applicable PACFISH S&G's

Summary of Granite Mining Project for ESA Listed Species using the Matrix of Pathways & Indicators Alternatives 2 and 3

Alternative 2 – Miner's Proposed Plan of Operation

Table 3-40 below determines the risk of effects and examines the direct and indirect effects to fisheries using the matrix indicators or habitat components and Riparian Management Objectives that would be potentially affected by mining activities and connected actions proposed under Alternative 2. Refer to Table 3-37 and 3-38 for reasons for including specific aquatic habitat parameters in this evaluation. Under Alternative 2, any mitigation measures and WRPMs are only those proposed in the Plan of Operation. These can be referenced in the Water and Soil Resources Protection Measures report in the project file, which also includes further analysis on water quality impacts concerning surface and subsurface sediment discharge. Thorough discussions of effects to water resources such as sedimentation, water temperature and water withdrawals are presented in Appendix 7 and summarized in Chapter 3, Water Resources, and are not repeated here.

Table 3-40: Determination of risk of adverse effects (high, moderate, low) to native fish populations in the Granite SWS from proposed mining activities Alternative 2[5]

L=Low potential of negative effects on habitat. The action is controlled by seasonal or spatial restrictions and is not likely to negatively affect habitat.

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

H= A high rating assumes possible negative effects on habitat. The action is not completely controllable, and intense administration of the activity is needed. Negative effects on the habitat are likely to occur.

Mine Claim and Rationale	Direct Effects to Fish	Risk of Direct/Indirect Effects to Each Matrix Indicator (reach scale)										
		Temp	Sediment	Chemical Contamination	LWM	Refuge	Off-Channel	Bank Stability	Flood Plain	Road Access	Flow Disturbance	RHCA Disturbance
Altona	L	L	L	H	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to for containment of adit waste rock.											
Belvadear	L	H	H	L	L	L	L	L	L	M	M	M
	Proposed operation does not have a method or mitigation to prevent sediment discharge. RHCA disturbance due to removal of vegetation and temp road access. Concerns due to water withdrawals.											
L&H	M	L	H	H	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge or mitigation for containment of adit waste rock.											
Olive Tone	M	H	M	L	L	L	L	L	L	L	M	L
	Concerns due to water withdrawals and potential direct effects due to fording on Olive Creek.											
Royal White	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams											

[5] Mitigations measures are only those proposed in the Miner's Proposed Plan of Operation, see project description. Reference the Water and Soil Resource Protection Measures report (project file) for further analysis on Water Resource impacts to applicable matrix indicators.

Sunshine /McWillis	L	L	M	L	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge											
Yellow Jacket	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams											
City Limits	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Eddy Shipman	H	L	H	M	L	L	L	L	L	M	L	H
	Proposed operation does not have a method or mitigation to prevent sediment discharge or mitigation for containment of adit waste rock. Indirect effects due to ford and road use.											
Make It	L	M	L	L	L	L	M	L	L	L	M	L
	Temperature and flow disturbance concerns with use of the reservoir.											
Muffin	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Old Eric 1&2	H	M	H	L	L	L	L	L	L	L	L	L
	Direct effects to fish due to suction dredging, and temperature concerns associated with overflow from settling pond.											
Yellow Gold	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Tetra Alpha Placer	H	M	H	L	L	M	L	H	H	H	L	H
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct effects due to fords and road use. Disturbance to RHCA from temporary road construction. Concerns due to water withdrawals											
Tetra Alpha Lode & Mill	M	M	L	L	L	L	L	L	L	L	L	L
	Concerns due to water withdrawals.											
Blue Sky-Bull Run	H	L	H	L	L	M	M	M	M	M	L	M
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct effects due to fordand road use. Disturbance to RHCA given temp road construction. Direct effect to fish due to suction dredging.											
Bunch Bucket	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Grubsteak	H	L	M	L	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct effects due to fords.											
Lightning Creek	H	L	H	L	L	L	L	M	L	L	L	L
	Direct effects to fish due to suction dredging and concerns due to water withdrawals. Direct effects due to ford.											
Lucky Strike	L	L	L	L	L	L	L	L	L	L	L	L
	Distance from DCH or fish bearing streams.											
Ruby Group	M	L	H	L	L	L	L	L	L	H	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct effects to fish associated with ford.											
Blue Smoke	H	L	H	L	L	L	L	L	L	L	L	L
	Direct effects to fish associated with suction dredging.											
East Ten Cent	L	L	M	L	L	L	L	M	M	M	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Disturbance to RHCA with road construction and use.											
Hopeful I	L	L	L	L	L	L	L	L	L	L	L	L
	Distance of mining activity from Granite Creek and local topography											
Hopeful 2&3	H	L	M	M	L	L	L	M	L	M	L	M
	Proposed operation does not have a method or mitigation to prevent sediment discharge. Direct concerns with stream ford.											
Little Cross	H	L	M	L	L	L	L	L	L	L	L	L

	Potential direct effects to fish due to suction dredging activity.											
Rose Bud 1-4	L	L	M	L	L	L	L	L	L	L	L	L
Troy D	L	L	M	L	L	L	L	L	L	L	L	L
	Proposed operation does not have a method or mitigation to prevent sediment discharge.											

Alternative 3 – Miner's Proposed Plan of Operation with Forest Service Requirements

Table 3-41 below examines the direct and indirect effects to fisheries using the matrix indicators or habitat components and Riparian Management Objectives that would be potentially affected by mining activities and connected actions with Forest Service General Requirements (Appendix 2), Plan-specific RPMs (Appendix 11) proposed under Alternative 3. Refer to Table 3-37 for reasons for including specific aquatic habitat parameters in this evaluation.

Table 3-41: Determination of risk (high, moderate, low) to native fish populations in the Granite SWS from proposed mining activities in Alternative 3.

Mine Claim and Rationale	Direct Effects to Fish	Risk of Indirect/Direct Effects to Each Matirx Indicator (evaluated at the reach scale)										
		Temp	Sediment	Chemical Contamination	LWM	Refuge	Off-Channel	Bank Stability	Flood Plain	Road Access	Flow Disturbance	RHCA Disturbance
Altona	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Belvadear	L	H	H	L	L	L	L	L	L	M	M	M
	General Requirements, Concerns due to water withdrawal.											
L&H	L	L	H	M	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times)											
Olive Tone	L	H	L	L	L	L	L	L	L	L	M	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (ford 2-4 times). Concerns due to water withdrawal.											
Royal White	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Sunshine /McWillis	L	L	M	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times).											
Yellow Jacket	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
City Limits	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Eddy Shipman	M	L	M	L	L	L	L	L	L	M	L	H
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (ford 2-4 times).											
Make It	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures.											
Muffin	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Old Eric 1&2	H	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Direct effect to fish due to suction dredging.											
Yellow Gold	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements											
Tetra Alpha Placer	H	M	H	L	L	M	L	L	M	M	L	H
	General Requirements, Site Specific Protection Measures. Concerns due to water withdrawal. Direct effects due to fords.											

Mine Claim and Rationale	Direct Effects to Fish	Risk of Indirect/Direct Effects to Each Matirx Indicator (evaluated at the reach scale)										
		Temp	Sediment	Chemical Contamination	LWM	Refuge	Off-Channel	Bank Stability	Flood Plain	Road Access	Flow Disturbance	RHCA Disturbance
Tetra Alpha Lode & Mill	L	M	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures, potential temperature concerns due to water withdrawals.											
Blue Sky-Bull Run	H	L	H	L	L	M	M	M	M	M	L	M
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (ford 2-4 times). Direct effect to fish due to suction dredging.											
Bunch Bucket	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements.											
Grubsteak	H	L	L	L	L	L	L	L	L	H	L	L
	General Requirements, Site Specific Protection Measures. Direct effects due to ford.											
Lightning Creek	H	M	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (ford 2-4 times). Direct effect to fish due to suction dredging. Concerns due to water withdrawal.											
Lucky Strike	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements.											
Ruby Group	M	L	M	L	L	L	L	L	L	M	L	L
	General Requirements, Site Specific Protection Measures. Direct effect from fords.											
Blue Smoke	H	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Direct effect to fish due to suction dredging.											
East Ten Cent	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures.											
Hopeful I	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures.											
Hopeful 2&3	H	L	M	M	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (ford 2-4 times).											
Little Cross	H	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures. Direct effect to fish due to suction dredging.											
Rose Bud 1-4	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures											
Troy D	L	L	L	L	L	L	L	L	L	L	L	L
	General Requirements, Site Specific Protection Measures											

Summary of Determination of Effects Analysis for all Alternatives

Refer to the Biological Assessment in the project file for more detailed information regarding determination of effects to ESA listed fish species and their habitat.

Alternative 1- No Action Alternative

As the No Action Alternative, there would be no proposed mining activity and connected mining actions under this Alternative. Therefore, there is no mechanism for direct, indirect effects and no contribution to cumulative effects to ESA listed fish species and their designated critical habitat and USFS R6 sensitive

fish, aquatic invertebrates and their habitat under Alternative 1. Therefore, there would be ***no effect*** to Proposed, Endangered, and Threatened fish species and DCH and ***no impact*** to Sensitive fish and aquatic invertebrate species and their habitat.

Alternative 2 - Miner's Proposed Plan of Operation

Alternative 2 meets purpose and need under 36 CFR 228.4 and 228.5 including inspection, monitoring and reporting requirements. Alternative 2 does not meet some PACFISH mining standards and guidelines (Table 3-29). Under Alternative 2, some proposed Plans include proposed mitigations with bonds that would not avoid adverse impacts to listed fish and retard RMO's, for example, newly constructed temporary roads, settling ponds and processing sites and placer activity within the RHCA without adequate Plan-specific protection measures. These operations have not proposed methods to prevent sediment discharge into the stream.

Alternative 3 - Miner's Proposed Plan of Operation with Forest Service Requirements

A summary of determination of effects analysis and rationale is presented in Table 3-34. Determinations are made for ESA listed species and their designated critical. A determination of effects to Regional Sensitive Species is displayed in Table 3-40.

General Requirements for Lode Mines L1-L11, Road-related Requirements Z1-Z14, and Reclamation Requirements R1-R18 are requirements and water quality protection measures that eliminate or lessen the impacts of possible sedimentation and chemical contaminant impacts from proposed mining operations (Appendix 2). A combination of these general requirements and Plan-specific protection measures such as limiting stream fording, and stringent monitoring, specifically addressing sedimentation/chemical contaminant issues on Eddy Shipman, Tetra Alpha, L&H, Grubsteak, and Hopeful 2&3, along with the criteria listed in the Decision Framework section of Chapter 1 regarding 401 certification, results in Alternative 3 to be in compliance with Forest Plans as amended by PACFISH.

As described earlier, given Forest obligations and direction under WQMPs, the UNF and WWNF Forest Plans, current monitoring data, Best Management Practices (including Plan-Specific RPMs (Appendix 11) and General Requirements (Appendix 2)), and considering the area of active and total mining disturbance at each site; the potential effects to riparian areas and water quality from Alternative 3 to incrementally add to past, present, or reasonably foreseeable future activities to cause cumulative effects to native fish populations including ESA listed fish species and their DCH, and R6 sensitive fish and aquatic invertebrate species and their habitat are minor and do not prevent attainment of PACFISH RMOs.

Compliance with the Forest Plan and Other Direction

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 and Wallowa-Whitman National Forest Plans, 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 Guidelines.

Alternatives 1 (No Action) and 3 are consistent with Forest Plan direction regarding native fish populations. Alternative 3 incorporates Forest Service Requirements, which, are a combination of applicable 2012 National Best Management Practices, Forest Service General Requirements (Appendix 2) and Plan-specific RPMs (Appendix 11), and monitoring measures that are incompliance with state and federal water quality rules and regulations. The State of Oregon Department of Environmental Quality (ODEQ) has completed Total Maximum Daily Loads (TMDLs) for the North Fork John Day Subbasin (2010). Alternative 3 was designed to meet all water quality regulatory requirements for the UNF and WWNF. Given these Forest Service Requirements, none of the potential direct/indirect/cumulative effects would prevent attainment of PACFISH Riparian Management Objectives (HUC 6) or steelhead/redband and bull trout trout population viability. Application of PACFISH direction would maintain or improve fish habitat conditions in the analysis area; therefore there would not be adverse modifications to critical habitat or adverse effects to listed fish, as per applicable PACFISH objectives and guidelines.

Summary of ESA Consultation and Determinations

Findings of the Biological Assessment (BA) for the Granite Mining project are summarized in Table 3-42. The BA does not include suction dredge activities so the number of Plans that are NLAA and LAA are different than in this FEIS. Effects of suction dredging are included in the FEIS in the event the State of Oregon lifts the suction dredge moratorium, and the Forest Service is then able to reinitiate ESA Section 7 consultation.

Table 3-42. Summary of Effects Determinations by Number of Plans in the Biological Assessment.

Number of Plans of Operations in the Biological Assessment with Potential Effects to ESA Listed Fish Species and/or their Designated Critical Habitat	No Effect	May Affect, Not Likely to Adversely Affect (NLAA)	May Affect, Likely to Adversely Affect (LAA)
Bull Trout Number of Plans	11	8	9
Steelhead Number of Plans	4	13	11

Revised Biological Assessments were submitted November 20, 2015 to National Marine Fisheries (NMFS) and December 15, 2015 to U.S. Fish and Wildlife Service (USFWS). A draft review Biological Opinion (BO) was received February 2, 2016 from USFWS with agreement on the effects determinations in the BA submitted by the Forest Service. A similar draft review BO is expected in March from NMFS and it is expected there will be agreement on the effects determinations in the BA. Comments from Applicants on the review draft BOs will be submitted to USFWS and NMFS. Final BOs are expected from USFWS in April 2016, and from NMFS in May 2016.

First Foods – Confederated Tribes of the Umatilla Indian Reservation (CTUIR)

First Foods is the basis for natural resource management by the people of CTUIR, with a long-term goal of restoring native foods for the Tribal community. In the CTUIR tribal creation belief, the Creator asked the foods "who will take care of the Indian people?" Salmon was first to promise, then the other fishes lined up behind salmon. Next were deer, then cous, then huckleberry. The First Foods serving ritual in the longhouse is based on this order and reminds people of the promise the foods made, and the people's reciprocal responsibility to respectfully use and take care of the foods. The First Foods service order begins with water, essential to sustain all life. Following water is salmon, then deer, then cous, then huckleberry.

The 28 Plans of Operation described in the Granite Mining EIS have the potential to affect First Foods of CTUIR. The primary effect would be to water and salmon, since most claims are in or near water. In general, the effects to first foods of water and salmon are summarized below.

There are seven operations that propose suction dredging. Suction dredge operations have the greatest potential to directly affect water and salmon. These occur across the Granite Mining watershed. All miners must receive a suction dredge permit, and follow State of Oregon laws and regulations.

Smaller effects are from other activities occurring in the stream, including

- Fording streams by trucks and other equipment (eight Plans) which creates sediment and disturbs fish
- withdrawing water for operations (five Plans)

The smallest effects are from activities on the stream bank. These include

- Digging test holes which creates sediment that can move into stream channels
- Operating mining equipment on the stream banks (such as high bankers and sluice boxes)
- Removing stream bank vegetation which can affect stream bank stability and decrease shade to streams and remove a food source for fish
- Other indirect effects such as camping and discharge of heavy metals (two Plans Tetra Alpha Mill and Eddy Shipman) (see Table 3-22)

From a watershed-wide perspective, these 28 claims are scattered throughout the 94,526 acre Granite watershed, with 104 acres analyzed under this EIS. No miner may disturb more than 0.25 acres at one time, and each 0.25 acres must be restored before another 0.25 acre may be mined. In addition, a maximum of 200 cubic yards (~ 3,240 square feet) of streambed could potentially be disturbed by suction dredging in this project (25 cubic yard per claim multiplied by 8 claims; see Table 3 of the BA for further effects analysis of suction dredging). To provide context there are about 24 miles of salmon/steelhead/bull trout habitat in the Granite watershed with an estimated 1,267,200 [6] square feet of instream fish habitat in this watershed.

The Forest Service has established General Requirements, and Resource Protection Measures that allow the miner to continue to operate their claim, but also includes specific actions the miner must take to

[6] 24 miles x 5,280 feet x 10’ average stream width

protect water quality and fish resources. These protection measures would greatly reduce the impacts to First Foods water and fish.

Wildlife

Introduction

A biological evaluation for proposed, endangered, threatened or sensitive (TES) wildlife species in the Granite Creek Watershed has been completed and is available in the project file. A summary of determinations for those species is displayed in Table 3-43 below.

TES Species and Habitat

Table 3-43: Summary of Determinations

Species	Scientific name	Status	Determination[1]
Birds			
Lewis's woodpecker	*Melanerpes lewis*	Sensitive	MII
White-headed woodpecker	*Picoides albolarvatus*	Sensitive	MII
Mammals			
Gray wolf	*Canis lupus*	Sensitive	MII
Canada lynx	*Lynx canadensis*	Threatened	NE
Townsend's big-eared bat	*Corynorhinus townsendii*	Sensitive	MII
Spotted bat	*Euderma maculatum*	Sensitive	NI
Fringed myotis	*Myotis thysanodes*	Sensitive	MII
Amphibians			
Columbia spotted frog	*Rana luteiventris*	Sensitive	MII
Invertebrates			
Fir pinwheel	*Radiodiscus abietum*	Sensitive	NI
Western bumblebee	*Bombus occidentalis*	Sensitive	NI
Johnson's hairstreak	*Callophrys johnsoni*	Sensitive	NI
Intermountain sulphur	*Colias christina pseudochristina*	Sensitive	MII
Yuma skipper	*Ochlodes yuma*	Sensitive	MII

[1] MII = may impact individuals and or habitat but not likely to cause a trend to Federal listing or a loss of viability; NE = no effect; NI = no impact.

The biological evaluation determined there would be no effect or impact to Canada Lynx, Spotted bat, Fir Pinwheel, Western bumblebee, and Johnson's hairstreak. These determinations were based on either no known population present within the Granite Creek watershed, the species is not expected to occur on any

of the mining sites, and/or the scale of the mining operations is small enough that it would not hinder the capability of the watershed to support a population if one should establish there. Therefore, because there would be no direct/indirect or cumulative effects to those species, they will not be further discussed in this document.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

There would be no direct/indirect or cumulative effect on any of the above proposed, endangered, threatened or sensitive wildlife species because no mining activity would occur.

Lewis's and White-headed Woodpeckers

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Due to the low potential for tree removal on any mining site, it is unlikely that Lewis's woodpecker or white-headed woodpecker would be affected by the project. Although, if individuals of either species were located within the vicinity of an active mining operation, the birds may shift spatially outside of the area. The determination for both species is "**may impact individuals and or habitat but not likely to cause a trend toward federal listing or a loss of viability**".

Cumulative Effects of Proposed Mining Activities

Past, present, and ongoing habitat loss pose a threat to the continued existence of the Lewis's woodpecker throughout its range (Wisdom et al. 2000). Amounts of old-growth ponderosa pine remaining in Oregon are unknown, but are probably less than 10 percent of what occurred in pre-European settlement times (Marshall 1997). The loss has occurred mainly through a combination of timber harvest, road building, and fire. Among the most significant and greatest declining wildlife habitat in the Interior Columbia Basin is late and old-growth forest structure. Wisdom et al. 2000 concludes that source habitats for most species declined strongly from historical to current periods across large geographic areas. Strongest declines were for species dependent on low-elevation, old-forest habitats. The white-headed woodpecker was the highest for any species in that group. Much of the remaining late- and old-forest structure on the managed forest exists in remnant stands, often isolated from similar habitat.

Gray Wolf

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

The 28 mining sites provide habitat capable of supporting wolves. The grasses and browse that grow on disturbed areas where mining has taken place may attract some deer and elk, which are prey for wolves. The mining activities as described would unlikely have negative effects to gray wolves. Although wolves could be temporarily displaced during operational activities, this would have no impact on wolf populations, reproduction, or mortality of individual wolves.

Cumulative Effects of Proposed Mining Activities

Because this project will not have a measureable direct or indirect effect on gray wolves, it will not contribute to cumulative effects to gray wolves or their habitat.

Determination

The project area has potential to be used by wolves, but there is no current recorded use by this species. Mining activities may cause prey to leave the immediate area of individual mining claims, thereby affecting wolf movements. Implementation of any of the action alternatives "**may impact individuals and or habitat but is not likely to cause a trend toward federal listing or a loss of viability.**"

Townsend's big-eared bat and Fringed myotis

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

The project area does contain similar habitat features typically used by these species, including potential roost trees and open forest foraging areas. Four plans have adits proposed for activity: Eddy Shipman, L&H, Royal White, and Tetra Alpha. If any of those adits currently serve as roost sites then bats would likely be displaced when these adits become active again. There is a chance that some bats could be displaced once placer mining resumes at some of the mine sites. This displacement could happen from the increased level of noise, ground vibration, and human presence at the sites. However, this risk is low given that most bats are isolated from these disturbances when roosting during the day. Mining operations typically do not occur during night time hours when bats emerge to feed and water.

Existing ponds created from past mining operations now serve as valuable watering sites for bats. These ponds also attract insects on which bats feed. Some ponds will not be disturbed when work resumes at these 28 sites. However, several ponds will be cleaned out and used for mining operations. These uses will not likely deter bats from feeding and watering at the ponds.

The surrounding forests also provide day roosts and feeding habitat. Very few trees will be cut at the mine sites, and the surrounding forested landscape will not be affected by the mining in regard to how bats utilize this habitat. Some snags may be felled during implementation of the project if they represent a safety hazard to personnel or equipment.

The few sites that do have unique structures (old buildings) will not change from their current condition, so risk to bats is relatively low. If displacement of bats occurs at some of the sites due to increased noise and human activity, those bats may find other suitable roosts at other inactive mines in the area. Old mining structures are common in the vicinity of these projects, so options exist for displaced bats.

Cumulative Effects of Proposed Mining Activities

Ongoing and reasonably foreseeable actions within the Granite watershed include watershed restoration activities, grazing, timber harvest, firewood gathering, and prescribed burning. All of these projects have the capability to have cumulative effects on the Townsend's big-eared bat and fringed myotis if they impact roost sites or insect prey availability. The additional habitat loss that may occur as a result of these mining operations may impact individuals in the short term but should not lead to a loss of population viability due to the small scale of each mining operation.

Determination
The determination for Townsend's big-eared bat and fringed myotis is "may impact individuals and or habitat but not likely to cause a trend toward Federal listing or a loss of viability".

Columbia Spotted Frog *(Rana luteiventris)*

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities
Spotted frog habitat would be disturbed and frogs may be killed or displaced during mining operations at existing ponds. This project may impact individuals through direct mortality from crushing with equipment and through displacement from cleaning and using existing ponds. The habitat provided by settling ponds was created from past mining activity. These features will be made temporarily unusable when mining is occurring. However, the plans of operation stipulate that upon completion of mining the ponds will reshaped to specifications outlined by the Forest Service. These specifications were developed to provide spotted frog breeding habitat. On existing ponds the miner should slope sides from 0 to 18 inches deep along the north, west, and east edges. This sloped portion of the pond should be a minimum of 3 feet in width (most importantly on the north, west, and east sides, but may be sloped all the way around). Existing ponds that do not have water in them except during operations, and ponds which are being created for mining purposes, need to be filled in upon completion of operations.

Cumulative Effects of Proposed Mining Activities
Ongoing and reasonably foreseeable actions within the Granite watershed include watershed restoration activities , grazing, timber harvest, and prescribed burning. All of these projects have the capability to have cumulative effects on the spotted frog if they impact habitat or prey availability. The additional habitat loss that may occur as a result of these mining operations may impact individuals in the short term but should not lead to a loss of population viability due to the small scale of each mining operation.

Determination
Although individuals may be impacted, this project is not expected to lead to a trend toward Federal listing. The determination for this species is "**may impact individuals and or habitat but not likely to cause a trend toward Federal listing or a loss of viability**".

Intermountain sulphur and Yuma skipper

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities
There have been no surveys or recorded observations for these butterflies within the project area. Habitat alteration would occur for the larval host plant (if present) of the Yuma skipper and intermountain sulphur at most of the mine sites due to reworking the tailing piles at these sites. This should be a short-term effect as vegetation would become established again in the dredging piles after operations are complete. Johnson's hairstreak spends the majority of time in the upper forest canopy of mature forest; this project would not remove any mature, old growth habitat so there should be no direct, indirect or cumulative effects. It is unknown at this time whether larval host plants or nectar plants of any of these species are located within any of the mining site locations.

Cumulative Effects of Proposed Mining Activities

Ongoing and reasonably forseeable actions within the Granite watershed include grazing, timber harvest, and prescribed burning. All of these projects have the capability to have cumulative effects on the intermountain sulphur and Yuma skipper if they occur where host plants are present. The additional habitat loss that may occur as a result of these mining operations may impact individuals in the short term but should not lead to a loss of population viability due to the small scale of each mining operation.

Determination

Because little is known about the Intermountain sulphur and habitat alteration is likely to occur for the larval host plant of the Yuma skipper, the determination for these two species is "**may impact individuals and or habitat but not likely to cause a trend toward Federal listing or a loss of viability**".

Management Indicator Species and Habitat

The management indicator species of the Wallowa-Whitman National Forest (WWNF) and the Umatilla National Forest (UNF) and the habitat or habitat component that they represent are shown in 2. Habitat conditions for management indicator species must be managed to maintain viable populations (*WWNF Forest Plan, page 2-9*) at the Forest or larger scale. All the species in Table 3-4 are known or suspected to inhabit the analysis area.

Table 3-44: Management Indicator Species

Species	Habitat	Forest
Pileated woodpecker (Dryocopus pileatus)	Old growth and mature forests	UNF and WWNF
Primary cavity excavators[1]	Snag and log habitat	UNF and WWNF
Northern goshawk (Accipiter gentiles)	Old growth and mature forest	WWNF
Rocky Mountain elk (Cervus elaphus)	Arrangement of cover and forage	UNF and WWNF
American marten (Martes americana)	Old growth and mature forest	UNF and WWNF
Northern Three-toed Woodpecker (Picoides tridactylus)	Snag and log habitat	UNF

[1] Northern flicker (*Colaptes auratus*), Lewis' woodpecker (*Melanerpes lewis*), yellow-bellied sapsucker (*Sphyrapicus varius*), Williamson's sapsucker (*Sphyrapicus thyroideus*), red-naped sapsucker (*Sphyrapicus nuchalis*), hairy woodpecker (*Picoides villosus*), downy woodpecker (*Picoides pubescens*), white-headed woodpecker (*Picoides albolarvatus*), Northern three-toed woodpecker (*Picoides tridactylus*), black-backed woodpecker (*Picoides arcticus*), mountain chickadee (*Parus gambeli*), black-capped chickadee (*Parus atricapillus*), white-breasted nuthatch (*Sitta carolinensis*), red-breasted nuthatch (*Sitta Canadensis*), and pygmy nuthatch (*Sitta pygmaea*).

Management indicator species are addressed in separate sections of this analysis that relate to the habitat they are associated with. For example, pileated woodpecker, northern goshawk, and American marten are

covered in the old-growth habitat section, while the Northern three-toed woodpecker and primary cavity excavators are covered in the snag section.

Mature and Old Growth Forest Habitat

MA 15 is the management area designated in the Wallowa-Whitman National Forest Plan to "maintain habitat diversity, preserve aesthetic values, and to provide old-growth habitat for wildlife." The Umatilla National Forest Plan also provides direction for management of dedicated old growth habitat (MA C1). Designated mature and old growth forest stands will be located and retained to distribute suitable habitat throughout the Forest for wildlife species dependent upon this habitat type. Forest stands will meet ecological, biological, size and distribution criteria as suitable old growth for survival and reproduction of indicator species (*UNF Forest Plan, page 4-149*). There are 1,763 acres within MA 15 and 1244 acres of C1 within the analysis area for a total of 3007 acres (3% of the analysis area). These areas are in small clumps scattered throughout the analysis area and 2 of the proposed mining sites fall within these areas (Eddy Shipman and Grubsteak). The management indicator species for old-growth habitat include the pileated woodpecker, northern goshawk, and American marten.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

There would be no effects to designated old-growth areas (MA 15 and MA C1) or the species that depend on this kind of habitat. There would be no effects to non-designated old-growth forest habitat. Disturbed mine sites would continue to re-vegetate over time and may eventually develop into old-growth habitat. This would require greater than a century on most of the mine sites.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Effects to old growth and wildlife species dependent on this kind of habitat would be minor and immeasurable at meaningful scales. Mining on these 28 mine sites would set back vegetative succession on these sites for the duration of mining. Upon completion of mining and reclamation, succession would begin the slow process of re-establishing forested habitat. This process would take well over a century to develop old-growth forest habitat on these sites. Developing and managing old-growth forest habitat and mining are not compatible on the same acres. It is not reasonable to expect these mine sites to become old growth or support the management indicator species within the foreseeable future. The balance of the landscape not impacted by mining is where habitat for these management indicator species would be provided in conjunction with other forest and range objectives. The 2 proposed mining sites that fall within MA C1 are Eddy Shipman and Grubsteak. Eddy Shipman has a total area of 3 acres and Grubsteak has a total area of 2 acres. These 2 sites are on the periphery of old growth management areas and may cause enough disturbance to deter MIS species from using the area immediately surrounding the sites. A total of 5 acres of may be impacted by disturbance or by removal of trees that pose hazards. The small scale of this disturbance may temporarily displace individuals but will not be large enough to affect populations of any MIS species.

Cumulative Effects of Proposed Mining Activities

None of the alternatives would contribute to cumulative effects to mature and old-growth forest habitat or the species that utilize this habitat because no net reduction in old-growth habitat would result from either alternative.

Snags and Down Wood

The effect to primary cavity excavators from the loss (or reduction) of snags is a long-term absence of some woodpeckers from portions of their geographic range, and their ecological relationships with forest pests and secondary cavity users. Larger diameter snags can require 100 to 250 years to be replaced, and the species that require large snags generally do not have alternatives for nesting substrate. Woodpeckers are also known to contribute to maintaining forest pests (insects) at endemic levels. This function is lost when nesting and roosting habitat is lost or severely reduced over large portions of forested habitat. The primary cavity excavators (including pileated woodpecker) are management indicators on the Wallowa-Whitman and Umatilla National Forest.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

No snags, logs, or green trees would be cut or disturbed except what is lost to natural fall rates and the ongoing firewood program. There would be no direct or indirect effects to primary cavity excavators resulting from maintaining these 28 mine sites in an inactive status.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

These two alternatives would not have a measurable effect on snag or log habitat or to the species that use these habitat features at the landscape scale. There would be small-scale reductions in snag numbers because some snags may be cut to address hazards around work areas. However, very few potential danger trees were observed during field reconnaissance of the mine sites. Few green trees would be removed and would not result in measurable effects to snag- and log-dependent wildlife species. The small scale of these effects would not reduce the ability of any primary cavity excavator species from using the project area.

Cumulative Effects of Proposed Mining Activities

The cumulative effects of these mines would be negligible based on the relatively small size of the project areas, spatial distribution of the mines, and the fact that so few trees and snags are proposed for removal.

Northern Goshawk

Northern goshawks are the largest accipiter in North America and are generally considered forest habitat generalists that persist and reproduce where at least a portion of their home range is in an old-growth condition. The goshawk is a management indicator species on the Wallowa-Whitman National Forest, and is specifically addressed in the Regional Forester's Eastside Forest Plan Amendment #2 (1993). No goshawk nests are known to exist within any of the project areas. If nests are located prior to or during project implementation, district wildlife personnel would work with the miners and minerals personnel to mitigate effects to goshawks during the nesting season.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

Retaining these 28 mine sites in an inactive condition would result in no change to the current condition. Vegetation would continue to recover on these sites, increasing forage and eventually cover for many species, but at localized, minor scales. The lasting effects of existing roads, tailings, and old mining

activity would persist into the long term, but a “no action” decision would not worsen or change the existing condition.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Mining operations will not result in a reduction of suitable goshawk habitat. Disturbance from operations may temporarily displace individuals to other areas. If a goshawk nest(s) is discovered at any of the mine sites a seasonal restriction on the use of heavy equipment would be recommended in the immediate vicinity of the nest (Appendix 2, General Requirement G16). No mining sites are within a goshawk post-fledgling area.

Cumulative Effects of Proposed Mining Activities

Neither of the alternatives would contribute to cumulative effects to northern goshawks or their habitat because no loss of habitat would occur and potential nesting, foraging, and dispersal habitat is relatively abundant and widespread in the surrounding landscape.

Rocky Mountain Elk

Rocky Mountain elk is the most popular big game species in northeastern Oregon and is likely responsible for more recreation visitor days than any other single species or activity on the Forest. Elk are popular among wildlife watchers, outdoor photographers, and hunters. Elk are also a management indicator species on the Wallowa-Whitman and Umatilla National Forests. As a management indicator, elk serve to indicate the condition and function of the habitat that they share with numerous other wildlife species. Elk are an indicator of forage and cover abundance and quality, and the patch dynamics that comprise quality elk habitat. Additionally, elk serve as a meaningful indicator for those species that are sensitive to human activities since they exhibit greater individual and herd fitness when adequate security habitat is available. Also, in an effort to address culturally significant foods, this habitat analysis reflects the effects to this species.

Elk habitat is typically analyzed by assessing several habitat variables including forage quality/quantity, size and spacing of forage and cover patches, level of motorized access, and cover quality. These variables are combined to generate a numerical value referred to as a habitat effectiveness index (HEI). Since the magnitude of change for any of these variables would be so small for this project, an HEI analysis would be of no value.

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

Retaining these 28 mines in an inactive condition would result in no change to the current condition. As vegetation continues to recover on these sites, increased forage and eventually cover may provide for improved elk habitat, but at localized, minor scales. The lasting effects of existing roads, tailings, and old mining activity would persist into the long term, but a “no action” decision would not worsen or change the existing condition.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

There would be little change in how elk use these areas, except for disturbance within and immediately surrounding the mines when work is being conducted. Disturbance from mining operations may displace elk to areas with less noise and lower quality forage and cover. Road densities would not change, because the proposed miner-created temporary access roads would not contribute to open road densities. Elk may avoid or reduce their use of the mining areas during periods of operation when human presence and motorized equipment are prevalent. No mining sites are within migration corridors or calving areas. Three main features that contribute to summer elk habitat effectiveness are riparian habitats or moist sites for thermal relief, open road densities that affect potential for disturbance/displacement, and livestock grazing, which may affect forage availability or cause displacement (Christensen et al. 1993). Although the localized area around the mine site would have reduced cover and forage, the contiguous habitat that surrounds the area should provide alternative suitable habitat.

Cumulative Effects of Proposed Mining Activities

The cumulative effects of proposed activities at these 28 mines would depend on which mines would be operating at the same time and their proximity to one another. This is impractical to predict since the plans of operation apply to a 10-year period, and the mining activity could be continuous, intermittent, or sporadic. If all the mines were active at the same time, it could result in cumulative effects that would affect elk distribution in the Granite watershed. Disturbance from these 28 mines, when combined with general motorized access, forest management activities, and various forms of recreation, could compound these effects. However, this disturbance would not threaten the viability of the elk population in this watershed.

Neotropical Migratory Birds

Neotropical migratory birds are those that breed in the United States and winter primarily south of the United States-Mexico border. They include a large group of species, including many hawks, shorebirds, warblers, and other songbirds, with diverse habitat needs spanning nearly all successional stages of most plant communities. Of the 225 migratory birds that are known to occur in the western hemisphere, about 102 are known to breed in Oregon.

Nationwide declines in population trends for neotropical migrants have become an international concern. Habitat loss is considered the primary factor in declines of neotropical migratory birds.

In 2000, the Oregon-Washington Chapter of Partners in Flight published its Landbird Conservation Plan (Altman 2000). The plan uses a “Priority Habitats and Species” approach. By managing for a group of species representative of important components in a functioning coniferous forest ecosystem, many other species and elements of biodiversity would be conserved. The Granite Mining project areas lie predominantly in mixed conifer forest with variable amounts of dry conifer forest conditions as defined in the Landbird Conservation Plan. These focal species (Table 3-45) were selected based in part on their conservation need and degree of association with important habitat attributes in coniferous forests in the Blue Mountains.

Table 3-45: Forest conditions, associated habitat attributes, and focal species in the analysis area

Forest condition	Habitat attribute	Focal species
Dry Forest	Large trees and snags	White-headed woodpecker
Dry Forest	Old forest with openings	Flammulated owl
Dry Forest	Open understory with pine regeneration	Chipping sparrow
Mesic Mixed Conifer	Large snags	Vaux's swift
Mesic Mixed Conifer	Overstory canopy closure	Townsend's warbler
Mesic Mixed Conifer	Structurally diverse	Varied thrush
Mesic Mixed Conifer	Dense shrub layer	MacGillivray's warbler
Mesic Mixed Conifer	Edge and openings	Olive-sided flycatcher

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

Retaining these 28 mines in an inactive condition would result in no change to the current condition. As vegetation continues to recover on these sites, increased shrub cover may provide nesting habitat, but at localized, minor scales. The lasting effects of existing roads, tailings, and old mining activity would persist into the long term, but a "no action" decision would not worsen or change the existing condition.

Alternatives 2 and 3 – Action Alternatives

Direct and Indirect Effects of Proposed Mining Activities

Effects to neotropical migratory bird species that use this area would be negligible in terms of diversity and abundance. Mining operations occurring in spring through early summer could affect nesting neotropical migratory bird species; however, the relatively small scale of the individual project areas and the nature of the actions pose little risk of affecting overall populations.

In the short term, some nesting habitat may be lost as a result of operations, but the scale at which it would occur is not expected to measurably reduce neotropical migratory bird species richness or abundance. Some individual birds may experience shifts in home ranges as habitat is altered, but operations would not result in their complete displacement**.** These actions would not lead to a decline of neotropical migratory bird species habitat or populations.

Cumulative Effects of Proposed Mining Activities

Migratory birds are not only affected by actions that degrade habitat and disturb behaviors on their breeding grounds, but they are also in decline due to destruction, degradation, and disturbance on their wintering grounds and stopover locations. It is impossible to predict the effects of all threats that neotropical birds face along their migration corridors and wintering grounds. However, mining in the Granite watershed would not cause additional impacts to bird populations because the project would impact such a small portion of their available habitat.

Summary of Effects

The biological evaluation determined there would be no effect or impact from Alternative 2 and 3 to ESA threatened Canada Lynx, and sensitive Spotted bat, Fir Pinwheel, Western bumblebee, and Johnson's hairstreak. For other Region 6 sensitive species listed in Table 3-43, there would be either No Impact, or a determination of "may impact individuals and or habitat but not likely to cause a trend toward federal listing or a loss of viability".

Under Alternatives 2 and 3, the small scale of disturbance from mining activities may temporarily displace individuals but will not be large enough to affect populations of any MIS wildlife species, nor would the effects from the activities jeopardize the viability of any of the MIS wildlife species in the project area.

Compliance with the Forest Plan and Other Direction

Based on the analysis above, and the analysis of the Biological Evaluation in the project file, Alternatives 2 and 3 are consistent with the goals, standards, and guidelines in the Umatilla and Wallowa-Whitman National Forest Plans, as amended. This is primarily due to the small scale of disturbance from the proposed mining activities.

Invasive Species

Invasive plants are defined as a non-native plant whose introduction causes or is likely to cause economic, environmental, or human health harm. An invasive species is distinguished from other non-natives by their ability to spread in native ecosystems. "Noxious weeds" on the other hand is a legal term used by state, county, and federal agencies to denote plants that pose particular threats, generally to agriculture. Many undesirable non-natives can be invasive and pose threats to healthy native plant communities but do not meet the criteria for listing as a "noxious weed." For that reason, this analysis will focus on all invasive non-native plants and not just those listed as "noxious weeds."

Invasive non-native species are currently damaging the biological diversity and healthy native plant communities located both on and off national forest system (NFS) lands. The introduction and subsequent spread of invasives can have a variety of environmental effects such as displacement of native species, reduction in suitable habitat, reduction in forage for livestock and wildlife, destruction of habitat and loss of TES species, increased soil erosion, water quality reduction, and significant reductions in soil productivity. The establishment and spread of non-native plants is a dynamic event that incorporates many diverse variables. Invasion theory, as it pertains to non-native species, contains three main principles: disturbance, propagule pressure, and competition (Hobbs & Huenneke 1992, Lockwood et al. 2005, Sutherland 2008).

Invasive species are quick to colonize an area of disturbance and can use their "weedy" life-history traits to establish within novel habitats. Disturbance such as fire, construction, mining disturbance, and commercial timber harvest can alter native plant communities and increase the chance of invasion by non-natives. Several factors such as type of disturbance, proximity to propagule source, and size or magnitude of disturbance can increase the propensity for invasion of an otherwise healthy plant community by non-natives.

The second factor in the invasion theory is propagule pressure. Propagule pressure is defined as the number of possible individuals (seeds, seedlings, etc.) released into a region in which they are not native and the number of such release events (Lockwood et al. 2005). In essence, the higher the propagule pressure (more seeds or more opportunities for a release) the greater the likelihood of a successful colonization. Many factors can lead to increased propagule pressure but the most likely cause is an increase in the number of release events. Many of the activities conducted on the NFS lands can lead to an increase in the propagule pressure including fire, timber sales and salvage, road construction, use of heavy equipment, recreation, and grazing.

Finally, the last principle of invasion theory is competition. Even though the ability of an invasive to spread or colonize new sites is generally species dependent, all invasive non-natives are considered potential threats to native plant communities.

Forest Plans

The Pacific Northwest Region (R6) Invasive Plant Program Record of Decision (ROD) (USDA 2005) amended the Forest Plans for both the Umatilla National Forest and the Wallowa-Whitman National Forest. The Region 6 ROD outlined 23 standards for the prevention and management of invasive non-native plants that have been added to all regional Forest Plans and require consideration of invasive species in all planning efforts. The regional ROD does not however approve any site-specific treatment,

instead requiring a completed analysis by each National Forest (see the specific sections below for each Forest's analysis).

Of the 23 prevention and management standards in the regional ROD, only five directly affect activities found in the Granite Mining project. These standards are:

1. Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis…..vegetation management plans, and other land management assessments.
2. 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 (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest Service lands.
3. Use weed-free straw and mulch for all projects, conducted or authorized by the Forest Service, on National Forest System Lands.
7. Use only gravel, fill, sand, and rock that are judged to be weed free by District or Forest weed specialists.
8. Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists.
13. Native plant materials are the first choice in re-vegetation for restoration and rehabilitation where timely natural regeneration of native plant community is not likely to occur

Under the Region 6 ROD, these standards apply to the prevention and management of all invasive non-native species and not just those listed as "noxious weeds".

Wallowa-Whitman National Forest Invasive Species Plan

The Wallowa-Whitman National Forest completed the Wallowa-Whitman National Forest Invasive Plants Treatment Project Environmental Impact Statement and Record of Decision in 2010. Most of the existing invasive plant infestations within the Granite Mining EIS area on the WWNF National Forest are covered under this analysis and have proposed herbicide treatments for the high priority weed species.

In December 2012, Judge Simon, U.S. District Court of Oregon, issued an "Opinion and Order on Motion for Partial Vacatur", remanding the 2010 decision to the Forest Service for reconsideration of cumulative effects, but allowing certain treatments to continue while the analysis is being completed. All infested sites can be treated by non-herbicide methods, which include mechanical, manual, and biological treatments. Herbicide treatments are permitted in accordance with the 2010 ROD (using the 10 herbicides evaluated in the FEIS and following project design features and buffering requirements) on approximately 5000 acres previously mapped under Decision Notices and Findings of No Significant Impacts for noxious weed management signed on April 2, 1993 and August 8, 1994. The site numbers associated with these 5000 acres are listed in Exhibit 1 of Judge Simon's Order.

Umatilla National Forest Invasive Species Plan

The Umatilla National Forest completed the Umatilla Invasive Plant Environmental Impact Statement and Record of Decision in 2010. Most of the existing invasive plant infestations within the Granite Mining EIS area on the Umatilla National Forest are covered under this analysis and have proposed herbicide treatments for the high priority weed species.

Effects Analysis Methodology

Specific Assumptions

The following are two assumptions made about the status of invasive non-native plants within the Granite Creek Watershed Mining project area.

Assumption 1: Invasive non-native species are spreading at a rate of 8-12% on public lands (USDA 2005).

Assumption 2: The Record of Decision (ROD) for the Wallowa-Whitman National Forest Invasive Species Management EIS, and the 2010 Umatilla Nation Forest Invasive Plant EIS and ROD and the adoption of the standards from the Region 6 ROD should slow the rate of spread and establishment of invasive non-native species by up to 50% (USDA 2005, USDA 2010).

Assumption 3: In order to process more material a day a larger area of surface disturbance would be created. For example a plan that proposes to process 5 cubic yards/day would likely create a smaller bare ground signature than one that proposes to process 20 cubic yards/day.

Specific Methodology

The descriptions, resources, and effects (expected and potential) were assessed using field surveys, literature documentation, documented site information, and professional judgment. Throughout this document, the intensity of the effect is graded on a qualitative scale using the effect levels of “NO” “LOW”, “MODERATE”, and “HIGH”. Those effects identified as low intensity will create little to no bare soils, and extremely limited potential for introduction of invasive plant material to the project area. If left untreated invasive species within these areas would not spread from current locations or expand from current levels at rates higher than those found in the absence of project activities. Moderate level activities are those that, with proposed mitigation measures, could be treated and reduced to pre-project levels, but without the implementation of these measures could begin to spread beyond current levels. Finally, a high intensity effect is one that could create opportunities for spread and introduction of invasive species that could not be mitigated with normal effort or proposed measures. A high intensity effect, if controllable, would likely require significant increase in invasive treatment activities or funding in order to control the infestations.

Data Sources

There are inventoried invasive non-native plant sites within the Granite project areas. The inventoried infestations are shown in the individual mining site forms in the project file. In addition to these listed species, the project area also includes *Ventenata dubia, Bromus tectorum*, and others that are potentially harmful invasive species but don’t meet the requirement for listing on the state or county “noxious weed” lists. Treatment and monitoring records document all site visits by invasive plant specialists, spanning the years since initial discovery and inventory of the site. These records are on file at the appropriate District Office in Ukiah or Baker City, Oregon. These sites are visited on a regular basis for treatment and monitoring and can be relocated and identified on the ground when necessary.

Indicators

Direct and Indirect effects of proposed mining activities, access (roads, fords, bridges), and mitigation and monitoring requirements

Direct and indirect effects of the alternatives are identified and discussed, and effects of project level activities will be quantified as increases or decreases to the indicators listed below. Differences between alternatives will be displayed by comparing the potential change in the indicators from the existing conditions.

Potential Establishment

While direct/indirect effects on the potential establishment of non-native plants are difficult to predict and quantify, they would occur through ground disturbance and introduction of invaders into new areas. Disturbance is defined as a punctuated event or series of events that kill or damage existing organisms, directly or in-directly increase resource availability, and create an opportunity for new individuals to become established (Sousa 1984). Disturbance associated with minerals activities are expected through movement of heavy equipment, soil displacement, and vegetation compression; but the amount of disturbance can vary depending on activity density and type. Further, project activities can introduce new species into areas by transporting non-native plant material on machinery or personnel. Increased disturbance and access would increase the potential for new establishment of invasive non-native species in sites previously unoccupied.

Short-term timeframe: 1-2 years. This period of time would be long enough to notice the germination and growth of any new invasive non-native species after project activities.

Long-term timeframe: 25-30 years. This long term timeframe was chosen because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative. Further, changes in the plant community dynamics would have been identified by this point and establishment of invasive non-native plants would have been established.

Spatial Boundary: The boundary of the effects is the individual mining claims and buffered ¼ mile on all sides. This area contains the area of potential activity and gives a buffer to include the possibility of spread from outside the activity unit.

Methodology: In order to analyze the effects of project activities on the potential establishment of invasive non-native species, a qualitative estimate of the impact is reported on a site by site basis. The effect estimates are classified as “NO”, “LOW”, “MODERATE”, and “HIGH” effects and are based on the amount of ground disturbance proposed, whether that disturbance was pre-existing, and the proximity of invasive non-native species. A mining plan with little new ground disturbance and no known invasive non-native plants in the vicinity would be rated as low effect to potential establishment while a plan that proposes large-scale new ground disturbance with invasive non-native plants on site might be rated as a high effect.

Potential to Spread

While direct/indirect effects from the potential spread of non-native plants are difficult to predict and quantify, they would occur through ground disturbance and the possible increase in “invisibility” of a plant community after disturbance. Invasive plants are estimated to spread at 8-12 percent a year on NFS land (USDA 2005), but according to the R6 ROD (USDA 2005) the adoption and use of the standards shown above should reduce the rate of spread of invasive plants by over 50 percent (down to 4-6 percent). Increased disturbance and pre-existing invasive non-native sites in the vicinity of a mining operation would increase the potential for spread of invasive non-native species.

Short-term timeframe: 1-2 years. This period of time would be long enough to notice the increase in size of a known infestation, and allow for the rapid response to potentially contain that site after project activities.

Long-term timeframe: 25-30 years. This long-term timeframe was chosen because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative. Further, changes in the plant community dynamics would have been identified by this point and spread of invasive non-native plants would have been established.

Spatial Boundary: The boundary of the effects is the individual mining claims and buffered ¼ mile on all sides. This area contains the area of potential activity and gives a buffer to include the possibility of spread from outside the activity unit.

Methodology: In order to analyze the effects of project activities on the potential spread of invasive non-native species, a qualitative estimate of the impact is reported on a site by site basis. The effect estimates are classified as "NO", "LOW", "MODERATE", and "HIGH" effects and are based on the amount of ground disturbance proposed, whether that disturbance was pre-existing, and the existence of known invasive non-native species infestations would be rated as a "no" effect to the potential spread while a plan that proposes large scale new ground disturbance with invasive non-native plants on site might be rated as a high effect.

Cumulative effects

Where direct and indirect effects, due to project activities occur, a cumulative effects analysis must be prepared. The cumulative effects analysis must account for all impacts from past, present, and reasonably foreseeable future activities.

Long-term timeframe: 25-30 years because climate change, unforeseeable future projects, demographic changes, and others make assumptions beyond this timeframe speculative.

Spatial Boundary: The cumulative effects analysis area for this project is confined to the project area only and those areas within a ¼ mile buffer of each proposed plan of operation. This area is appropriate because there are no expected direct or indirect effects from project activities outside of the ¼ mile buffer of each plan of operation or the project area boundary and thus no cumulative effects.

Methodology: In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

Affected Environment/Environmental Effects

Affected Environment

The existing condition of the project area as it pertains to invasive non-native species is described in a site by site manner for each proposed mining plan of operation (See project file for invasive species

presence/condition on each specific mine sites). The conditions outlined were created from site visits and GIS queries. Table 3-46 shows a summary of all inventoried invasive non-native plants within the project area.

Table 3-46: Known Invasive Weed Presence in the Granite Project Area

Species Code	Common Name	Number of Sites	Acres
CEBI2	Spotted knapweed	18	91
LIVU	Yellow toadflax	6	177
CEDI3	Diffuse knapweed	13	141
CYOF	Houndstongue	5	40
PORE5	Sulfur Cinquefoil	*	*
HYPE	St. Johnswort	*	*
CIAR	Canada thistle	*	*
CIVU	Bull Thistle	*	*

Source: USDA FS 2012.. [*These species are not generally intensively inventoried. They are considered widespread. Biologicals, if available, are considered established.]

Environmental Effects

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

In this analysis the “no action” alternative would maintain the current condition as no new activities will be authorized. No proposed Plans or amendments to currently approved plans would be approved. There would still be other activities related to mining that could continue. Any notice of intent level work would still continue as this level of activity does not require analysis under NEPA. Other impacts to the establishment and spread of invasive non-native species would continue (i.e. recreation, wildfire and wildfire suppression, etc.).

Alternative 2

Direct and Indirect Effects of Proposed Mining Activities

Alternative 2 would authorize the approval of the Plans of Operations (Plans) as submitted by the miners. The total number of Plans proposed for approval under this alternative is 28. The Plans of Operations included in this alternative are in the project file. A summary of each proposed Plan of Operations can be found in Appendix 8.

All Plans would contain a variety of requirements to meet 36 CFR 228 Subpart A. All operations must meet all other applicable State and Federal laws, including but not limited to the Clean Water Act, the

National Historic Preservation Act, the Archaeological Resource Protection Act, the Endangered Species Act, and all applicable State and Federal fire regulations.

Potential Establishment of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential establishment of invasive non-native species for alternative 2 are discussed below. After consideration and analysis of each plan of operation the analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new miner-created temporary access roads, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species.

- *Moderate Effect Plans:* There are 24 Plans that pose a moderate effect to potential establishment of invasive non-native species. These plans are Altona, Belvedear, Bunch Bucket, City Limits, Lucky Strike Placer/Mill, Olive Tone, Royal White Group, Sunshine/McWillis, Ruby Group, Yellow Gold, Yellow Jacket, Tetra Group Lode/Mill, L&H, Muffin, Eddy Shipman, Blue Sky/Bull Run, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful 1. These sites all have either no invasive non-native species within the ¼ mile buffer or have low-priority low-risk species. Each of the 24 above Plans are also proposing relatively little annual ground disturbance. The amount of ground disturbance on these claims would be less than 5 cubic yards/day of operation.

  The potential effect from the establishment of new invasive non-native plants within previously un-infested areas is estimated to be moderate under Alternative 2. Without any mitigations or general requirements under this alternative, the greatest risk would be the establishment through introduction and movement of propagules on heavy equipment used for the mining activity. However, the low priority low risk species present, the location of these infestations, and the use of existing access roads would keep the effect of establishment from being high.

- *High Effect Plans:* There are 4 Plans that pose a high effect from the potential establishment of invasive non-native species. These plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek. These sites all have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer, have proposed development of new miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The plans in this group propose to process more than 20 cubic yards/day.

  The potential effect from the establishment of invasive non-native species under Alternative 2 for the 4 plans of operation mentioned above is high. The high effect conclusion was reached due to multiple factors. First, all of these Plans are proposing to have larger scale ground disturbance than the other Plans in this project. More ground disturbance would allow more opportunity for establishment of invasive non-native species. Second, the Plans in this group are proposing the use and development of new temporary road access that has not previously existed. Roadways and vehicle travel are one of the key factors to consider when analyzing the potential establishment of invasive non-native species. Generally, the more roads and access, the higher the likelihood of establishment of new invasive sites. Third, the existence of already identified invasive non-native species sites would increase the risk of further establishment. The proximity of current sites would increase the risk of establishment into newly-disturbed areas as the movement of propagules would increase. For these reasons, the

Plans listed in this group are estimated to have a potentially high effect on the establishment of invasive non-native species as compared to the moderate effect group.

Potential Spread of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential spread of existing invasive non-native species infestations for Alternative 2 are discussed below. After consideration and analysis of each Plan, the analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new miner-created temporary roads, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species.

- *No Effect plans:* There are 13 Plans that pose no effect from the potential spread of invasive non-native species. These plans are Altona, Belvedear, Bunch Bucket, City Limits, Lucky Strike Placer/Mill, Olive Tone, Royal White Group, Sunshine/McWillis, Ruby Group, Yellow Gold, Yellow Jacket, Muffin, and L&H. These sites all have no invasive non-native species on the site or within the ¼ mile buffer.

  The potential effect from the spread of existing invasive non-native infestations within these activity areas is a zero under Alternative 2 because there are no current existing infestations within the area.

- *Moderate Effect Plans:* There are 11 Plans that pose a moderate effect to the potential establishment of invasive non-native species. These plans are Tetra Group Lode/Mill, Eddy Shipman, Blue sky/Bullrun, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful 1. These sites all have infestations of invasive non-native species within the site or within the ¼ mile buffer, have no proposed new miner-created temporary access roads, and are proposing smaller scale ground disturbance as measure in cubic yards/day. The Plans in this group propose to process less than 5 cubic yards/day.

  The potential effect from the spread of existing invasive non-native plants within the project area is estimated to be a moderate effect under Alternative 2. Without any mitigations or general requirements under this alternative, the greatest risk for the spread of invasive non-native species is through the creation of bare ground and movement of propagules on heavy equipment used for the mining activity. However, the location of these infestations, the use of existing access roads, and the smaller scale of disturbance proposed (< 5 cubic yards/day) would keep the effect of spread from being high.

- *High Effect Plans:* There are 4 plans of operation that pose a high effect to the potential spread of invasive non-native species. These plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek. These sites all have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer, have proposed development of new miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process more than 20 cubic yards/day.

  The potential effect from the spread of invasive non-native species under Alternative 2 for the 5 plans of operation mentioned above is high. The high effect conclusion was reached due to multiple factors. First, all of these plans are proposing to have larger scale ground disturbance than the other plans in this project. More ground disturbance would allow more opportunity

for the spread of existing infestations of invasive non-native species. Second, the plans in this group are proposing the use and development of new miner-created temporary access roads that have not previously existed. Roadways and vehicle travel are one of the key factors that lead to increased risk of spread of invasive infestations. Generally, the more roads, access, and use equates to higher likelihood of increased spread of existing invasive sites. Third, the existence of high priority invasives would increase the risk of spread. The higher priority invasives generally have a much higher likelihood of spread. This increase in spread rate is due to higher fecundity and vegetative reproduction rates. The proximity of current sites would increase the risk of spread into newly-disturbed areas. For these reasons, the Plans listed in this group are estimated to have a potentially high effect on the establishment of invasive non-native species as compared to the moderate effect group.

Cumulative Effects of Proposed Mining Activities in Alternative 2

This section will examine the cumulative effects on the potential establishment of non-native plants as a result of proposed activities. For a specific description of other activities within the analysis area (Granite Creek Watershed), see Table 3-47 below. The information in Table 3-47 is followed by a more in-depth description of the cumulative effects within the Granite Mining analysis area. Activities, past, present, and reasonably foreseeable future, may present increased risks for non-native plant establishment within the project area. These activities have influenced vegetation and habitat throughout the project area and have created favorable situations for non-native plants to proliferate.

Table 3-47: Cumulative effects for the potential establishment of invasive non-native species within the Granite Mining Analysis Area.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Bullrun Culverts, Blue Sky Mine Culvert, 10 cent culverts, Clear Creek road realignment, and Olive Creek road reconstruction	Increase in propagule pressure do to increased access and movement of heavy equipment.	Yes	Yes	Moderate	This project will increase the use of heavy equipment and create some small areas of new ground disturbance. The use of common mitigations (i.e. avoid known infestations, clean equipment prior to use on NFS lands) for the project will keep the effect intensity down to a moderate rating.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Notice Level Mining (including suction dredging)	Increase in propagule pressure and bare ground	Yes	Yes	Low	The threat, however low, exists for the introduction of invasive plants through the movement of seeds on individual users. Seeds attached to tools, clothes or equipment could be moved to novel habitats.
Dispersed Recreation	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.
Prescribed Fire and Fuels Reduction (Granite WUI and 10 Cent Fuels)	Increase in disturbance and short-term reduction in competition	Yes	Yes	Moderate	Prescribed burning has the potential to increase disturbance, thus favoring invasive non-native plants. The short-term reduction in fuels may also reduce competition of native plants allowing the spread of the non-native plants. The burning could however, reduce the cover of the invasive plants already in place and retard seed set, and in conjunction with ongoing treatment, allow native plants to establish.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Large Fires and Wildfire Suppression	Large scale disturbance and introduction of seeds and other plant material	Yes	Yes	High	The extreme size and temperatures of wildfire can create optimal locations for invasive plant establishment. The removal of native vegetation coupled with the speed of movement of non-native plants creates ideal invasion conditions. Introduction of weedy material is also a risk during suppression operations due to the movement of equipment, engines, aircraft, etc.
Invasive Species Management	Prevention or reduction in introduction and spread of noxious weeds.	Yes	Yes	Moderate (Positive) .	This activity should have a positive effect on the spread and establishment of invasive species by reducing the current extent of sites already found in the project area, and by minimizing the opportunity for new sites and species to establish
Developed Recreation (incl. Campgrounds, trailheads, rentals)	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Private Land activities (incl. Cabins, Residences, Timber harvest)	Ground disturbance or transportation of non-native plant material	Yes	Yes	Moderate	Activities on private ground have the potential to increase disturbance thus favoring invasive non-native plants. The establishment of invasive non-native plants on private ground could then increase the risk of movement and establishment within the project area. The unregulated nature of many private land activities increases the potential intensity of this effect.

The above activities, as outlined in the table, coupled with specific project activities can create situations for increased risk of introduction of non-native plant material. Ongoing treatments of non-native species help to mitigate the risks posed by management activities. Treatment continues on an annual basis within previously inventoried invasive sites.

Wildfire, combined with project activities, has the greatest chance for cumulative effects on non-native plants within the Granite Mining project area, but predicting wildfire occurrence is difficult. Large scale and intense wildfire disturbance would create ideal areas for the introduction and spread of non-native plants. With increasing numbers of wildfires the numbers of non-native species could increase (Merriam, et al., 2006), with the largest increases found in those areas with pre-existing non-native plant populations.

Of the activities with predictable timetables, roads and fuels treatments have the highest possibility of cumulative effects within the project area. Roads are a vector of weed spread and transport, thus unregulated road use, use of miner-created temporary roads, and use of closed Forest Service roads increases the risk. Travel management decisions (expected in the future on the Wallowa-Whitman National Forest) should reduce this risk by ending unregulated road use and cross-country vehicle traffic. Fuels treatments have the potential to increase disturbance, thus favoring invasive non-native plants. The short-term reduction in fuels may also reduce competition of native plants allowing the spread of the non-native plants.

The Plans as proposed under Alternative 2 however, do not comply with all management direction. Specifically, the alternative would not meet the direction as outlined in the WWNF and Umatilla Forest Plans as amended by the Region 6 Invasive Plant Program ROD. Without complying with the regional standards (from above #1, 2, 3, 7, 8, and 13), this alternative would not be compliant with approved management direction.

Alternative 3

Direct and Indirect Effects of Proposed Mining Activities

Unlike Alternative 2, under this alternative, additional Forest Service BMPs would be added to the Plans of Operations for protection of water resources, fisheries, soils and other resources. These BMPs include: Forest Service Plan-specific RPMs (Appendix 11) and General Requirements (Appendix 2).

Potential Establishment of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential establishment of invasive non-native species for Alternative 3 are discussed below. The effects when combined with certain General Requirements and mitigations are less impactful under Alternative 3 than Alternative 2. Specific effects are discussed below, but generally each Plan, when coupled with the General Requirements and mitigations, would have one entire effect level less than that outlined under Alternative 2(i.e. from Moderate to Low or Low to No effect). After consideration and analysis of each Plan, this analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new road construction, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species.

- *Low Effect Plans:* There are 24 Plans that pose a low effect for the potential establishment of invasive non-native species under Alternative 3. These plans are Altona, Belvedear, Bunch Bucket, City Limits, Lucky Strike Placer/Mill, Olive Tone, Royal White Group, Sunshine/McWillis, Ruby Group, Yellow Gold, Yellow Jacket, Tetra Group Lode/Mill, L&H, Muffin, Eddy Shipman, Blue Sky/Bull Run, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful. These sites were identified as moderate effect Plans under Alternative 2. These sites all have either no invasive non-native species within the ¼ mile buffer or have low-priority low-risk species. Each of the 24 above Plans are also proposing relatively little annual ground disturbance. The amount of ground disturbance on these claims would be less than 5 cubic yards/day of operation.

  The potential effect of establishment of new invasive non-native plants within previously un-infested areas is estimated to be low under Alternative 3. With mitigations and General Requirements under this alternative, the greatest risk would be the establishment through introduction and movement of propagules on heavy equipment used for the mining activity. General requirement IS2 would mitigate this effect by requiring the pre-cleaning of all equipment used outside of the road prism. Further, all soil left stockpiled and any areas replanted must follow general requirements IS6, R7, and R12. These requirements would require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover those piles with mulch, which would reduce the growth and establishment of invasive non-native species. Any seeding conducted must use certified weed-free seed to ensure that no establishment of invasives occurs from seeding activities during reclamation operations. The General Requirements, the low-priority low-risk species present, the location of these infestations, and the use of existing temporary mine access roads would keep the potential effect of establishment low for these Plans.

- *Moderate Effect Plans:* There are 4 plans of operation that pose a moderate effect for the potential establishment of invasive non-native species under Alternative 3. These plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek, and were identified as high effect Plans under Alternative 2. These sites have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer, have proposed new

miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process more than 20 cubic yards/day.

The effect for the establishment of invasive non-native species under Alternative 3 for the 5 Plans mentioned above is moderate. The moderate effect conclusion was reached due to multiple factors. First, all of these Plans are proposing to have larger scale ground disturbance than the other Plans in this project. More ground disturbance would allow more opportunity for establishment of invasive non-native species. Second, the Plans in this group are proposing the use and development of new temporary miner-created access roads that have not previously existed. Roadways and vehicle travel are one of the key factors to consider when analyzing the potential establishment. Generally, the more roads and access, the higher the likelihood of establishment of new invasive sites. Third, the existence of already identified invasive non-native species sites increases the risk of further establishment. General Requirement IS2 would mitigate this effect by requiring the pre-cleaning of all equipment used outside of the road prism. Further, all soil left stockpiled and any areas replanted must follow General Requirements IS6, R7 and R12. These requirements require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover these piles with mulch, which would reduce the potential growth and establishment of invasive non-native species. Any seeding conducted must use certified weed-free seed to ensure that no establishment of invasives occur from seeding during reclamation operations. The General Requirements, the low-priority low-risk species present, the location of these infestations, and the use of existing temporary mine access roads, would reduce the effect of establishment from high (under Alternative 2) to moderate for these Plans.

Potential Spread of Invasive Non-native Species

The direct and indirect effects in terms of magnitude, extent, duration, direction, and speed on the potential spread of invasive non-native species for Alternative 3 are discussed below. The effects, when combined with certain General Requirements and mitigations, are less impactful under Alternative 3 than Alternative 2. Specific effects are discussed below, but generally each Plan, when coupled with the General Requirements and mitigations, would have one entire effect level less than that outlined under Alternative 2 (i.e. from Moderate to Low or Low to No effect). After consideration and analysis of each Plan, this analysis will group similar operations together. This grouping is based on expected effects and impacts to the invasive non-native species, new miner-created temporary access roads, size of annual disturbance (identified as cubic yards removed per day), type and size of invasive species within the site, and proximity to other invasive non-native species. Any Plans identified as “no effect” for the spread of invasive species under Alternative 2 will not be discussed under Alternative 3 because the effects are the same under both alternatives.

- *Low Effect Plans:* There are 11 plans of operation that pose a low effect to the potential spread of invasive non-native species. These plans are Tetra Group Lode/Mill, Eddy Shipman, Blue sky/Bullrun, Blue Smoke, Grubsteak, Hopeful 2&3, Little Cross 1, Make It, Old Eric 1&2, Rose Bud 1-4, and Hopeful 1. These sites all have infestations of invasive non-native species within the site or within the ¼ mile buffer, have no proposed miner-created temporary access roads, and are proposing smaller scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process less than 5 cubic yards/day.

  The potential effect of spread of existing invasive non-native plants within the project area is estimated to be low under Alternative 3. With mitigations and General Requirements included in Alternative 3, the greatest risk to the spread of invasive non-native species is through the creation of bare ground and movement of propagules on heavy equipment used

for the mining activity. General Requirement IS2 and IS5 would mitigate this effect by requiring the cleaning of all equipment prior to entry to NFS lands and the avoidance of pre-existing infestations on the mining sites while invasive non-native plants are in flower or seed. Further, all soil left stockpiled and any areas replanted must follow General Requirements IS6, R7 and R12. These requirements require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover these piles with mulch, which would reduce the potential growth and spread of invasive non-native species. The General Requirements, the low-priority low-risk species present, the location of these infestations, and the use of existing temporary mine access roads, would keep the effect of establishment low on all of these Plans.

- *Moderate Effect Plans:* There are 4 Plans that pose a moderate effect for the potential spread of invasive non-native species. These Plans are Tetra Alpha Placer, East Ten Cent, Troy D, and Lightning Creek. These sites all have larger infestations of higher priority invasive non-native species within the site and within the ¼ mile buffer surrounding each site, have proposed development of new miner-created temporary access roads, and are proposing larger scale ground disturbance as measured in cubic yards/day. The Plans in this group propose to process more than 20 cubic yards/day.

  The effect for spread of invasive non-native species under Alternative 3 for the 5 Plans mentioned above is moderate. The moderate effect conclusion was reached due to the effect from the General Requirements and mitigations included in Alternative 3, on multiple factors. First, all of these Plans are proposing to have larger scale ground disturbance than the other Plans in this project. More ground disturbance would allow more opportunity for the spread of existing infestations of invasive non-native species. Second, the Plans in this group are proposing the use and development of new temporary mine access roads that have not previously existed. Roadways and vehicle travel are one of the key factors that lead to increased risk of spread of invasive infestations. Generally, the more roads, access, and use equates to a higher likelihood of increased spread of existing invasive sites. Third, the existence of high priority invasives would increase the risk of spread. The higher priority invasives generally have a much higher likelihood of spread. This increase in spread rate is due to higher fecundity and vegetative reproduction rates. The proximity of current sites would increase the risk of spread into newly disturbed areas. However, General Requirement IS2 and IS5 would mitigate this effect by requiring the cleaning of all equipment prior to entry into NFS lands and that all ground disturbing activities avoid the known invasive non-native infestations while in flower or seed to reduce the spread of these sites. Further, all soil left stockpiled and any areas replanted must follow General Requirements IS6, R7 and R12. These requirements require the miner to mechanically treat invasive non-native species as they occur on stockpiled soil and cover these piles with mulch that should reduce the growth and establishment of invasive non-native species. The General Requirements, the higher priority species present, the location of these infestations, and the use of existing temporary mine access roads would reduce the effect of establishment from high (under Alternative 2) to moderate for all of these Plans.

Cumulative Effects of Proposed Mining Activities in Alternative 3

This section will examine the cumulative effects on the potential establishment of non-native plants as a result of proposed activities. For a specific description of other activities within the analysis area, see Table 3-48 below. The information in Table 3-48 is followed by a more in-depth description of the cumulative effects within the Granite Mining project area. Activities, past, present, and reasonably

foreseeable future, may present increased risks to non-native plant establishment within the project area. These activities have influenced vegetation and habitat throughout the project area and have created favorable situations for non-native plants to proliferate.

Table 3-48: Cumulative effects for the potential establishment of invasive non-native species within the Granite Mining Analysis Area.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Bullrun Culverts, Blue Sky Mine Culvert, 10 cent culverts, Clear Creek road realignment, and Olive Creek Road reconstruction	Increase in propagule pressure do to increased access and movement of heavy equipment.	Yes	Yes	Low	This project will increase the use of heavy equipment and create some small areas of new ground disturbance. The use of common mitigations (i.e. avoid known infestations, clean equipment prior to use on NFS lands) for the project will keep the effect intensity down to a moderate rating. General Requirement IS2, which requires the cleaning of all equipment prior to movement into the project area, would reduce this potential effect when compared to Alternative 2.
Notice Level Mining (including suction dredging)	Increase in propagule pressure and bare ground	Yes	Yes	Low	The threat, however low, exists for the introduction of invasive plants through the movement of seeds on individual users. Seeds attached to tools, clothes or equipment could be moved to novel habitats.
Dispersed Recreation	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Prescribed Fire and Fuels Reduction (Granite WUI and 10 Cent Fuels)	Increase in disturbance and short-term reduction in competition	Yes	Yes	Moderate	Prescribed burning has the potential to increase disturbance thus favoring invasive non-native plants. The short-term reduction in fuels may also reduce competition of native plants allowing the spread of the non-native plants. The burning could however, reduce the cover of the invasive plants already in place and retard seed set, and in conjunction with ongoing treatment allow native plants to establish.
Large Fires and Wildfire Suppression	Large scale disturbance and introduction of seeds and other plant material	Yes	Yes	High	The extreme size and temperatures of wildfire can create optimal locations for invasive plant establishment. The removal of native vegetation, coupled with the speed of movement of non-native plants, creates ideal invasion conditions. Introduction of weedy material is also a risk during suppression operations due to the movement of equipment, engines, aircraft, etc.
Developed Recreation (incl. Campgrounds, trailheads, rentals)	Movement and introduction of invasive plant material	Yes	Yes	Low	Minimal risks involved with dispersed camping due to the movement and spread of invasive plant material by people and equipment. This risk is further minimized by a focused treatment of invasive plants in and around camping and gathering areas.

Project	Potential Effects	Overlap in:		Effect Intensity	Rationale
		Time	Space		
Private Land activities (incl. Cabins, Residences, Timber harvest)	Ground disturbance or transportation of non-native plant material	Yes	Yes	Moderate	Activities on private ground have the potential to increase disturbance, thus favoring invasive non-native plants. The establishment of invasive non-native plants on private ground could then increase the risk of movement and establishment within the project area. The unregulated nature of many private land activities increases the potential intensity of this effect.

The above activities, as outlined in the table above, coupled with specific project activities could create situations for increased risk of introduction of non-native plant material. Ongoing treatments of non-native species help to mitigate the risks posed by management activities. Treatment continues on an annual basis within previously inventoried invasive sites.

Wildfire combined with project activities has the greatest chance for cumulative effects on non-native plants within the Granite Mining project area, but predicting wildfire occurrence is difficult. Large scale and intense wildfire disturbance would create ideal areas for the introduction and spread of non-native plants. With increasing numbers of wildfires the numbers of non-native species could increase (Merriam, et al., 2006), with the largest increases found in those areas with pre-existing non-native plant populations.

Of the activities with predictable timetables roads and fuels treatments have the highest possibility of cumulative effects within the project area. Roads are a vector of weed spread and transport, thus unregulated road use, use of miner-created temporary roads, and use of Forest Service closed roads increases the risk. Travel management decisions (expected in the future on the Wallowa-Whitman National Forest) should reduce this risk by ending unregulated road use and cross-country vehicle traffic.

The Plans as proposed under Alternative 3 do comply with all management direction by meeting the requirements of the WWNF and UNF Forest Plans and all amendments, including the standards and guidelines found in the Region 6 Invasive Plant ROD (USDA 2005).

Summary of Effects Analysis

The effects found in the above analysis can manifest in a variety of ways depending on the alternative. Each alternative has its own risks and effects that would be expected from project activities.

As stated earlier, Alternative 1 would have no new effects due to project activities within the project boundary. However, continuing risks would exist from other types of activities occurring in the analysis area, and invasive non-native species would continue to spread and establish at the 4-6 percent mentioned previously.

Although risks are present with or without project activities, the danger of invasive species spread due to project activities under Alternatives 2 and 3 would increase when compared to Alternative 1. With implementation of project design features to reduce and control the introduction and spread of non-native species, the impacts that do exist would be minimized, and effects under Alternative 3 would be less than Alternative 2. The lack of specific mitigations and required standards under Alternative 2 would increase the chances of new introductions, spread, and establishment of invasive non-native plants, spread and establishment rates would be expected at or above the natural predicted rate. Even with the presence of ongoing treatments, the rate of spread and establishment could be higher than 8-12 percent per year. With implementation of project design features to reduce and control the introduction and spread of non-native species, the impacts that do exist would be minimized. Specific mitigations and required standards included in Alternative 3 would reduce the chances of new introductions, spread, and establishment of invasive non-native plants, and spread and establishment rates would be expected at the upper end of the natural level or about 6-8 percent (Table 3-49).

Table 3-49: Summary of estimated effects under all alternatives in the Granite Mining Projects on invasive non-native species.

Est. Effect*	No-Action	Alt. 2	Alt. 3
Establishment Potential	-	--	--
Spread Potential	-	--	--

* Estimated effect is based on increases (from pre-project levels) in establishment and spread of invasive non-native species due to project level activities. More -'s equate to higher risk.

Climate Change (Direct/Indirect and Cumulative Effects)

The potential effects of climate change on invasive species are unclear. Studies have suggested that climate change could favor invasion by non-native plants, while others have found that some species may actually be reduced as a result of potential climate change effects (Bradley, et. al, 2009; Hellman, et. al, 2008). It is safe to assume however, that invasions by non-native species would still be a concern.

With the unknown extent of climate change and the potential effect on non-native species, it is difficult to analyze the effects of climate change on invasive species in the Granite mining project. However, due to the mitigations and General Requirements under Alternative 3, it seems un-likely that the activities of this project, when coupled with climate change, would increase the risk of invasion of the Granite Mining project area beyond that outlined under Alternative 3. Because the mitigations and General Requirements are not included in Alternative 2, there would be a slight increase in the potential for any increased impact on native species from climate change.

Compliance with the Forest Plan and Other Direction

The Forest Plan (as amended by the 2005 Region 6 ROD, amendment #RF5) provides direction for the control of noxious weeds and other competing vegetation where such activities are not precluded by management area direction. The goals focus on maintaining or enhancing ecosystem function to provide for long-term integrity and productivity of biological communities, treatment of priority infestations, and monitoring the effects of all activities to reduce the impacts of non-native plants. The site specific treatment requirements are further amended by the Wallowa-Whitman National Forest Invasive Plant Treatment Program EIS and Umatilla National Forest Invasive Plant Treatment Program EIS (USDA 2010). The Granite Mining Project under Alternative 3 is consistent with these goals, standards, and guidelines through adherence to the EIS and the Forest Plan's. However, Alternative 2, which does not require the adherence to applicable standards would not meet the requirements set out in the WWNF and Umatilla Forest Plans, and therefore does not meet compliance of management direction.

Botany

Introduction

Botanical resources refer to those vascular or non-vascular taxa that have been assigned special status as either Threatened or Endangered via federal Endangered Species Act (ESA) designation or as Sensitive by the Region 6 Regional Forester.

This analysis is also the Biological Evaluation (BE), which analyzes effects or impacts from the action alternatives to plants listed as federally Threatened or Endangered (TE), or proposed for listing, and Forest Service Sensitive (S) plant species. The plants considered in this analysis are listed on the RFSSSL (Regional Forester's Special Status Species List) as updated in December 2011 (http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/). This list includes all TES plant species in Region 6.

This analysis is the means of conducting the review and documenting the findings (FSM 2672.4). The objectives of this analysis are to:

1) ensure that Forest Service actions do not contribute to the loss of viability of any native or desired non-native plant species at the individual National Forest level or contribute to trends toward Federal listing of any species;
2) comply with the requirements of the Endangered Species Act that actions of Federal agencies not jeopardize or adversely modify critical habitat of Federally listed species;
3) provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process
4) demonstrate compliance with the Umatilla and Wallowa-Whitman National Forest Plans, and other laws, regulations and policies relative to protection of TES plant species.

Scale of Analysis

The analysis area for this resource was limited to the proposed project areas as described in the Plan of Operations as submitted to the Forest Service for the Granite Creek Watershed Mining EIS, hereafter referred to as the Granite Mining EIS and the project area.

Summary of Determinations

Federally Listed Plant Species

Within the confines of the various mining areas as described in the proposed Plans of Operations covered under the Granite Mining EIS there are no known populations of any federally threatened or endangered plant species listed under the auspices of the Endangered Species Act (ESA).

Silene spaldingii – Spalding's catchfly – is Federally-Listed as Threatened under the Endangered Species Act and is known to occur on the Umatilla and Wallowa-Whitman National Forests. The action alternatives would have **No Effect** on *Silene spaldingii*. *Silene spaldingii* occurs primarily in open

grasslands on deep loess-derived Palousian soils. All known occurrences of the species are many miles distant from the proposed activities. There is no suitable habitat within any of the proposed activity areas for *Silene spaldingii*.

Mirabilis macfarlanei – Macfarlane's four-o-clock – is also Federally-Listed as Threatened under the Endangered Species Act. The species is known to occur on the Wallowa-Whitman National Forest in the Hells Canyon National Recreation Area in Wallowa County. It also occurs on the Cottonwood District of Bureau of Land Management land holdings in Idaho County, Idaho. The action alternatives would have **No Effect** on *Mirabilis macfarlanei*. *Mirabilis macfarlanei* is strictly confined to lower elevation reaches of the Hells Canyon area and is not to be expected within the geographic area as all known occurrences of the species are many miles distant from the proposed actions. The proposed activities would comply with present Federal regulations pertaining to the management of Threatened, Endangered, and Sensitive plant species.

Sensitive plant species

No plant species presently listed by the Region 6 Forester as sensitive were found during the course of conducting comprehensive surveys of the mining claims covered by this EIS. Therefore, the action alternatives would have **No Impact** on any listed sensitive plants. However, see the discussion below regarding the very rare, but not presently listed, spider biscuitroot – *Lomatium tarantuloides*.

A list of R6 sensitive, and strategic, plant species that were thought to have potential for occurrence at the proposed mining sites is presented in Table 3-52 later in this section.

Table 3-50: Effects Determinations Spectrum (Sensitive Species)

NI	No Impact
MIIH	May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
WIFV	Will Impact Habitat or Individuals with a Consequence that the Action May Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species
BI	Beneficial Impact

Existing Conditions

In preparing this analysis, botanical surveys conducted in the project area were reviewed in the Natural Resource Inventory System (NRIS) Threatened Endangered Sensitive Species/Invasive Species (TESP/IS) database. In addition, a pre-field review of potential special status plants was assembled as a guidance tool for directing field efforts.

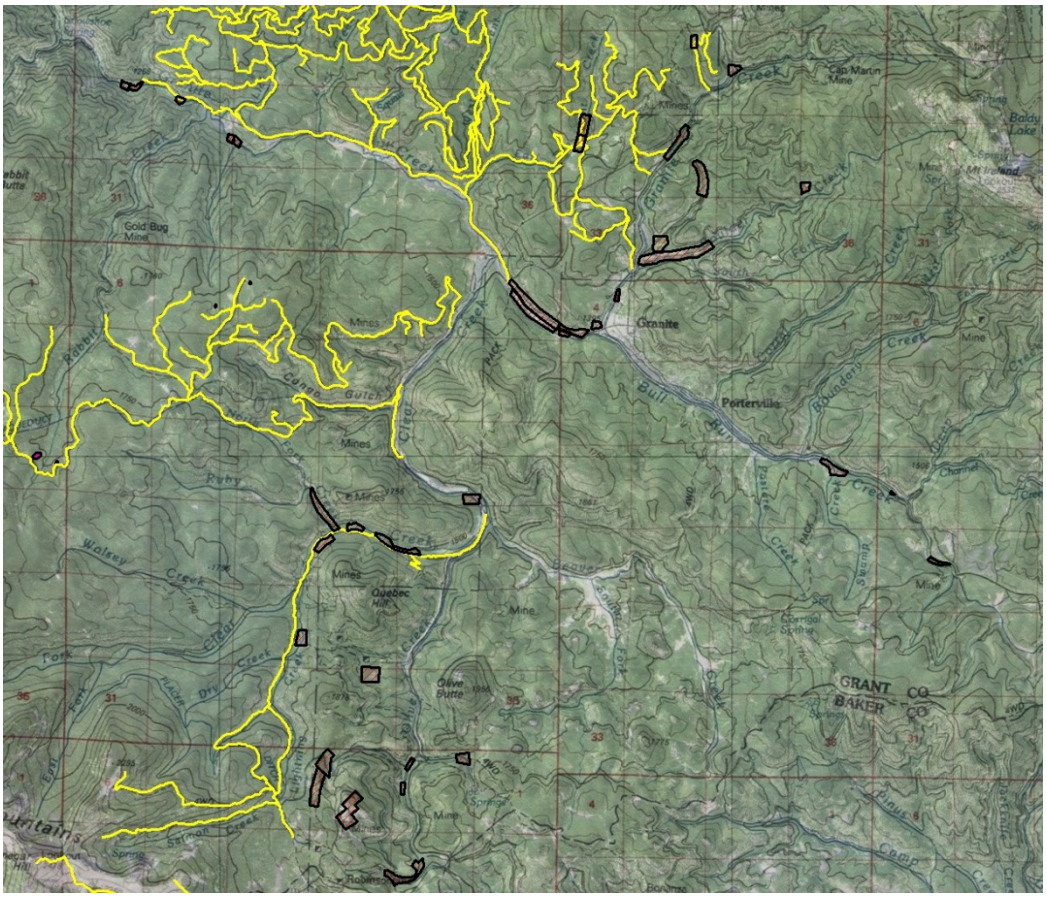


Figure 1: Granite Mining EIS Claim Locations.

Table 3-51: Granite Mining EIS Project Names / National Forest / Survey / Sensitive Species Synopsis

Project Name/Forest	Botanical Survey Type	RFSSSL Species & Species of Interest Presence/Absence
Altona WWNF	not visited	none
Belvedear Group WWNF	complete species	none
Blue Sky/Bull Run WWNF	complete species	none
Blue Smoke	not visited	----
Bunch Bucket UMA	not visited	-----
City Limits WWNF	not visited	-----
East Ten Cent UMA	complete species	none
Eddy Shipman UMA & WWNF	not visited	-----
Grubsteak UMA	complete species	none
Hopeful 1	complete species	none

Project Name/Forest	Botanical Survey Type	RFSSSL Species & Species of Interest Presence/Absence
UMA		
Hopeful 2&3 UMA	complete species	none
L&H	complete species	none
Lightning Creek UMA	complete species	none
Little Cross 1 WWNF	not visited	-----
Lucky Strike UMA &WWNF	complete species	none
M&L WWNF	not visited	-----
Make it WWNF	not visited	-----
Muffin WWNF	targeted	none
Old Eric 1&2 UMA	not visited	-----
Olive Tone WWNF	not visited	-----
Rose Bud 1-4 UMA	complete species	none
Royal White Group WWNF	complete species	*Lomatium tarantuloides*
Ruby Group UMA	complete species	none
Sunshine Group WWNF	complete species	none
Tetra Group WWNF	complete species	none
Troy D WWNF	targeted	-----
Yellow Gold WWNF	complete species	none
Yellow Jacket WWNF	not visited	-----

UMA = Umatilla N.F. / WWNF = Wallowa-Whitman N.F.
Targeted = additional survey conducted June 20, 2013.

Table 3-52: Review of Sensitive Sensitive Species With Potential To Occur On Granite Mining EIS Sites.

Species	Habitat	Status	Likelihood of Occurrence	Populations Found / Number
Botrychium ascendens	moist areas	sensitive	low	none
Botrychium crenulatum	moist areas	sensitive	moderate	none
Botrychium hesperium	moist areas	sensitive	low	none

Species	Habitat	Status	Likelihood of Occurrence	Populations Found / Number
Botrychium lineare	moist areas	sensitive	low	none
Botrychium lunaria	moist areas	sensitive	low	none
Botrychium montanum	moist areas with spruce	sensitive	moderate	none
Botrychium paradoxum	moist areas	sensitive	low	none
Botrychium pedunculosum	moist areas	sensitive	low	none
Carex cordillerana	moist areas / riparian	sensitive	moderate	none
Carex lasiocarpa	seasonally moist meadows	sensitive	low	none
Carex saxatilis	fens	sensitive	low	none
Gentianella propinqua	seasonally moist meadows	will be sensitive on next R6 list cycle	low	none
Listera borealis	serpentine fens	sensitive	moderate	none
Lomatium erythrocarpum	rocky south exposures at higher elevations	sensitive	low	none
Lomatium tarantuloides	gravelly serpentine substrates	sensitive on future R6 list cycle	moderate	yes – 1
Phacelia minutissima	seasonally moist / bare soil	sensitive	low	none
Swertia perennis	moist forested sites	strategic	moderate	none
Utricularia minor	still fresh water ponds	sensitive	moderate	none

Botanical Surveys

Botanical surveys for RFSSSL vascular and non-vascular plant species were conducted in support of the Granite Mining EIS on the 27th and 29th of July, 2010, and again in 2011 on the 9th and 10th of August, 2011. An additional targeted survey was conducted by Forest Service botanists on the 20th of June 2013. This later additional survey was specifically conducted to address the possible occurrence of the very rare

biscuitroot species *Lomatium tarantuloides* within the footprint of the proposed Plan of Operations for the Royal White lode mining claim.

A representative subset of the full suite of sites in the proposed action was visited. For most of the mining claim sites visited a running tally of all the vascular plant species encountered was kept (see Table 3-51 above). A comprehensive list of non-vascular species and lichens was not kept, as surveys were specifically only of a targeted nature for sensitive taxa in these groups.

Attention was also paid to the possible presence of populations of First Foods. This suite of plant species are of cultural importance to the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). Traditional use plants are also important to the Confederated Tribes of Warm Springs (CTWS) and Nez Perce Tribe. Efforts to address their presence and population status on Forest Service lands on a broad scale are ongoing. An evaluation of their presence on the proposed mining claim sites has been submitted as a separate document to the respective forest cultural resource programs.

Several of the visited mining claim sites were, upon evaluation, considered to be so heavily impacted by past mining activities, including historical dredge tailings, that surveys were quickly conducted with no attempt to search the area for common species not encountered previously. Table 3-49 makes the distinction between two types of survey evaluations as either ‘complete species’ or ‘targeted’.

The survey methodology employed was the standard ‘intuitively guided technique’ wherein all habitats and settings in a given area are investigated so as to provide as complete a biodiversity assessment of an area as possible within the allotted time. Surveys were also conducted at phenologically appropriate times during the field season so as to maximize the probability of encountering the greatest number of species possible.

The large majority of the mining claim sites were, as was expected, were disturbed by previous mining activities. In all cases the potential for discovery of hitherto unknown populations of RFSSSL species was considered to be fairly low. Several of the mining claim sites – 11 in total; see Table 3-49 – were not visited at all based upon prior knowledge of the depauperate condition of existing vegetation site conditions. However, it was also recognized that a few of the mining claims included relatively intact wetland sites. Additionally, a few of the claims are situated on geologic substrates of ultramafic affinity. Rocks of this type – serpentine and peridotite in particular – are well-known worldwide to often harbor unusual, and frequently very rare, narrow endemic plant species. In this regard claims that included these features were given particularly strong scrutiny.

Results

The surveys did not result in the discovery of any vascular plant, non-vascular plant or lichen species on the present iteration of the RFSSSL. As discussed below there is however one proposed site that is of botanical interest and deserves discussion accordingly – the Royal White Group claim.

Royal White Group

The Royal White Group site is a lode-mining operation that is approximately 10-acres in size. Mining activities are confined to underground excavations and associated activities near the active adit entrance. The claim is located in a large block of serpentine.

Surveys at the site in late July of 2011 resulted in the discovery of a small population of the then ‘strategic species’ Bolander’s bluegrass – *Poa bolanderi* at the west margin of the claimed area. This annual grass

species was recently added to the R6 strategic list. However, the species has since been recommended for delisting as of the last rare plant meeting (October 2012) of the Oregon Biodiversity Information Center (ORBIC). It is anticipated that this plant will not be of concern relative to the proposed plan of operations for the Royal White Group.

However, based upon habitat characteristics at the Royal White site, a second species of conservation concern – *Lomatium tarantuloides* – spider biscuitroot – was recognized as having significant potential of occurring on the site. The July surveys in 2011 were conducted too late in the field season to determine if the species was indeed present or not. A relatively nearby discovery of this as yet undescribed species in early July of 2011 suggested the likely presence of the plant at the Royal White site.

The rare plant species *Lomatium tarantuloides* was recently published (Darrach and Hinchliff 2014). This member of the carrot family (Apiaceae) is now known from several localities in the Greenhorn Mountains and is restricted to gently sloping gravelly serpentine substrates. The species is presently recognized as rare by the Oregon Natural Heritage Program (ORBIC), but will not be formally included on its published lists as a List 1 entity until the 2016 iteration of its tri-annual Rare Threatened and Endangered Species of Oregon. Formal listing of the species as sensitive on the RFSSSL will occur subsequent to the ORBIC listing.

On the 20th of June, 2013 Forest Service botanists revisited the Royal White group site and specifically assessed the area for the presence of *Lomatium tarantuloides*. The plant was found in great abundance on the edge and slightly into the project claim footprint (Figure 2). The population of plants is comprised of perhaps 2000 individuals in a dense contiguous patch on serpentine gravels that have , over time, apparently received persistent disturbance created by fossorial rodents – most probably *Thomomys talpoides*, the northern pocket gopher. As with some other *Lomatium* species (Darrach and Wagner 2011), it is surmised that this disturbance regime is a critical ecological element allowing *Lomatium tarantuloides* to persist on the landscape over time.

Protection Measures included in Alternative 3

1. To preclude the possibility of any severe damage (e.g. direct mechanical destruction of plants or soil compaction) to the population of *Lomatium tarantuloides* at the Royal White site by inadvertent forays into the area by mining equipment, the miner will not breach the area protected by fallen trees immediately adjacent to Forest Service Road 1042970 that transects the population. Prior to commencement of mining activities, the Forest Service will fall small trees or install another type of barrier around the area to be avoided and protected.

Effects Analysis

Direct Effects

Alternative 1 – No Action

The no action alternative would have no direct effect on rare plant resources because no Plans of Operations would be authorized for approval.

Alternative 2 –Proposed Action

The population of rare *Lomatium tarantuloides* located at the Royal White Group site (Figure 2) could be affected by mining activities. The proposed activities may lead to harming the viability of this population through such factors as soil compaction (e.g. vehicle traffic) or other incursions to the site that may be viewed as compromising the integrity of the population.

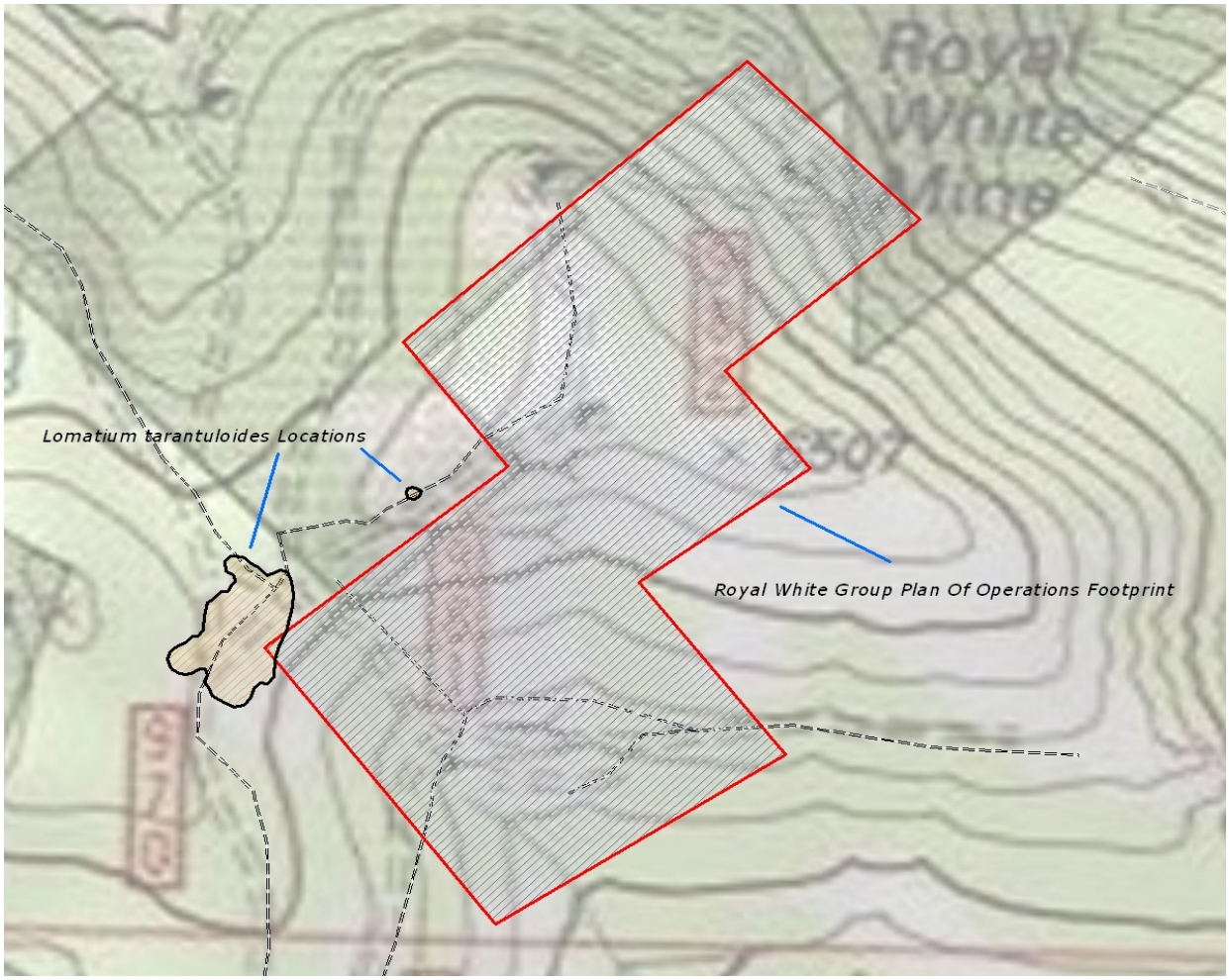
Alternative 3 – Proposed Action with Additional Forest Service Requirements

Under this alternative, Forest Service Requirements designed to protect and improve water quality, fish habitat, and surface and other resources would be incorporated into the Plans of Operations. The addition of Forest Service protection measures and requirements in this alternative, including the site-specific protection measure for *Lomatium tarantuloides* at the Royal White Group site, would prevent impacts to the single rare plant population at the Royal White Group lode claim.

Indirect Effects

Indirect effects to rare plant resources from Granite mining activities are addressed together in this section due to the similarity of effects. Only the Royal White Group mining claim harbors rare plants – *Lomatium tarantuloides*. The primary indirect effect to be considered is the impact invasive plant species may have on this population. At the present time there are not any significant invasive plant issues noted in the immediate area of this population. However, the apparent perpetual state of disturbance that characterizes the site predisposes the location to colonization by weedy invasive taxa. Mining activities may act as a vector to introduce non-native weeds to the locale. Fortunately, the serpentine substrate that characterizes the area is typically refractory to invasion by non-native species. Also, measures to prevent the potential invasion and spread of invasive species are incorporated into this alternative (Chapter 2 – Monitoring, Appendix 2 - General Requirements, and Appendix 11 – Resource Protection Measures).

Figure2: Location of Lomatium tarantuloides population adjacent to and overlapping the Royal White Group Plan of Operations Footprint



Cumulative Effects under Alternative 2 and 3

The spatial scale of analysis for cumulative effects to TES plant species is the immediate Granite EIS area in the Granite Creek watershed. The temporal scale begins with the first European settlers in the area in the 1800's and ends approximately 30 years into the future or 2043. Past, present, and reasonably foreseeable future events in the Granite EIS can be expressed primarily as a conglomeration of 6 factors:

1. Historical ungulate grazing by domestic animals – both sheep and cattle

   Domestic livestock grazing in the area is largely germane to the discussion as an historical legacy. Of particular note sheep grazing in the area was a major source of disturbance to vegetation in the past. Large sheep bands nearly completely denuded herbaceous cover from many areas in nearby subalpine settings. Ecological disclimax plant communities reflecting this intense period of unmanaged grazing persist to the present and can be expected to persist well into the future. It is likely that local rare plant resources were severely impacted. No grazing of domestic livestock

currently occurs within the Granite Creek Watershed, therefore, there would be no cumulative effects from domestic grazing going forward.

2. Ongoing soil and plant disturbances associated with the resident native ungulate populations

   Native ungulate effects upon the landscape in and immediately adjacent to the area addressed in the Granite EIS are interpreted to have incurred minimal impacts. This statement pertains to the past, at the present time, and, as inferred, into the future timeline. This is not to say that native ungulates have not, are not, and will not have impacts. It is only meant to state that clear herbivory pressures are not apparent in influencing the trajectory of plant communities

3. Ongoing soil disturbances by fossorial rodents – particularly the northern pocket gopher *Thomomys talpoides*.

   Fossorial rodents acting as a significant agent of soil disturbance in the area appears to be quite prevalent at the present time. Northern pocket gophers burrowing under winter snowpack are clearly a significant disturbance factor at the *Lomatium tarantuloides* site at the Royal White Group claim. As discussed above, they very likely play an important role in allowing the plants to persist in significant numbers. Past and future levels of burrowing rodent activity in the area are indeterminant. However climate change influences, discussed further below, may play a major influential role in depressing populations.

4. Disturbances associated with fires and fire-fighting efforts.

   Fire as an agent of disturbance in the Granite EIS area is not well resolved. However it can be reasonably assumed that the historical fire regime in the area has been modified in the last 100 years as fire suppression has dominated management philosophy. Future fire effects to vegetation and rare plant resources are expected to become progressively more pronounced as recent climate modeling data largely indicate that future fire return intervals will be shorter and fire behavior may be more extreme.

5. Effects directly attributable to climate modification.

   In addition to expected significant departures in fire return intervals and fire behavior discussed above, climate changes are predicted to have a pronounced effect on depth and duration of snow pack at higher elevations. These snow pack changes are anticipated to deleteriously change the setting in which rare plant resources reside in the Granite EIS area. The very rare *Lomatium tarantuloides* – spider biscuitroot – appears to be dependent upon a persistent disturbance regime provided primarily by the fossorial rodent *Thomomys talpoides* – the northern pocket gopher. This rodent species is well known for being very active during the winter months under snowpack, and the species exerts significant herbivory pressure on various plant species in this setting (Ingles 1949; Litaor et al. 2008; Stuebe and Anderson 1985; Darrach and Wagner 2011).

   As impending predicted climate change becomes more pronounced with moderating winter temperatures and the associated expected reduced temporal presence of snow pack, it stands to reason that fossorial rodent populations may decline accordingly. The deleterious effects of the absence of a fossorial rodent disturbance regime on a population of a different recently described rare *Lomatium* species with similar ecological requirements to *Lomatium*

tarantuloides is probably predictive of an impending population decline to be expected for spider biscuitroot (Darrach and Wagner 2011).

Summary of Effects for Rare Plant Species from the Granite Mining EIS Alternatives

In summary, due to the direct, indirect, and cumulative effects from all the alternatives summarized in sections above for the one rare plant species – *Lomatium tarantuloides* - identified during the course of conducting on-the-ground botanical surveys the determination is‘MIIH - May Impact Individuals or Habitat, but Will Not Likely Contribute to a Trend Towards Federal Listing or Cause a Loss of Viability to the Population or Species ’.

Consistency with Federal Regulations (ESA) and Forest Plans

The Forest Plans for the Umatilla and Wallowa-Whitman National Forest (1990) include the goal, ‘Maintain or improve habitats for all threatened and endangered plant and animal species on the Forest, and manage habitats for all sensitive species to prevent their becoming threatened or endangered.’ Under the National Forest Management Act, the population viability boundary stops at the Forest Boundary. Alternative 3, with the Forest Service protection measure for *Lomatium tarantuloides*, is consistent with both existing ESA regulations and the 1990 Forest Plans.

Access/Transportation System

The Granite Creek Watershed Mining proposals would not add new Forest Service open roads to the watershed, and is therefore consistent with WWNF and UNF Forest Plan direction for access/transportation. A roads analysis conducted for this analysis can be found in the project file.

Affected Environment

Introduction

Mining Claim Access

Mining access is different from access needed or associated with other national forest uses. Federal regulations provide a mining miner reasonable access incident to their operations (refer to 36 CFR 228.12). As a part of this analysis, the access proposed for each operation was evaluated to determine which existing and proposed roads (Forest Service closed/decommissioned, and temporary miner-created), fords and bridges are reasonably incident to the operation, and to determine what BMPs, if any, are needed to approve or regulate construction, use, or maintenance of the roads, fords and bridges.

The following Table displays the access proposed under Alternatives 2 and 3.

Table 3-53: Closed and Temporary Access Roads Proposed for use by Miners

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
Altona	1042E1a	1042E1c	1042E1b	0.56	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042E1b	1042E1a	1042M1a	0.59	Native	Temporary -E	Y	Y	
	1042E1c	1305098	1042E1a	0.21	Native	Temporary -E	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1042M1a	1042E1b	Processing	0.05	Native	Temporary -P	Y	Y	Proposed
	1305098	1305092	1041E1c	0.20	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305099	1305080	1305092	0.30	Native	FS Closed	Y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
	1305092	1305099	1305098	0.03	Native	FS Closed	y	N	Condition is unusable and would require re-construction. Alternate road is available to access site.
Belvadear	1305-E2	1305080	Claim	0.15	Native	Temporary - E	Y	Y	
Blue Sky/Bull Run	7300-E4a	Co 24	7300-E4b	0.11	Native	Temporary -E	Y	Y	Existing Ford on bull run Access disperse campsite
	7300-E4b	7300-E4a	Processing	0.15	Native	Temporary -E	Y	Y	Existing Ford on Swamp Creek
	7300-E4c	7300-E4a	Site 2 Blue Sky	0.02	Tailings	Temporary -E	Y	Y	
	7300-M4a	7300-E4a	Site 3 Blue Sky	0.07	Native	Temporary -P	Y	Y	
	7300-M4b	Co 24	Site 2 Bull Run	0.07	Native	Temporary -P	Y	N	Proposed Temporary Bridge – In Alt 3, replaced with 7375-M1a because placement and removal of bridge would result in a discharge.

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
	7375-M1a	7375-000	Site 1 Bull Run	0.05	Native	Temporary -E	Y	Y	Alt 3-gate during use
	7375-M1b	7375-M1a	Site 2 Bull Run	0.20	Native	Temporary-P	N	Y	Alt 3 only. Instead of bridge on 7300-M4b.
Blue Smoke	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road,
Bunch Bucket	1310-E2a	1310000	Site 1	0.08	Aggregate	Temporary -E	Y	Y	Access dispersed campsite
	1310-E2b	Site1,2	Processing	0.09	Native	Temporary -E	Y	Y	
	1310-E2c	Proces-sing	Site 2	0.08	Native	Temporary -E	Y	Y	
City Limits	7300-E3a	7300000	Claim	0.11	Tailings	Temporary -E	Y	Y	
	7300-E3b	7300000	Claim	0.02	Tailings	Temporary -E	Y	Y	
East Ten Cent Creek	7350050	7350000	Claim	0.06	Aggregate	FS Closed	Y	Y	OHV Trail
	7350070	7350000	Claim	0.39	Aggregate	FS Closed	Y	Y	OHV Trail
	7350-E1a	7350070	Pond	0.12	Aggregate	Temporary -E	Y	Y	Miner Install new Gate
	7350-M1a	7350050	Shed	0.32	Native	Temporary -E	Y	Y	Miner Install new Gate
Eddy Shipman	7300590	7300000	7300-E1a	0.04	Native	FS Closed	Y	Y	Existing FS Gate
	7300680	7300000	7300-E1d	0.10	Native	FS Closed	Y	Y	Existing FS Barricade.
	7300-E1a	7300590	Cabin/Adit B	0.42	Native	Temporary -E	Y	Y	Old County Road
	7300-E1b	7300-E1a	7300-E1c	0.10	Native	Temporary -E	Y	Y	
	7300-E1d	7300680	Adit A	0.07	Native	Temporary -E	Y	Y	Existing ford, Granite Creek
Grubsteak	1300-M1a	Co 24	Dig Site	0.19	Native	Temporary -E	y	Y	Existing Miner's Bridge & Gate
Hopeful 1	1035-E2a	1035012	Cabin/Claim	0.17	Aggregate	Temporary - E	Y	Y	
	1035012	1035011	Claim	0.70	Aggregate	FS Closed	Y	Y	
Hopeful 2-3	1035-E1a	1035000	1035-E1b	0.21	Aggregate	Temporary -E	Y	Y	Old Road 1035-015 Miner Install new Gate
	1035-E1b	1035-E1a	1035-E1d/cabins	0.08	Aggregate	Temporary -E	Y	Y	
	1035-E1c	1035-E1a	1035-E1d/filter plant	0.27	Native	Temporary -E	Y	Y	Old Road 1035-015

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
	1035-E1d	1035-E1b	1035-E1c	0.19	Native	Temporary -E	Y	Y	Existing Ford (Alt 2 = 2) (alt 3 = 1) Granite Creek
L&H	1305-E5a	1042950	1305200	0.29	Native	Temporary -E	Y	Y	Continuation of Rd 950
	1305-E5b	1305200	Adit	0.06	Native	Temporary -E	Y	Y	
Lightning Creek	1305-E6a	1305100	Final Pond	0.07	Native	Temporary - E	Y	Y	
	1305-E6b	1305100	Dig Site	0.10	Native	Temporary - E	Y	Y	
Little Cross	1000-E3a	Co 24	Campsite	0.03	Tailings	Temporary - E	Y	Y	
Lucky Strike	Only using open FS roads								
Make-it	7300-E2a	7300700	Cabin	0.37	Native	Temporary - E	Y	y	Existing Miner's gate
Muffin	7355012	7355000	Claim	0.18	Native	FS Closed	Y	y	
	7355M1a	7355012	Work Site	0.08	Native	Temporary - E	Y	y	Existing - miner will rehab
Old Eric 1&2	10000-E2a	Co 24	Campsite	0.40	Tailings	Temporary - E	Y	y	Dispersed Camp site
Olive Tone	1305-E4a	1305082	1305-E4b	0.02	Native	Temporary - E	Y	y	
	1305-E4b	1305-E4A	Pond/Mining Site	0.16	Native and Tailings	Temporary - E	Y	y	Existing Ford on Olive Creek
Rosebud 1-4	1000-E1a	1000000	Claim	0.46	Native	Temporary - E	Y	Y	Powerline Road
Royal White	1042-E2a	Pvt Rd	Upper Adit	0.11	Native	Temporary - E	Y	Y	Extension of 1042-982
	1042-E2b	Pvt Rd	Mine Bldings	0.14	Native	Temporary - E	Y	Y	Behind existing private gate
	1042-E2c	1042982	Shafts	0.06	Native	Temporary - E	Y	Y	
Ruby Group	1310-E1a	1310000	Cabin/Sites 1,2,3	0.62	Native	Temporary - E	Y	Y	2 existing fords, (Clear & Ruby) Miner proposed ATV Bridge
	1310-E1b	1310-E1a	Site 2, staging area	0.03	Native	Temporary - E	Y	Y	
	1310-E3a	1310000	Site 4,5	0.07	Native	Temporary - E	Y	Y	
	1310-E3b	1310-E3a	Site 6	0.06	Native	Temporary - E	Y	Y	
	1310-E3c	1310-E3a	Site 7	0.02	Native	Temporary - E	Y	Y	
	1310-E4a	1310000	Site 8	0.09	Native	Temporary - E	Y	Y	

Claim Name	Road Number	From	To	Length	Surface Type	Existing Condition	Alt 2	Alt 3	Comments
Sunshine/McWillis	1305054	1305050	1305-M1s	0.40	Native	FS Closed	Y	Y	
	1305-M1a	1305054	Claim site	0.18	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab Existing Miner's Bridge, McWillis
	1305130	1305120	Diversion Dam	0.45	Native	Decommis-sioned	Y	Y	Use as Temporary Road
Tetra Alpha Lode	7355- M5a	7355020	adit	0.01	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Mill	7355011	7355000	7355011-M4a	0.31	Native	FS Closed	Y	Y	
	7355-M4a	7355011	Top Mill	0.05	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
	7355-M4b	7355-M4a	7355011	0.03	Native	Temporary - E	Y	Y	Existing Rd - miner will rehab
Tetra Alpha Placer	7355011	7355000	7355011-M4a	0.72	Native	FS Closed	Y	Y	
	7533012	7355000	7355011-M4a	0.42	Native	FS Closed	Y	Y	
	7355-M3a	7355011	Processing	0.27	Native	Temporary - E	Y	Y	proposed Boulder Crk ford in Alt 2 only
	7355-M3b	7355-M3a	Claim	0.06	Native	Temporary - P	Y	Y	Proposed road
	7355-M3c	7355011	Claim	0.03	Native	Temporary - P	Y	Y	Proposed Ford, Boulder
	7355-M3d	7355011	Claim	0.02	Native	Temporary - P	Y	Y	Proposed Ford on Boulder
Troy	1000-E4a	Co 24	Claim	0.05	Tailings	Temporary - E	Y	Y	Existing Gate
	1000-E4b	1000-E4a	Claim	0.11	Tailings	Temporary - E	Y	Y	
Yellow Gold	7355025	7355020	7355026	0.05	Native	FS Closed	Y	Y	
	7355026	7355025	Alternate Processing	0.11	Native	FS Closed	Y	Y	
	7355050	7355000	Claim Trail	0.61	Native	FS Closed	Y	Y	Alt 3 preferred use (gate during use)
	7355055	7355050	Claim	0.37	Native	FS Closed	Y	Y	
	7355-E2a	7355055	Processing site	0.11	Native	Temporary - E	Y	Y	
Yellow Jacket	1305-E1a	1305035	Claim	0.11	Native	Temporary - E	Y	Y	
	1305-E1b	1305-E1a	Claim/House	0.15	Tailings	Temporary - E	Y	Y	

Forest Plan Direction

Transportation System

WWNF

The WWNF Forest Plan goal for the transportation system is: "To provide a safe, efficient, environmentally sound access for the movement of people and materials involved in the use and management of the National Forest Lands." (WWNF *Forest Plan, page 4-34*)

WWNF Forest Plan standards and guidelines for the transportation system include:

- Provide the minimum system necessary for the specific activities authorized under the management area direction.
- Manage road and trail uses to protect resources, accommodate or restrict conflicting uses, provide reasonable safety, and prevent damage to the facilities.
- Protect water quality in all aspects of road and trail system management.
- Use practices that will avoid or minimize sediment production from new road construction and will correct existing sediment sources.

Basic custodial maintenance is performed on closed Forest Service roads to reduce damage to adjacent resources to an acceptable level and to ensure that the road remains in place to provide for potential future management activities or public access needs. Emphasis is given to maintaining the drainage facilities and runoff patterns. Vegetation encroachment and down woody material buildup may occur at this level. While roads are closed to highway vehicles, they remain open and suitable for OHV use and non-motorized travel. Seasonal closures exclude access during the wet season to protect the road and adjacent resources, and to protect wildlife and habitat.

Access

WWNF Forest Plan standards and guidelines for access include:

- Manage traffic as needed due to structural limitation of the road or limitation imposed by other resources, such as wildlife or recreation. (*Forest Plan, page 4-34*).
- Implement open road density guidelines as opportunities arise. Normally this will be following a timber sale project, but may also include special projects aimed at reducing open road densities in key areas (*Forest Plan p. 4-36)*.

Open Road Densities

When calculating Open Road Densities to determine if a project meets Forest Plan guidelines, the WWNF Forest Plan states:

- *"Meet the specific open-road density guidelines found in the direction for individual management areas unless a specific exception is determined, through the Forest Service NEPA process, to be needed to meet management objectives. 2/3/.*

  2/Total road density (closed and open roads) is not restricted except as stated in the standards and guidelines for soils.

> *3/The method used for calculating open road densities is an important factor. The average road density is calculated by dividing an area by the number of miles of open roads within that specific area.*
>
> *If the area is too large, the average becomes meaningless; conversely, if the area is too small, the resulting figures may not provide useful information. For the purpose of implementing this direction, open road density will normally be calculated on the basis of subwatersheds. The area of each Management Area contained in each subwatershed will be calculated, and the open roads within that management area/subwatershed will also be calculated to determine the open road density.*
>
> *The acreage and road mileage included in the calculation will include all acres (NF and private) within the major proclaimed boundaries of the National Forest, but will exclude private land acreage outside the major proclaimed boundaries.*
>
> *"Islands" of proclaimed National Forest which are outside the major proclaimed boundaries will be included in the calculations if they are still under National Forest management. Decisions to leave open road densities greater than the guidelines are expected to be the exception rather than the rule"* (*Forest Plan p. 4-35*).

Therefore, the Forest Plan identifies the following guidelines for calculating open road densities in order to comply with the Forest Plan:

> *"Calculate open road densities for each management area found within a subwatershed to include all National Forest and private lands within the major proclaimed boundaries of the National Forest."*

For this analysis, two calculations were used for determining whether open road densities by Management Area within a subwatershed (MA/SWS) comply with the Forest Plan; 1) all State, County, private, and Forest Service open roads, and 2) Forest Service open roads only, as those are the only roads over which the Forest Service has jurisdiction.

Open road density results are presented in Table 3-52 for all MA/SWS on the WWNF. The open road densities for Alternative 2 and 3 were derived from the WWNF GIS database, which reflects the current existing condition. The 0.38 (Alt 2) and 0.33 (Alt 3) miles of new miner-created temporary access roads are not included in the total open road miles or open road density calculation because they are not considered open roads.

Table 3-54: Open Road Densities by Management Areas within Subwatersheds (MA/SWS) For WWNF, County, and Private Roads under all Alternatives

Subwatershed	Management Area	Acres	Square Miles	Open Road Miles	Open Road Density
Beaver Creek	1	15.0	0.02	0.1	3.5
	15	415.6	0.6	0.1	0.2
	18	11672.5	18.2	43.6	2.4
Bull Run Creek	1	8.1	0.01	0.2	15.6
	15	867.5	1.4	1.2	0.9
	18	17302.3	27.03	45.2	1.7
	4	1.9	0.003	0.00	0.00
	6	585.2	0.9	0.00	0.00
Clear Creek	1	5.4	0.008	0.1	11.1
	18	1555.8	2.4	3.0	1.2
Lower Granite Creek	15	224.1	0.3	0.6	1.6
	18	831.2	1.3	2.7	2.1
Upper Granite Creek	15	255.7	0.4	0.0	0.0
	18	6484.5	10.1	27.6	2.7
	4	3.7	0.01	0.0	0.0
	6	393.7	0.6	0.0	0.0
Totals		**40622.1**	**63.5**	**124.5**	**2.0**

Note: Open Road Density numbers are calculated from the whole number, and not the rounded version as shown in Square Miles and Road Miles columns

Open Road Density = Open Road Miles / Square Miles

Open road densities are based on the management areas within the subwatersheds.
Data Source: WWNF GIS – 7/24/2013 - road_density_sws.xls (118kb), e.dreher

Table 3-55: Open Road Densities by Management Areas within Subwatersheds (MA/SWS) for WWNF Roads Only under all Alternatives

Subwatershed	Management Area	Acres	Square Miles	Road Miles	Open Road Density
Beaver Creek	1	15.0	0.02	0.1	3.3
	15	415.6	0.6	0.1	0.2
	18	11672.5	18.2	42.4	2.3
Bull Run Creek	1	8.1	0.01	0.2	12.6
	15	867.5	1.4	1.2	0.9
	18	17302.3	27.03	37.2	1.4
	4	1.9	0.003	0.0	0.0
	6	585.2	0.9	0.0	0.0
Clear Creek	1	5.4	0.008	0.1	11.1
	18	1555.8	2.4	2.6	1.1
Lower Granite Creek	15	224.1	0.3	0.6	1.6
	18	831.2	1.3	2.5	1.9
Upper Granite Creek	15	255.7	0.4	0.0	0.0
	18	6484.5	10.1	27.4	2.7
	4	3.7	0.01	0.0	0.0
	6	393.7	0.6	0.0	0.0
Totals		**40622.1**	**63.5**	**114.3**	**1.8**

Note: Open Road Density numbers are calculated from the whole number, and not the rounded version as shown in Square Miles and Road Miles columns

Open Road Density = Open Road Miles / Square Miles

Open road densities are based on the management areas within the subwatersheds.
Data Source: WWNF GIS – 7/6/25/2013 - road_density_sws.xls (118kb), e.dreher

Umatilla NF

No specific open road density standards and guidelines are included in the Umatilla NF Forest Plan.

A Motorized Access and Travel Management Plan was completed for the North Fork John Day Ranger District (USDA 1990) that designated roads, trails and areas for use by motorized vehicles. The Umatilla NF Forest Plan includes the following forest-wide standards and guidelines for access:

> *"Limit motorized vehicles to roads, trails, and areas which are designated for use in the Umatilla NF Motorized Access and Travel Management Plan. Temporary exceptions are authorized for those conducting official duties including firefigting, organized rescues, duties by special use permit or contract, and other listed in the Forest Motorized Access and Management Plan or having the district ranger's authorization (Umatilla NF Forest Plan, pg. 4-50)."*

A mining Plan of Operations is signed by the district ranger, and would provide the miner with authorization to use roads identified for access in the Plan of Operations.

The following Umatilla NF Forest Plan direction emphasizes that miners are allowed reasonable access to their claims:

> *"Under the mining laws, claimants are entitled to access to their mining claims. Access for exploration and development of locatable mineral resources will be analyzed in response to a proposed operating plan. A decision on reasonable access will be made as a result of appropriate environmental analysis (Umatilla NF Forest Plan, pg. 4-81)."*

None of the Management Area specific standards and guidelines prohibit miners access to their mining claims. For example, Management Area A8-Scenic Area provides the following direction:

> *"Provide access to valid mining claims and private land (Umatilla NF Forest Plan, pg. 4-129)."*

For Management Area C7 (Special Fish Management Area), which includes the majority of the analysis area on the Umatilla NF, The Umatilla Forest Plan include the following standard/guideline relative to transportation:

> *"Road construction, reconstruction and maintenance are permitted as long as consistent with the objectives of water quality and anadromous fish habitat.*
>
> *Road construction will rarely occur within 500 feet of Class I and II streams, within 250 feet of Class III and IV streams, or on slopes over 60 percent. Road location, design, construction, and maintenance techniques used will focus on minimizing soil loss impacts to water quality and fisheries habitat (UNF Forest Plan, pg. 4-169)."*

Under all alternatives, no new open Forest Service roads are proposed for construction, however miner-created temporary access roads are proposed under Alternatives 2 and 3. The following definitions included in Appendix 2, General Requirements, describe the various types of roads in the the analysis area:

> *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 constructed by the miner 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 trail and that is not included in a forest transportation atlas. These roads are not necessary for long-term resource management and will be decommissioned after use. The level of decommissioning will be specified in the

operating plan. Temporary access roads are given a number in the operating plans for tracking and mapping purposes only, and are not considered a National Forest System Road. An "M" number is a miner-created road, and an "E" number is an existing road that has not been designated necessary for long-term management and will be managed as a temporary access road.

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.

Environmental Effects

Effects Common to Alternatives 1, 2 and 3

Forest Plan Consistency

WWNF

Under all alternatives, no new open Forest Service roads are proposed for construction, therefore open road densities would not increase under any of the alternatives. The WWNF Forest Plan states:

> *"Analyze projects which will require construction of new roads or which require opening old roads, with the intent of meeting specific management area road density guidelines during the activity. If the analysis indicates that meeting these guidelines during project activity is important in meeting the resource management objectives, and if the project will require an open road density in excess of the guideline, then mitigation of the effects of adding open roads will take place where practicable. Mitigation may include efforts such as closing other roads in the analyis area…" (Forest Plan pg. 4-36).*

Although the above standard and guideline was designed to address impacts from construction or opening of existing Forest Service roads for timber sale haul, it can be applied to this project. **No new open Forest Service roads would be added to the watershed under any of the alternatives in this project, therefore all alternatives are consistent with WWNF Forest Plan open road density guidelines and no exceptions to the guidelines are needed.** The .38 miles (Alternative 2) and .33 miles (Alternative 3) of new temporary mine access roads are not included in the total open Forest Service road miles or open road density calculations because they are not open to the public. They are for use only by the miner as stipulated in their Plan of Operations, and requirements to prevent public access to those temporary roads are included in Appendix 2, General Requirements, Z-12.

Umatilla NF

Since no specific open road density standards and guidelines are included in the Umatilla NF Forest Plan, an analysis of open road densities would not be sufficient to determine consistency with the Umatilla NF Forest Plan.

Because the Forest Plan includes direction that allows miners reasonable access to their claims, and no new Forest Service open roads would be constructed, all alternatives would be consistent with the Umatilla NF Forest Plan.

Alternative 2

Alternative 2 would continue current management of the transportation system, including the Forest Service's implementation of past decisions as the program of work and funding allows. Administrative use and public access would remain at current levels. The proposed Plans of Operations, as submitted by the miners include the following access-related actions:

- Authorizing use of 4.71 miles of previously closed or decommissioned Forest Service roads 4.26 closed and .45 decommissioned)
- Authorizing use of 8.98 miles of existing miner-created temporary roads
- Authorizing use of 0.3 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 11existing fords on FS closed or existing miner-created roads
- Authorizing construction of 2 new fords (2 fords at Tetra Alpha Placer)
- Authorizing placement of 2 temporary bridges to be removed at the end of each operating season (Bull Run Site #2 and Ruby Group)
- Authorizing installation of 3 new gates (East Ten Cent Creek and Hopeful 2&3)

Direct and Indirect Effects

The construction, maintenance, and reclamation of these temporary roads, fords and bridges would be regulated only by the proposed requirements the miners submitted with their Plans. However, their Plans may not have included specific direction for ensuring these access roads are seasonally closed. Therefore there may be a small increase in public access on these temporary roads, fords and bridges because the miners may not adequately close roads at the end of each season.

Mine Access

These access roads, fords and bridges would allow reasonable access to the mining operations. However, some of the proposed new temporary mine access roads, fords and bridges included in Alternative 2 may not meet the objectives of water quality and anadromous fish habitat, as is discussed in the Water Quality and Fisheries sections of this Chapter. No additional requirements Requirements for the use, maintenance and restoration of these temporary roads are included in this alternative. At the end of operations, the miners would reclaim access roads (Forest Service closed/decommissioned, and any miner-created temporary roads) authorized in the Plan of Operations. These reclamation activities typically include ripping and reseeding the road bed. Reclamation activities are outlined in a reclamation plan included with the calculation of the bond required for the Plan.

Public Access

A WWNF Forest Plan Transportation goal is " *to provide safe, efficient, environmentally sound access for the movement of people and materials involved in the use and management of the National Forest lands*" (*WWNF Forest Plan, pg. 4-34*). A Umatilla NF Forest Plan goal is to *"Provide and manage a safe and economical roads and trail system and facilities needed to accomplish the land and resource management and protection objectives of the Forest (Umatilla NF Forest Plan, pg. 4-3)."* Access to National Forest lands is being provided to the public under this alternative. Therefore, Alternative 2 would be consistent with WWNF and Umatilla NF Forest Plan direction for public access. The two gates proposed for the East Ten Cent Plan would prevent public access to that operation, limiting impacts to surface resources from use of the access roads.

The remaining effects for Alternative 2 are the same as described above for "Effects Common to all Alternatives".

Cumulative Effects

The cumulative effects analysis area is the Granite Creek watershed for the ten-year duration of the Plans of Operations.

With respect to foreseeable future WWNF Travel Management Plan (TMP), it is anticipated that designation of roads, trails and areas for motorized use under the TMP will limit cross-country travel within the project area. It is anticipated that the TMP would not restrict miners' access to their operations because 36 CFR 228.12 allows them reasonable access. Roads incident to mining, not designated as open in the TMP, could be authorized for miner's access through either a Plan of Operations or special use permit.

The new miner-created temporary access roads (approximately 0.38 miles) would temporarily add to the physical presence of roads in the watershed. Because the miners may not provide an adequate closure device at the end of each season, there may be an increase in public access on these temporary roads.

Alternative 3

Alternative 3 includes the following access-related actions:

- Authorizing use of 4.18 miles of previously closed or decommissioned Forest Service roads 3.73 closed and 0.45 decommissioned)
- Authorizing use of 8.21 miles of existing miner-created temporary roads
- Authorizing use of 0.43 miles of new temporary roads created by the miner whether by blading or continued travel
- Authorizing use of 11 existing fords on FS closed or existing miner-created roads
- Authorizing construction of 1 new ford (1 ford at Tetra Alpha Placer)
- Authorizing placement of 2 temporary bridges to be removed at the end of each operating season (Bull Run Site #2 and Ruby Group)
- Authorizing installation of 3 new gates (East Ten Cent Creek and Hopeful 2&3)

The effects of implementing Alternative 3 would be the same as described for Alternative 2 with the following exceptions. Alternative 3 differs from Alternative 2 by 1) decreasing the total miles of

roads to be used for access to mining sites from 13.99 miles to 12.82 miles (FS closed, decommissioned, and existing or new miner-created temporary access roads), and 2) decreasing the number of fords to be used from 13 to 12.

Alternative 3 also differs from Alternative 2 by including Plan-specific water resource protection measures (WRPMs) (Appendix 11) and General Requirements to the Plans. General Requirements G7, R12, and Z1-14 are specific to roads used by the miners (Appendix 2).

All Forest Service closed and temporary would be reclaimed to the satisfaction of the Forest Service when mining operations are complete.

The decreased miles of access roads and reduction in fords in Alternative 3, along with the above resource protection measures, would reduce the potential impacts to surface resources under this alternative.

Direct and Indirect Effects

Unlike Alternative 2, additional requirements for the use, maintenance and restoration of these temporary roads, fords and bridges are included in Appendix 2, General Requirements.

This alternative would ensure that temporary miner-created access roads, "closed" Forest Service system roads, and existing temporary roads used in accordance with an approved Plan would be closed to public use and maintained according to the General Requirements (Appendix 2). Under General Requirement Z-12, during seasonal shutdowns, to restrict vehicular travel, the miner is responsible for closing roads not designated as open, and all temporary access roads as identified in the Plan of Operations.

Mine Access

The Umatilla NF Forest Plan states that reasonable access to mining operations is stipulated at 36 CFR 228.12 *(Umatilla NF Forest Plan, pg. 4-81)*. The new miner-created access roads, fords and bridges included in this alternative were reviewed by the minerals and transportation specialists, and they determined that the roads, fords and bridges identified under Alternative 3 in Table 3-51 would provide reasonable access to the miners (Refer to last column in Table 3-51).

Public Access

A WWNF Forest Plan transportation goal is " *to provide safe, efficient, environmentally sound access for the movement of people and materials involved in the use and management of the National Forest lands*" (*WWNF Forest Plan, pg. 4-34*). A Umatilla NF Forest Plan transportation goal is to *"Provide and manage a safe and economical roads and trail system and facilities needed to accomplish the land and resource management and protection objectives of the Forest (Umatilla NF Forest Plan, pg. 4-3)."* Access to National Forest lands is being provided to the public under this alternative. Therefore, Alternative 3 would be consistent with WWNF and Umatilla NF Forest Plan direction for public access.

The remaining effects for Alternative 3 are the same as described above for "Effects Common to all Alternatives".

Cumulative Effects

The cumulative effects related to the foreseeable future WWNF Travel Management Plan (TMP) are the same as under Alternative 2. However, there would be no public accessibility to the temporary mine access roads due to the addition of the General Requirement Z-12 as discussed above. Therefore there would be no increase in public access from this alternative.

Comparison of Alternatives

Alternative 3 would include preventative measures (Z-12) to ensure that no increase in public access to temporary mine access roads would occur, while Alternative 2 may result in an increase in public access on these temporary roads because the miners may not adequately close roads at the end of each season.

All alternatives would be consistent with WWNF Forest Plan open road density guidelines, and Umatilla NF Forest Plan transportation standards/guidelines for the reasons stated above under “Forest Plan Consistency” and “Direct/Indirect Effects”.

Recreation

Introduction

This document describes the recreation resources within the Granite Creek Mining analysis areas and the effects of the project alternatives; including direct, indirect, and cumulative effects. This document focuses on recreation opportunities that are likely to experience effects from mining operations including: (1) developed recreation sites, campgrounds, trails and trailheads, motorized and non-motorized trails, and Scenic By-way, (2) Wilderness, and (3) Dispersed Recreation.

The analysis area includes the Granite Creek Watershed portions of which lie on both the Wallowa-Whitman and the Umatilla National Forest. The analysis area is 94,480 acres (40,624 Wallowa-Whitman, and 49,539 Umatilla). 28 mining operations are proposed within the area with a total area of disturbance of 119 acres or 0.0013% of the National Forest System lands located within the project area. Each site is small, typically between 2-5 acres in size with seven operations proposing disturbance of between 8-10 acres.

The purpose of this project is authorization of 28 Plans of Operations that is consistent with the Wallowa-Whitman Land and Resource Management Plan (WWN Forest Plan), the Umatilla Land and Resource Management Plan (UNF Forest Plan), agency policy, direction, the laws and regulations governing the occupancy of National Forest System lands related to mineral entry.

Overview of Issues Addressed

The primary issue is the potential impact or conflicts related to the interaction between the recreational activities common to the area and mining.

Recreational conflict is defined as “goal interference attributed to another’s behavior” (Jacob and Schreyer, 1980). Anytime people with different goals meet on the same landscape conflicts can occur (Giroux).

The potential for interaction will be measured by evaluating the size of the area, the location of the mining related to developed sites, the type of recreation activities anticipated in the area, and the percentage of time each year that both uses will occur simultaneously.

Analysis Framework: Statute, Regulatory Environment, Forest Plan and Other Direction.

Regulatory Environment

Forest Plans

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable WWNF Forest Plan direction. This project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for recreation resources.

Recreation

Goal: *In coordination with and awareness of recreational opportunities on other lands, provide a wide variety of recreation opportunities in an attractive setting, and make those opportunities available to all segments of society.*

Standards and Guidelines

1. Recreation Opportunity Spectrum. Provide a full range of recreation opportunities, except urban, as described in the Recreation Opportunity Spectrum (ROS) and outlined in the National Recreation Strategy

2. Provide for interpretation and environmental education as an important part of outdoor recreation in all ROS classes. Promote a better understanding of the long-term compatibility of people living in harmony with nature as well as our natural and cultural history resources.

3. Encourage innovation, creativity, and partnership arrangements will be in all ROS settings to establish and sustain a balanced range of recreational services and facilities that are responsive to changing recreation demands on the Wallowa-Whitman National Forest.

4. Meet the goals for setting and experience opportunities for each ROS class as outlined below.

Primitive:

Timber harvest is not appropriate Access must be nonmotorized with high to moderate degrees of challenge and risk to the pedestrian or equestrian user through a matching variety of trailless areas and different levels of trails.* Site development scale is Level 1 or less.

Restrictions and controls on the user are not evident after entry. Use densities of PAOT (persons at one time) per acre should range from 1 to 25, depending on the landscape's ability to absorb the sights and sounds of humans. Road management objectives are to prohibit use of any existing primitive roads by any motorized user. No roads may be built. Any existing primitive roads will be regarded and/or revegetated to natural-appearing conditions. The compatible visual quality level is preservation Interpretation is through self-discovery, possibly augmented by books or guides, with no on-site facilities.

Semi-primitive Non-motorized:

Unscheduled timber harvest may occur for salvage of dead timber resulting from catastrophic events or to improve and maintain a healthy, attractive, semiprimitive setting. No new roads may be built. Motorized harvesting and mineral exploration should be done in the low public use season and in not more than half of any decade. All activities must meet 'foreground retention" visual quality objectives. Road management objectives are to eliminate or prohibit public motorized use of any existing primitive roads or trails. No facilities except for trail shelters, limited signing, sanitary and safety needs will be installed. All facilities will be made from native-like, rustic materials. Site development scale is level 2 or less. Use densities of PAOT per acre should range between 0.004 and 0.08 depending on the landscape's ability to absorb the sights and sounds of humans. Interpretation is through self-discovery, augmented by books, guides and maps, with no on-site facilities.

Semi-primitive Motorized

Vegetation management may range from no timber harvest to limited unscheduled regeneration cutting and sanitation salvage for the purpose of maintaining a healthy, attractive semiprimitive setting. Harvest units must meet "foreground partial retention" visual quality objectives

Motorized harvesting and mineral exploration may be done over "primitive" road systems primarily in the low public use season. Public access is by trails and primitive roads ranging in challenge from most difficult to easiest.[7] Road management objectives are to encourage high clearance 4-wheel drive vehicles and trail bikes, but discourage highway vehicles. Primitive roads are maintained at Level II. Site development scale is Level 2 or **less.** Interpretation is through very limited on-site facilities, maps, brochures, guides, and other portable media.

Facilities are limited to shelters, signs, sanitary, and safety needs in native-like, rustic materials. Use densities of PAOT per acre should range between 0.004 and 0.08 depending on the landscape's ability to absorb the sights and sounds of humans.

Roaded Natural:

Timber harvest may be scheduled (see VQO direction under Visual Resource Management) and should meet "retention" or partial retention" as seen from roads and trails. Access is generally single- or double-lane dirt or gravel roads. Road management objectives are to generally accept or encourage use by dispersed recreationists in highway vehicles. On some logging spurs or other single-purpose roads, this use may be discouraged or eliminated. Dispersed area facilities should be level 2 or less and may include shelters, boat ramps, sanitary facilities, interpretive facilities, and safety needs in native, rustic materials. Use densities of PAOT per acre should range between .04 and 2.5 depending on the landscape's ability to absorb the sights and sounds of humans. Density range includes averaging in developed sites. The norm for developed sites should

[7] See Trails Handbook (FSH 2309.18) for definition of difficulty levels.

be development scale 3. Mineral exploration and extraction may be appropriate but meeting adopted VQO. Interpretation is through signs and other structures, such as overlooks, decks and boardwalks, using native-like materials with some refinement in design, printed and other portable materials, and limited interpretation by Forest staff.

Roaded Modified:

Timber harvest is dominant but carried out within the NFMA regulation of being shaped and blended with the terrain. Stumps, skid roads, landings, and clearcut forms all may be dominant to the user. Road management objectives for local roads would often provide a complete mix of opportunities. Access to recreation campsites, berry fields, wood gathering areas, etc , is encouraged. Some roads will be managed to permit use by high-clearance vehicles and trail bikes while discouraging use by highway vehicles. Use on others by all vehicles may be restricted or prohibited to meet wildlife, safety, or other objectives. User-established sites will be recognized and prescriptions for timber harvest, slash cleanup, site preparation and other silvicultural practices will consider the environmental setting and recreational attractions. The attempt will be made to retain a significant measure of this character after treatment. Such sites will also be considered in grazing plans and the timing of when livestock are on the sites.

Interpretation is through simple on-site facilities such as signs or numbered posts made of native-like rustic materials, printed or other portable material. Facilities may include shelters for winter use by ski tourers or snowmobiles. Use densities of PAOT per acre should range between, .008 and 1.2.

Rural:

Management directions for the small area of rural ROS on the Forest are included under Management Areas 5 and 16

5. Discourage use where actual use densities exceed desirable levels or encourage use in other areas. These actions may include such things as recommending little-used areas to the public, limiting or increasing trailhead parking, maintaining or increasing difficult access, or separating uses (e g, motorized and nonmotorized, or pedestrian and equestrian).

14. **Special Areas**. Protect special places on the Wallowa-Whitman National Forest: e g, dispersed recreation sites, water features, rock or unique landform features, areas of

unique vegetation, historic sites, or other places which are special to Forest users commensurate with other Forest management Objectives.

15. **Road, Trail, Area Closures and off-road vehicle** use will be in accordance with the Forest Travel Management Plan and 36 CFR 295.[8] This plan will be reviewed annually and revised as necessary, considering management needs and public desires

Umatilla National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable UNF Forest Plan direction and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for recreation resources.

Goal: *Manage for a broad spectrum of recreation opportunities and experiences on the Forest.*

General

1. Use the Recreation Opportunity Spectrum (ROS) to inventory the array of recreation opportunities on the Forest and to guide management of the physical, social, and managerial settings.

2. Encourage public participation in recreation management and in the decision making process for projects, programs, or policies affecting recreation opportunities.

3. In all management activities, incorporate recreation considerations to enhance the quality of opportunities and positively affect use.

4. Provide Forest recreationists with freedom of choice in selecting sites, areas, routes, and activities to meet their recreation needs.

5. Emphasize "leave no trace' techniques in all portions of the Forest to reduce management costs and minimize resource impacts.

6. Increase revenues from recreation use where cost-effective. Fees should be competitive, based on market values and the principle that those who benefit directly pay for the activity or facility. Where possible, receipts should be used to benefit the area where the fees were collected.

7. Risk management will include reasonable efforts to provide inspections of lands and facilities, warnings on the safe use of areas/facilities and inherent dangers, management of medical emergencies, training and supervision of personnel, accident and injury reporting, documentation, and sharing of information.

8. Develop a Forest Recreation Opportunity Guide (ROG) containing the kinds and locations of the Forest recreational opportunities. Highlight a wide variety of opportunities (locations and activities) to disperse use; e g., roadless, old growth, wildlife areas, historic sites, unique ecological areas, scenic routes, facilities for the disabled, motorized, rivers, streams, and

[8] Superseded by 36 CFR 261.13 and 36 CFR 212.51

other special places. Include basic management policies and regulations that govern the area. Update as needed to keep information current.

9. Maintain and update the Recreation Information Management (RIM) System to provide data for recreation planning and management per manual and handbook direction.

10. Maintain recreation as an important component of access management. Acquire the access needed to provide Forest recreation opportunities, in compliance with laws and regulations. Retain or acquire public access to all areas of the Forest utilizing easement, prescriptive rights, land acquisition, and land exchange procedures.

11. Priority will be placed on preventing conflicts among users by good communications and providing information to affected people. Indirect management actions (i.e., design, education, information, etc.) will be preferred over direct actions (i.e., restrictions, enforcement, etc.). Generally, recreation conflicts will be resolved in order of priority: (1) Public safety, (2) wise use of resources, (3) retention of or increased wide spectrum of opportunities, (4) prevention or filling of recreation opportunity voids, and (5) relation to the surrounding environment.

12. Make the first impression of the Forest a good one. Put priority on 'curb appeal' at Forest entrances, administrative sites, major Forest roads, recreation developments and other high use places.

13. A positive approach should be used when stating rules and regulations (signs, brochures, etc.). Regulation of outdoor recreation should be minimized; ensure that those adopted are effective, useful, and justified. Regulations should contribute to enjoyable experiences in the long run, rather than be for the convenience of administrators.

Dispersed Recreation

1. Provide for a spectrum of recreational activities such as hunting, fishing, gathering forest products, viewing scenery, camping, hiking, floating, and so forth.

2. Provide a range of physical (remoteness, size of area, evidence of humans), social (encounters), and managerial (restrictions, information services) settings for recreation.

3.
   a)Inventory, evaluate, and manage dispersed occupancy sites and other special places. Project planning will provide for the protection of established occupancy spots (especially hunter camps) and other special places. Sites will be rendered unusable only when not in public demand or a higher priority use for other resources is timely, clearly needed, and where other sites to satisfy the recreation need are made available.
   b) Manage the occupancy sites and adjacent area to at least partial retention visual quality level.
   c)
4. Incorporate an integrated ecosystems approach, the special appeal of the Blue Mountains, Scenic Byways and Corridors Management (roads, trails, and rivers) into Forest recreation planning and management. Coordinate with adjacent landowners to achieve a continuity of management along corridors and areas.

a) Identify the potential of any proposed activity to change Recreation Opportunity Spectrum (ROS) classes in all project environmental analyses.

5. Manage public use as necessary to provide safety, sanitation, and appropriate resource setting, while minimizing regimentation. When necessary to place restrictions on use reasons should be explained and displayed in offices, literature, and at the point of restriction.

6. Provide specialized or modernize dispersed facilities, or site modification needed to maintain or enhance the variety of dispersed recreation opportunities, prevent pollution from human waste, provide safety (including fire), or reduce undesired resource effects.

7. Encourage people not requiring or desiring a wilderness setting to use nonwilderness National Forest System lands for their recreation needs.

8. Location and design standards for, and construction of, new or reconstructed roads and trails will accommodate user developed occupancy spots at locations and quantities appropriate to the planned ROS experience level.

9. Operate and maintain the Forest road system to provide dispersed recreation opportunities in concert with management area emphasis and direction.

10. Limit motorized vehicles to roads, trails, and areas which are designated for use in the Umatilla National Forest Motorized Access and Travel Management Plan. Temporary exceptions are authorized for those conducting official duties including firefighting, organized rescues, duties by special use permit or contract, and others listed in the Forest Motorized Access and Management Plan or having the district ranger's authorization.

Off-highway Vehicle Use

1. Ensure that off-highway vehicle (OHV) use is managed to protect other resources, promote safety of users, and minimize conflicts with other uses (Executive Order EO 11644, as amended by EO 11989). Use OHV prohibitions only where needed to minimize disturbance of wildlife, provide a range of recreation opportunities, or to protect the soil and water resources.

2. Continue and expand programs and agreements with Oregon and Washington for snow, OHV, and ATV trails and facilities.

3. Encourage OHV use to remain on designated routes by using route location, design, and public information programs. Routes should be planned to integrate on-road and offroad travel and disperse use across broad areas.

4. If necessary to eliminate OHV use, insofar as possible, provide a substitute area for the OHV opportunity eliminated.

5. In riparian areas, trails for motorized use will be managed to protect water quality and fish and wildlife habitat. Existing motorized use trails should be relocated outside the floodplain or 'hardened' where practical. OHV use will be limited to designated routes.

6. Emphasize permitted activities rather than prohibited ones in signing and information to minimize recreation use conflicts.

7. Review the Forest motorized access and travel management plans annually and revise as necessary (usually biennially).

8. Public information describing the areas and routes where motorized use is permitted, prohibited, or restricted; explaining the conditions of use: and providing reasons for such closures will be provided on a travel map. The map will be reviewed annually and revised as necessary (usually biennially).

Trails

1. Provide and manage the Forest trail system as a recreation resource that complements land management objectives.

2. Provide and manage a trail system to offer the full range of opportunities and difficulty levels: Primitive, mechanized, all-season, barrier-free, short and extended, interpretive, historical, and more. Provide for trail difficulty levels appropriate to recreation opportunity objectives.

3. Annually update the Forest Trail Management Plan to identify the current mix of development, management, and maintenance.

4. Construct, reconstruct, relocate, maintain, and manage trails and associated trailheads to standards appropriate for serving the intended type and level of use and to provide opportunities for satisfying recreation experiences, while minimally affecting soil, water, and vegetative resources, and requiring minimal maintenance.

5. Priority for new trails or trail relocation will be to provide route loops, fill opportunity voids, or resolve user or resource conflicts.

6. Trails located in resource development areas must be included in the implementation strategy analysis and project environmental analysis. Any decision to abandon the trail must be clearly documented. To the extent possible, trails should be protected during project activities. If not practical to preserve an existing trail, the trail should be relocated

Other Direction

The 1994 Elkhorn Drive Management Plan identified the following goals:

1. Showcase outstanding National Forest scenery;
2. Increase the public's understanding of the National Forests as the major provider of outdoor recreation;
3. Increase public awareness and understanding of all National Forest activities;
4. Meet the growing demand of driving for pleasure as a significant recreation use;
5. Increase the use of the National Forests by non-traditional users including urban minorities, the disadvantaged, and the elderly;
6. Contribute to the Nation's overall Scenic Byways effort.
7. Ensure visitor recognition that the Scenic Byway is administered through the cooperative efforts of the Forest Service, adjacent landowners, and various state and local public agencies.
8. Help strengthen a positive image of the Forest Service as a multiple-use agency by providing a variety of safe, quality interpretive sites and recreation facilities.

9. Foster an understanding and appreciation for the culture and history of the region, and encourage a land use ethic that provides for stewardship of a sustainable environment.
10. Promote understanding of ecosystem management and forest ecology in light of historic management practices, forest health, endangered species and economic stability.
11. Provide a positive example of innovative interpretation and high quality recreation opportunities and visitor services to local communities, adjacent land managers, and the Forest Service.

Effects Analysis Methodology

Specific Assumptions

Assumption 1: Recreational activities common to the area will occur at the same time of the year that mining operations are proposed.

Assumption 2: Conflicts from mining operations will be limited to the sights and sounds of the operation or any restrictions to conducting a specific recreational activity as a result of operations.

Assumption 3: That the Multiple Use Act, 30 USC 612(b) allows other uses of the surface of NFS lands, including recreation, provided that "any use of the surface... shall be such as not to endanger or materially interfere with prospecting, mining or processing operations or uses reasonably incident thereto." (612(b)). A mining claimant can protest to the managing federal agency about public use which results in material interference and, if unsatisfied, can bring suit to enjoin the activity (Mineral Law, Terry Maley)

Specific Methodology

Indicators

Direct and Indirect of proposed mining activities, access (roads, fords, bridges), and and Forest Service Requirements (including General Requirements, site-specific protection measures and monitoring)

The potential for interaction will be measured by evaluating the size of the area, the location of the mining related to developed sites, the type of recreation activities anticipated in the area, and the percentage of time each year that both uses will occur simultaneously.

Indicator Measure 1: The location of the mining related to developed sites, trails, interpretive sites, the Scenic By-Way, and Special Interest Areas.

Short-term timeframe: 1 year, this provides sufficient time to evaluate the potential conflict between uses for comparsion.

Long-term timeframe: 10 years, to make assumptions beyond this timeframe speculative**.**

Spatial Boundary: Mining sites in the Project Area, because of the distance of mining operations from recreation sites located outside the Project Area, and there will be no hauling of material from mining sites with the exception of the removal of small samples for analysis, the potential for contact between recreation activities and mining is minimal.

Methodology: Determine distance and topographic features that provide barriers from the sights and sounds of mining operations from the nearest recreational development.

Indicator Measure 2: An evaluation of the type of recreation anticipated to occur in the project area that potentially will occupy the same area at the same time. The evaluation will identify any conflicts with the ability to conduct a specific recreation activity as a result of mining activity.

Short-term timeframe: 1 year, this provides sufficient time to evaluate the potential conflict between uses for comparsion.

Long-term timeframe: 10 years, to make assumptions beyond this timeframe speculative**.**

Spatial Boundary: Mining sites in the Project Area, because of the distance of mining operations from recreation sites located outside the Project Area, and there will be no hauling of material from mining sites with the exception of the removal of small samples for analysis, the potential for contact between the two activities is minimal.

Methodology: Determine the type of recreational activity and any barriers that might prohibit or restrict the activity as a result of mining operations.

Affected Environment

Wallowa-Whitman National Forest

The portion of the Granite Creek Watershed analysis area that is on the Wallowa-Whitman National Forest (WWNF) is considered non-developed or General Forest Area where visitors engage in dispersed activities such as hiking, hunting, and dispersed camping in undeveloped areas. Based on a survey conducted in 2009, of forest visitors recreating on the WW NF, an estimated 28% use General Forest Areas.

In descending order of use, major recreation activities within General Forest Areas include: camping, motorized travel, big-game hunting, fishing, and hiking. In addition, driving for pleasure, picking mushrooms or berries and fuelwood gathering occur in the area.

No developed sites such as designated camping areas, designated picnic areas, or trailheads are located in or near the analysis area within the WW NF. However, undeveloped hunting camps occur throughout the area along or near open roads, with an estimated at 20-30 sites or 10-15 acres of potential disturbance. Some are plainly visible, having been used to park a recreation vehicle or pitch a tent each hunting season. Others are much less conspicuous, with additional camps established each year and other sites going several years without use. The analysis area occurs within the Sumpter and Desolation Big Game Management Units of Oregon Department of Fish and Wildlife. Hunting season typically begins in August and extends through November.

The 1990 WWNF Forest Plan identifies 2% of the Upper Granite analysis area as roaded modified, 6% as semi-primitive motorized, 13% as semi-primitive non-motorized, and the remaining area, 79%,

as roaded natural (see descriptions above). The North Face vehicle closure area (245 acres) is located within the analysis area.

All operations are in roaded-modified or roaded-natural. With the exception of roaded-modified, all areas are characterized by a natural or natural-appearing environment. In the semi-primitive areas motorized use is light, but allowed on existing roads.

With the exception of the North Face Vehicle Closure, the entire area is open to motorized travel including off-road travel. All maintenance level 1 roads (closed roads) are open to off-road vehicles. Travel increases during the big-game hunting season; otherwise, travel is light. Within the closure area, the level 1 roads receive little use; however, the primary route through the closure, Road 7300-755, continues to receive use and is a designated snowmobile route.

Several miles of designated snowmobile trails occur within the area. These trails utilize snow-covered forest system roads that are mechanically groomed (snow-packed). The designated trails are used by snowmobiles during the winter months, generally December through the middle of March. Occasionally, snowmobilers use non-designated roads. Due to terrain limitations, off road or cross-country snowmobile travel rarely occurs.

One hiking trail, FS 1604, is located on the northeastern edge of the analysis area, and is not immediately adjacent to any mining operation.

Approximately 10% or 13 miles of the 106 mile Elkhorn Scenic By-way (County Road 520 and Forest Road 73) lie within the analysis area. The portion of the Scenic by-way within the analysis area runs from Blue Spring Summit to Crane Flats.

Approximately 348 miles of open and closed roads within the analysis area can be used for recreation activities common to General Forest Areas. Of these roads, 61 miles, or 17.5%, are within 200 feet of stream, and have the highest potential for introducing sediment into streams. Approximately 32.9 of the 61 miles are closed roads. Closed roads are not maintained and therefore receive less use, thereby further reducing the potential for sediment introduction.

The Ah Hee Diggings Interpretive Site displays the mining efforts of Chinese miners in the late 1800s and the residual hand-stacked rock tailings can be seen from the Elkhorn Drive Scenic Byway. This area is withdrawn from mineral entry and no mining is allowed.

Umatilla National Forest

Non-Wilderness Recreation

Olive Lake Campground

Olive Lake Campground is the only developed campground within the analysis area. It is a popular, high-use fee campground during the summer and early fall months. There are 26 campsites, 2 day use sites, a fishing platform, boat ramp/dock and a 2.5 mile hiking trail around the perimeter of the lake. Fishing, boating, picnicking, overnight camping, and hiking are popular activities at this site. Olive Lake was dammed in the early 1900’s to supply water to the Fremont Powerhouse. Portions of

the wooden pipeline can still be seen while traveling along FS Road 10, between Olive Lake and the Fremont Powerhouse.

Fremont Powerhouse Complex

The Fremont Powerhouse Complex is located within the analysis area. The site consists of a turn-of-the-century powerhouse and caretaker house, three additional residences, numerous outbuildings and an interpretive sign. Although the powerhouse has not been operational since the 1960's, the site is used intermittently for administrative purposes and the Oregon National Guard recently completed a renovation project at the site. Three of the residences are open to the public for cabin rental use and the site is also a popular location for visitors to learn more about the area's early mining history. Anticipated future plans will likely include on-site interpretive tours during the summer months and the inclusion of an additional residence into the cabin rental program. The site will continue to have occasional administrative use as well.

Dispersed Camps

There are numerous dispersed camps, estimated at 40-50 sites, located along or near the open roads. This is a popular area for deer and elk hunters, and receives a lot of dispersed camping use during the fall season, along with some use during the summer months. A generic description of a dispersed campsite consists of a user-made area that is generally adjacent to a developed road. The site often has a meat pole in the tree, a rock fire ring and a hardened parking/camping surface for one to three families. In addition to dispersed camping and hunting activities, mushrooming, firewood gathering and sightseeing are other popular recreational pursuits in the area. The analysis area occurs within the Desolation Big Game Management Units of Oregon Department of Fish and Wildlife. Hunting season typically begins in August and extends through November.

Scenic Area and Trails

A portion (3,021 acres) of the Vinegar Hill/Indian Rock Scenic Area lies within the analysis area. There are four non-motorized trails in this area; including: #3173 Ben Harrison Trail (0.5 miles), #3022 Lost Creek Trail (1 mile), #3035 Saddle Camp Trail (2 miles), and #6141 Blue Mountain Trail (1.5 miles). The Saddle Camp/Lost Creek Trailhead is the only developed trailhead accessing the scenic area within the analysis area. Facilities include a graveled parking pad, signing and a bulletin board. The Scenic Area is managed for its recreation and scenic values with no motorized access within the analysis area. Primary use occurs during the fall big game hunting seasons, but summer recreational use continues to slowly increase due to outstanding scenic values. Sight-seeing, hiking and horseback riding are popular activities for this area.

OHV use

There are no designated OHV (Off Highway Vehicle) trails in the area. However, OHV activity is permitted and does occur on open roads in the analysis area. This includes riding motorcycles (Class III) and four-wheelers (Class I) on these roads. With the exception of Forest Service Road 10, all open roads within the analysis area are open to OHV travel, per the 2001 Interim Program for ATV/OHV Strategy on the Umatilla National Forest (UNF). Additionally, the 1000460, 1000520,

1010370, 1035060, 1035080, 1038060, 7350050, 7350052 and 7350070 are forest system roads open seasonally to OHV use but closed to other motorized travel.

Snowmobile use

Forest Service Road 10 is groomed for snowmobile use from the junction of Rd. 13 and Rd. 10 to Desolation Guard Station. All of FS Rd. 10 within the analysis area serves as a groomed snowmobile trail during the winter months. A local snowmobile club grooms the trail (Rd. 10) when there is adequate snow coverage, typically between the months of December and March. Because snowmobile use would occur outside of the time when miners typically operate, there would be no measurable impact to snowmobile activity from the action alternatives.

Wilderness Recreation

Legislative guidance for management of the wilderness resource administered by the UNF is contained in the Wilderness Act of 1964 (PL 88-577), which directs that the land be managed so it "generally appears to have been affected primarily by the forces of nature, with the imprint of human activity substantially unnoticeable." Wilderness is further defined as "…in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled". Untrammeled means "not subject to human controls and manipulations that hamper the free play of natural forces."

The following trails are located within the North Fork John Day Wilderness: #3022 North Fork John Day River Trail (.2 miles), #3173 Ben Harrison (4.5 miles), #3018 Lake Creek Trail (2.5 miles), #3022 Lost Creek (4.1 miles), #3035 Saddle Camp (2.5miles), and #3016 Granite Creek Trail (2.4 miles and 1 mile in general forest area). Ben Harrison and Granite Creek Trailhead is the only developed wilderness trailhead in the analysis area. Features include a graveled parking pad, signing and a bulletin board. Lost Creek Saddle Camp and Olive Lake Recreation Area both offer trail access into the wilderness.

While trail use is heaviest during the fall big game hunting seasons, there has been an increase in summer-time use by recreationists. Some of these activities include camping, hiking, horseback riding, huckleberry picking, sightseeing, and viewing remnants of the area's rich mining history. There are several high-use traditional campsites located along these trails within the analysis area. These sites are monitored and encouraged for use due to the topography, river location and Leave No Trace principles, which encourages use at existing sites in order to minimize impacts to vegetation and stream banks.

Most of the wilderness within the analysis area is classified as semi-primitive (using the Wilderness Resource Spectrum), with a small portion to the north designated as primitive.

Although visitors are increasing every year, the North Fork John Day Wilderness gets relatively low use in comparison to other wilderness areas nearby, including the Eagle Cap Wilderness on the Wallowa-Whitman N.F. and the Wenaha-Tucannon Wilderness on the north half of the UNF.

Trail locations are primarily in canyon bottoms, which coincide with most historic mine activity within the wilderness area.

The recreational value of wilderness is to offer outstanding opportunities for solitude or primitive and unconfined recreation (Section 2 of the Wilderness Act). Users of the area are seeking an experience

isolated from sights, sounds, and the presence of others. Additionally, users wish to feel a part of nature, to have vastness of scale, and a degree of challenge and risk while using outdoor skills. The landscape is typically void of developments and the evidence of humans.

Special Interest Areas

The following table identifies the Special Interest Areas located within the analysis area:

Table 3-56: Granite Creek Watershed Special Interest Areas

Special Interest Area	Acres in Analysis area
Vinegar Hill	3229.51
Twin Mountain Roadless Area	2930.39
North Fork John Day Wilderness	25217.40
Greenhorn Mountain Roadless Area	2488.52
Special Fish Management Area	16241.61
Olive Lake - Fremont Powerhouse	1001.36
Vinegar Hill RNA	179.05
Greenhorn Historical Area	83.72
North Fork John Day Wild & Scenic River	1.61
Ah Hee Diggings Interpretive Site	60

Table 3-57: Wilderness Acres

Wilderness	Acres
North Fork John Day Wilderness	25217.43

Table 3-58: Inventoried Roadless Acres

Roadless Area	Acres
Greenhorn Mountain	2488.53
Twin Mountain	2930.39
Grand Total Acres	5418.92

Recreation Opportunity Spectrum

The table below identifies the ROS classes present within the analysis area and the number of acres for each.

Table 3-59: Wallowa Whitman NF Recreation Opportunity Spectrum

Recreation Opportunity Spectrum	Acres
Roaded Modified	2359.01
Roaded Natural	31445.79
Rural	223.49
Semi-Primitive Motorized	6281.59
Semi-Primitive Non-Motorized	1590.02
Grand Total Acres	**41899.90**

Table3-60: Umatilla Recreation Opportunity Spectrum

Recreation Opportunity Spectrum	Acres
Roaded Modified	7047.47
Roaded Natural	12643.95
Semi-Primitive Motorized	705.73
WPT[9]	2138.17
WSN	23083.69
Grand Total Acres	**45619.01**

Operation location by ROS:

Roaded Modified:

- Eddy Shipman
- Make-It
- Hopeful 1,2, and 3

Roaded Natural:

- East Ten Cent Creek
- Magnolla Group
- Tetra (load)
- Tetra (Mill and Alpha)
- Muffin
- Yellow Gold

[9] WSN (Wilderness Semi Primitive) and WPT (Wilderness Primitive Trail) are both wilderness designations and the effects are discussed in the Wilderness section.

- Troy D
- Little Cross
- Blue Smoke
- Bunch Bucket
- Ruby Gold (East Site)
- Grubsteak
- Blue Sky - Bull Run
- Lightning Creek
- Yellow Jacket 123
- Altona
- Sunshine/McWillis
- Belvadear Group
- Olive Tone
- L&H
- Royal White Group
- Lucky Strike
- Rosebud

Rural:

- City Limits

Semi-Primitive Motorized:

- Ruby Gold (West Site)

Environmental Consequences

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

There would be no direct effects on recreation if no action were to take place. Recreation activities and opportunities would remain at the same level, thus there is no means of estimating the indirect effects of taking no action.

US citizens have a statutory right to remove valuable minerals from National Forest System lands open to mineral entry. Therefore, mining activities would occur under all the alternatives, including the No-Action Alternative. However, the 28 proposed Plans of Operations would not be authorized for approval under this alternative.

The regulations governing the surface use of National Forest System lands allow a level of operations to occur without authorization from the Forest Service. Each specific site is evaluated to determine what level of activity may occur under the regulations. This evaluation is first conducted by the miner. However, the level of operations allowed under the regulations cannot cross the threshold of causing a significant disturbance. Operations that may cause a significant disturbance of surface resources are to notify the Forest Service and may require authorization within a Plan of Operations before mining can occur. There is no way to determine how many operations would occur or are

currently operating at this level (without a Plan of Operations) and therefore no way to measure the effects.

Cumulative Effects of No Action

Given that there are no measurable direct and indirect effects that would occur under the no action alternative, there would also be no measurable cumulative effects.

Alternatives 2 and 3

Direct and Indirect Effects of Proposed Mining Activities (Alternatives 2 & 3)

Indicator Measure 1: The location of the proposed mining activities related to developed sites, trails, interpretive sites, the Scenic By-Way, and Special Interest Areas.

Developed Sites

Olive Lake, the only developed campground, and the Fremont Powerhouse which is used as a Recreational Rental, are the two developed sites within the analysis area. Access to both sites is via Forest Service Road 10. None of the proposed mining operations would use this route as access. The nearest operations are located approximately 5 miles to the northeast and 5 miles to the southeast. The distance to the nearest operations and the topography serve as barriers so that visitors are unlikely to see any operational mining activities from these developed sites. Sounds associated with mining operations are typical of any construction projects. Operation of heavy equipment, generators, pumps, and the sounds associated with tumblers used to separate the placer deposits may carry cross country for some distance. However, the mountainous terrain typical of the area restricts the sound from traveling long distances and usually cannot be heard for more than a half mile from the mine site.

It is unlikely that users of these sites would experience any conflict associated with any of the mining activity within the analysis area.

Elkhorn Scenic By-Way

Magnolia Group, Buffalo Group, Eddy Shipman, Make-it, Muffin, City Limits, Old Erick 1 &2, Blue Smoke, Blue Sky, and Bull Run proposed operations lie within one-half mile of the Elkhorn Scenic By-Way. Most of these proposed operations would be screened from the By-Way by vegetation; however, a few would be clearly visible to visitors traveling the road.

Both historic and recent evidence of mining are common along the Scenic By-Way. Some historic mining, Ah-Hee Diggings, and the Sumpter Dredge are featured attractions along the By-Way. Dredge pilings are located throughout the area with the most significant evidence in the Sumpter Valley from a bucket dredge that operated between 1913 and 1954.

Implementation of either alternative would increase public awareness of National Forest activities, strengthen the Forest Service image as a multiple-use agency, encourage a land use ethic, and promote an understanding of ecosystem management. All are stated goals of this 1994 Scenic By-Way Management Plan.

Because most of the mining activity within the analysis area would not be visible from the Scenic By-Way, only 10% of the By-Way is within the analysis area, and evidence of mining is and has been commonly seen along the route, no measurable effects are anticipated from the implementation of either alternative.

Wilderness, Inventoried Roadless Areas and Areas Included in the Potential Wilderness Inventory

No operations are proposed within Wilderness, Inventoried Roadless Areas or Potential Wilderness Areas.

Table3-61: Wilderness Attributes and Effects from Alternative 2 and 3

Wilderness Attributes (FSH 1909.12, Ch. 70(72))	Alternative 2 and 3 Effects
Natural– Are the area's ecological systems substantially free from the effects of modern civilization and generally appear to have been affected primarily by forces of nature. Consider: a. presence of non-native species that alter the composition of natural plant and animal communities b. developments that degrade the free flowing condition of rivers and streams c. presence of light pollution that degrades night sky quality and night sky quality related values d. presence of pollutants that degrade water quality e. health of ecosystems, plant communities, and plant species that are rare or at risk	Alternative 2 and 3 proposes no activity that would degrade the free-flowing condition of rivers and streams, degrade night sky quality or introduce pollutants that degrade water quality, thereby retaining the characteristics of an area that is free from the effects of modern civilization.
Undeveloped – The degree to which an area is without permanent improvements or human habitation. Consider level of human occupation and modification.	Alternative 2 and 3 would retain the undeveloped wilderness attribute with no evidence of human development.
Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation – An area's capability of providing solitude or primitive and unconfined types of recreation. Solitude is isolation from sights, sounds, and the presence of others from the developments and evidence of humans; consider size of area, presence of screening, distance from impacts, and degree of permanent intrusions.	No conflict with wilderness visitors would occur, therefore there would be no effect to wilderness visitors' experiences.

Wilderness Attributes **(FSH 1909.12, Ch. 70(72))**	**Alternative 2 and 3 Effects**
Opportunity to feel a part of nature; to have a vastness of scale; a degree of challenge & risk while using outdoor skills are measures of primitive and unconfined recreation	
Untrammeled - The wilderness is essentially unhindered and free from modern human control or manipulation.	Alternative 2 and 3 would retain the untrammeled wilderness attribute with no evidence of human control or manipulation.

Effects on wilderness recreation would not vary between the two alternatives. Because no activities are proposed in Wilderness, no effects on Wilderness would occur from the proposed activities.

Areas included in the Potential Wilderness Inventory as identified in the Wilderness and Undeveloped Lands Report (project file)

Table 3-62: Potential Wilderness Areas (PWAs)

Location/Size	Acres
Coincident boundary with wilderness	14,096
Less than 5000 acres	0
Grand Total Acres	**14,096**

DataSource:
T:\FS\NFS\WallowaWhitman\Project\whitGraniteMining2009\GIS\Workspace\edreher

Operations located in PWAs adjacent to wilderness (regardless of PWA acreage):

- Hopeful 1, 2, and 3
- Ruby Group
- Bunch Bucket
- Grubsteak

The above identified operations overlap into PWAs. These mine sites are areas of significant current mineral activity, including prospecting with mechanical or motorized equipment. Mining activity at these sites has been ongoing for several years dating back to the 1980's. There is also significant evidence of historic mining dating back to the 1800s, when dredging and hydro-mining were common. Access roads, structures, dredge piles, and adits exist at all these sites. The Hopeful claims all have cabins and Ruby also has a cabin. These improvements would not meet the criteria for inclusion within a PWA (FSH 1909.12, 71.11). These operations are located along the perimeter of polygons that meet the criteria for Potential Wilderness (Refer to maps in the Wilderness and Undeveloped Lands report in the project file). Excluding these mine sites would not disqualify the remaining area for possible wilderness inclusion based on the criteria in FSH 1909.12.

For the same reasons described for PWAs, the areas identified on the map (areas less than 1,000 acres) provided by Oregon Wild during the 30-day scoping period (project file) would not be affected by the proposed mining Plans because the areas where mining is proposed already show significant evidence of past mining.

Alternatives 2 and 3 meet the requirements in Forest Service Handbook 1909.12 CH. 71.11- Wilderness evaluation, and reflect the roadless area boundaries identified in the 2001 Roadless Area Conservation Rule (Wilderness and Undeveloped Lands report, project file).

FSH 1909.12, 71.11:

> Evidence of historic mining (50+ years ago). **Do not include areas of significant current mineral activity, including prospecting with mechanical or motorized earthmoving equipment.** The inventory may include areas where the only evidence of prospecting is holes that have been drilled without access roads to the site. Potential wilderness also may include:

a. Areas that otherwise meet inventory criteria if they are covered by mineral leases having a "no surface occupancy" stipulation.

b. Areas covered by mineral leases that otherwise meet inventory criteria only if the lessee has not exercised development and occupancy rights. If and when these rights are exercised, remove the area, or portion affected, from the inventory unless it is possible to establish specific occupancy provisions that would maintain the area in a condition suitable for wilderness.

Alternatives 2 and 3 meet the above criteria which specifically excludes active mining sites for consideration as potential wilderness. Each site has evidence of significant current and historic mineral activity, and road access.

Special Interest Areas

No proposed operations are located in Vinegar Hill, Twin Mountain Roadless Area, Greenhorn Mountain Roadless Area, Olive Lake - Fremont Powerhouse, Vinegar Hill RNA, Greenhorn Historical Area, North Fork John Day Wild and Scenic River, or the Ah Hee Diggings. Because the proposed operations are not located within or adjacent to any of these special areas, no measurable effects are anticipated by implementing either Alternative 2 or 3.

The following proposed operations are located within or adjacent to the Special Fish Management Area:

- Lucky Strike
- Altona
- Yellow Jacket 1,2,3
- Lightning Creek
- Bunch Bucket
- Grubstake
- Ruby Group
- Hopeful 1,2,3
- East Ten Cent Creek
- Make It
- Magnolia Group.

The type of recreation anticipated for this Special Interest Area would be what normally occurs in dispersed or undeveloped areas of the Forest. These effects will be discussed in the Dispersed Recreation area section.

Other effects of the alternative on recreation use, opportunities and facilities would be the same as Alternative 1.

Direct and Indirect Effects of Proposed Mining Activities (Alternatives 2 & 3)

Indicator Measure 2: An evaluation of the type of recreation anticipated to occur in the project area that potentially will occupy the same area at the same time. The evaluation will identify any conflicts with the ability to conduct a specific recreation activity as a result of mining activity.

As mentioned above, recreational conflict is defined as "goal interference attributed to another's behavior" (Jacob and Schreyer, 1980). Anytime people with different goals meet on the same landscape conflicts can occur (Giroux).

Developed recreation, as described above, and the Scenic By-Way would not be affected by either alternative. Throughout the remaining area, the anticipated recreational activity would be what is typical of undeveloped areas such as camping, motorized travel, big-game hunting, and hiking. In addition, driving for pleasure, picking mushrooms or berries and fuelwood gathering may occur in these areas.

The assumption is that mining and the recreational activity would occur at the same time and be at or near the same place. Therefore, the evaluation will focus on the type of recreational activity and if the mining would affect the ability to conduct any certain activity.

Dispersed Recreation

There are no restrictions to access of mining sites for activities that do not materially interfere with mining, and typically the recreational activities listed above would not interfere. For public safety reasons, and the public's reluctance to enter into an active operation, mine sites are generally avoided. With the exception of fishing, activities that use general forest areas like picking berries and mushrooms, gathering firewood, and hunting may encounter conflicts. Driving for pleasure, hiking on trails, camping in dispersed sites, and other motorized travel should not be limited by mining operations. However, because the proposed operations occupy a small area, and the surrounding area provides significant opportunity to enjoy all the recreational activities common in the area, any effects would be minimal. Since the area would remain open and available for these activities, the difference between the level of current activity and when the mines become operational cannot be measured.

Fishing as a dispersed activity will not be affected by any of the alternatives. The State has closed Granite Creek and all its tributaries to year-round fishing (2013 Oregon Sport Fishing Regulations, pg. 73 under Special Regulations for the Northeast Zone). Fishing is often related to other recreational activity in the area such as camping and hiking. Therefore, regardless of which alternative is selected, without fishing as an attraction, dispersed recreational activity within this area is expected to be lower.

Recreation Opportunity Spectrum (ROS)

All but six of the proposed operations are located within ROS Roaded Natural, three are located in Roaded Modified. Roaded Natural recognizes that mineral exploration and extraction is an appropriate activity and Roaded Modified allows a full range of management and use activities. The mining operations proposed within these areas do not limit the range of recreational opportunities that typically occur within these settings. One operation, City Limits, is located within an ROS class of Rural. A Rural setting is typical of a developed area. In this case the operations are located adjacent to the town of Granite. Though recreational activities do not specifically occur in this area, recreationists are accustomed to the services available at Granite. Because of the high level of development in and around Granite, the sights and sounds of a small operation will not detract from the recreational experience.

One operation, Ruby Group, is proposed within the ROS class of Semi-primitive Motorized. The proposed mining meets the objectives described for this setting. The miner has proposed the use of high clearance vehicles and ATVs over primitive roads, and little vegetation would be removed. However, operations would occur at the same time as the public use season. Because Ruby creek is an intermittent stream and no trails or other recreational improvements are located near the site, the primary recreational activity is limited to big game hunting. There is also a cabin located at this site that has been in use on an intermittent basis since the 1920's. Because of the short time period that hunting would occur while mining is conducted, and generally hunters are more tolerant of other uses of the land, no measurable impacts to this activity are anticipated.

Off Highway Vehicle (OHV) travel

On the Umatilla National Forest OHV travel is limited to designated roads. Several of the mine sites are accessed by roads closed vehicle traffic. These restricted roads can only be used by the miner incident to his/her mining. Conversely, the Wallowa-Whitman National Forest is open to OHV travel except in areas closed, such as the North Face Vehicle Closure area. Use surveys indicate that approximately 24% of the visitors use General Forest Areas and approximately 1.5% of visitors surveyed (NVUM 2009) indicate OHV use as their primary activity with only 2.6% indicate participating in OHV use during forest visits.

Most of the observed OHV travel within the area is associated with hunting. Hunting season begins in the late summer early fall. At that time of the year mining operations begin to shut down. There is the potential for some interaction. However, with mining operations slowing down at this time of the year, potential conflict between these two activities should be minimal.

Because of the low use by OHV's in this area, and no additional travel restrictions will be imposed by selection of any alternative, there will be no measurable effects to OHV travel related to user conflicts.

Cumulative Effects of Proposed Mining Activities (Alternatives 2 & 3)

Long-term timeframe: 25-30 years because climate change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative.
Spatial Boundary: Granite Creek Watershed

The cumulative effects analysis area for recreation is the same as the Granite Creek Watershed Mining analysis area. The effects are the same for all alternatives. Past, present and future activities listed in at the beginning of this Chapter that overlap the proposed mining operations in time and space include use and maintenance of dispersed campsites, OHV travel (on and off road), and vehicular use of native surface roads. These activites occur continuously throughout the summer season and could occur at the same time that mines are in operation.

Ongoing recreation activities can directly affect soil compaction, loss of vegetation within riparian areas, and the potential of activity-generated sediment into area streams, caused by the use of dispersed campsites or by vehicle use of native surface roads. This may indirectly affect water quality. However, at the current level of recreation use, 13% reported the recreation activities common to General Forest Areas as their primary activity, 2009 NVUM, and the relatively small area of potential disturbance , recreation activities in this area do not have a measurable cumulative effect on water quality.

Summary of Effects Analysis for all Alternatives

Mining within the area does not preclude other legitimate uses of the Forest. Mining rights do not grant exclusive use of the land. Some mining sites may be gated to protect personal property or provide public safety. However, recreational use of the land is not prohibited. Mining in its present form in this area has not changed for many years. Operating Plans have been approved for the level of activity considered in the proposed action described in Alternatives 2 and 3 at many of these sites going back to the early 1980's, and there is no evidence of interference or conflict with either users.

For the reasons listed above, there would be little to no effect, adverse or positive, on the existing recreation use patterns, and opportunities as described in the Affected Environment section by implementation of Alternatives 1 through 3. Due to the very slight difference in mining operations approved under any alternative, these alternatives do not change the current condition.

Alternatives 2 and 3 would authorize the use of approximately 9 miles (less under alternative 3) of closed roads for mining access. The majority of these roads are currently being used by the miner's to access their sites. Controlled use by the miner would be allowed, with requirements to maintain the roads to prevent sedimentation problems (Appendix 2, General Requirements). Opening the roads would not alter the use by the general public because the miner would be responsible for closing the roads during seasonal shutdowns (Appendix 2, General Requirement Z12).

Compliance with the Forest Plan and Other Direction

Though a majority of the Forest Standards and Guidelines outline agency actions related to managing the variety of recreational activities found on the Forest and within the project area, the specific activities that reflect the interaction between recreation and the proposed action of authorizing mining are as follows:

Umatilla Forest Plan

1. In all management activities, incorporate recreation considerations to enhance the quality of opportunities and positively affect use.

2. Provide Forest recreationists with freedom of choice in selecting sites, areas, routes, and activities to meet their recreation needs.

3. Priority will be placed on preventing conflicts among users by good communications and providing information to affected people. Indirect management actions (i.e., design, education, information, etc.) will be preferred over direct actions (i.e., restrictions, enforcement, etc.). Generally, recreation conflicts will be resolved in order of priority: (1) Public safety, (2) wise use of resources, (3) retention of or increased wide spectrum of opportunities, (4) prevention or filling of recreation opportunity voids, and (5) relation to the surrounding environment.

4.

    a) Incorporate an integrated ecosystems approach, the special appeal of the Blue Mountains, Scenic Byways and Corridors Management (roads, trails, and rivers) into Forest

recreation planning and management. Coordinate with adjacent landowners to achieve a continuity of management along corridors and areas.

b) Identify the potential of any proposed activity to change Recreation Opportunity Spectrum (ROS) classes in all project environmental analyses.

Wallowa-Whitman Forest Plan

1. Use the Recreation Opportunity Spectrum (ROS) to inventory the array of recreation opportunities on the Forest and to guide management of the physical, social, and managerial settings.
2. Recreation Opportunity Spectrum. Provide a full range of recreation opportunities, except urban, as described in the Recreation Opportunity Spectrum (ROS) and outlined in the National Recreation Strategy.
3. Location and design standards for, and construction of, new or reconstructed roads and trails will accommodate user developed occupancy spots at locations and quantities appropriate to the planned ROS experience level.

With the exception of Hopeful 1, 2, & 3, Ruby Group, Eddy Shipman, and Make-It proposed operations, all mine sites are within ROS Roaded Natural. Hopeful 1-3, Eddy Shipman, and Make-It mine sites are located in ROS Roaded Modified. A portion of Ruby Group is located in Simi-Primitive Motorized.

The Standards and Guidelines of the Umatilla Forest Plan states “Identify the potential of any proposed activity to change Recreation Opportunity Spectrum (ROS) classes in all project environmental analyses” (*UNF Forest Plan, pg. 4-50*). The ROS class for both Semi-primitive Non-motorized and Semi-primitive Motorized has conditions for the period of time that mineral exploration should be conducted, limiting operations to the “low public use periods”. This condition would apply to all the alternatives. As stated in the Assumptions, the Multiple Use Act, 30 USC 612(b) allows other uses of the surface of NFS lands, including recreation, provided that "any use of the surface... shall be such as not to endanger or materially interfere with prospecting, mining or processing operations. All the operations propose to mine generally from early spring to late fall, when the area is free from snow. For the same reason, that is when the area receives most use by the public. Limiting mining to low public use periods would materially interfere with mining and be a violation of the Multiple Use Act, 30 USC 612(b). To be consistent with the Multiple Use Act, 30 USC 612(b), this analysis assumes that all alternatives are consistent with the Forest Plan because the Forest Plan suggests that mining “should” be conducted during low public use periods, and not “must” be conducted during low public use periods.

Visual Resources

Introduction

Viewing scenery is a highly sought after recreation activity and it contributes to the local quality of life, recreation, tourism and economic vitality. The scenic quality of the Granite Creek Analysis Area is valued as a state-wide resource as the Blue Mountain Scenic Byway, and the Elkhorn Scenic Byway. These Byways are drawing people from outside of the local area to come for the experience of viewing scenery as an intrinsic value of the area. Local use comes from LaGrande, Baker City, and John Day. The major access routes are Forest Route 51 which links I-84 from Hilgard State Park (via State Highway 244) to the area, Forest Service Road 73, which also links I-84 from the North Powder exit to the area, and also links State Highway 7 to the area via Sumpter.

Forest Service Road 73 provides 3-season passenger vehicle access to local campgrounds, trailheads and the Anthony Lakes Ski resort. Scenery resources from this route include a mixed conifer forest canopy over steep mountain terrain. High mountain peaks are the key scenic element of this route. Forest Route 51 provides access to campgrounds, trailheads and wilderness experiences. From this route the scenic resource is a park like river valley until the route climbs up into the headwaters of the Grand Ronde River, where the landscape becomes more mountainous, with views limited by dense lodgepole pine. Where views open up, the scene is of a mixed conifer forest on steep slopes and long ridges.

This evaluation applies the current National Forest Landscape Management methodology. Currently, Visual Quality Objectives identify the degree of disturbance allowed in specific areas related to the scenic attractiveness, concern level, and the distance from which the area is seen from particular routes. Scenery Management is also evaluated by the methodology of Agricultural Handbook #701 Landscape Aesthetics, Scenery Management Handbook (USDA Forest Service 1995b). Visual Quality Objectives are similar to Scenic Integrity Objectives and are therefore in this analysis considered synonymous. Scenic Integrity Objectives can be found in the Visual Resources specialist report in the project file.

The Visual Quality Objectives (VQO) that would limit or impact mining operations of the scale in this analysis is Preservation, Retention and Partial Retention (defined below). The analysis area includes 23% maximum modification, 51% modification, 12% partial retention, 2% retention, and 9% preservation. Mining sites are located in areas of retention, partial retention, modification and maximum modification. VQO's for each mine site can be found in the Visual Resources specialist report in the project file.

Retention- management activities are not visually evident. Activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., should not be evident.

Partial Retention- management activities remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size amount intensity direction, pattern, etc., remain visually subordinate to the characteristic landscape.

Modification- management activities may dominate the original characteristic landscape. However, activities of vegetative and landform alteration must borrow from naturally established form, line,

color, or texture so completely and at such as scale that its visual characteristics are those of natural occurrences with in the surrounding area or character type.

Maximum Modification- Allows management activities of vegetative and landform alterations may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail which is incongruent with natural occurrences as seen in foreground or middle ground.

Table 3-63: VQOs by acreage and percentage of analysis area

VQO		Acres	Analysis area %
Modification		48513.79	51.35%
Partial Retention		11799.34	12.49%
Retention		1901.44	2.01%
Preservation		8604.42	9.11%
Maximum Modification		21847.77	23.12%
	Total:	**92666.76**	**98.08%**

Regulatory Environment

The following statutory authorities and Federal regulations in FSM 2380.11 - 2380.19 provide for management of landscape aesthetics and scenery within the National Forest System: The Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528; The Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the National Forest Management Act of 1976 (16 U.S.C. 1601); 36 CFR part 219, subpart A; 36 CFR part 251, subpart B; 36 CFR part 223.

Forest Plan

Wallowa-Whitman National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable Land and Resource Management Plan (Forest Plan) direction and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines for **Landscape Management.**

Forest Management Objectives: Landscapes

> The visual quality objectives summarized in Table 4-1 will maintain the natural appearance of landscapes seen from major travel routes and recreation sites. Other lands outside of wilderness will appear somewhat modified to heavily modified by timber activities.

Goal

To manage all National Forest lands to obtain the highest possible visual quality, commensurate with other appropriate public uses, costs and benefits

Standards and Guidelines

1. **VQO's.** Meet visual quality objectives through management techniques described in National Forest Landscape Management, Volumes 1 and 2, and the Wallowa-Whitman National Forest Visual Management Plan - Desired Visual Model (maps showing visual objectives and Level I and Level II viewsheds are available at the Forest Headquarters in Baker City).
2.
3. **Retention Foreground.** In retention foregrounds the area regenerated per decade should not exceed 7 percent or less than 3 percent of the suitable forest land within the viewshed. Maximum seen area disturbed should not exceed 10 percent[10] within any viewshed. Limit regeneration unit size to that which meets retention and desired character including consideration for future entries and regrowth. The approximate range of sizes necessary to accomplish this is 1/2 to **2** acres in the immediate foreground (less than 500 feet) and 3 to 5 acres in the foreground greater than 500 feet from the road or trail. Units against road or trail edges should be shelterwoods or selection cuts rather than clear-cuts. Target tree size is 36 inches where biologically feasible.

4. **Partial Retention Foreground and Retention Middleground**. In partial retention foreground and retention middleground, the area regenerated per decade should not exceed 9 percent or be less than 5 percent of the suitable forest land within any viewshed. The maximum seen area disturbed at any one time should not exceed 14 percent of any viewshed. Limit regeneration unit size to that which meets partial retention and desired character including consideration of future entries and regrowth. The approximate range of sizes necessary to accomplish this is 1/2 to 2 acres in the immediate foreground (less than 500 feet) and 3 to 5 acres in the foreground greater than 500 feet from the road or trail. Target size tree in foreground is 26 inches, where biologically feasible.

5. **Partial Retention Middleground**. In partial retention middlegrounds, the area regenerated per decade should range between 8 and 10 percent. Limit maximum regeneration unit size to 10 acres. Maximum area disturbed at any one time should not exceed 20 percent.

6. **Created Openings.** Consider a created opening is to no longer be an opening, visually, when trees reach 20 feet in height. Rotation periods will be sufficient to grow large tree character in viewshed foregrounds.

7. **Resolving Conflicts**. Where conflicts develop between visual quality objectives and timber or range management objectives, these conflicts will be resolved in favor of meeting the visual objectives. Where conflicts occur between old-growth objectives and visual objectives, old growth will have priority.

8. **Viewshed Plans**. Plans will be prepared for all Level I viewsheds that will refine boundaries, establish project design criteria, identify opportunities for scenic enhancement, and set entry priorities and timing.

Desired Condition

[10] All Visual Resource percentages quoted in the VQOs apply to regeneration harvest. Not applicable to intermediate cuts, over story removals, or individual tree selection harvest.

The desired condition for scenery is to manage all National Forest System lands to obtain the highest possible visual quality, commensurate with other appropriate public uses, costs and benefits (WWNF Forest Plan, page 4-42). The goal of scenery management is to a) minimize immediate impacts to scenery, and b) restore landscapes to a sustainable condition.

Vegetation

A mosaic of vegetation patterns across the slopes, rock formations and views of the rivers and streams punctuate the corridor, along with distant views to background landscapes. Deciduous vegetation along the riparian corridor provides ribbons of color adding color diversity. Openings are shaped in a manner that appears natural, free form, with no straight lines, and feathered edges that don't appear unnaturally abrupt.

Cultural Elements

The area has a rich history of mining. Historic mining structures are interpreted in a manner that enables the visitor to "see" into the past and discover the heritage of the area. Existing mining structures are kept in such a manner that is orderly and unobtrusive or contrasting to the natural landscape. Screening from the most used viewing areas eliminates the mining operation effects to the view. The structure's appearance is rustic and/or harmonizes with the surrounding setting.

Recreational Elements

The recreational facilities are of consistent design, derived by the natural setting and portraying strong design principles. Recreational sites fit the site well and accommodate visitor needs in a way that harmonizes with the landscape.

Umatilla National Forest Plan: Forest-wide Standards & Guidelines (1990)

The following list of standards and guidelines are a subset of all applicable Forest Plan direction and this project is being analyzed for consistency to all applicable Forest Plan standards and guidelines.

Forest Management Goals

Provide attractive natural to near-natural settings for Forest users along important highways, roads, trails, and in and around developed and primitive sites.

Visual Resource

In total, about 26 percent of the Forest, outside of wildernesses, will be managed to provide a natural to slightly altered visual appearance. This equates to a partial retention visual standard, as described in the Landscape Management Handbook. Lands managed to meet the standards include unroaded areas, old growth stands, and some riparian areas where timber harvest is restricted. Other areas are viewsheds and some riparian areas where timber management and harvest are designed to maintain or produce a large-tree appearance. All wildernesses will be managed to the visual quality standard of preservation.

The visual quality objectives of retention and partial retention are emphasized in viewshed, which include state highways, key Forest travel routes, and major water features. In the viewsheds, modification may be used on the background distance zones which have minimal variety. Viewsheds will be managed to the specifications of the A3 and A4 Management Areas as identified on the Forest Plan map. Forest Plan table 4-5 displays visual management intent for each inventoried viewshed[11].

Viewshed corridor management plans for sensitivity level 1 and 2 viewsheds will be developed according to direction, and will specify vegetative manipulation guidelines to attain the desired forest character. The plans will indicate scheduling and amounts of timber harvest needed to maintain or enhance long-term visual characteristics.

Although about two-thirds of the Forest, outside the wildernesses, will eventually be modified, activities will be designed to borrow from naturally established form, line, color, and texture so that the affected areas may eventually resemble natural occurring ones. Modified silvicultural systems and techniques will also be used to help minimize impacts to visual quality.

The principles contained in Volumes 1 and 2 of the National Forest Landscape Management Handbook, and other published handbooks within the Visual Management System (Utilities, Range, Roads, Timber, Fire, and Ski Areas) will be used to manage the visual resource.

A3 Viewshed 1

Goal

Manage the area seen from a primary travel route, use area, or water body, where forest visitors have a major concern for the scenic qualities (Sensitivity Level 1) as a natural appearing landscape description.

The strategy applies to all or parts of the defined Sensitivity Level 1 travel routes, use areas, or water bodies. Sensitivity levels are defined in the Umatilla National Forest landscape management text, and viewshed boundaries are defined on the Forest Visual Quality Objective (VQO) maps.

The following defined viewsheds, or parts of viewsheds, are included in the management area:[12]

10. Forest Road 73 (Forest Road 52 to Forest Boundary) (NFJD);
13. Forest Road 10 (Olive Lake east to Forest Boundary) (NFJD).

Desired Future Condition

Viewsheds will be managed primarily to meet the visual quality objectives of retention and partial retention. An attractive, natural appearing landscape will be created or maintained. A maximum of three distance zones for each viewshed, including foreground, middle ground, and background radiating from the viewer position (and a visual quality objective for each zone), have been delineated according to the process defined in the Agriculture Handbook 701.

Management activities will be done with the highest sensitivity to people's concern for scenic quality. Vegetative manipulation will be conducted so that Forest management activities are not usually noticeable in the foreground and remain visually subordinate in the middle ground viewing area. All viewsheds will have vegetative management plans. Timber harvest areas will be sized and shaped to

[11] Refer to Umatilla Land Management Plan for Table.
[12] Only those identified in the Forest Plan located within the Project Area are listed

be compatible with the natural surroundings, but harvest may be noticeable in the background. Forest stands will occasionally be logged in order to maintain long-term health and vigor, and to encourage a park-like, natural appearance with big trees in the immediate foreground. Recreational opportunities will be mostly road oriented.

Management Area Standards and Guidelines

Visual

Visual Quality Objective (VQO) will generally be Retention in the foreground and Partial Retention in the middle ground. Exceptions are defined through the process described in Agriculture Handbook 701. Activities within these viewsheds may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes of landscape should be of such size, amount, intensity, direction, and pattern that they continue to provide a natural appearance, except for short-term changes to meet long-term objectives.

Principles of visual management will be applied so that positive attributes of a managed forest can be enjoyed while negative visual aspects of activities will be minimized.

Landscapes containing negative visual elements will be rehabilitated. Landscapes will be enhanced by opening views to distant peaks, unique rock forms, unusual vegetation, or other features of interest.

Viewshed corridor plans will be developed for all Sensitivity Level 1 viewsheds and will guide project activities when completed.

Effects Analysis Methodology

Specific Assumptions

Assumption 1: The highest potential for visual impacts is along the main travel routes (FR 73, 10 and County Road 24) at sites where a significant amount (acre or more) of vegetation will be removed or activities will be clearly visible.

Assumption 2: Based on National Visitor Use Monitoring (NVUM) results from 2009, 20% of the visitors using the National Forest use General Forest Areas. The Granite Creek Watershed is predominately General Forest Area. The analysis area represents approximately 2% of the total General Forest Area identified on the two National Forest. Based on these figures, an estimated 5200 National Forest Visits[13] annually or an average of 14 visits per day occurs within the analysis area.

Specific Methodology

Indicators

Indicator Measure: Proximity of the operations to a main travel route, the level of disturbance proposed, and compliance with VQOs. Currently, Visual Quality Objectives identify the degree of

[13] A National Forest Visit is defined as the entry of one person upon national forest to participate in recreation activities for an unspecified period of time (NVUM, 2009).

disturbance allowed in specific areas related to the scenic attractiveness, concern level, and the distance from which the area is seen from particular routes.

Timeframe: 1 to 3 years, because historically each operations varies on an annual basis on how long or if they operate. These operations are small and rely on the market value of gold and the cost of operation to determine when and if economically that operations are feasible in a given year. Additionally, all operations have proposed to reclaim all but ¼ acre of disturbed ground on an annual basis thereby minimizing the visual impacts.

Spatial Boundary: The Granite Creek Watershed analysis area. Sights and sounds associated to these small operations are limited to a short distance.

Methodology: Evaluate the magnitude in terms of compliance with VQOs, the duration that alterations to the landscape are expected to last, the extent at which the sites will be viewed.

Duration will be measured in terms of years; short term is considered less than 1 year and moderate is intermittent impacts or limited to 2 or 3 years. The operations have proposed a 10 year term and impacts will be minimal upon successful completion of the required reclamation. The extent of the exposure to visitors is expected to be small with less than 100 people impacted on annual bases to the sights and sounds of the operations.

Affected Environment

Mining Activities

Visual evidence of decades of historic mining activities is evident in this area. A site along the Elkhorn Scenic Byway is known for the Chinese mining that has a vast area of hand-stacked rock walls placed during the mining process. The Sumpter Dredge was in operation in this area up until the 1950's. The tailings left by this activity have been identified as historic features. The existing operations in this area are often in areas that have been previously disturbed, generally in historic mine tailings, and do not appear in stark contrast to the surrounding landscape. To the casual observer travelling the route, the operations are not immediately apparent. In most cases the sites are screened by trees. Some activity may be noted periodically, but the sites do not degrade the integrity of the scenic resources. Most sites are less than five acres in total size. Two sites exceed 10 acres. In many cases, the operations have been inactive for many years. Currently, the proposed mining operations are within the areas of Retention, Partial Retention, and Modification (project file). Total disturbance proposed for all 28 operations represents 104 acres or 0.1% of the entire project area.

Past Harvest and Fire Suppression Activities

The scenery resources in this watershed have been most affected by past harvest and fire suppression activities. Commercial harvests have increased the stand composition of early seral species, especially lodgepole pine. These areas include dense stands of small-stemmed lodgepole, appearing patchy, uneven and somewhat unnatural. Fire suppression has also contributed to increasingly dense stands and increased fuel loads, making the foreground views appear very dense and cluttered. Visual

penetration into these stands is negligible. Middleground and background views include some square and irregular shaped clear cuts. That last harvest activities occurred in 2002 with the last period of significant harvest activity occurring in the early 80's.

Fire suppression activities produce effects to the scenic environment both directly and indirectly. Some firefighting activities, such as mechanical fire line and safety zone construction, can result in direct, long-term effects from vegetation clearing and ground disturbance. In the case of fire line construction, these effects are usually magnified by the linear nature of the pattern of disturbance. In some vegetation types, fire suppression can and has produced vegetative conditions that would not be present had fire occurred at historical levels. Fire exclusion has allowed some late seral or climax forest cover types, such as Douglas fir, to dominate the visual landscape in some locations for longer periods of time than they would without excluding fire. To some extent, this has resulted in landscapes with less visual diversity than what would be present in the absence of fire suppression.

Visual impacts can vary considerably with the magnitude and intensity of the fire. The effects are often dominant on the landscape immediately following the activity and for a few following years. With accelerated regrowth of herbaceous and understory vegetation, the major visual effects are usually temporary and short term. Often these effects are subtler, resulting in more open stand conditions, again depending on the intensity of the fire.

Within the project area there have been two significant wildfires (>1000 acres), both lightning caused and in the John Day Wilderness. The most recent was the Vinegar fire in 2013, totaling 1,315 acres. Within the project area, primarily in the 80's and 90's, an additional 13 lightning caused fires occurred that were less than 1000 acres in size, with 11 less than 300 acres. The total burned area was 5,500 acres in the project area, or approximately 0.06% of the project area. Three operations are located about a mile from any burned area. Hopeful 2&3 is a mile north of the Tabor fire (152 acres in the wilderness, 1986), and Lucky Strike is located about 1 mile east of the Vinegar fire (1350 acres in the wilderness, 2013). The Vinegar fire intensity in the area near the east perimeter was high.

Environmental Effects

Alternative 1 – No-action Alternative

Direct, Indirect and Cumulative Effects of No Action:

There would be no direct effects on visual resources if no action were to take place. Mining activities and would remain at the same level, thus there is no means of estimating the indirect effects of taking no action. The level of operations under this alternative is low impact and typically small. This would be restricted to activities that would not result in a significant impact to surface resources (36CFR 228.4(a)).

The existing sites that lie in areas of retention or partial retention do not currently detract from the scenic resources from Forest Service Road 73. Some structures are visible, but they do not dominate the scene. Sites that lie in areas of modification are currently impacting foreground views at a small scale. Moderate impact is caused by past ground disturbance, structures and equipment. The natural-appearing characteristics of the landscape setting is obviously altered, however, the size of these disturbances are of such small, limited scale, they meet the modification VQO or Scenic Integrity Level of Low.

Given that there are no measurable direct and indirect effects that would occur under the no action alternative, there would also be no measurable cumulative effects.

Alternative 2 and 3 – Proposed Action and Proposed Action with Best Management Practices.

Direct and Indirect Effects of Proposed Mining Activities (Alternative 2 and 3)

Measurement Indicator: Proximity of the operations to a main travel route, the level of disturbance proposed, and compliance with VQOs. Currently, Visual Quality Objectives identify the degree of disturbance allowed in specific areas related to the scenic attractiveness, concern level, and the distance from which the area is seen from particular routes.

Sites in Retention

The following sites are located along FSR 73: City Limits, and Old Erick 1 &2. Old Erick 1&2 would be screened from the road by vegetation; however, City Limits be clearly visible to visitors traveling the road. Hopeful 1 is located on a closed road adjacent to the wilderness.

The proposed activities at these existing sites would have minimal effect to the scenic resources, because the majority of the operations are screened or do not detract from the landscape character.

Although there is evidence of historic mining at these sites that would be visually similar to the proposed action, management direction would be to restore the site to a more natural condition, Activity at the mine sites would not repeat form, line, color, or texture which are frequently found in the surrounding foreground. The disturbance caused by mining would be relatively short term in nature with no more than ¼ acre disturbed at one time before reclamation is required. The three operations listed above total 3 acres of disturbance, or 0.2% of disturbance within the project area with a VQO of Retention.

Because the disturbance represents only a small percentage of the watershed, and reclamation is ongoing and completed annually, the visual impacts are considered short term. This disturbance within the watershed will not substantially alter the landscape character of the area. Visual Quality Objectives allow for short term changes to meet long term objectives (*Agricultural Handbook #701, Umatilla NF Forest Plan)*. When reclamation is complete and vegetation is reestablished, the mined area will return to a more natural appearance.

Sites in Partial Retention

The following sites are located on either along FSR 73 or County Road 24/520: Blue Smoke, Eddy Shipman, Make-It, Old Eric 1&2, Rosebud 1-4, Blue Sky-Bull Run, and Troy D.

Blue Sky-Bull Run is located on County Road 24 and their operations will be clearly visible from the Scenic By-Way. This operation will alter the foreground visual landscape by a modification of the

vegetation. The miner will clear all vegetation from three areas, each approximately ½ acre in size. The size of the clearings meet Forest Standards and Guidelines which limit disturbed areas to less than 14% of the viewshed and limits areas of clearing to an approximate range of ½ to 2 acres within 500 feet of a road (this objective is specific to timber regeneration units). The dominate view for travelers along the Scenic By-way at this location is Middle Ground and Foreground. VQ Objective is the same for both views. This area of the By-Way show evidence of past timber harvest with openings in various stages of regeneration. Travel views of motorist are either Northwest or Southeast, depending direction of travel with the mine sites located perpendicular to direction of travel. Terrain and vegetation limits the view of these sites to less than half a mile of travel. These sites will be evident but will not visually dominate.

Eddy Shipman proposal includes continued underground mining at one site, and milling using an arrastra. These activities are expected to meet partial retention, because the majority of the operations are screened and/or are visually evident but are not dominant.

Those proposed activities at sites lying in areas of modification are expected to continue to meet the modification objective or low scenic integrity level.

Sites in Modification

The remaining proposed operations are located in Modification or Maximum Modification VQO Categories. These operations are not located along main travel routes, listed above. The VQO objectives will be attained when mining at each site is completed. The required reclamation for each site will return the disturbed areas to the surrounding area character type. The re-contouring and re-vegetation required at each site will match the visual characteristics of the surrounding area. The limited scale of each operation will not visually dominate the landscape. The surrounding natural landscape will continue to be the prevailing visual feature.

Cumulative Effects of Proposed Mining Activities (Alternative 2), and the Proposed Action with Best Management Practices (Alternative 3).

Timeframe: 1 to 3 years, because historically each operations varies on an annual basis on how long or if they operate. These operations are small and rely on the market value of gold and the cost of operation to determine when and if economically that operations are feasible in a given year. Additionally, all operations have proposed to reclaim all but ¼ acre of disturbed ground on an annual basis thereby minimizing the visual impacts.

Spatial Boundary: The Granite Creek Watershed analysis area. Sights and sounds associated to these small operations are limited to a short distance.

The cumulative effects analysis area for scenery is the viewshed from County Road 24 and Forest Service Road 73.

The primary past activities are vegetation treatments, such as thinning and burning. These activities reduce tree density, and have altered visual aesthetics in the short term. Overtime, the landscape visual experience will change, and eventually scenic integrity with these past actions will be enhanced as large-diameter trees develop.

Present activities (other than mining) continue to be vegetation management. Implementing Forest Plan standard and guidelines, and Best Management practices limit the effects to scenic integrity on federal land.

The cumulative effects analysis area for scenery is the viewshed from Grant County Road 24, Forest Service Road 73 and 10. These routes are designated concern level one routes are used as viewing platforms by the majority of the public. In this viewshed there is visual evidence of past even-age harvests that have created unnatural appearing geometric shapes on the landscape. Private land harvest activities, primarily single-tree removal and fuel reduction thinnings, have been limited to approximately 300 acres within the watershed over the last 15 years. Other ongoing and expected or reasonably foreseeable actions and operations (as listed at the beginning of this chapter) would not be expected to cause measurable visual impacts. No project-related activities would occur to alter landscape aesthetics.

It is expected however, that there will be naturally-occurring fires in the Granite Creek Watershed, which could open timber stands up, creating a greater mosaic of open pockets and thickets, and/or burn stands that currently screen mining activities from the roads. In the event of stand-replacement fire, depending on timing of such an event, some of the existing and proposed mining sites could become more visible to the public. With no vegetative screening, the project sites that are currently screened from roadway views along Forest Road 73 and County Road 24 would be visible, and would cause greater impact to the scenery resources until vegetation grew to heights that would once again provide screening. This “unveiling” caused by fire, in addition to current impacts of past clear cuts that have created geometric shapes would reduce scenic integrity to low.

Typically, large wildfire do not occur in the analysis area and scenic values should change at a gradual rate as undergrowth and fuel accumulations continued. Trees in the previous even-age harvests areas would continue to grow, and appear less managed.

Considering the total 104 acres with most of the 28 operations within the 2-5 acres of disturbance from mining activity proposed in these alternatives, along with the additional requirements and protection measures in Appendices 2 and 12, and with ongoing reclamation, no measurable cumulative effects to scenery are anticipated for Alternatives 2 and 3.

Summary of Effects

Alternatives 2 and 3 would have minimal effects to visual quality. These effects would be limited by the size of the disturbed areas, the duration of time each site would be visible from the traveling public along the Scenic By-Way, and the requirement to reclaim each site.

Visual impacts of mine sites are typically screened by natural vegetation unless they are visible in the foreground from primary travel routes. The highest potential for foreground views is along the Scenic By-Way. These views are at 90 degrees from the way of travel limiting the exposure to very short durations. The impacts would be further reduced by the required reclamation of disturbed sites. Annually, each site would be re-vegetated with native grasses, and when final reclamation is completed the site would be planted with vegetation appropriate to the site and to original densities. This would limit both the size of the disturbed areas and the duration of the impact. Over time, each mine site would be in various stages of recovery and visually be more representative of the surrounding foreground view.

Compliance with the Forest Plan and Other Direction

Selection of Alternative 1 would not meet WWNF Forest Plan goals to provide for the exploration, development, and production of a variety of minerals on the Forest (*WWNF Forest Plan 4-33*). This alternative would unreasonable restrict operations to the activities described in 36CFR 228 that do not require approval in a Plan of Operations. In most cases, this would not allow for full development of the mineral resource. This would unduly restrict the statutory rights afforded under the 1872 Mining Law (as amended) to every citizen to enter and remove valuable minerals from lands open to mineral entry.

Since 1872, an evolving body of legislation and policy has acknowledged, addressed, and directed mineral development on federal lands. The Federal Government's policy for minerals resource management is most succinctly expressed in the Mining and Minerals Policy Act of 1970.

The Forest Service bases its mission to administer mineral resources on that policy. As expressed in the Forest Service Manual, the availability of mineral and energy resources within the National Forests significantly affects the development, economic growth, and defense of the Nation. The mission of the Forest Service in relation to minerals management is to encourage, facilitate, and administer the orderly exploration, development, and production of mineral resources on National Forest System lands to help meet the present and future needs of the Nation.

The Forest Service has both a responsibility and an obligation to manage mineral resources in ways that meet the intent and direction of specific mineral laws and a multitude of other laws affecting management of the Nation's forests and grasslands. Mineral resource development is a valid management responsibility as directed by law and policy, and is crucial to meeting the needs of the Nation and supporting a strong economy.

Alternative 2 complies with federal mining laws but does not meet the Forest Service's regulatory responsibilities to manage resources by minimizing adverse environmental impacts on National Forest System surface resources (36CFR 228).

Alternative 3 meets the Mining Laws, allowing access and extraction of valuable minerals and provides for reasonable measures to protect the impacts to National Forest System surface resources. Implementing this alternative would meet Visual Quality Objectives which allow for activities that are visually subordinate to the landscape (Partial Retention), and for activities that dominate the landscape but borrow from naturally established form, such as natural open areas or previously altered landscapes. As a requirement of reclamation, disturbed sites would meet Partial Retention. The reclaimed sites would be visually subordinate to the characteristic landscape within 3-5 years.

Social and Economic

Introduction

The Granite Watershed is located in the northeast corner of the Grant County which covers much of the southwestern part of the Blue Mountain region of northeastern Oregon.

Mining History

Early federal minerals legislation encouraged the settlement and economic development of western lands. The General Mining Law of 1872 opened the public domain to mining activities. Its stated purpose was to encourage and promote mineral development. This law authorized miners to locate mineral claims on public domain lands. Eventually, if certain conditions were met, the United States conferred title to the land within the claim to the miner. With the exception of the town of Granite, this type of patented land makes up a significant proportion of the private lands within the Granite Creek Watershed.

The history of gold mining in Grant County began soon after the initial discoveries of placer gold at Griffin Gulch in 1861. Discoveries were also made at Sumpter and Canyon Creek, and by 1864 nearly all the mining districts of the Blue Mountains area were known (Lindgren, 1901, p. 563-564). The important gold-producing districts in Grant County were the Canyon Creek, Granite, Greenhorn (partly in Baker County), North Fork, Quartzburg, and Susanville. All of Granite and a portion of Greenhorn mining district were located in the Granite Creek Watershed.

From 1880 to 1899, Grant County produced $3,022,564 (about 146,000 ounces) in gold (Lindgren, 1901, p. 573). From 1904 through 1957 it produced 77,840 ounces of lode gold, 226,835 ounces of placer gold, and 19,967 ounces undifferentiated as to source. Approximate total gold production through 1959 was 470,600 ounces. *(A. H. Koschmann and M. H. Bergendahl - USGS 1968)*

As early as 1862 placer gold was mined from the gravels of Granite Creek, Clear Creek, and Bull Run; in 1874 lode mining became commercially important when the Monumental and La Belleview mines, the most productive lode mines in the district, were discovered. Much of the early placer mining was done by the Chinese, who at one time outnumbered the Americans (Lindgren, 1901, p. 686). From World War II through 1959 the district was virtually idle with the exception of the Buffalo mine which supplied nearly all the lode gold mined in eastern Oregon during that period (Koch, 1959, P.I).

Koch (1959, p. 38) estimated the total lode production of the Granite district to be $1,800,000, most of which was in gold and in small amounts of silver. This would represent, conservatively, about 75,000 ounces of gold. Recorded lode production for the district from 1904 through 1959 was 37,250 ounces. Placers yielded $1,033,000 in gold through 1914 (Oregon Dept. Geology and Mineral Resources, 1941, p. 40). Recorded placer production from 1904 through 1959 was 34,080 ounces and total gold production for the district was about 160,000 ounces.

Placer production was at its peak from 1863-1866. Placer mining began to decline about 1890 as the richest placers were worked out. But the placer operations had uncovered many rich veins, and lode mining began in earnest. Records show 2,000 people received their mail at Greenhorn at the height of the hard rock mining boom in 1902. By 1911 lode mining was on the decline, but a new gold rush began with the advent of bucket line dredges. The Burnt River was mined using a floating bucket line

dredge, and smaller streams such as Pinus, Camp, and Jackknife Creeks were mined using doodlebugs or dragline dredges. Dredge tailings composed of boulders and large rock piled up behind these dredges and covered the topsoil, which settled to the bottom.

Closure of precious metals mining combined with increased operating costs and a fixed gold price precluded the reopening of all but a few mines after World War II (*WWNF Forest Plan, pg. 2-15*). By 1957 the large bucket dredge operations had shut down. Inflation and high gold prices in the early 1980s caused renewed interest in gold mining and increased activity. The potential exists for many more years of removal of gold, silver, and other precious metals from both hard rock and placer deposits by small-scale mining operations like those currently taking place. There is also potential for reclamation of past disturbances.

Economics

A comprehensive economic efficiency analysis requires that all economic benefits and costs be identified and compared. Quantifiable economic information on the benefits of the alternatives that would result in improved environmental conditions for the Granite Creek Watershed is not available; for example, the flow of economic benefits from reducing the production of sediment is not readily definable. However, economic costs and benefits relative to the mining operations can be estimated, based on the equipment in use or proposed to be used, the estimated rates of exploration or production, the cost of any additional operating requirements included in the alternatives, and the reclamation required to be done upon completion of mining activities – both seasonal and permanent. The miners' personal income benefits from these mining operations are also not available, as the Forest Service does not receive reports on the quantity and quality of gold and other marketable minerals recovered.

Expenses of mining, would likely find their way into the local economy which would be positive. The possibility does exist that some of the proposed operations would not operate. Expenses may render their deposit as uneconomical at today's precious metal market prices. However, it is not feasible to attempt to predict how many, if any would not mine, because full marketing evaluations of each of these deposits is beyond the scope of this analysis, and therefore an economic determination cannot be made by the Forest Service for each individual operation. Therefore, to determine the potential economic effect, this analysis will evaluate and compare between alternatives only the operating cost to mine one half acre of placer deposits.

Although five operations propose lode mining, only two propose to operate at small production levels. Royal White is the only operation that proposes lode mining exclusively. The other four propose a combination of placer and load. The cost associated with lode mining are generally higher then placer mining. Load mining as proposed in this analysis is not measured by acre of material processed. Because this type of operation only represents a small percentage of the proposed operations, the similarity of these operations to the placer operations, i.e. labor, time per day and length of season, and equipment used, there is not a measurable difference between the two types of operation on the economic contribution.

Regulatory Environment

Federal Laws

Many laws, regulations, policies, and plans direct the Forest Service to support and facilitate mineral extraction while protecting surface resources to the extent possible.

The **1872 Mining Law** states that all valuable mineral deposits in land belonging to the United States are to be free and open to exploration. Under this law, a mine locator "shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations and of all veins, lodes, and ledges throughout the entire depth."

The **Organic Administration Act of 1897** grants authority to the Forest Service to regulate surface resources of National Forest System lands.

The **Multiple Use Mining Act of 1955** directs that any mining claim located after July 23, 1955 shall not be used, prior to issuance of patent, for any purposes other than prospecting, mining or processing operations and uses reasonable incident thereto, and that such claims shall be subject to the right of the United States to manage and dispose of the vegetative surface resources thereof and to manage other surface resources thereof, and right of the United States, its permittees, and licenses, to use so much of the surface thereof as may be necessary for such purposes or for access to adjacent land.

The **Mining and Mineral Policy Act of 1970** directs the Federal Government to foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs.

The **National Forest Management Act of 1976 (NFMA)** recognizes the fundamental need to protect and, where appropriate, improve the quality of soil, water, and air resources. The Act also recognizes the interrelationships between and interdependence within renewable resources.

The **Federal Land Policy and Management Act of 1976 (FLPMA)** states that public lands will be managed recognizing the need for domestic sources of minerals.

The **Forest Service Surface Use Regulations (36 CFR Part 228, Subpart A – also known as the 228 Regulations)** set forth rules and procedures for use of the surface of National Forest System lands in connection with mineral operations. The regulations direct the Forest Service to prepare the appropriate level of NEPA analysis and documentation when proposed operations may significantly affect surface resources. These regulations do not allow the Forest Service to deny entry or preempt the miners' statutory right granted under the 1872 Mining Law. The regulations require the Forest Service to develop measures to minimize adverse impacts on National Forest resources. The 228 regulations include requirements for reclamation.

The **Forest Service Manual (FSM) 2800** discusses specific responsibilities and considerations for dealing with Plans of Operations. It states that the Forest Service should minimize or prevent adverse impacts related or incidental to mining by imposing reasonable conditions that do not materially interfere with operations. It also requires the Forest Service to evaluate proposals for road

construction and reconstruction and consider alternatives that may be less damaging to surface resources (*FSM 2817.25*).

The Forest Service direction also includes the National Environmental Policy Act of 1970 (*42 U.S.C. 4332*), the Council of Environmental Quality regulations (CEQ) at 36 CFR 800; the Federal Water Pollution Control Act (Clean Water Act); and the Clean Air Act as amended.

The Mining Law Administration program is managed by the Bureau of Land Management (BLM) as authorized by the Secretary of the Interior, and involves recordation, maintenance (annual assessment requirements), and mineral patents. Joint administration of the mining laws on National Forest Systems lands is provided for in a Memorandum of Understanding (MOU) between the BLM and Forest Service. The purpose of the MOU is to ensure coordination between the general surface resource management of the Forest Service and the administration of the mining laws by the BLM.

Wallowa-Whitman National Forest Plan

The 1990 Wallowa-Whitman National Forest Plan (WWNF Forest Plan) Goals for minerals are:

- To provide for exploration, development, and production of a variety of minerals on the Forest in coordination with other resource objectives, environmental considerations, and mining laws.

The WWNF Forest Plan includes the following Minerals Standards and Guidelines (*WWNF Forest Plan, pg. 4-33*):

1. Access. Permit claimants reasonable access to their claims as specified in the United States Mining Laws.
2. Operating Plans. Require operating plans in accordance with 36 CFR 228 Subpart A when operations are proposed, which involve significant disturbance of the surface resources.
3. Operating plans will include reasonable and operationally, feasible requirements to minimize adverse environmental impacts on surface resources.
4. Analyze operating plan proposals and alternatives, including alternatives for access, reclamation, and mitigation, using Forest Service NEPA process.
5. Reclamation. Develop reclamation standards using an interdisciplinary process to ensure lands are in productive condition to the extent reasonable and operationally feasible. Reasonable opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs and formulated using technical and other resource input.

Umatilla National Forest Plan

The 1990 Umatilla National Forest Plan (UNF Forest Plan) includes the following Minerals Standards and Guidelines (*UNF Forest Plan, page 4-8)*:

1. Mineral exploration and mineral removal are permitted throughout the Forest except in withdrawn areas.
2. Under the mining laws, claimants are entitled to access to their mining claims. Access for exploration and development of locatable mineral resources will be analyzed in response to a proposed operating plan. A decision on approval of reasonable access will be made as a result of appropriate environmental analysis.

3. When claimants propose mining activities which involve disturbance of the surface resources, a notice of intent and/or a proposed plan of operation must be submitted. The proposal will be processed in a timely manner in accordance with 36 CFR 228.
4. During development of operating plans or plan modifications. Reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the miner. The test for operating plan requirements is 'reasonableness.'
5. Reclamation standards will be developed using an interdisciplinary process to insure land restoration to a productive condition to the extent reasonable and practicable. When reasonable, opportunities to enhance other resources will be considered. Concurrent reclamation will be stressed. Reclamation bonds will be based on actual reclamation costs.
6. Claims on which application for patent have been made will be examined and conclusion of validity will be presented to the BLM for final action.

Effects Analysis Methodology

Specific Assumptions

Assumption 1: Estimating the cost to mine one half acre will be sufficient to display the economic effects between alternatives.

Assumption 2: The primary area of economic effect from operations in the Granite watershed will be Baker and Grant Counties.

Assumption 3: The cost of operations includes reclamation by the miner.

Assumption 4: An average depth of bedrock for operations in the analysis area is 10 feet. This is based on personal observations over a 20-year period and the limitations on the equipment typically used.

Assumption 5: Based on personal observations and discussions with miners in the area, on the average, only the last two feet above bedrock contain enough values to process.

Specific Methodology

Data Sources

- Bureau of Land Management bond calculation spreadsheet
- Final Environmental Impact Statement, North Fork Burnt River (April 2004)

Indicators

Indicator Measure 1: The effects of the alternative on operating cost.

Short-term timeframe: 5 year (increases in operating cost make assumptions beyond this timeframe speculative.)

Spatial Boundary: Baker and Grant Counties. Typically, miners reside in the area or stay on site while operating. Supplies, materials, and equipment are purchased or serviced locally.

Methodology: The estimated cost of operation based on the Bureau of Land Management Bonding Spreadsheet will be used to display the effects between alternatives.

The decision to be made does not affect the right to access the mineral estate within the project boundary, thus it is assumed that mining would occur under all alternatives. Changes in mineral removal would occur chiefly due to factors outside the control of the Forest Service, such as the value

of gold. These changes would occur regardless of the selected alternative. Therefore, the analysis does not make assumptions about variation in mineral removal between alternatives.

Affected Environment

Placer gold is typically sold in one of two forms. Nuggets may be sold to jewelry makers, the general public, or other users directly. An unknown amount of gold production enters the market directly by sales to the jewelry industry, and thus, may never be reported as typical production from some small operations. Individual pieces are typically assessed an additional charge or "nugget bonus" in addition to the gold market price. Placer gold may also be smelted, and pass into the market through the same route as lode-mined gold (U.S. EPA 1988b).

According to U.S. Bureau of Mines statistics, placer mines have historically produced approximately 35 percent of the total U.S. gold production. However, while net gold production has increased annually in recent years, placer production has decreased as the readily accessible deposits have been mined out and improvement in heap leaching technology have increased. Placer mines produced only two to three percent of the total U.S. gold production during the period from 1984 through 1989; in 1990 and 1991, placer production accounted for approximately one percent of the U.S. total. According to Bureau of Mines statistics, placer mines produced 2,888 kg of gold in 1991 while total U.S. gold production was approximately 289,885 kg (U.S. DOI, Bureau of Mines 1988a; U.S. DOI, Bureau of Mines 1992a; Lucas 1992).

The economics involved in mining a deposit is dependent on factors including the cost of fuel, interest rates, and the market price of gold. These factors are variable in terms of location and time. Under 1991 conditions, gold placer mines could economically beneficiate gravels containing as little as 0.49 grams per cubic meter (0.01 oz/cubic yard). However, average recoverable gold content of precious metals from placer gravels was 0.82 gm/m3 (0.02 oz/yd3) of material washed. (U.S. DOI, Bureau of Mines 1992a).

Regardless of size, most placer mines throughout the country operate on a seasonal basis (ADEC 1986; U.S. EPA 1988a). The small size of most placer operations and the relative ease in establishing an operation make placer mines particularly sensitive to fluctuations in market prices; more mines are active when prices are up and fewer are active as prices drop. These facts contribute to the difficulty in establishing the number of mines operating at any one point in time (U.S. EPA 1988a). Additionally, the limited information collected by state and federal agencies, and the sources that these agencies use to determine the number of operational mines, make specific characterization of the placer mining industry exceedingly difficult.

This analysis does not address the economic consequences of mineral removal because the rights to the mineral estate are granted under the General Mining Act of May 10, 1872, as amended. Mining activities would occur under each alternative. Therefore, this economic analysis does not consider the value of mineral removal.

Within the Granite Creek Watershed analysis area, there are no currently approved mining Plans of Operations. There may be some small-scale operations that are limited to the use of hand tools. Small-scale operations that do not use mechanized earthmoving equipment are allowed by regulations and do not require the miner to contact the Forest Service. The contribution to the local economy of these operations cannot be measured and will not be included in this analysis.

The operations considered in this analysis typically do not employ workers so labor cost is not included in the operating cost.

Employment and Income

Employment within Baker and Grant Counties is distributed in industry sectors as displayed below in Table 3-64. Government and Retail Trade are the largest components of employment in the counties. Mining employment represents 2% in Baker County and 1% in Grant County. The largest employer for mining in Baker County is Ash Grove cement plant at Durkee which has 109 employees.

Table 3-64: Employees and Wages by Industry[14]

	Baker		Grant	
Industry	**Employment**	**Avg. Salary**	**Employment**	**Avg. Salary**
Accommodation and food services	694	$16,677	216	$14,634
Administrative and waste services	234	$14,427	108	$14,528
Arts, entertainment, and recreation	99	$3,818	55	$3,000
Construction	508	$20,428	0	0
Finance and insurance	245	$28,098	107	$25,701
Forestry, fishing, related activities, and other	185	$13,324	245	$29,755
Government	1,264	$52,303	1033	$53,073
Information	113	$28,788	53	$39,208
Management of companies and enterprises	50	$12,320	0	0
Manufacturing	704	$39,132	0	0
Mining	134	$16,097	18	$4,556
Other Services, except public administration	589	$27,168	207	$22,889
Professional and technical services	370	$24,046	114	$21,307
Real estate, rental, and leasing	390	$7,664	0	0
Retail trade	1,075	$22,022	420	$20,421
Transportation and warehousing	291	$46,069	0	0
Utilities	87	$82,655	0	

[14] www.zoomprospector.com

	Baker		Grant	
Industry	**Employment**	**Avg. Salary**	**Employment**	**Avg. Salary**
Wholesale trade	122	$27,672	58	$24,207

Figure 3: Oregon Mining Industry Fact Sheet

MINING IN OREGON

Oregon's mining industry is vital to the state's economy. It ranked thirty-fifth nationally in total nonfuel mineral production value in 2004. The value of nonfuel minerals was $367 million. The industry employed 2,866 workers with an average annual income of $40,898. Oregon's combined direct and indirect economic output gain from the mining industry was $1.4 billion (2005 data).

America's mining industry directly employed over 320,000 employees in 2004, who labored to produce minerals with a total value of over $67 billion. These materials were further transformed by consuming industries into consumer and industrial goods creating an additional $2.0 trillion in value added by other mineral, metal and coal consuming industries.

FACTS ABOUT OREGON'S MINING INDUSTRY

Oregon produces about 1% of the total U.S. nonfuel mineral value. Construction sand and gravel and crushed stone were the state's leading nonfuel minerals.

Employment 1/	
Total State Industry	**2,888**
Number of Mines	
Nonfuel Minerals	**288**
Annual Wages	
Mining Industry Average 2/	**$40,888**
Total State Average (Private Sector)	**$36,826**
Coal Consumption (short tons)	
Electric Power	**2,077,000**
Industrial	**W**
Residential/Commercial	**W**
Total	**2,141,000**
Value of Nonfuel Mineral Production Per Capita	**$101**

Per capita nonfuel mineral value reflects the amount of nonfuel minerals produced per person in the state. The value is calculated by dividing the total value of nonfuel mineral production by the total state population. ***(2004 U.S. Census Bureau data).***

Annual Production Value	
Clays	W
Gemstones	1,210,000
Sand and gravel:	
Construction	125,000,000
Stone:	
Crushed	126,000,000
Others*	114,000,000
Total	**$367,000,000**
Mining's Impact on Oregon's Economy 3/ (millions)	
Output Generated - Direct	$400
Output Generated - Indirect	1,000
Total	**1,400**
Earnings Generated - Direct	148
Earnings Generated - Indirect	286
Total	**434**
Personal Income and Tax Revenue Generated	156
Employment Impacts	
Employment Generated - Direct	3,100
Employment Generated - Indirect	8,900
Total	**12,000**

Note: Data may not add to totals because of independent rounding.
1/ Includes employees of all mining sectors, contractors and office workers.
2/ Includes coal.
3/ Data provided by the Moore Economics study, *The Economic Contributions of the Mining Industry in 2006* (2005 data).
W Withheld to avoid disclosing company proprietary data.
* Combined values of cement (portland), clays (bentonite), diatomite, emery (2002 - 03), lime, perlite (crude), pumice and pumicite, and talc (crude).

Sources: U.S. Geological Survey, Mineral Industry Surveys, 2004; DOE/EIA Coal Industry Annual 2004; Bureau of Labor Statistics, Average Annual Pay Report 2004 and Mine Safety & Health Administration 2004 Part 50 data.

National Mining Association 101 Constitution Ave., NW Suite 500 East, Washington, DC 20001 202/463-2600

Note: Sand, Gravel, and Crushed Stone are the States leading non-fuel minerals.

Environmental Justice

Executive Order 12898 requires Federal agencies to "identify and address the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." According to the Council on Environmental Quality's (CEQ) Environmental Justice Guidelines for NEPA (1997) "minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis…..a minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above stated thresholds." Thus, the ethnic and racial composition of Baker and Grant County, surrounding the potential mining activity are of interest. The shares of population by race and ethnicity are displayed in Table 3-65[15] below. In 2012, the share of population described as white was greater than the state in both Counties. Since the difference in shares between the different counties is small, these differences are not considered "meaningful" as defined by the CEQ. Thus, while minority groups exist in the area, they are not considered environmental justice populations.

Table 3-65: Population by Race and Ethnicity

Category	Baker County		Grant County		Oregon
Population, 2012 estimate	15,909		7,317		3,899,353
Population, 2010 (April 1) estimates base	16,134		7,445		3,831,073
Population, percent change, April 1, 2010 to July 1, 2012	-1.4%		-1.70%		1.8%
Population, 2010	16,134		7,445		3,831,074
White persons, percent, 2011 (a)	95.5%		95.50%		88.6%
Black persons, percent, 2011 (a)	0.4%		0.30%		2.0%
American Indian and Alaska Native persons, percent, 2011 (a)	1.2%		1.30%		1.8%
Asian persons, percent, 2011 (a)	0.5%		0.40%		3.9%
Native Hawaiian and Other Pacific Islander persons, percent, 2011 (a)	0.1%		0.10%		0.4%
Persons reporting two or more races, percent, 2011	2.4%		2.40%		3.4%
Persons of Hispanic or Latino Origin, percent, 2011 (b)	3.6%		3.10%		12.0%
White persons not Hispanic, percent, 2011	92.2%		93.00%		78.1%

Civil Rights, Women, and Minorities

Adverse effects on civil rights, women and minorities not already identified in the FEIS for the WWNF and UNF forest plans are not expected from implementing the alternatives. To the greatest

[15] http://quickfacts.census.gov

extent possible, all populations have been provided the opportunity to comment before decisions are rendered on proposals and activities affecting human health or the environment. The proposals within this EIS would not have a direct or indirect negative effect on minority or low-income populations.

Environmental Effects

Alternative 1 – No-action Alternative

Direct and Indirect Effects of No Action

All National Forest System lands within the analysis area are open to mineral entry. US citizens have a statutory right to remove valuable minerals from National Forest System lands open to mineral entry. Therefore, mining activities would occur under all the alternatives, including the No-Action Alternative. However, the 28 proposed Plans of Operations would not be authorized for approval under this alternative.

The regulations governing the surface use of National Forest System lands allow a level of operations to occur without authorization from the Forest Service. Each specific site is evaluated to determine what level of activity may occur under the regulations. This evaluation is first conducted by the miner. However, the level of operations allowed under the regulations cannot cross the threshold of causing a significant disturbance.

Assuming that the level of operations under this alternative is low impact and typically small, there is no way to measure what level of economic contribution would occur.

There would be no direct effects on the socioeconomic environment if no action were to take place. Any change in conditions would occur as a natural progression of economic and social activity, thus there is no means of estimating the indirect effects of taking no action.

Cumulative Effects of No Action

Given that there are no measurable direct and indirect effects that would occur under the no action alternative, there would also be no measurable cumulative effects.

Alternatives 2 and 3 – Proposed Action and Proposed Action with Forest Service Requirements

Direct and Indirect Effects of Proposed Mining Activities

Alternative 2 and 3 have the same estimated effects on the cost to mine one half acre of land.

Although in Alternative 3 proposes implementation of site-specific mitigations and the General Requirements, this would not measurably change the economic benefit or harm. A majority of these requirements adjust operating practices to reduce the environmental effects. Examples of these requirements include maintaining disturbed sites in a stable condition, armoring fords, placing lined vaults under hazardous materials, using certified weed-free straw, and maintaining erosion control devices on roads. These are all considered best management practices and do not represent a substantial investment of time or money. Other requirements would have a direct cost associated

with them, such as the purchase of fire tools, hazardous spill kits, and in some operations, water testing. These requirements would not represent a substantial investment by the miners.

Another factor that may increase cost equally under both alternatives is the requirement to comply with all Federal and State laws and regulations. In Alternative 2, the individual mining proposals may not have included this requirement. However, Alternative 3 specifically addresses compliance with all laws (G18). A decision to select any of the alternatives would not affect this requirement.

Based on the BLM spreadsheet (attached), the cost to operate is estimated at $17,800 per half acre mined. This cost is associated with supplies, materials, and the cost to operate equipment (fuel, repairs, supplies, and maintenance). All these expenses would contribute to the local economy. The cost benefit to the miner would be the value of gold recovered minus the operating cost.

Implementation of either Alternative 2 or Alternative 3 would have a positive effect on the local economy. Even if only a percentage of mines are operational in a given year, for each half acre mined, $17,800 in operational cost would benefit the local community.

Cumulative Effects of Proposed Mining Activities

Long-term timeframe: 10 years because economic change, unforeseeable future projects, demographic changes, etc. make assumptions beyond this timeframe speculative.

Spatial Boundary: Analysis area**:** Granite Watershed

The cumulative effects of either alternative include the change in social and economic conditions that would result from the operation of these mines, in conjunction with the direct and indirect effects of other present and reasonably foreseeable activities being conducted in the Granite Watershed. It assumed that the effects from past activities have already been absorbed by local communities and are represented in the affected environment. Any change in the social and economic environment as a result of these alternatives would be in addition to other mining activities (hand work), and any other income producing activities occurring simultaneously in the analysis area, as well as those that could reasonably occur in the future.

Within the analysis area there is a very limited economic base to benefit the local economy. There are no current mines operating in the area. The Buffalo mine, located on private land within the watershed, has shown some recent interest from prospective investors, but no operations have occurred in several years. The City of Granite is located within the watershed but has only a small store/restaurant/gas station and limited lodging. An increase in mining activity would most likely benefit these local businesses, however, most materials, supplies, services and equipment would come from Baker City, the largest community near the analysis area with a full range of services. As stated above, the benefits of business within the analysis area have already been absorbed into the local economy. Therefore, the proposed mining activities would have an immeasurable positive cumulative effect on the local economy (City of Granite), and may have a small positive effect on the community of Baker City.

Cultural Resources

Introduction

This Cultural Resources analysis incorporates by reference and summarizes what is found in the two Cultural Resources specialist reports from the WWNF and UNF (project file-FOIA exempt). Both forests consulted with the Oregon State Historic Preservation Office (SHPO) for this project. Concurrence with a "no historic properties adversely affected" determination was received for the Wallowa-Whitman National Forest from SHPO on February 24, 2014. Consultation between the Umatilla National Forest and SHPO is currently ongoing and a determination of “no historic properties adversely affected” is expected spring 2016.

For all proposed Plans on both forests, approximately 104 acres are planned for actual work activities. The smallest mine work area is 1 acre, and the largest is 10 acres. The Area of Potential Effect (APE) is being defined as the proposed work area within the claim boundary.

Prehistoric and historic sites (primarily historic mining sites) are documented in the Granite Mining analysis area. Structures, both historic and modern, are present in the mining project area. In most cases, the structures belong to the miners as part of their mining operations. There are also several prehistoric sites recorded in the mining project area. These prehistoric sites will be avoided by all mining activities.

Prehistoric/Historic Setting

Prehistoric and historic American Indian cultural resource site types may include lithic scatters (chipped stone artifacts), resource utilization areas such as tool stone quarries and plant processing sites, seasonal camps such as small habitation areas or large villages, and special places. Special places may consist of sites and places that are valued for cultural, religious, or traditional importance (for example, traditional food locations such as berry areas, root gathering areas, medicinal plant grounds, and collection areas for materials for utilitarian and ceremonial craft production, as well as usual and customary hunting and fishing locations). Artifacts may include obsidian, chert, or basalt projectile points, knives, scrapers, burins, bifaces, utilized flakes, and debitage. Bone tools, stone cobble tools, mortars and pestles, net sinkers, beads, and various metal objects may also be included in artifact assemblages.

Prehistoric residents of the Plateau region of the interior northwest adapted to the harvest and long-term storage of several key resources. The key resources included fish, edible plants, and a wide variety of animals. All three forms of sustenance played heavily in the survival of Plateau peoples.

Historic cultural resources include remains and records of the past that are at least 50 years old. Cultural materials or locations show occupation and resource utilization of the Plateau region of the interior northwest. Sites may include trash dumps, log cabins, building complexes, mines, ditches, and railroads, and are most often related to homesteading, timber harvest, or mining activities. Also represented are administrative sites related to early Forest Service management. Artifacts may

include notched logs or cut lumber, tin cans, bottles and jars, ceramics, and metal items such as tools.

Historic mining sites may include mining adits and pits, tailings, structures such as cabins and stamp mills, trash dumps, and water ditches. Artifacts may include large equipment such as boilers and trommels, and smaller items such as hand tools, tin cans, bottles, and jars.

With regard to tailings, most of the proposed Plans are in locations with some form of historic mining and resulting tailings. The current projects may move historic tailings about as the tailings are re-processed. However, in many areas this activity has happened a number of times. The re-processing and moving about of tailings in the Granite Creek watershed has been ongoing over time and can be considered a continuation of historic activity rather than a new or different activity.

Culturally Significant Foods

According to the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), First Foods are those resources, reserved in their treaty, to which Tribal members retained rights. These rights, such as hunting, fishing, and gathering roots and berries, have been acknowledged by the United States Supreme Court. The CTUIR's mission to protect, restore, and enhance the First Foods (including water, salmon, deer, cous, and huckleberry) for the perpetual cultural, economic, and sovereign benefit of the Tribe measures the success of resource management by the availability and utilization of these resources. The sustainability of these resources is considered by them the minimum ecological condition necessary to meet the subsistence needs of the community. In addition to first foods, there are other foods, medicines, materials and plants that are expected to occur in association with first foods when landscapes are in high quality, high functioning physical and ecological condition.

At least three known subsistence areas utilized by the Cayuse and Umatilla are in or near the analysis area. Culturally significant foods (both flora and fauna) are being addressed in other sections of the EIS.

The botany specialist report includes an evaluation of the presence of some of the culturally significant plants on the proposed mining claim sites. Although not all culturally significant plants were surveyed for or were addressed, the Forest Service conducted a botanical survey of the mining claims to identify known culturally significant plants. The result of this survey is documented in a separate botanical report. The Wildlife section of this chapter addresses impacts to big game, and the Fisheries section addresses fish species and habitat. Big game includes elk and deer, and efforts were made to identify any habitat issues that might impact these populations. Fish resources were also addressed from the habitat perspective, mainly for potential water quality issues. For further information on these resources please, refer to these respective sections of this chapter.

Traditional Cultural Properties (TCPs)

The National Register Bulletin: Guidelines for Evaluating and Documenting Traditional Cultural Properties states "to determine what constitutes a reasonable effort to identify traditional cultural

properties is to consult those who may ascribe cultural significance to locations within the study area." Consultation with interested parties, including Tribal Historic Preservation Offices and elected Tribal government officials, is initiated through the Section 106 process of the NHPA and through the National Environmental Policy Act. If traditional cultural properties are identified through the Section 106 or NEPA scoping process, they will be evaluated through consultation with the THPO and SHPO offices. The National Forests depend on Tribal feedback in order to identify potential traditional cultural properties.

Maps showing the analysis area, and a brief description of the project, were provided to the CTUIR during the following National Forests-CTUIR Program of Work meetings:

Natural Resources Committee and staff; February 22, 2012
Fish & Wildlife and Cultural Resources Committees and staffs; March 27, 2012
Board of Trustees government-to-government; May 9, 2012
Natural Resources Committee and staff; May 20, 2013
Fish & Wildlife and Cultural Resources Committees and staffs; June 25, 2013
Board of Trustees government-to-government; August 23, 2013
Natural Resources Committee and staff; June 4, 2014
Fish & Wildlife and Cultural Resources Committees and staffs; July 15, 2014
Board of Trustees government-to-government; September 19, 2014

CTUIR concerns were expressed regarding water, fish, and cultural resources.

Maps showing the analysis area, and a brief description of the project, were provided to the Nez Perce Tribe at staff-to-staff Program of Work meetings on April 24, 2012, and April 4, 2013. No tribal concerns were expressed about the project.

Maps showing the analysis area, and a brief description of the project, were provided to the Confederated Tribes of Warm Springs at a meeting on October 30, 2013.

Drafts of cultural resource specialist reports from the WWNF and UNF were submitted to the CTUIR and Confederated Tribes of Warm Springs on July 11, 2014. A final WWNF cultural resource specialist report was submitted to the CTUIR, Confederated Tribes of Warm Springs, and Nez Perce Tribe on August 17, 2014. An updated UNF cultural resource specialist report was submitted to the CTUIR and Confederated Tribes of Warm Springs in August, 2014. A preliminary Granite Creek Watershed Mining DEIS was submitted to the CTUIR and Confederated Tribes of Warm Springs in September of 2014. A meeting was held with both Forests and CTUIR staff on November 17, 2014 to review comments on the preliminary DEIS and cultural resource specialist reports. Tribal comments were addressed and, as appropriate, incorporated in the DEIS. No comments were received from any local tribes during the official 45-day comment period.

Laws, Regulations and Policy

In 1966 Congress declared that the federal government "administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations" (National Historic Preservation Act (NHPA)) (16 U.S.C. 470-2(3)). This need was made more explicit when the NHPA was amended in 1980 and Section 110 was added to expand and underscore federal agency responsibility for identifying and protecting historic

properties and avoiding unnecessary damage to them. Many historic properties are fragile, and once damaged or destroyed they cannot be repaired or replaced.

Section 106 of the NHPA compels federal agencies to take into account the effect of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (36 CFR 60).

Cultural resources provide information on the Wallowa-Whitman and Umatilla National Forests' prehistoric and historic heritage, including evidence of several American Indian groups (primarily the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Indian Reservation, and the Nez Perce Tribe and their predecessors), and other groups such as European-Americans and Chinese. In addition to providing archaeological evidence of past lifeways and adaptation to the environment, cultural resources also lend a historic perspective on today's technological and sociological change.

The Forest Service is directed to identify, evaluate, treat, protect, and manage historic properties by several laws. However, the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.), provides comprehensive direction to federal agencies about their historic preservation responsibilities. Executive Order 11593, Protection and Enhancement of the Cultural Environment, issued in 1971, also includes direction about the identification and consideration of historic properties in federal land management decisions. It directs federal agencies to inventory cultural resources under their jurisdiction, to nominate to the National Register of Historic Places federally owned properties that meet the criteria, to use due caution until the inventory and nomination processes are completed, and to ensure that federal plans and programs contribute to preservation and enhancement of non-federally owned properties.

The NHPA extends the policy of the Historic Sites Act of 1935 (49 Stat. 666; 16 U.S.C. 461-467) to include resources that are of state and local significance, expands the National Register of Historic Places (NRHP), and establishes the Advisory Council on Historic Preservation (ACHP) and State Historic Preservation Officers (SHPOs). NHPA Section 106 directs all federal agencies to take into account effects of their undertakings on properties included in or eligible for the National Register. Regulations 36 CFR 800 implement NHPA Section 106. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally-owned historic properties.

The Forest Service Manual, Chapter 2360, Cultural Resource Program Management, provides guidance for the National Forests. Guidance is also provided by the 2004 Programmatic Agreement among the USDA Forest Service PNW Region 6, the ACHP, and the Oregon SHPO Regarding Cultural Resources Management in the State of Oregon by the USDA Forest Service.

Survey Methodology and Results

With the exception of Old Eric 1 and 2, which had no previous cultural survey recorded, all the claim areas had previous survey associated with them and each claim area was revisited by an archaeologist as part of this project. In addition, the area associated with Old Eric 1 and 2 was surveyed as part of this project. The purpose of these visits was to examine the area of potential effect (APE) for each location and to note any changes that might have occurred since the area was previously visited. The APE for each Proposed Plan of Operation is the proposed work area within the claim boundary. Road accesses to claims from main Forest Service roads were included in this assessment and potential impacts were also considered.

It is recognized that most if not all of the proposed mining claims are either in whole or in part occurring on old dredge or other mining tailing. These older tailing being associated with previous mining entries into these areas have some historic value, however the historic value of the tailing is in their existence at these locations as mining remains, rather than in the tailings themselves. Given this, these claims tend to fall in the realm of "living history". Therefore, they are being considered a continuation of the historic activity that created them, albeit at a much smaller scale, rather than a completely new or different activity in the area. There is the potential to move these tailing around because the miners are intending to, in some plans, reprocess these tailings. In many cases, these tailings have been processed and moved at least once if not twice before. It is believed that given the small amounts of material (relative to what is there), that this moving around of the tailings would not significantly impact or destroy any cultural value associated with these tailings.

WWNF

Surveys were conducted in 2008, 2013 and 2014 for this project. Some areas were completely open ground exposed by mining or road activity, and others were forested with some duff cover and vegetation. Survey conditions were generally good, and weather was clear and dry.

The entire analysis area has received intensive inventory, through a combination of past and current survey.

The majority of the project area had received previous adequate survey; however, current survey was completed in most proposed work areas by Nolan and Purvis. Their transect interval was 20 meters or less, and transects generally followed the contours of the terrain. Harvey completed a current reconnaissance survey of all project areas. He also completed intensive survey, at 20 meter or less transects, for those work areas which were not covered by Nolan and Purvis. For roads that received current survey, a corridor width of at least 40 meters (20 meters on either side of centerline) was accomplished. During surveys, special attention was given to areas of high visibility such as bare ground, rodent mounds, road or stream cuts, and natural and human-caused disturbance.

Total survey acres was 467 (445 project acres, plus 22 extra acres). Nolan and Purvis's current intensive survey was approximately 165 acres; they focused on proposed work areas and in a few places surveyed beyond the actual project boundary. Harvey's current survey included approximately 56 acres of intensive, with the remaining 389 of the project acres receiving reconnaissance survey. (Note that the Nolan and Purvis survey area and the Harvey survey area have some overlap.)

Cultural resource sites that were monitored were documented. Photos were taken. Sketch maps were updated. Transect interval in the site areas was less than 20 meters.

All project areas were surveyed. Eighteen previously recorded cultural resource sites were monitored. The sites include mines, tailing and adit locations, ditches, historic artifact scatters, and a small bridge. Eleven of the sites are not eligible for the NRHP, five are unevaluated, and two are eligible. No new sites were located.

UNF

Survey results from previous UNF projects were used for this analysis. In addition, each of the proposed mine locations were visited and surveyed by an archaeologist. Old Eric 1 and 2 were surveyed as part of the project and the results are documented in the cultural report.

The data gathered consisted of collecting GPS locations for all of the buildings (if there are any associated with the claim), taking photographs of the buildings, and surveying the areas for potential prehistoric archaeological material.

In addition, additional research was conducted at the county court house of Grant County in John Day Oregon as well researching any historical information available in Granite and Ukiah.

The claims intersect 22 sites and 1 isolated find, and an additional 13 sites and 2 isolated finds are within 100 meters of the claim boundaries. Of the sites that intersect the claims, 21 are historic, one is pre-historic, and the isolated find is historic. Of the 13 sites and 2 isolated finds that are outside the claim boundaries (do not intersect the claims), all are historic. The single pre-historic site is a lithic scatter that is considered eligible for listing on the National Register of Historic Places (NRHP). The 3 isolated finds are considered not-eligible for listing on the NRHP by definition.

The sites that are unevaluated for NRHP eligibility (all are historic mining-related sites) will be treated as eligible and protected as needed from project activities. There are some notable exceptions to this strategy. Some of the cabins that are unevaluated are the property of the miners so the ability of the Forest Service to protect these cabins is limited to stipulations in the permits; this, however, is deemed adequate protection since the permit holders are obligated to follow the terms of their permits. The Forest Service will work cooperatively with the miner to protect these cabins.

Requirements and Protection Measures

General Requirements

With regard to historic structures on mines, there may be opposing interests between the Forest Service and miners. By law, within a claim, the claimant has the right of exclusive possession to appurtenances such as cabins, although the use must be directly related and incident to the mining operations actually conducted on the claim. In the past, if a miner wanted to remove or modify a structure, the Forest Service perceived that it had very limited options. For this project, the Forest Service has made an effort to work cooperatively with miners to discuss historic structures and recommended protection efforts.

Historic mine features such as tailings, adits, and pits may also be features of opposing interests between Forest Service cultural resource specialists and miners. Within a claim boundary, the claimant has the exclusive right to explore, develop, and mine the minerals. In the past, great leniency was given to miners with regard to historic features; and this can be seen in most of the current project areas, where many historic adits and tailings have also been worked in modern times.

For the current project, there are some general requirements that must be followed as part of the mining Plans of Operation and permits. The following three requirements pertain to cultural resources:

> **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. Miner 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.

G17. If unexpected cultural 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, affected tribes and other consulting parties. All eligible and unevaluated sites will be protected throughout the life of the project as required by law. Protection of these sites, in most cases, shall be accomplished through avoidance by ground-disturbing activities.

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

G18. Approval of this plan does not relieve the miner 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.

Site-specific Cultural Resource Protection Measures

As a result of the field surveys, recommendations were made to protect or avoid specific cultural sites. These protection measures are identified by Plan in Appendix 11 of this EIS.

Environmental Effects

Alternative 2 – Direct/Indirect and Cumulative Effects

Alternative 2 does not include the site-specific cultural resource protection measures or General Requirements to avoid and/or protect cultural resource sites within the Area of Potential Effect (APE) of several proposed Plans. Therefore, Alternative 2 has the potential for ground-disturbing or other impacts to known and unknown cultural resource sites from the proposed mining-related activities.

Alternative 3 – Direct/Indirect and Cumulative Effects

Although there are cultural resource sites located within the Area of Potential Effect (APE) of

several proposed Plans, the Plan-specific cultural resource protection measures identified in Appendix 11, and General Requirements G3, G17 and G18 are sufficient to protect all eligible and unevaluated sites, and as such the proposed Plans should not have an adverse effect (no direct/indirect or cumulative effects) on any historic properties present. Therefore it has been determined that there will be "**No Adverse Effect**" to any known eligible or unevaluated cultural resources from the proposed mining-related activities.

In the event that a previously unknown cultural resource is encountered, it will be protected from disturbance and a forest archaeologist will be notified. Work will not continue in the vicinity of the newly discovered resource until it has been evaluated for the NRHP and all necessary consultations completed.

Other Required Disclosures

Unavoidable Adverse Effects

Localized sediment inputs/reduced water quality at site and down stream

Off-channel activity that would have a water quality impact is limited to the 1) mining activity at Belvadear and 2) mining activity at Blue Sky/Bull Run (Blue Sky site 3). The impacts are summarized below and discussed in detail in Appendix 7 by Plan.

The mining activity at Belvadear would input sediment via subsurface flow of sediment generated by mining in the riparian area into Olive Creek through the narrow berm which separates the area to be mined and Olive Creek. The berm is composed of old placer tailings and flow was observed entering the creek through the berm at two points indicting connection between the creek and the proposed mining area.

The mining activity at Blue Sky/Bull Run (site 3) has the potential for a discharge of sediment into Bull Run Creek as a result of active mining in the side channel.

Localized increases in stream temperatures and reduction in stream flow at the sites

Belvadear, Eddy Shipman, Hopeful 1, Lightning, Olive Tone, Tetra Alpha Placer and Tetra Alpha Mill and Lode proposed to withdraw water from creeks within the Granite watershed. Analysis of water withdrawal impacts for all of the eight Plans are found in in detail in Appendix 7 by Plan.

Five Plans have the potential to withdraw enough water to measurably increase localized stream temperatures and reduce stream flow. They are Belvadear, Lightning, Olive Tone, Tetra Alpha Placer and Tetra Alpha Mill and Lode. The impacts are summarized below.

Under these five Plans, water withdrawals would occur on Boulder Creek (Tetra Alpha Placer and Tetra Alpha Mill and Lode), Lightning Creek (Lightning Placer) and Olive Creek (Belvadear and Olive Tone). These three streams are small tributaries and available data show that currently stream depths and flows are low in the summer and stream temperatures exceed the ODEQ standard. Therefore, the miner's proposal to withdraw water during the summer has the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation. The magnitude of the impact would vary as a function of climate and flow conditions that year and prior years.

Localized increases in detrimental soil conditions and loss of soil productivity

Soils would be disturbed and soil productivity lost as a result of the proposed activities. The mining areas proposed for activity are small (< 10 acres) and in many cases a portion of the activity area has already been disturbed due to past mining activity. Therefore, the amount of new detrimental soil disturbance would be small when assessed at the subwatershed scale (**Table 3-24)**. The addition of

Forest Service General Requirements would help accelerate the recovery of soil productivity and prevent soil erosion (Appendix 2), though the length of time required to restore soil structure and soil productivity once it has been lost could still be on the order of decades.

Short-Term Use and Long-Term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

The majority of uses under the Plans of operations continue mining activity on the same areas that have been disrupted for over a century. Mining is not a short-term use. It may take decades to exhaust a mineral source. During that time, activity varies with the market for the mineral being mined.

Long-term productivity at the sites has been changed. Under Alternative 3, additional protection measures and requirements have provided for future forest productivity on freshly disturbed sites by preserving topsoil, establishing vegetation in kind, and otherwise reclaiming sites. However, historic disturbance that is not a part of the current Plans of Operations will remain in a state of low productivity until restoration occurs and assists in the process of recovery.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

Loss of cultural sites resulting from accidental damage or vandalism would be an irreversible commitment of resources. Extensive cultural resource surveys and a requirement to avoid and protect cultural sites provide reasonable assurance that there would be no irreversible loss of cultural resources.

Minerals are a limited resource. They were generated through geologic activity. There is little chance that more minerals will be created in this geologic era. Removal of the mineral is irreversible. There may be other as-yet undiscovered sources that would counteract this extraction, but since the area has been mined for over a century, it is likely that most sources have already been located and are in the process of being removed at various rates. Until such time as all the mining activity has been completed within the Granite Creek Watershed, the sites are irretrievably committed to mining.

There are no known significant irreversible resource commitments or irretrievable losses of timber production, wildlife habitats, fisheries, or water quality from actions initiated under any of the

alternatives. Water quality and soil impacts are addressed above under the heading "Unavoidable Adverse Effects".

Plans and Policies of Other Jurisdictions

State, County and other Required Permits

Other authorities may require additional permits for some or all of the activities included in a proposed Plan of Operations. It is the responsibility of the miner to make sure they obtain all required state, county or federal permits necessary to conduct their mining operation. These permits are generally enforced by the agency which issues and administers the permit. The Forest Service has consulted with several of these agencies during this analysis process and will provide copies of this document to those agencies as requested (Appendix 2, General Requirements G18 and G19). Approval of a Plan of Operation by the Forest Service does not remove the legal liability of the miner to abide by other state and federal laws or regulations.

The following Oregon Department of Environmental Quality (ODEQ) and Oregon Department of State Lands (DSL) permits are specifically mentioned in this document in conjunction with some of the proposed activities. One or more of the following permits may be required.

- **The 700-PM Permit**
- **General Permit (600 permit)**
- **Individual Permit** – required if operation does not fit General Permit
- **401 certification** – if an 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(1) - Compliance With the Clean Water Act)

Clean Air Act

This project will have no impact on air quality. There are no fuel treatments planned, so there will be no smoke emissions from the burning of fuels. Mining activity could create a limited amount of dust, but this would be confined to the project area and would not affect any areas designated for protection under the State of Oregon's Smoke Management Program.

Clean Water Act (CWA)

Refer to the Water and Soil Resources analysis in this chapter for a description of how the alternatives comply with the CWA.

Wetlands and Floodplains

Refer to the Water and Soil Resources analysis in this chapter for a description of how the alternatives comply with Executive Orders 11988 and 11990.

Public Health and Safety

All action alternatives include provisions to protect the general public from the hazards of mining operations.

Mining operations can pose a safety risk to the general public. Uninformed recreationists may inadvertently travel onto active mining sites. Trucks and other vehicles used in the mining operation may pose a hazard to recreationists using the same roads. Pits and unguarded adits also pose a risk. The Code of Federal Regulation for Parks, Forests, and Public Property at 36 CFR 228.9 (maintenance during operations, public safety) states that during all operations, the operator shall maintain structures, equipment and other facilities in a safe, neat and workmanlike manner. Hazardous sites or conditions resulting from operations shall be marked by signs, fenced, or otherwise identified to protect the public in accordance with Federal and State laws and regulations. Because all authorized Plans would be required to adhere to all mining-related laws, regulations and policies, all action alternatives include provisions to protect the general public from the hazards of mining operations. Since there would be no effect on public water sources from any of the proposed Plans, the proposed Plans would comply with the Safe Drinking Water Act of 1974. Additional management requirements to protect the general public have been incorporated in the Plans of Operations included under Alternative 3 (Appendix 2 – General Requirements).

Effects on ESA-Listed Species and Regional Forester's Sensitive Species

The Endangered Species Act requires protection of all species listed as "Threatened" or "Endangered" by Federal regulating agencies (U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration – Fisheries). The Forest Service maintains through the Federal Register a list of species which are proposed for classification and official listing under the Endangered Species Act, species which appear on an official State list, or that are recognized by the Regional Forester as needing special management to prevent being placed on Federal or state lists. This section identifies the actions taken to comply with the Endangered Species Act. Details regarding the actual species found within the analysis area and the potential effects of proposed activities on the species and their habitat are contained under Wildlife, Fisheries, and Botany sections of this chapter.

Plants

There are no known populations of "Threatened" or "Endangered" plant species within the analysis area. A biological evaluation has been completed for "sensitive" plant species. See the Botany section of this chapter for more detailed discussion of the predicted effects on "Sensitive" plant species.

Terrestrial Wildlife

Effects of the proposed activities are not considered significant in the context of the analysis area, the Wallowa-Whitman National Forest, the Umatilla National Forest, and the Blue Mountains. Wildlife

species and habitat will not be significantly impacted by activities that are limited in duration and intensity and affect a relatively small area. No adverse effects are expected for any wildlife species listed as “Sensitive” by the Forest Service, nor those listed as “Threatened” or “Endangered” by the U.S. Fish and Wildlife Service. A determination has been made that the proposed activities would have no effect to threatened Canada lynx, therefore consultation with the U.S. Fish and Wildlife Service is not required for listed wildlife species. A biological evaluation has been completed for “sensitive” wildlife species. See the Wildlife section of this chapter for more detailed discussion of the predicted effects on “sensitive” wildlife species.

Aquatic Species

A Biological Assessment (BA) was prepared for ESA threatened MCR summer steelhead and Columbia River bull trout and their designated critical habitat (DCH). A draft review Biological Opinion and Terms and Conditions was received from USFWS on February 2, 2016, and draft Terms and Conditions from NMFS on January 6, 2016. Effects determinations for ESA species in the Granite Creek Watershed Mining Plans are documented in the BA and FEIS Chapter 3, Fisheries. The Biological Assessment found that activities proposed in the Plans will have “No Effect”, “May Affect, but are Not Likely to Adversely Affect”, or “May Affect, and are Likely to Adversely Affect” on ESA listed species and their DCH. Final Biological Opinions are expected from USFWS and NMFS in the spring of 2016.

Under ESA Section 7 regulations and consistent with provisions of section 7 (a)(3), (b) and (c), Applicants have been designated for the Granite Mining Project (letters in project file). Applicant involvement includes a meeting with the UNF and WWNF July 2, 2014 to discuss the draft Biological Assessment, and opportunities to review updated Biological Assessments, review draft Biological Opinions and draft Terms and Conditions. Draft review documents were mailed to Applicants June 30, 2015, December 21, 2015 and February 12, 2016, along with postings on the WWNF website).

Biological evaluations were prepared for sensitive species as identified by the Regional Forester. The evaluations determined that while there may be impacts to individual species, those effects are not likely to contribute to a trend towards federal listing or loss of viability of the population or species (FEIS Chapter 3, Table 3-36).

Cultural Resources

Both forests consulted with the Oregon State Historic Preservation Office (SHPO) for this project. Concurrence with a "no historic properties adversely affected" determination was received for the Wallowa-Whitman National Forest from SHPO on February 24, 2014. Consultation between the Umatilla National Forest and SHPO is currently ongoing and a determination of “no historic properties adversely affected” is expected spring 2016.

If unexpected cultural 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, affected tribes and other consulting parties. 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 or by following the Secretary of Interior's Guidelines for Historic Preservation.

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

In an effort to protect historic structures, the removal of any eligible or unevaluated building from a claim location will be considered a separate undertaking and as such will be consulted on as a separate project. What this means is that a separate consultation with SHPO will be initiated when and if these structures are to be removed. In conjunction with this effort, those buildings that are currently eligible or unevaluated will be considered eligible for this current project (Granite Mining EIS) and will be maintained as to preserve the potential historic nature of the buildings following the Secretary of Interior's Guidelines for Historic Preservation.

Consultation with Indian Tribes/Protection of Treaty Resources

Potentially affected Tribes were contacted during the analysis process (see Chapter 1, Public Involvement).

Certain rights and privileges were reserved by the Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation and the Nez Perce Tribe by virtue of the treaties of 1855. These treaties resulted in cession by the Tribes to the United States of a large territory that includes the entire Umatilla National Forest and approximately two-thirds of what is now the Wallowa-Whitman National Forest. The treaties provide that the Tribes will continue to have the rights of taking fish in streams running through and bordering the reservations and at all other usual and accustomed stations in common with other citizens of the United States. Further, the tribes retain the right of erecting suitable or temporary buildings for fish curing as well as the privilege of hunting, gathering roots and berries, and pasturing stock on unclaimed lands. These rights remain unaffected, and were considered in the development of this document.

Chapter 4

Agencies and Persons Consulted

Recipients of the Final EIS

The following list contains the recipients of the Granite Mining FEIS. The list includes those who requested copies, responded during the scoping or comment period, operators affected by the proposal, tribes, and required agencies.

Agencies

Advisory Council on Historic Preservation
Department of Environmental Quality
Department of Land Conservation and Development
Department of Geology and Minerals Industries
Division of State Lands
Environmental Protection Agency, Region 10
FAA, Northwest Mountain Region
Federal Highway Administration
National Marine Fisheries Service, Habitat Conservationists Division
Natural Resources Conservation Service
NOAA Office of Policy and Strategic Planning
Northwest Power Planning Council
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Department of the Interior
Oregon Parks and Recreation Department
Oregon State Economist
Oregon State Water Resources Department
USDA APHIS PPD/EAD
USDA National Agricultural Library
USDA Office of Civil Rights
USDI Office of Environmental Policy and Compliance
U.S. Army Engineer, Northwest Division
U.S. Coast Guard
U.S. Department of Energy, Office of NEPA Policy and Compliance

Organizations

Eastern Oregon Mining Association
Hells Canyon Preservation Council
Northwest Environmental Defense Center
Oregon Wild

Individuals

Jan Alexander
Ken Anderson
Fadi Atiyeh
Norm Becker
James & Sandra Bisset
Randy Bunch
David Busselle
Brooke Myers
Brian Hanley
Roy Campbell
Charles Cree
Steve & Jonathan Cree
Mark Gates
Robert Glazebrook
Earl Graham
Scott & Rebecca Guthrie
Bill Holoboff
Alice Knapp
Dennis Koellermeier
Gene Ladoucer
Dianne Lewallen
Chad Marmolejo
Teneil McCreary
Melvin McDaniel
David & Janice Meheen
Norma & Brie Myers
Nate Nazer
Jeff Nazer
Tommy Partee
Anthony Perasso
Jean Public
Mark & Lori Roan
Sandy & George Row
Leslie Sissel
Steve Smith
Robert Sunderman
Ray Woodward

Tribes

Confederated Tribes of the Umatilla Indian Reservation
Nez Perce Tribe
Confederated tribes of the Warm Springs Reservation
Burns Paiute Tribe

Preparers

The following agency personnel (past and present) participated in the preparation of the EIS. All personnel are current, previous or retired employees of the Wallowa-Whitman and Umatilla National Forests.

Jeff Tomac –Whitman District Ranger (WWNF)

Ian Reid – current North Fork John Day District Ranger (UNF)

Robert Varner – North Fork John Day District Ranger (UNF)

Suzanne Fouty – District Hydrologist (WWNF)

Edward Farren – South Zone Hydrologist (UNF)

Tracii Hickman – Threatened and Endangered Species Coordinator (UNF)

Allison Johnson – District Fisheries Biologist (UNF)

Chris Helberg – Minerals and Special Uses Administrator (UNF)

Mike Hall – District Minerals and Recreation Staff (retired WWNF)

Sophia Millar – Interdisciplinary Planner/NEPA (WWNF)

Jamie Ratliff – District Wildlife Biologist (WWNF)

Mark Darrach – Forest Botanist (UNF)

Josh White – Invasive Species Specialist (WWNF)

Bradley Lathrop - Invasive Species Specialist (UNF)

Allen Madril – Forest Archaeologist (UNF)

Sarah Crump – Forest Archaeologist (WWNF)

Erik Harvey – South Zone Archaeologist (WWNF)

Lori Seitz – South Zone Road Manager (UNF)

Eric Dreher – GIS Specialist

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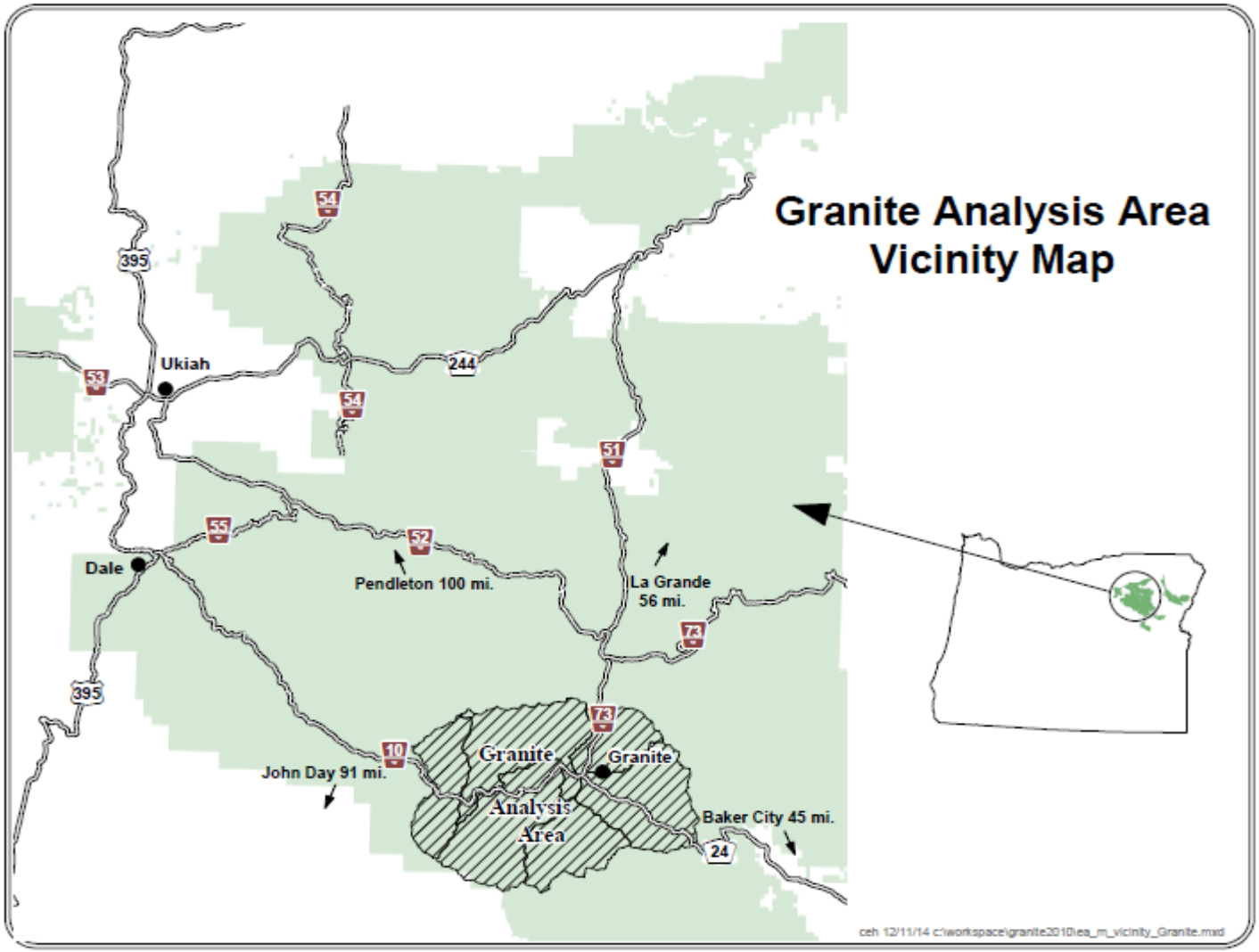
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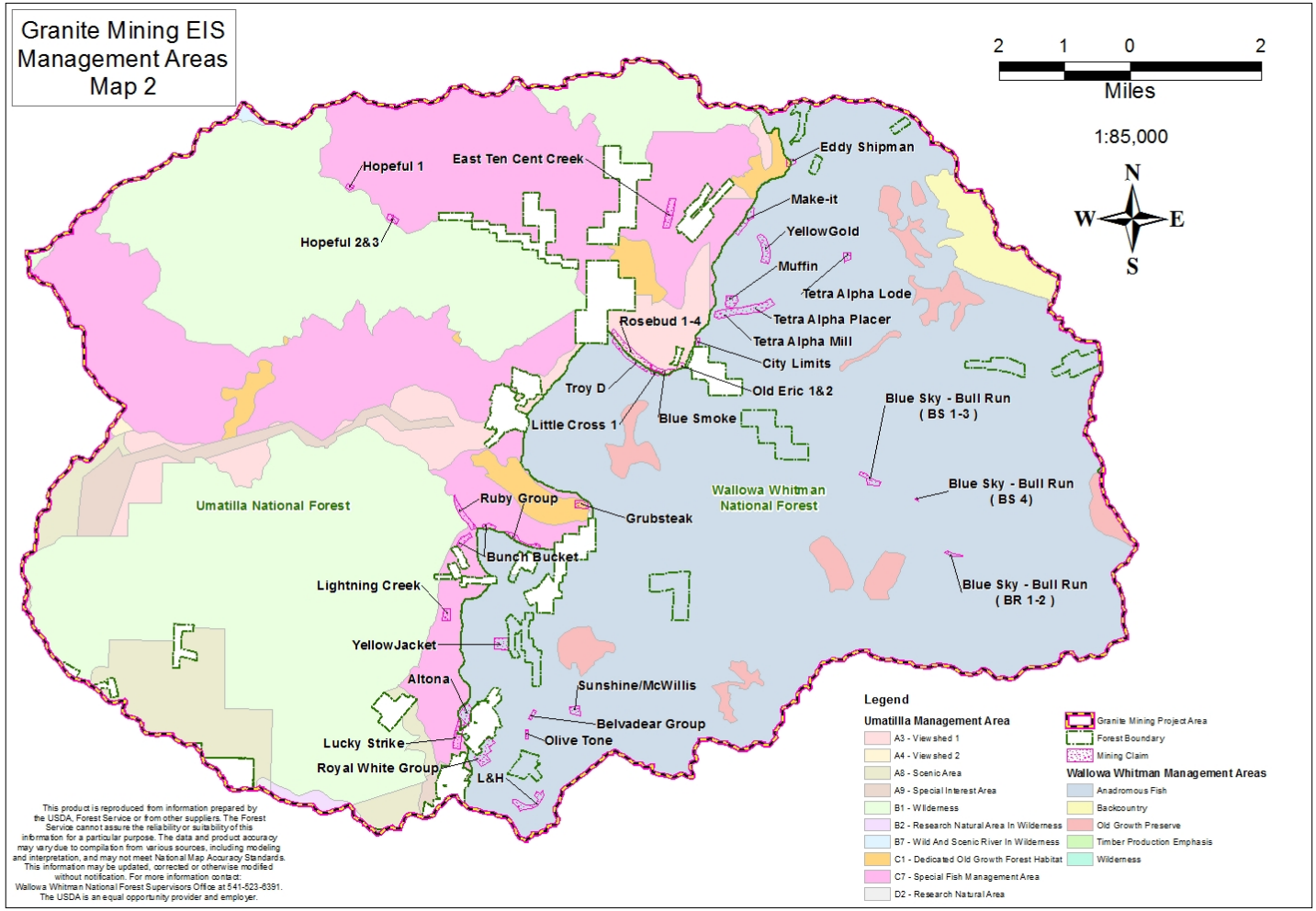
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East Ten Cent Creek
Hopeful 2&3
Eddy Shipman
Make-it
YellowGold
Muffin
Tetra Alpha Lode
Tetra Alpha Placer
Tetra Alpha Mill
City Limits
Rosebud 1-4
Old Eric 1&2
Troy D
Little Cross 1
Blue Smoke
Blue Sky - Bull Run
(BS 1-3)
Blue Sky - Bull Run
(BS 4)
Blue Sky - Bull Run
(BR 1-2)
Wallowa Whitman
National Forest
Umatilla National Forest
Ruby Group
Grubsteak
Bunch Bucket
Lightning Creek
YellowJacket
Altona
Sunshine/McWillis
Belvadear Group
Olive Tone
Lucky Strike
Royal White Group
L&H
Legend
Umatillla Management Area
A3 - Viewshed 1
A4 - Viewshed 2
A8 - Scenic Area
A9 - Special Interest Area
B1 - Wilderness
B2 - Research Natural Area In Wilderness
B7 - Wild And Scenic River In Wilderness
C1 - Dedicated Old Growth Forest Habitat
C7 - Special Fish Management Area
D2 - Research Natural Area
Granite Mining Project Area
Forest Boundary
Mining Claim
Wallowa Whitman Management Areas
Anadromous Fish
Backcountry
Old Growth Preserve
Timber Production Emphasis
Wilderness
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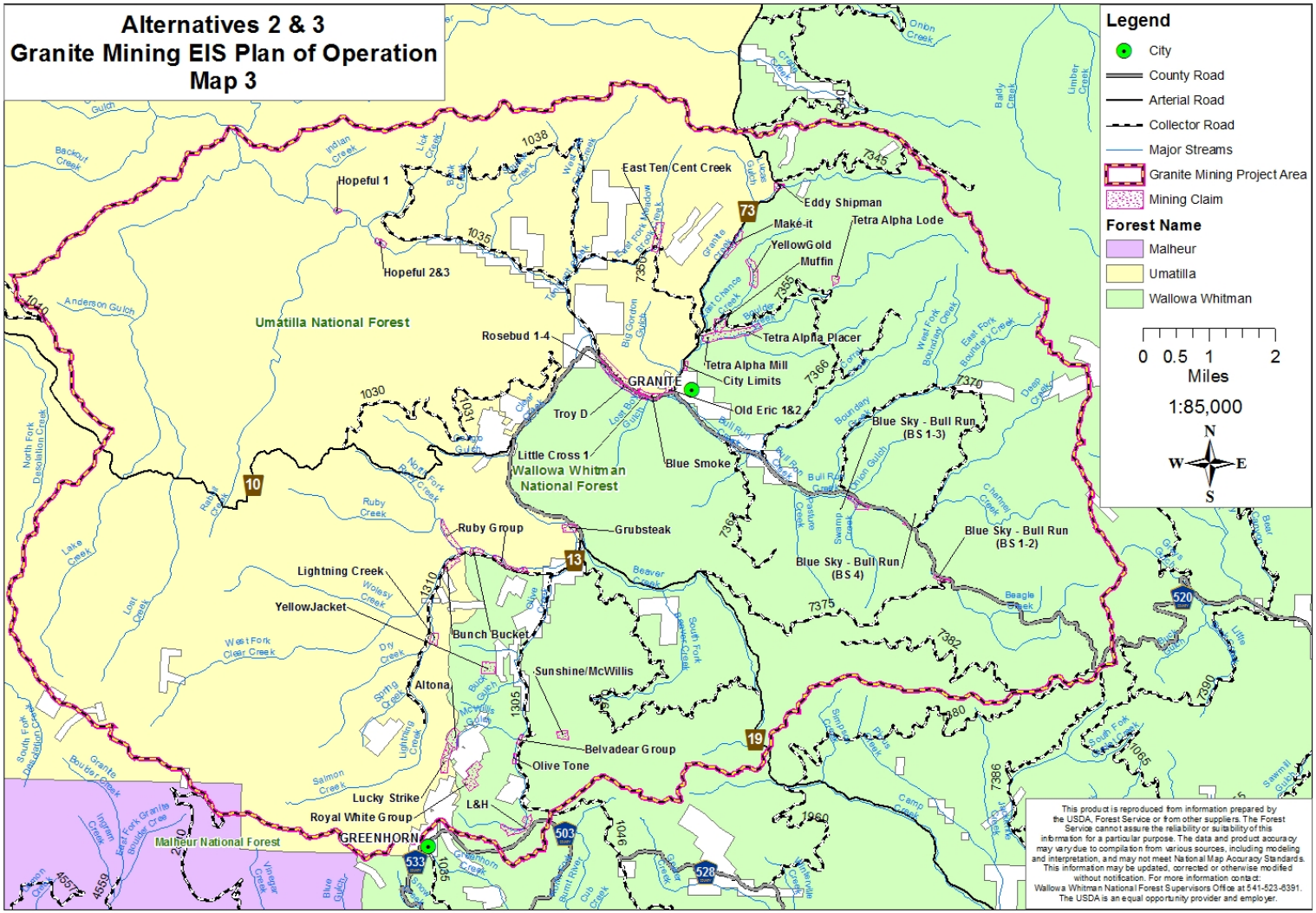
Alternatives 2 & 3
Granite Mining EIS Plan of Operation
Map 3
Legend
City
County Road
Arterial Road
Collector Road
Major Streams
Granite Mining Project Area
Mining Claim
Forest Name
Malheur
Umatilla
Wallowa Whitman
0 0.5 1 2
Miles
1:85,000
N
W
E
S
Umatilla National Forest
Wallowa Whitman National Forest
Malheur National Forest
GRANITE
GREENHORN
Hopeful 1
Hopeful 2&3
East Ten/Cent Creek
Eddy Shipman
Make-it
Tetra Alpha Lode
YellowGold
Muffin
Rosebud 1-4
Tetra Alpha Placer
Tetra Alpha Mill
City Limits
Old Eric 1&2
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Little Cross 1
Blue Smoke
Blue Sky - Bull Run (BS 1-3)
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Blue Sky - Bull Run (BS 4)
Ruby Group
Grubsteak
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YellowJacket
Bunch Bucket
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Belvadear Group
Olive Tone
Lucky Strike
Royal White Group
L&H
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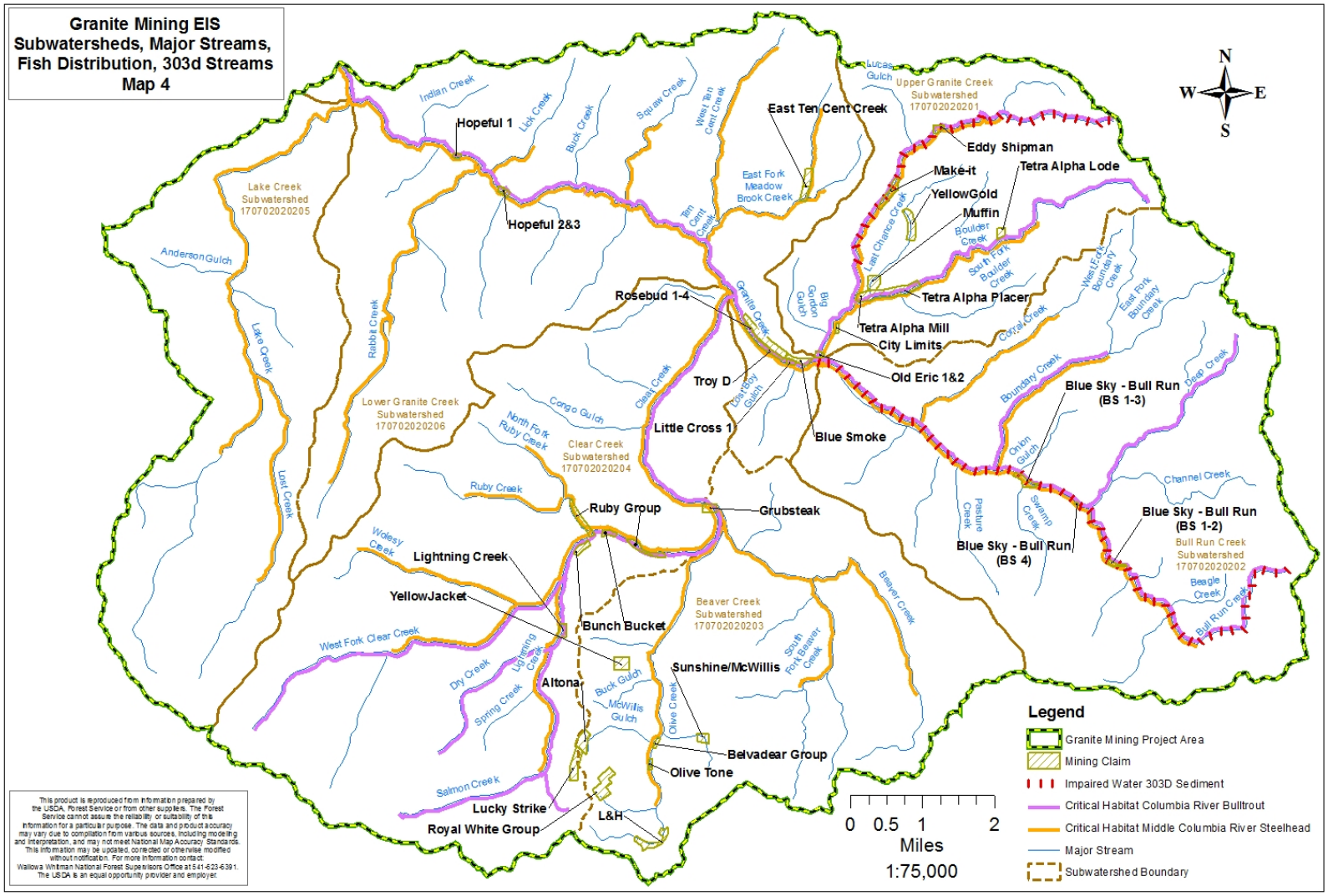
Granite Mining EIS
Subwatersheds, Major Streams,
Fish Distribution, 303d Streams
Map 4
N
W
E
S
Hopeful 1
Hopeful 2&3
East Ten Cent Creek
Eddy Shipman
Make-it
Tetra Alpha Lode
YellowGold
Muffin
Tetra Alpha Placer
Tetra Alpha Mill
City Limits
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Grubsteak
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YellowJacket
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Altona
Sunshine/McWillis
Belvadear Group
Olive Tone
Lucky Strike
Royal White Group
L&H
Upper Granite Creek Subwatershed 170702020201
Lake Creek Subwatershed 170702020205
Lower Granite Creek Subwatershed 170702020206
Clear Creek Subwatershed 170702020204
Beaver Creek Subwatershed 170702020203
Bull Run Creek Subwatershed 170702020202
Indian Creek
Lick Creek
Buck Creek
Squaw Creek
West Ten Cent Creek
East Fork Meadow Brook Creek
Ten Cent Creek
Lucas Gulch
Last Chance Creek
Boulder Creek
South Fork Boulder Creek
West Fork Boundary Creek
East Fork Boundary Creek
Boundary Creek
Deep Creek
Coral Creek
Big Gordon Gulch
Granite Creek
Anderson Gulch
Lake Creek
Rabbit Creek
Lost Creek
Congo Gulch
Cleat Creek
Cloverboy Gulch
North Fork Ruby Creek
Ruby Creek
Onion Gulch
Pasture Creek
Swamp Creek
Channel Creek
Beagle Creek
Bull Run Creek
Wolesy Creek
West Fork Clear Creek
Dry Creek
Spring Creek
Lightning Creek
Buck Gulch
McWillis Gulch
Olive Creek
South Fork Beaver Creek
Beaver Creek
Salmon Creek
Legend
Granite Mining Project Area
Mining Claim
Impaired Water 303D Sediment
Critical Habitat Columbia River Bulltrout
Critical Habitat Middle Columbia River Steelhead
Major Stream
Subwatershed Boundary
0 0.5 1 2
Miles
1:75,000
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United States
Department of
Agriculture

Forest
Service

March 2016

Appendices - Volume 1

(Appendices 1A-6B)

Final Environmental Impact Statement

Granite Creek Watershed Mining Project

North Fork John Day Ranger District
Umatilla National Forest

Whitman Ranger District
Wallowa-Whitman National Forest

Baker and Grant Counties, Oregon

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Appendix 1B - Explanation of Bentonite Blanket to Line Ponds

Appendix 2 - General Requirements for Plans of Operations

Appendix 3 - PACFISH MM2 and Structures in RHCAs

Appendix 4A - Effects of Suction Dredging

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Appendix 5A – Stream Temperature Data sorted by SWS

Appendix 5B – Stream Temperature Data sorted by Creek

Appendix 5C - Graphs of selected Stream Temperature data

Appendix 6A – Roads proposed for use – sorted by Plan

Appendix 6B – Roads proposed for use – sorted by SWS

Appendix 1A

Site Characteristics Used to Develop Forest Service Water Resource Protection Measures (WRPMs)

Site Characteristics Used to Develop Forest Service Water Resource Protection Measures

Mining sites were visited by the Forest Service district hydrologist or the fisheries biologist. The proposed mining sites varied by topography, ground cover, presence of stream tailings, micro-topography, presence of beavers, and presence of adits. Based on the site characteristics, Water Resource Protection Measures (WRPMs) were developed (Appendix 1A) to eliminate the potential for a discharge of pollutant into any channel and ensure compliance with Clean Water Act (CWA) and PACFISH MM-2. While variability existed between sites, they fell into the general categories listed below.

1. Operations on valley floor
    a. No placer tailings line the channel bank
    b. Placer tailings line the channel bank
2. Operation on a hillslope
    a. No placer tailings line the channel bank
    b. Placer tailings line the channel bank
3. Beaver dams
    a. Currently present
    b. Likely to be present at some time in the near future
4. Adit present
    a. Not discharging water
    b. Discharging water and within 300 feet of perennial stream or natural wetland BUT not discharging directly into either
        i. Operation plans to use adit water BUT not work the lode.
        ii. Operation plans to use the adit water AND work the lode.
        iii. Operation will not use the adit water OR work the lode.
    c. Discharging water and within 300 feet of perennial stream or natural wetland AND discharging directly into one or the other
        i. Operation plans to use adit water BUT not work the lode.

ii. Operation plans to use the adit water AND work the lode.

iii. Operation will not use the adit water OR work the lode.

d. Discharging water and greater than 300 feet from perennial stream or natural wetland

i. Operation plans to use adit water BUT not work the lode.

ii. Operation plans to use the adit water AND work the lode.

iii. Operation will not use the adit water OR work the lode.

5. Miscellaneous Site Characteristics

Discussion of Site Characteristics for each Category

1. Operation on valley floor: Starting point of buffer measurement clarified and buffer widths adjustments made from Alternative 2

a. *No placer tailings line the channel bank*

Most proposed Plans of Operation identified buffers around streams, wetlands, and springs. However, the location of where the buffer measurement started was often ambiguous because it was tied the stream. The low-flow stream varies in width from year to year and within a given season, and the wetted edge is therefore not a fixed location. Identifying the high spring flow edge requires evaluating a number of field elements (i.e. vegetation type, erosion lines, bar morphology) to determine the hydrologic bankfull or yearly high flow edge to a stream *(Harrelson et al. 1994)*. Because many of these channels have widened and incised, there are often multiple points that one could choose from when measuring a distance “from the creek”. For example, in **Figures 1A-2 and 1A-3**, Points A, B, and C all meet that definition but at progressively higher stream flows (Point A being the low flow or summer flow edge and Point C being the very high flood event edge).

The ambiguity raised questions about where the miner planned to start their buffer measurement: Was the plan referring to the 1) the low-flow stream edge during operation which would vary from year to year, 2) from the stream edge as defined by the high spring runoff flow and if so what where the indicators used to determine that location or 3) from the top of the stream bank or edge of terrace? Was the intention of the miners to stay out of the active floodplain or off unstable banks? This ambiguity is a problem because the starting location of the buffer measurement determines the degree to which a buffer eliminates the potential for a discharge of sediment into navigable waters as defined by the CWA.

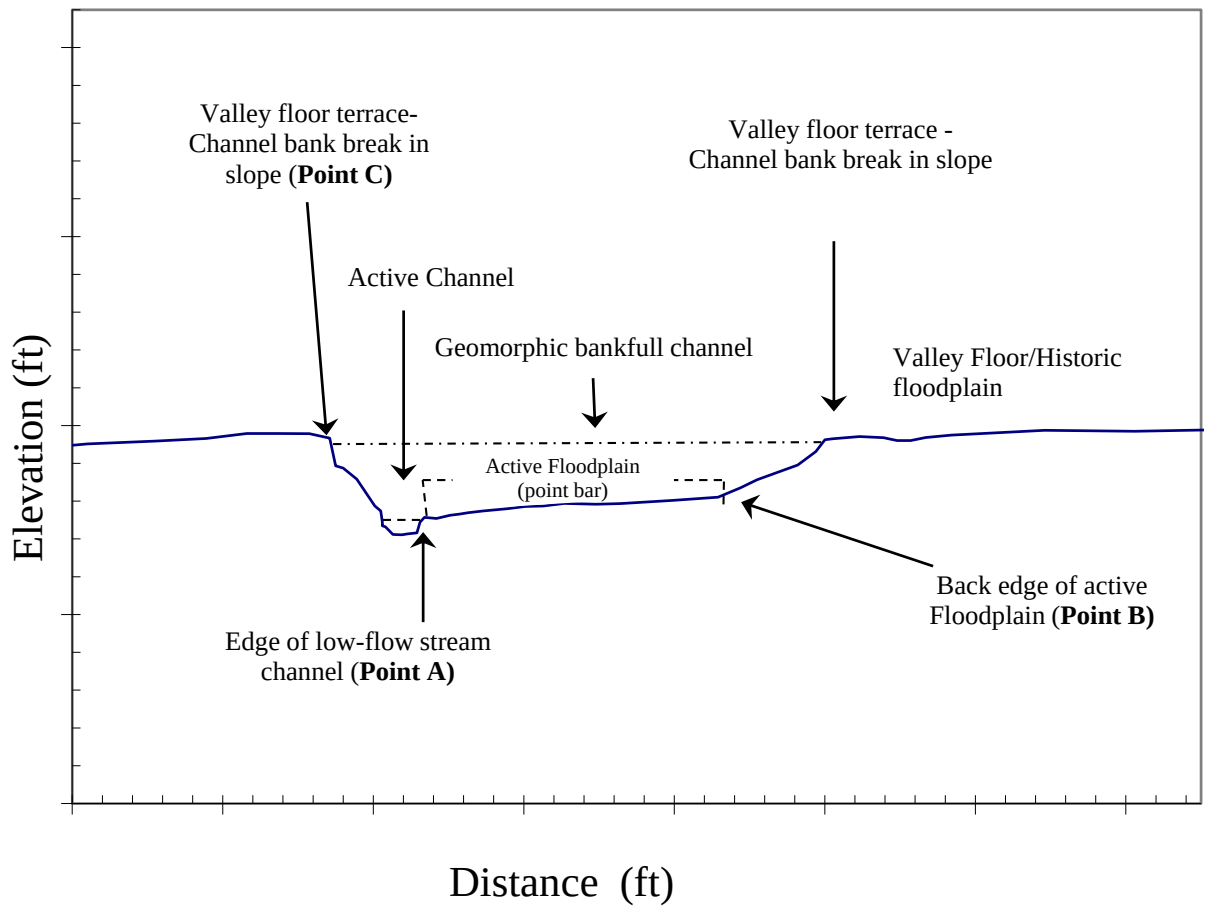


Figure 1A-1. Shows the location of the Valley floor terrace (historic floodplain) –Channel break-in-slope geomorphic feature. Note that this edge is NOT the streambank of the active channel but the streambank of the larger geomorphic channel. The active channel is inset into the geomorphic channel.

Figure 1A-2. Stream showing location of points mentioned in Figure 1A-1. Solid white arrow at the location of the valley floor-channel bank (VFT-CB) break-in-slope feature (**Point C)**. Dashed white arrow is at the point bar which is part of the active floodplain.

In order to eliminate the ambiguity and ensure no potential for a discharge of a pollutant, regardless of stream flow, a geomorphic rather than hydrologic feature was selected as the starting point for the buffer measurement. The geomorphic feature chosen as the starting point was the valley floor terrace-channel bank (VFT-CB) break-in-slope when present (**Figures 1A-1 and 1A- 2**). This geomorphic feature is clearly visible in the field and does not vary from year to year or within a season, unless an erosional event has occurred. The valley floor is the historic floodplain which has been isolated from the stream as a result of channel widening and incision due to historic land use. The selection of this geomorphic feature as the starting point puts proposed mining activities on the valley floor and outside the active floodplain, stream banks, and valley floor terrace banks. Current vegetation on the valley floor is drought tolerant, indicating that this geomorphic surface is rarely flooded.

Figure 1A-3 shows how the buffer zone location, and its ability to prevent a discharge of pollutant, varies depending on how the “creek edge” is defined and the topography. In Scenario 1, the operation would be in the stream bank that borders the active floodplain. In Scenario 2, the operation would be on the valley floor terrace, but close to the stream cut bank that borders the active floodplain. Disturbance of the cut bank in Scenarios 1 and 2 would result in sediment moving into the active floodplain which would then be delivered to the stream the following spring. In Scenario 3, the operation would be clearly on the valley floor terrace with 25 feet of a

no-activity zone separating the activity from the stream cut bank. In Scenario 4, the operation ends up on a steep hillslope.

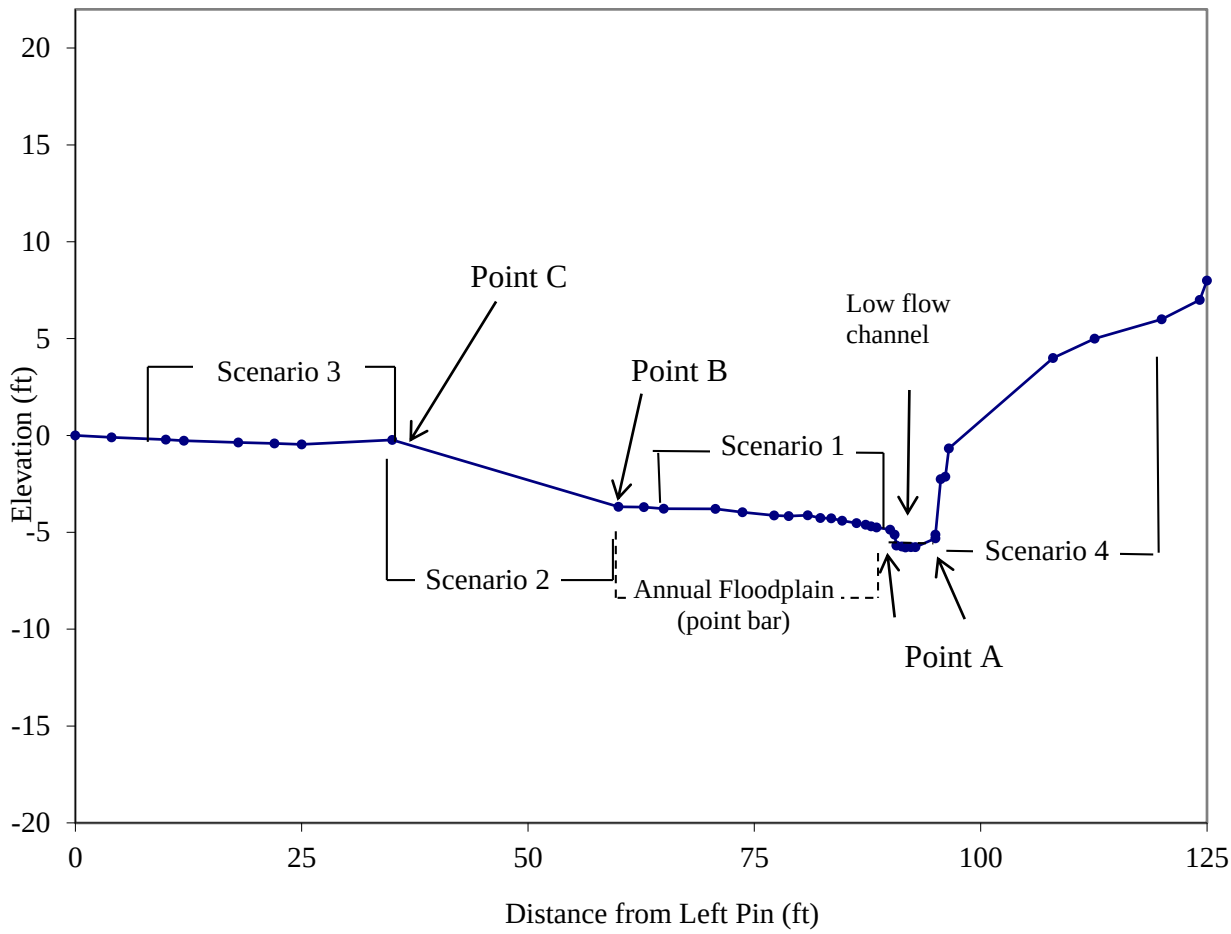


Figure 1A-3. Example of how the selection of a different starting point results in a different location for the operation. Any of these starting points would meet the "from a creek" reference. In this example, buffer distances are 25 feet in all scenarios.

Plan-specific stream buffers for mining-related activities (as specified in Appendix 1A of the EIS) are to be undisturbed.

Buffer widths in the Plans submitted by the miners varied from 10 to 25 feet from the stream. The Forest Service district hydrologist examined those plans and after clarifying the buffer starting point and evaluating the topography, and in the absence of any other circumstances (i.e. presence of placer tailings lining the edge of the valley floor, buffer distances were started at 25 feet and increased as slope increased and/or ground cover decreased. The literature review by *Belt et al. (1992)* discussed the effectiveness of buffer strips on sediment movement. Their review identified slope and density of obstructions as the key factors controlling sediment movement through a buffer strip. Valley floors tend to be flat, or may have considerable micro topography due to historic mining. Ground cover percentages were found to vary from 50 to 100 percent depending on the amount of grazing that is occurring in an area. The flat topography and ground cover results in sediment generated by mining activity moving as sheet, rather than channelized, flow which limits the distance sediment can travel. Given the limited

ground disturbance at any one time in a given operation, and the other general requirements that address stockpiled top soil and reclamation, the 25-foot buffer was determined to be sufficient to prevent sediment from entering the stream channel.

b. Placer tailings line the channel bank

Many operations state that they will have a 25-foot buffer in place to protect water quality. The starting point of measurement is, however, not clearly stated (See **Figure 1A-3**) and the effectiveness of the proposed buffer varies as a function of that starting point. For example, many proposed mining sites have old placer tailings lining the stream banks. In these cases, a 25-foot buffer may put the mining operation behind the tailings, in other places within the same operation it would but the mining operation in front of the tailings or on top of the tailings (**Figure 1A- 4**). In the two latter cases, the 25-foot buffer would not be sufficient and there would be a potential for a discharge of sediment into the creek. Therefore, the following modification was made.

The buffer location was tied to the location of the placer tailings lining the streambank and operations placed behind the tailings instead of being assigned a fixed distance (i.e. 25 feet). Because the location of the tailings with respect to the valley floor terrace-channel break-in-slope (VFT-CB) feature varied along the stream, the distance between the operation and the stream varied (Figure 1A-4), in some cases being within 10 feet of the break-in-slope feature. However, the tailings effectively trap sediment and, where present, completely prevent delivery of any sediment generated by the mining activity. Where there are breaks in the tailings piles and the potential for sediment reaching the creek, the 25-foot buffer distance from the VFT-CB break-in-slope feature was invoked along with additional protection measures such as installing straw bales or silt fences.

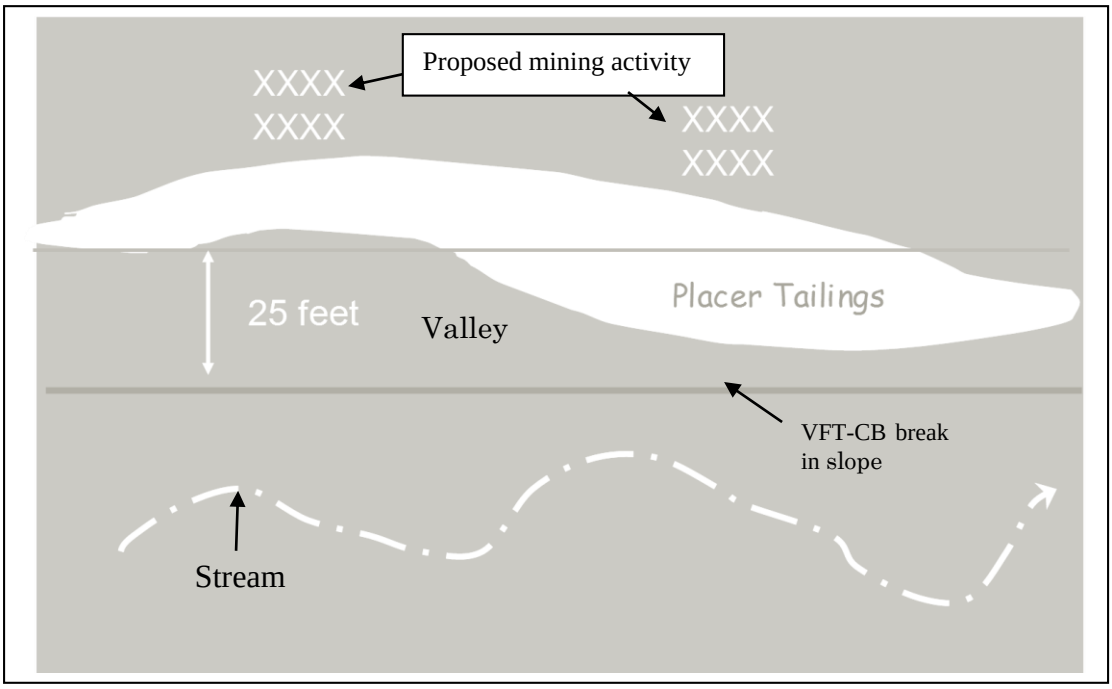


Figure 1A-4. Schematic showing how using the placer tailings piles results in a variable distance from the VFT-CB break-in-slope and the stream. THICK line represents the VFT-CB break-in-slope location.

2. Operations on hillslopes: Starting point of buffer measurement clarified and buffer widths adjustments made from Alternative 2 (reference Figure above)

Operations that occurred on hillslopes fell into three general categories: 1) hillslope feeds into a valley floor terrace where the bench is between 15 and 25 feet wide, 2) hillslope feeds into a valley floor terrace where the valley width (bench) is more than 25-feet wide, or 3) hillslope feeds directly into the stream or where the valley floor terrace is less than 15-feet wide. Where activity was occurring, buffer widths were adjusted as needed to create enough of a buffer strip to capture any sediment generated by activity on the hillslope. The concern with activity on hillslopes is the potential to have channelized flow which is capable of carrying sediment much further than overland flow (*Belt et al. 1992).* In some cases, where ground cover was limited, the hillslopes steep, and/or the valley floor was either absent or narrow, additional requirements were included, such as silt fences or straw bales to prevent sediment delivery to a stream channel.

3. Beaver dams

Beaver dams would not be breached or otherwise disturbed. Instead, miners would evaluate under what conditions a beaver dam could pose a problem to their operation ahead of time and would work with the district hydrologist to design and build pond-elevation control features. These methods allow for beavers and beaver dams to remain and continue to provide water quality and habitat benefits, while preventing the ponds from flooding the mining operations.

4. Adit waters

Several plans, located in the headwaters of various streams, proposed using water from adits for their processing. This water would be piped into processing and settling ponds and allowed to evaporate or seep into the ground and therefore would not directly discharge into surface water or channels that would transfer the water to a perennial stream or wetland.

Appendix 1B

Explanation of Bentonite Blanket to Line Ponds Proposed for Use in Settling Ponds in Areas of Concern

Explanation of Bentonite Blanket to Line Ponds Proposed for Use in Settling Ponds in Areas of Concern

The use of bentonite blankets to impede the flow of sediment and water towards the creek has been used in mining operations and in lagoon ponds to prevent contaminants. The Whitman Ranger District in 2010 used the bentonite blanket approach in the Beaver Creek Channel Sealing project. Sections of the channel were drying up as a result of historic placer mining, which had eliminated the fines, causing the channel to go dry. Since completion of the project, the stream has had perennial flow because the bentonite blanket has decreased the permeability of the channel sediments at a depth of about six feet. The blanket is actually clay situated between 2 layers of felt, and is much more natural than filter cloth or plastic. Refer to the following article by Rollins and Dylla for the effectiveness of bentonite blankets: http://cedb.asce.org/cgi/WWWdisplay.cgi?17099

The following Forest Service Water Resource Protection Measure (WRPM) would be required for those Plans of Operation that have settling ponds with the potential for a discharge of sediment to the creek via subsurface flow through old placer tailings. Each site would have adjustments made to the location of the blanket based on expected flow paths and orientation of the pond to the stream and the flow paths.

This WRPM is designed to eliminate the potential for settling pond sediment to reach the stream via subsurface flow through the tailings. The WRPM still allows water to move into the pond and flow through the bottom of the pond.

Forest Service Water Resource Protection Measure for example below:

Bentonite blanket will be placed in a trench between the stream and the pond. The trench will be 10 to 15 feet from the pond and would extend the length of the pond and a little around the upper and lower ends of the ponds.

Figure 1B-1: Aerial of site used as example to discuss use of bentonite blanket to prevent the potential for a discharge of sediment leaving a settling pond and making it to the creek via subsurface flow through tailings.

WHITE arrows: likely direction of groundwater flow through the old placer tailings and through the pond proposed for use as a settling pond.

Figure 1B-2: Cross-section through a pond showing the location of the trench with the bentonite blanket (gray) and expected subsurface flow directions. DASHED BLACK arrows = direction of flow through placer tailings.

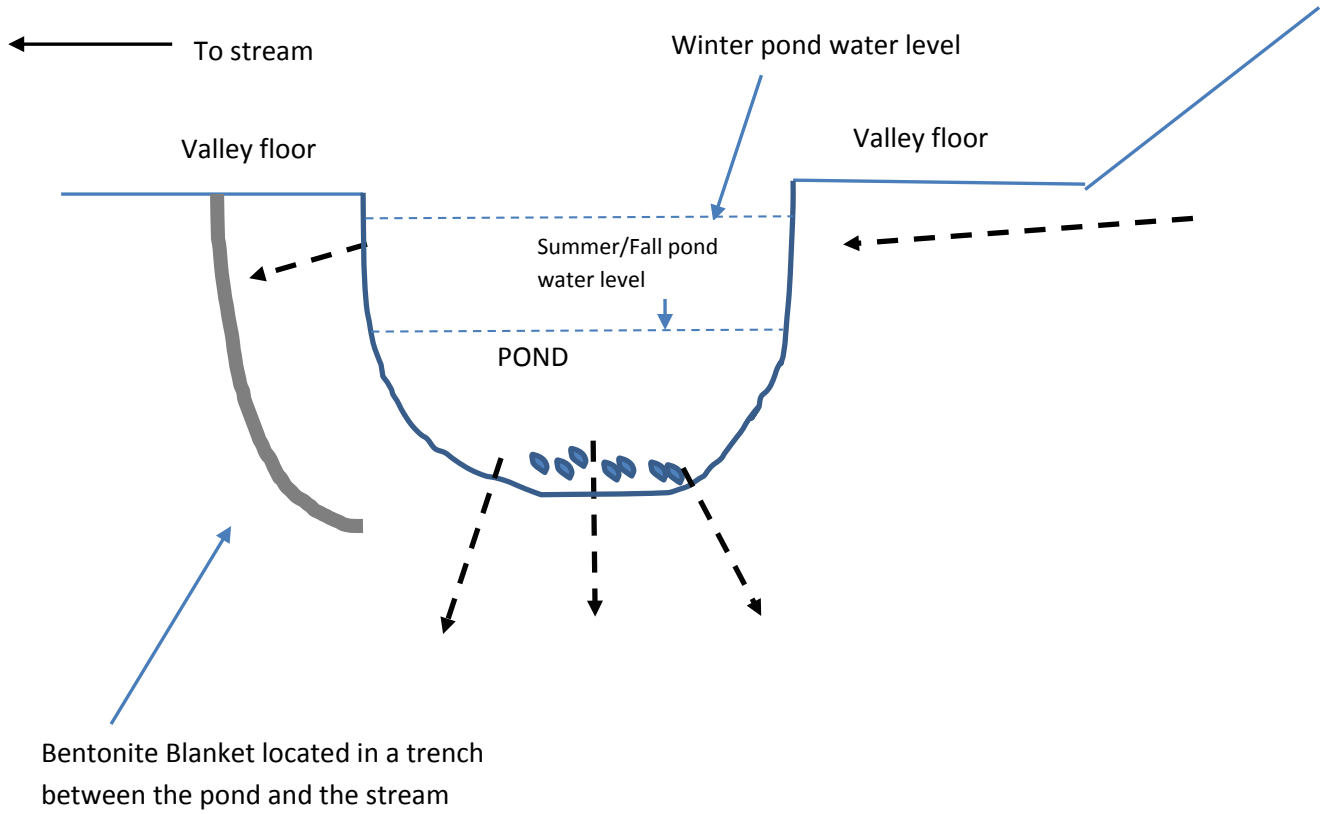


Figure 1B-3: Pre-bentonite Blanket installation. Flow moves in and out of pond through the pond bottom and sides with the potential to carry sediment unimpeded to the creek when pond located in coarse sediments with limited fines (i.e. old placer tailings).

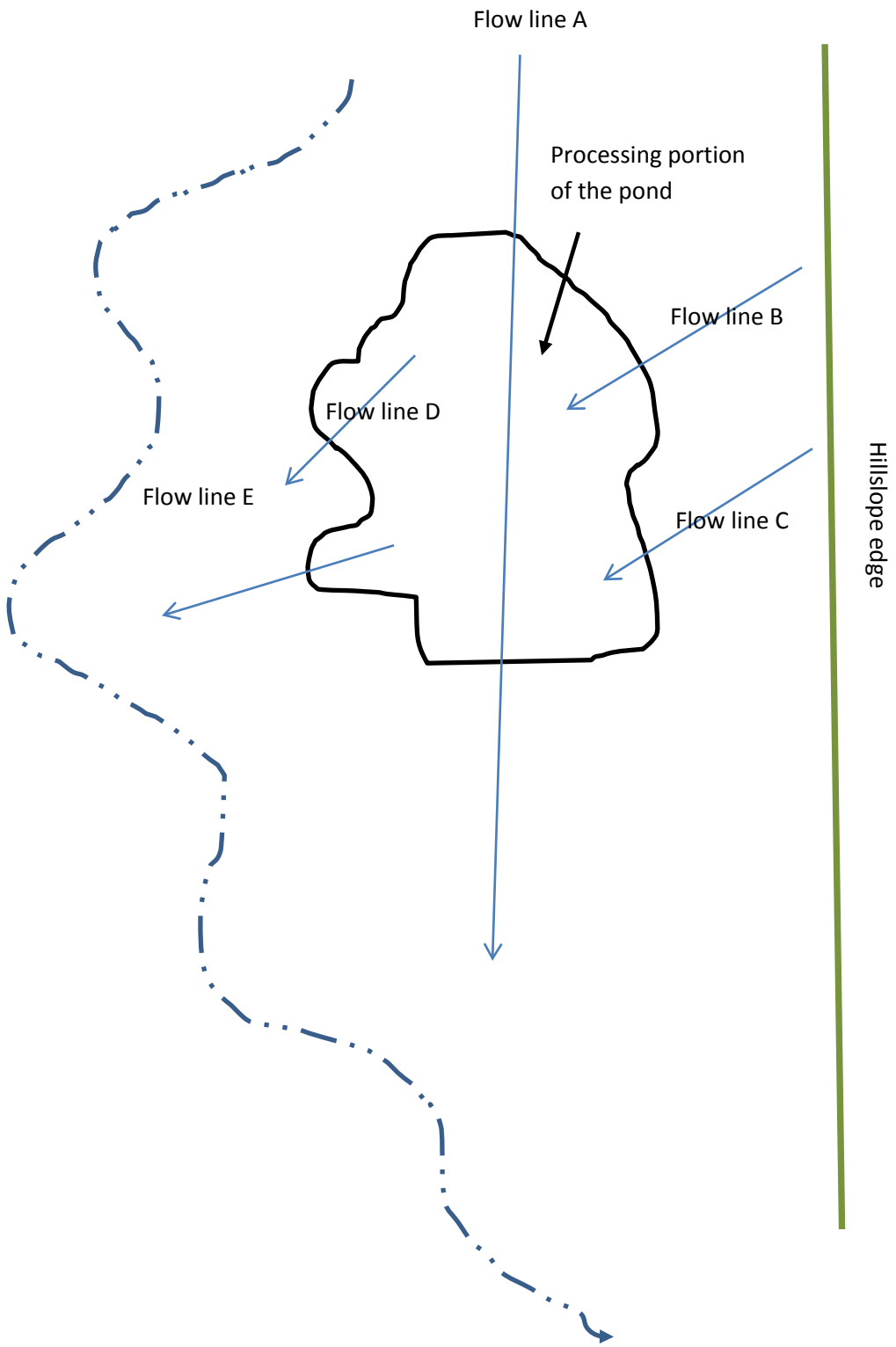
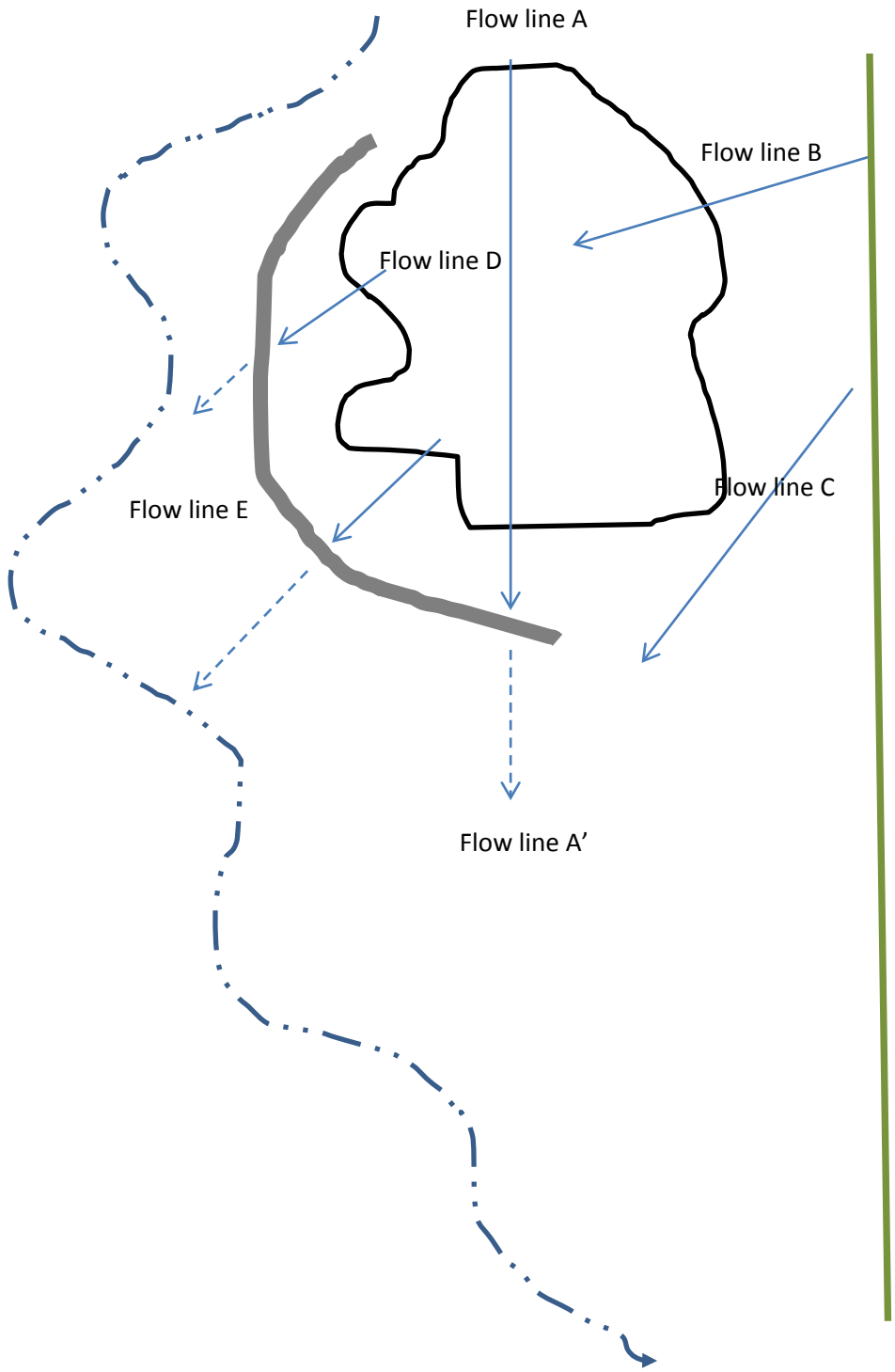


Figure 1B-4: Bentonite Blanket (gray) installed in a trench between the stream and the pond. Flow lines A and B move into pond. Water and sediment from the operation leave the pond moving through the subsurface but only minor water makes it beyond the blanket (dashed lines A' and E). The settling pond sediment is trapped behind the blanket.



APPENDIX 2

General Requirements for Plans of Operations Included in Alternative 3

Granite Creek Watershed Mining Project

General Requirements for Plans of Operations Included in Alternative 3

Requirements for Protection of Surface Resources

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. Prior to tree removal the Forest Service will conduct a stream-shade analysis to evaluate potential impacts to stream temperature and to ensure protection of water quality. 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.

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. See project file for additional Fisheries/Aquatics direction.

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. Plan-specific 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 Plan-specific 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[1]. 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))

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.

[1] 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.

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.

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 (Region 6 - 2005 Preventing and Managing Invasive Plants EIS and ROD), forest-specific invasive plant management plans, and the 2011 Region 6 Aquatics Invasive Species Management Plan.

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 ground disturbing activities will avoid inventoried (as identified on the map provided in IS1) noxious weed infestations 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 a Forest Service 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. Testing procedures will follow DOGAMI protocol.

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 contaminates. (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.

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 project file 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 Mines

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 waddles 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 an appropriate seed species mix or locally appropriate native trees and shrubs. Appropriate seed mixes will be created through consultation with the Forest Service.

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 Plan-specific ponds should be reclaimed or retained, and whether modifications are necessary for the retained ponds, refer to Appendix 7, Alternative 3.

<u>Pond Reclamation:</u> Where ponds are identified for reclamation, the pond shall be backfilled, re-contoured and seeded as specified in R12.

<u>Pond Retention AND modification required:</u> 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.

<u>Pond Retention BUT no modification required:</u> Leave pond as is.

R16. In mid to late fall, after completion of operations, the miner will distribute certified weed-free straw, 3 inches thick over approximately two-thirds of the area leaving small open patches distributed across the site. Seeding will not take place at this time, but will occur the following year when the straw has partially dried.

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 (*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 trail and that is not included in a forest transportation atlas. These roads are not necessary for long-term resource management and will be decommissioned after use. The level of decommissioning will be specified in the

operating plan. Temporary access roads are given a number in the operating plans for tracking and mapping purposes. An “M” number is an operator-created road that the operator is responsible for decommissioning and/or obliterating once mining activity is complete. An “E” number is an existing road designated for use by the operator, and the operator is not required to decommission and/or obliterate once mining activity is complete.

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 (project file).

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 (sub soiling) 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.

Appendix 3

Structures Inside RHCAs

Compliance with PACFISH MM-2 as it relates to potential impacts to streams and RHCAs

Appendix 3

Structures inside RHCAs

Compliance with PACFISH MM-2 as it relates to potential impacts to streams and RHCAs

INTRODUCTION

This appendix evaluates structures proposed for use that are located inside Riparian Habitat Conservation Areas (RHCA) for compliance with PACFISH MM-2 as it pertains to potential impacts to 1) streams and 2) RHCAs (terrestrial impacts). Compliance with MM-2 as it pertains to FISHERIES is found in the *Fisheries Section* of Chapter 3.

> **MM-2:** *Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to siting facilities in Riparian Habitat Conservation Areas exists, locate and construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on listed inland native fish [or anadromous fish].*
>
> *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.*

Compliance is evaluated for Alternative 2 (miner's proposal) and Alternative 3 (proposal with FOREST SERVICE requirements). The following features are considered structures:

1) Settling ponds (would receive sediment)
2) Temporary mine-access roads
3) Forest Service closed or decommissioned roads
4) Existing or Temporary bridges.

DETERMINING COMPLIANCE WITH PACFISH MM-2

<u>Streams:</u> Compliance with MM-2 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 (terrestrial impacts): Compliance with MM-2 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.

The following four questions are answered to determine compliance:

1. If an operation has proposed or existing structures within an RHCA, can the structures be relocated outside the RHCA and if not, why not?

2. Is construction and/or use of the structures in compliance with MM-2 under Alternatives 2 and 3 as it pertains to streams? As it pertains to activity inside the RHCA?

3. Is there the potential for a discharge via surface and/or subsurface flow under Alternatives 2 and 3 given the existing or proposed locations and characteristics of the structure?

4. Do the answers to questions 3 and 4 vary as a function of Alternative 2 or 3?

NOTE: The analyses reference Forest Service Water Resource Protection Measures (WRPMs) and General Requirements which are added under Alternative 3. The WRPMs for Alternative 3 are found in **Appendix 11** and listed by Plan. The Water and Soil Resource Protection Measures report in the project file includes information provided by the operators on their ponds which is taken directly from the Plans of Operation with the page number in the Plan noted. The Forest Service General Requirements are found in Appendix 2.

NOTE: The term "**pond**" is used in the discussions below and throughout this document only for consistency because this is how the water sources and settling areas for the proposed mining are referred to in the proposed Plan. However, from the perspective of Oregon Water Resources Department the term "**pond**" has a distinct meaning. A "**pond**" is considered a reservoir and requires a water right. In contrast a "**sump**" is defined as "a hole dug to a depth of ten feet or less with a diameter greater than ten feet in which ground water is sought or encountered (OAR 690-200-0050). In some cases, the source water proposed for use would fall under the definition of a **sump**. In other cases, a water right may be required for use.

If a Plan has a water right, then the permit number and the volume, if provided, is noted.

ANALYSIS of COMPLIANCE

Altona (Placer)

Site visited by Chris Helberg (Minerals Administrator, UNF) in 2010, 2011, and 2012 as part of her annual mining inspection. Field observations are from Chris.

Structures related to the Altona operation that were evaluated for compliance with MM-2 are 1) two existing temporary access roads and 2) the proposed temporary access road. The source water pond could not be evaluated because the miner could not find the adit, which was to be the water source.

Plan information

Two small off-channel ponds will be constructed near the effluent from the collapsed portal. This adit water will be gravity fed through a pipe into the ponds and will be used to process placer gravels (p. 5).

Ponds will each be approximately 10' x 20' x 10' (p. 7).

Source of processing water = adit discharge.

Field observations

Quartz Gulch has intermittent flow in this area because the Pete Mann ditch diverts flow upstream of the claim. The creek is considered seasonally fish-bearing. RHCA width = 300 feet/side. Valley bottom width varies between 100 to 300 feet wide. The creek is on private

land and the private/Forest Service land boundary varies between 10 to 130 feet north of the stream depending on stream location. The creek lies on the southern edge of a previously dredged area. Shrubs now exist in between the rock along the creek and throughout the old dredge tailings.

Pond-specific information

The proposed settling ponds are located near the private/Forest Service boundary and would be inside the RHCA. The collapsed adit (water source) was not found. Discussions with the miner on October 5, 2010 found that the miner also could not find the collapsed adit. **Therefore, the adit effluent as a water source and the ponds could not be analyzed in this document.**

Road-specific information

Miner proposes to use three Forest Service closed roads, one open Forest Service road, three existing temporary access (TA) roads and one proposed temporary access (TA) roads (Appendix 6).

Forest Service closed roads 1305-092, 098, 099 are unusable and Forest Service open road 1305-080 is unusable due to a washout. All would require considerable work to make them usable. Several have portions that cross drainages. Use of these roads is not required to access the site and these roads are NOT discussed further.

The existing TA roads (1042-E1a and 1042-E1b) and the proposed TA road 1042-M1a are at least 250 feet from the drainage but within the RHCA of Quartz Gulch. They are all native surface roads. There is sufficient ground cover to trap any sediment that leaves the roads prior to reaching the drainage. Road lengths are as follows: 1042-E1a = 0.56 miles; 1042-E1b = 0.59 miles; 1042-M1a = 0.05 miles.

Pond-specific Conclusions

Source water pond

The source water pond **could not be analyzed** because its location is unknown.

Settling ponds

1. The proposed settling ponds **could not be analyzed** because the location of its water source (the adit) is unknown.

2. Unknown because the miner could not locate the adit which would be supplying the pond water.

3. N/A. No data.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

Existing Temporary Access roads

1. The existing temporary access (TA) roads are required in order to access the site which is inside the RHCA. Therefore they cannot be moved out of the RHCA.

2. Use of the existing TA roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology because the roads would be at least 250 feet from Quartz Gulch. Therefore, there would be no impacts to the stream or stream banks and no change to width/depth ratios.

   c) No new soil disturbance or impacts to riparian vegetation as a result of road use because the roads are at least 250 feet from the gulch.

3. No potential for a discharge into Quartz Gulch from use of the existing TA roads because the roads would be at least 250 feet from the gulch, there is sufficient ground cover between the roads and gulch to trap any sediment that leaves the road.

4. Conclusions are the same regardless of alternative.

Proposed Temporary Access road

1. The proposed TA road is required in order to access the site which is inside the RHCA. Therefore it cannot be moved out of the RHCA.

2. Under Alternative 2, use of the proposed TA road would be in compliance with MM-2 *as it pertains to streams* because

   a) No impacts to water quality due to construction of the two track road and road use for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology due to construction road of the two track road and use because the road would be at least 250 feet from Quartz Gulch. Therefore, there would be no impacts to the stream or stream banks and no change to width/depth ratios.

However, use of the proposed TA road would NOT be in compliance with MM-2 *as it pertains to activity inside the RHCA* because

c) New detrimental soil disturbance and there are no provisions in the Plan for minimizing disturbance or that the road is closed and obliterated once the mining activity is done.

d) No impacts to riparian vegetation because the proposed road would be at least 250 feet from the gulch and in an area that does not have riparian vegetation.

Under Alternative 3, the construction and use of the proposed TA road would be in compliance with MM-2 both as it pertains to stream and as it pertains to activity inside the RHCA because of the addition of FS General Requirements Z1-14, R13 (Appendix 2). These protection measures would minimize new soil disturbance and require that these roads be closed, obliterated and revegetated once they are no longer required to the mining activity.

3. No potential for a discharge into Quartz Gulch from construction and use of the proposed TA road because the road would be at least 250 feet from the gulch, there is sufficient ground cover in this area to trap any sediment that might leave the road, and General Requirements Z1-14, R13, and any other WRPMs identified at the time of placement would be in place.

4. Conclusions vary as a function of alternative.

Belvadear (Placer)

Site visited by the district hydrologist on October 18, 2004 (Field book 2) and October 3, 2012 (Field book 10).

Structures related to the Belvadear mining operation that were evaluated for compliance with MM-2 are 1) an existing pond used as both source water and as a settling pond and 2) one existing TA road. Both structures are inside the RHCA of Olive Creek.

Plan information

A clean water pond approximately 20’x30’x5’ which is cut in half by berms exists and water is recycled between the off-channel settling recycling ponds (p. 6).

Water from the spring and from Olive Creek is used for processing….This is done under the water diversion permit for mining that was given to Harry J. Young on April 30, 1937 (p. 8).

Source of processing water = spring and Olive Creek.

Field observations

Olive Creek is a perennial and fish bearing stream. RHCA width = 300 ft/side.

Pond-specific information

The existing pond is inside the RHCA and would be used as both a source water and as a settling pond. Total valley bottom width is less than 300 feet. Stream is incised and confined between tailings. Hydrologist observed two ponds in 2004 and a single pond in 2012. It is expected that the pond will vary in shape and character over time. In 2004, the pond was 40 feet from the creek. In 2012 the pond was moved to the east and is now about 60 feet from the creek. Pond is on flat ground and behind a low berm that borders Olive Creek (about 2.5 feet wide).

Road-specific information

Miner would use existing TA road 1305-E2 to access the mining area. The road is inside the RHCA.

Pond-specific Conclusions

1. The existing source water/settling pond should not be moved outside the RHCA for the following reasons. If pond was moved outside the RHCA the pond would be on the hillslope because the valley bottom width in the area of the pond is less than 300 feet. Hillslope pond would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing pond is in a highly stable location, dug into the ground and is supplied by groundwater.

2. Use of the existing pond would be in compliance with MM-2 under both alternatives as it applies to stream conditions and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the pond is not in the channel.

   c) No impact to channel morphology because the pond is existing and separated from Olive Creek by 60 feet. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because it is an existing pond.

   e) No impact to the riparian vegetation because there is no riparian vegetation where the pond is located.

3. No potential for a discharge via surface or subsurface flow from the existing pond into Olive Creek under either alternative because the pond is dug into the ground and has silt coating

the pond bed indicating that fine sediment is being trapped in the pond. Therefore there would be no change to water quality.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. The road cannot be moved outside the RHCA because it is required to access the site which is located inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating access.

2. Use of the TA road be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impact existing water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity or channel morphology because the roads are not in the stream and are 50 feet or more from the stream. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   c) No new soil disturbance because they are existing roads.

   d) No impact to the riparian vegetation because the roads are existing and more than 50 feet from the stream.

3. No potential for a discharge into Olive Creek because the road bed is stable and separated from Creek by distance, old placer tailings and a berm. These features are effective at trapping any sediment that leaves the road prior to it reaching the creek.

4. Conclusions the same for both alternatives.

Blue Sky/Bull Run (Placer)

Sites (6 mining area and 1 processing area) visited by the district hydrologist on September 18 and 19, 2012 (Field book 7) and September 25 and 28, 2012 (Field book 9).

Structures related to the Blue Sky/Bull Run operation that were evaluated for compliance with MM-2 are 1) existing source water pond, 2) existing settling ponds, 3) existing temporary access roads, 4) the proposed temporary access roads, 5) an existing bridge, and 6) a proposed temporary bridge.

Plan information

A small washing plant or highbankers will be set up at the camp area where several dredge ponds which are not connected to Bullrun Creek. These are over 50 feet from the creek (p. 4).

Water for both the operations will be ground water in the existing dredge ponds….. On the Blue Sky , one or two off channel settling /recycling ponds will be used in the operation approximately 5'x10'x6'….(p.5).

Source of processing water = Groundwater. No surface connection between the ponds and Bull run Creek.

Field observations

Bull Run Creek is perennial and fish-bearing. RHCA = 300 ft/side. Swamp Creek is a mix of perennial and intermittent flow. It has intermittent flow in the vicinity of the existing ford proposed for use and has been mined in the past. Flow becomes perennial in the meadow which begins in the area of mining site Blue Sky #2 and connected to Bull Run Creek by a continuous channel. The portion of Swamp Creek that has perennial flow and connected to Bull Run Creek, may have fish and is therefore assigned an RHCA of 300 ft/side. The portion of Swamp Creek, located upstream of the meadow and in an area with past mining activity, has only intermittent flow and is heavily disturbed. It is considered intermittent and non-fish bearing and assigned an RHCA of 100 feet. Valley bottom width in the area of the processing ponds is about 300 feet and bounded by Bull Run Creek and a hillslope.

Pond-specific information

The processing area is on the south side of Bull Run Creek and on the west side of Swamp Creek. There are six ponds proposed for use and these parallel Bull Run Creek and they are inside the RHCA. The most westerly pond contains water and will be used for processing. There is an ATV trail that parallels the ponds and is on the south side of the ponds.

The ponds are numbered with Pond 1 being the most western pond and Pond 6 being the most eastern pond in the field book. Ponds are separated from each other by berms composed of old placer tailings. Pond 1 is the source water pond and Ponds 2 through 6 are the settling ponds.

Pond 1 has a lot of water and cat tails (no pond dimensions paced).
Pond 2 is very boggy with lush sedges and rushes and some patches of open water (Pond 2 = 40' x 80' paced).

Pond 3 is dry but lush with rushes (20' x 22 'paced).

Pond 4 is dry and lush with rushes and a few sedges (Pond 4 = 22' x 58' paced).

Pond 5 is dry with a couple of boggy areas and lush with rushes (36' x 60').

Pond 6 is dry and lush with rushes and pockets of sedges (40’ x 80’ paced).

Depths of the pond or bermed depressions are at least 4 feet deep. These features are old dredge ponds. Ponds are separated from Bull Run Creek by a minimum of 50 to 60 feet of tailings and 25 to 30 feet minimum of floodplain. Pond 6 is closest to Swamp Creek and within 25 feet of Swamp Creek. All ponds are on flat ground and are well sealed with fines and vegetation. They are highly stable and there are no concerns about sediment making it to either Bull Run or Swamp Creeks because of the abundance of vegetation in the bottom of the ponds and presence of vegetation along the sides such that sediment will be trapped in the ponds.

Road-specific information

Miner proposes to use four existing and three proposed temporary access roads to access the various sites (Appendix 6). All of these access roads are separated from Bull Run Creek by flat, well-vegetated ground. Distance between the creek and the roads vary 90 to more than 200 feet. All of the roads are inside the RHCAs of Bull Run and Swamp Creeks.

Existing temporary access (TA) roads

7300-E4a is a native surface road that is used by the public to access a dispersed campsite and **Blue Sky sites 1, 2, and 3** and the processing site**.** It fords Bull Run Creek. Ford approaches are sloped, stable and well rocked. Road length = 0.11 miles.

7300-E4b is a native surface road that is used to access the source water pond and the settling ponds (processing site) and **Blue Sky site 1.** It is a two track on flat ground and is more than 200 feet from Bull Run Creek. It is separated from the creek by the ponds, lush grasses and forbs and downed wood, and old placer tailings. Road length = 0.15 miles.

7300-E4c is composed of old tailings and is used to access **Blue Sky site 2**. Fine road sediment is limited. The road is 94 feet from Swamp Creek and about 200 feet from Bull Run Creek. The road is separated from Swamp Creek by tailings and portions of the meadow that are well vegetated. The road is separated from Bull Run Creek by tailings that parallel Bull Run Creek and a well-vegetated meadow. Road length = 0.02 miles.

7300-M1a is a native surface road that is used by the public. It is bermed at the end and is the connector road to proposed roads 7375-M1b and 7300-M4b. It is about 90 feet from Bull Run Creek and area between the creek and road has downed wood and abundant grasses and forbs. Road length = 0.05 miles.

Proposed temporary access roads

7300-M4b is a proposed temporary two-track road (native surface) that would be used to access **Bull Run site 2**. It would begin at the temporary bridge site proposed by the miner under

Alternative 2 and head downstream. There is 100% ground cover between the proposed general area of road placement and Bull Run Creek. The ground cover is lush grasses, forbs and needles and the ground is largely flat. Road length = 0.15 miles (792 feet).

7375-M1b is a proposed temporary road (native surface). It would access **Bull Run site 2** and connect to 7300-M4b. However, it ONLY exists under Alternative 3. It would replace the proposed temporary bridge that would be used to access 7300-M4b under Alternative 2. 7375-M1b would be a two track that would come through the forest to the site. Road placement would occur with Forest Service input. Ground cover between the general area of the proposed road and the creek is partly forest with downed wood and needles and some grasses and forbs and partly meadow with lush grasses and forbs. Road length = 0.2 miles

7300-M4a is a proposed temporary road (native surface) to access **Blue Sky site 3**. The proposed road would be located with input from the Forest Service. There is 100% ground cover between the proposed general area of road placement and Bull Run Creek and the ground cover is lush grasses, forbs and needles. Road length = 0.07 miles.

Bridge-specific information

Existing bridge

There is an existing wooden bridge that crosses Swamp Creek. The bridge is inside the RHCA. Swamp Creek in this area only has intermittent flow, is in an area that was mined in the past, and was dry at the time of the site visit on September 18, 2012.

The existing bridge is adjacent to an existing ford. However, given the size and structure of the bridge, it would only handle foot or ATV traffic. The ford would be used for heavy equipment. Use of the bridge by the miner would decrease how often the ford was used.

Proposed temporary bridge

Under Alternative 2, the miner proposes to install a temporary bridge across Bull Run Creek to access Bull Run site 2. The bridge would be installed and removed each season. The stream banks in area of the proposed bridge are fine grained and well-vegetated with lush grasses. The bridge is dropped under Alternative 3 and access to the site is replaced by proposed road 7375-M1b. This road exists only under Alternative 3.

Pond-specific Conclusions

1. The source water and settling ponds should not be moved outside the RHCA for the following reasons. If the ponds were moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 300 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g.

in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing ponds are on flat ground, a highly stable location, dug into the ground and supplied by groundwater.

2. Use of the existing source water pond and the settling ponds would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because:

   a) No impact to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity under either alternative because the ponds are not in the channel.

   c) No impact to channel morphology under either alternative because the ponds are existing and at least 100 feet from Bull Run Creek. Therefore, there would be no impacts to the stream banks and no change in channel width/depth ratios.

   d) No new detrimental soil disturbance because the ponds are existing.

   e) No impact to riparian vegetation because no riparian vegetation exists around the ponds. In addition, the lush rushes and sedges located in the ponds would remain because no activity, other than input of processing water, is proposed.

3. *Source water pond*

   No potential for a discharge via surface or subsurface flow from using the source water pond because only withdrawing water.

   Settling ponds

   No potential for a discharge via surface or subsurface from using the settling ponds into either Swamp or Bull Run Creeks under either alternative because 1) the ponds are old dredge ponds and are capable of holding volumes of water much greater then proposed by the operation and 2) the pond bottoms are vegetated with lush grasses, rushes and sedges. These vegetation types are effective at trapping fine sediment.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

Existing Temporary Access (TA) Roads

1. Use of the existing TA roads is required in order to access the sites which are located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. These roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impact existing water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity or channel morphology because the roads are not in the stream and are 50 feet or more from the stream. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   c) No new soil disturbance because they are existing roads.

   d) No impact to the riparian vegetation because the roads are existing and more than 50 feet from the stream.

3. There is no potential for a discharge into Bull Run Creek because the road beds are stable and separated from Bull Run Creek by distance, old placer tailings and well-vegetated ground. These features are effective at trapping any sediment that leaves the roads.

4. Conclusions the same for both alternatives.

Proposed Temporary Access (TA) Roads EXCEPT TA 7375-M1b

1. Use of the proposed TA roads is required in order to access the sites which are located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Under Alternative 2, these roads would NOT be in compliance with MM-2 as it pertains to stream and activity inside the RHCA because

   a) Potential impact to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology because the roads would not be in the stream and not along the stream bank. Therefore, there would be no loss of bank stability and change in width/depth ratio.

c) New detrimental soil disturbance and no provisions in the Plan to minimize disturbance necessary for access or ensure that these newly constructed two-tracks are obliterated and revegetated.

d) Potential impacts to riparian vegetation depending on where the road is located.

Under Alternative 3, construction and use of the two-track roads would be in compliance with MM-2 because of the addition of FS General Requirement Z1-14 and R13 (Appendix 2). These requirements ensure that roads will be located with FS input and appropriate soil and water resource protection measures identified and implemented. These resource protection measures include closing, obliterating and revegetating roads once they are no longer required to the mining activity.

3. **Alternative 2**

Potential for a discharge into Bull Run Creek under due to the uncertainty of road locations.

Alternative 3

Discharge potential **would be eliminated** because of the addition of General Requirements Z1-13 (Appendix 2). These General Requirements require that the proposed roads be located with input from the Forest Service and appropriate protection measures implemented. These resource protection measures also include closing, obliterating and revegetating roads once they are no longer required to the mining activity (General Requirement R-13, Z-14(Appendix 2).

4. Conclusions vary as a function of alternatives. The Forest Service General Requirements are added to Alternative 3 and these requirements bring the proposed mine access roads into compliance with respect to MM-2 by a) eliminating the potential for a discharge (water quality), b) minimizing the amount of road construction and new soil disturbance, and c) ensuring that roads would be reclaimed once no longer needed for mining activity (General Requirement R-13, Z-14, Appendix 2).

<u>Proposed Temporary Access (TA) Road 7375-M1b (Alternative 3 only)</u>

1. This proposed road exists ONLY under Alternative 3 and is a WRPM intended to eliminate concerns related to the placement and removal of the miner proposed temporary bridge to access Bull Run site 2.

   Creation and use of the proposed TA road would be required to access this site which is located inside the RHCA. Therefore, it could not be moved out of the RHCA without eliminating site access.

2. Under Alternative 2, this road does not exist. Under Alternative 3, this proposed TA road would be in compliance with MM-2 as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity or channel morphology because the road would not be in the stream and not along the stream bank. Therefore, there would be no loss of bank stability and change in width/depth ratio.

   c) New detrimental soil disturbance but the road would still be in compliance with MM-2 because this alternative adds Forest Service General Requirement Z1-14 and R13 (Appendix 2). These requirements ensure that roads will be located with FS input and appropriate soil and water resource protection measures identified and implemented. These resource protection measures include closing, obliterating and revegetating roads once they are no longer required to the mining activity.

   d) None or only very minimal impacts to riparian or wetland vegetation if the selected route crosses any seeps for the same reasons noted in 2c.

3. **Alternative 2**

   Road does not existing under this alternative. Therefore, no potential for a discharge into Bull Run Creek.

   Alternative 3

   No potential for a discharge because the addition of General Requirements Z1-13 (Appendix 2) is part of this alternative. These General Requirements require that the proposed road be located with input from the Forest Service and appropriate protection measures implemented. These resource protection measures also include closing, obliterating and revegetating roads once they are no longer required to the mining activity (General Requirement R-13, Z-14(Appendix 2).

4. Conclusions vary as a function of alternatives. The Forest Service General Requirements are added to Alternative 3 and these requirements bring the proposed mine access roads into compliance with respect to MM-2 by a) eliminating the potential for a discharge (water quality), b) minimizing the amount of road construction and new soil disturbance, and c) ensuring that roads would be reclaimed once no longer needed for mining activity (General Requirement R-13, Z-14, Appendix 2).

Bridge-specific Conclusions

Existing bridge

1. The existing bridge is a structure that is designed to cross a creek and decrease impacts to the stream banks and channel bed. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary. While use of the bridge is not required to access mining site 1 and the processing site with an ATV, use of the bridge by the miner would decrease how often the existing ford would be used and thus decrease potential impacts on fisheries (*See Chapter 3, Fisheries Section)*.

2. Use of the bridge inside the RHCA would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the bridge is not in the stream.

   c) No impacts to channel morphology because the bridge is existing, stable and spans the creek. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

   d) No new soil disturbance because the bridge is existing.

   e) No impact to the riparian vegetation because the bridge is existing.

3. No potential for a discharge from use of the bridge because it is existing and stable and no modifications are planned.

4. Conclusions are the same regardless of alternative.

Proposed Temporary Bridge (Alternative 2 only)

1. Use of the proposed temporary bridge would be required to cross Bull Run Creek access Bull Run site #2. Therefore, it could not be moved out of the RHCA.

2. Under Alternative 2, the proposed bridge would NOT be in compliance with MM-2 as it pertains to streams or activity inside the RHCA because

   a) Potential impact to water quality over the short-term during bridge placement and removal for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the bridge would span the creek.

c) No impact to channel morphology despite some bank disturbance related to bridge installment and removal because there would be no loss of bank stability or change in width/depth ratio.

d) Potential for some minor soil disturbance during placement and removal.

e) Potential for some minor impacts to the riparian vegetation because the bridge would be located in an area with riparian vegetation.

3. Under Alternative 2, potential for a discharge into Bull Run Creek due the disturbance of the stream banks could input of sediment into the creek when the bridge is installed and removed.

   Under Alternative 3, discharge potential **would be eliminated** because of the addition of a Forest Service site-specific WRPM. The WRPM replaces the proposed bridge with a temporary access road 7375-M1b (evaluated below). This road would be located with input from the Forest Service and have the same Forest Service General Requirements as mentioned above for the proposed TA roads. Under this alternative, potential soil disturbance at the bridge location and impact to riparian vegetation would also be eliminated.

4. Conclusions vary as a function of alternatives. The Forest Service WRPM and General Requirements related to roads are added to Alternative 3. These requirements eliminate the concerns related to the proposed bridge.

Blue Smoke (Placer)

Sites (3 mining area and 1 processing area) visited by the district hydrologist on September 25, 2012 (Field book 9)

Structures related to the Blue Smoke operation that were evaluated for compliance with MM-2 are 1) an existing source water pond, 2) an existing settling pond and 3) an existing temporary access road (TA road 1000-E1a).

Plan information

Processing site is located approximately in the middle of the project next to Pond #2 and a short access rd. Pond #2 will be used for fresh supply water to feed the processer and the existing depression will be utilized as main settling pond by increasing both depth and width to about double in size, pond #3 will be used as back up overflow pond to ensure no sediment would discharge into Granite Creek. Both will be monitored constantly to ensure that does not

happen. A silt fence will be installed between settling pond and overflow pond to decrease sediment (p. 3).

Source of processing water = Groundwater. The dredge ponds are separated from Granite Creek by County Road 24 and there is no surface connection between the ponds and the creek.

Field observations

Granite Creek is a perennial and fish-bearing stream. RHCA = 300 ft/side. Valley bottom is less than 300 feet and is operation occurs on a site bounded by County Road 24 and a hillslope.

Pond-specific information

Ponds are existing old dredge ponds and are inside the RHCA of Granite Creek. The ponds are located on the west side of Granite Creek and separated from Granite Creek by County Road 24. The ponds are between County Road 24 and the power line road which runs along the west hillslope. There are multiple old dredge ponds in this zone but only two will be used. They are identified in the Plan Sketch as Pond 2 (source water pond) and Pond 3 (settling pond).

Field observations by the district hydrologist found that water at Pond 2 (source water pond) is moving through the fill of County Road 24 and reemerging on the east side of the County Road as flowing water. This water makes it to Granite Creek. Pond 3 (settling pond) also has water moving through the road fill but much less volume, and the only indication of water movement is the presence of horsetail up on the fill on the east side of the County Road. No indication of water emerging as flowing water.

Ponds are highly stable, existing and the distance between Granite Creek west to the hillslope is less than 300 feet.

Road-specific information

Temporary access road 1000-E1a is proposed for use. The road is inside the RHCA and a native surface road. It is stable and separated from Granite Creek by a fill slope, small floodplains around the old dredge ponds and County Road 24. Road length = 0.46 miles.

Pond-specific Conclusions

1. The source water pond and the settling pond should not be moved outside the RHCA for the following reasons. The ponds are old dredge ponds and if moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 300 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing ponds are on flat ground, a highly stable location, dug into the ground and supplied by groundwater.

2. Use of the existing source water and settling ponds would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impact water quality for the reasons listed in #3 below.

   b) No impact inchannel complexity because the ponds are not in the channel.

   c) No impact to channel morphology because the ponds are existing and separated from Granite Creek by County Road 24. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because the ponds are existing.

   e) No impact to the riparian vegetation along Granite Creek because the ponds are separated from Granite Creek by County Road 24. In addition, there would be no impact to the riparian vegetation that has developed around the old dredge ponds because only processing water will be discharged into the ponds. There is no activity proposed in the riparian area around the dredge ponds that would alter vegetation.

3. *Source water pond*

   No potential for a discharge via surface flow from the source water pond into Granite Creek under either alternative because only withdrawing water.

   Settling ponds

   No potential for a discharge via surface flow from the settling pond into Granite Creek under either alternative because the proposed settling pond is an old dredge pond and capable of receiving volumes of water much greater then proposed by the operation and is separated from Granite Creek by County Road 24.

   No potential for a discharge via subsurface flow from the settling pond under either alternative because the County Road 24 road fill, in the vicinity of Blue Smoke, has limited permeability. The only indication that some water is seeping through the road fill is a shift in vegetation type on the fill slope adjacent to Granite Creek. However, no signs of erosion were observed on the fill slope in this area.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. The road is an existing temporary access road (also referred to as the powerline road) and use of this road is required in order to access the site which is inside the RHCA. Therefore it cannot be moved out of the RHCA.

2. Use of the road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

a) No impact to water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity or channel morphology because the road is not in the stream and separated from Granite Creek by County Road 24 and the old dredge ponds. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

c) No new soil disturbance because the road is existing.

d) No impact to the riparian vegetation along Granite Creek because the road is separated from Granite Creek by County Road 24. In addition, there would be no impact to the riparian vegetation that has developed around the old dredge ponds because the road is located along the base of the hillslope and above the ponds and riparian areas surrounding the ponds.

3. No potential for a discharge into Granite Creek from use of this road because the road is stable and separated from Granite Creek by a fill slope, small floodplains around the old dredge ponds and County Road 24.

4. Conclusions are the same regardless of alternative.

Bunch Bucket (Placer)

Sites (2 mining and 1 processing) visited by the district hydrologist on September 24, 2012 (Field book 8).

Structures related to the Bunch Bucket operation that were evaluated for compliance with MM-2 are the existing temporary access roads.

Plan information

The test hole/pond will have its volume expanded by deepening and grading the sides to a more gradual incline to secure a more dependable water supply (p.3).

Pond size will be approximately 30’ x 60’ and up to 10’ deep (p. 5).

Source of processing water = is unknown. The miner in his plan states that he plans to use the pond, but the pond is dry so actual source of water is unknown.

Field observations

Clear Creek is perennial and fish bearing. RHCA = 300 ft/side. Valley bottom width is more than 300 feet on the side that the activity is proposed.

Pond-specific information

The Bunch Bucket existing pond is just outside the RHCA of Clear Creek. RHCA = 300 ft/side. The pond was dry at time of visit. Pond would be used for both as a source water pond and as a settling pond.

Road-specific information

Miner proposes to use three existing temporary access roads (Appendix 6). The roads are within the RHCA of Clear Creek. They are more than 100 feet from Clear Creek and separated from the creek by flat, well-vegetated ground. Road lengths are as follows: 1310-E2a = 0.08 miles (422 feet); 1310-E2b = 0.09 miles (475 feet); 1310-E2c = 0.08 miles (422 feet).

Pond-specific Conclusions

1. The pond is outside the RHCA.

2. N/A. The existing pond is outside the RHCA.

3. *Source water pond*

   No potential for a discharge via surface or subsurface flow from the settling pond into Clear Creek but only withdrawing water.

   Settling pond

   No potential for a discharge via surface or subsurface flow from the settling pond into Clear Creek because pond is 1) more than 300 feet from the creek, 2) the ground is flat, and 3) the ground vegetation is 100 percent and very lush.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of the existing temporary access (TA) roads is required in order to access the sites which are inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the existing TA roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impact to water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity or channel morphology because the roads are not in the stream and are separated from Clear Creek by more than 100 feet. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

c) No new soil disturbance because the roads are existing.

d) No impact to the riparian vegetation because the roads are separated from Clear Creek by more than 100 feet.

3. No potential for a discharge into Clear Creek from use of these roads because the roads are stable and separated from Clear Creek by more than 100 feet of flat, well vegetated ground that would effectively any sediment that left the roads.

4. Conclusions are the same regardless of alternative.

City Limits (Placer)

Sites (1 mining and 1 processing) were visited by the district hydrologist on September 18, 2012 (Field book 7).

Structures related to the City Limits operation that were evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing settling ponds and 3) two existing temporary access roads.

Plan information

Process water will be constantly recycled in the off-channel settling ponds which are separated from Granite Creek by the rock tailings area and by the paved highway. Brush and cat tails around the pond will be protected (p. 5).

Source of processing water = Groundwater. No surface connection between ponds and Granite Creek.

Field observations

Granite Creek is perennial and fish-bearing. RHCA = 300 ft/side. Valley width on the east side of Granite Creek is less than 300 feet and bounded by Highway 73 and a hillslope.

Pond-specific information

The source water pond and the settling ponds are existing old dredge ponds and located inside the RHCA. They are dug into the ground and are stable. Ponds are separated from Granite Creek by the 7300 road and old placer tailings.

Road-specific information

Miner proposes to use two existing temporary access (TA) roads with road beds composed of old tailings (Appendix 6). The roads are within the RHCA. They are more than 100 feet from the creek and separated from the creek by highway 7300 and old dredge ponds. The ponds are located on flat ground and there is sufficient ground to trap any sediment that is generated by road use and prevent it from reaching the creek. Road lengths are as follows: 7300-E3a = 0.11 miles; 7300-E3b = 0.02 miles.

Pond-specific Conclusions

1. The source water and the settling ponds should not be moved outside the RHCA for the following reasons. The ponds are old dredge ponds and if moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 300 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing ponds are on flat ground, a highly stable location, dug into the ground and supplied by groundwater.

2. Use of the source water pond and the settling ponds would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because:

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the ponds are not in the channel.

   c) No impact to channel morphology because the ponds are existing and separated from Granite Creek by FS 7300 road and old dredge tailings. Therefore, there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because the ponds are existing.

   e) No impact to the riparian vegetation because the ponds are existing and separated from Granite Creek by FS 7300 and old dredge tailings. In addition, no impact to the riparian vegetation that has developed around some of the old dredge ponds because no activity is proposed in the riparian area around the dredge ponds that would alter vegetation.

3. *Source water pond*

   No potential for a discharge via surface flow from the source water pond into Granite Creek because would only be withdrawing water.

Settling ponds

No potential for a discharge via surface flow from the settling ponds into Granite Creek because the ponds 1) are old dredge ponds and capable of receiving volumes of water much greater than that proposed by the operation and 2) are separated from Granite Creek by the 7300 road and other old placer tailings.

No potential for a discharge via subsurface flow from the settling pond because 1) the 7300 road fill has limited permeability and 2) the pond bottoms are covered in silt. This indicates that the ponds have sealed and are not moving fine sediment through the subsurface.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of these existing roads is required in order to access the site. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the existing temporary access roads (TAs) would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because:

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology because the roads are not in the stream and separated from Granite Creek by FS 7300 and old dredge tailings. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because the TA roads are existing.

   d) No impact to the riparian vegetation along Granite Creek because the roads are separated from the creek by FS 7300. In addition, no impacts to the riparian vegetation that has developed around some of the old dredge ponds because the roads are located along the base of the hillslope and no new road activity is proposed for the riparian areas.

3. No potential for a discharge into Granite Creek as a result of road use because 1) minimal sediment is expected to be generated because the road beds are old tailings and 2) there is sufficient ground cover to trap and prevent any sediment that might be generated by road use from reaching the creek.

4. Conclusions are the same regardless of alternative.

East Ten Cent Creek (Placer)

Site visited by the district hydrologist on August 25, 2010 (Field book 5) and on September 19, 2012 (Field book 7).

Structures related to the East Ten Cent Creek operation that were evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing settling pond, 2) one closed Forest Service road (7350-050), 3) two existing temporary access roads, and 4) one existing bridge. Forest Service closed road 7350-070 is also proposed for use but is outside the RHCA and therefore not discussed further.

Plan information

The existing holding pond (@12 ft diameter) will be used to provide water for the operation and to act as a holding/settling pond (p.4).

Source of processing water = Groundwater. Ponds are elevationally above East Ten Cent Creek and there is no surface connection between the ponds and the creek.

Field observations

East Ten Cent Creek has intermittent flow but is thought to be seasonally fish-bearing. RHCA = 300 ft/side. Valley bottom width at the mining and processing areas is less than 100 feet. The valley bottom in this area is bounded by the creek and the hillslope.

Pond-specific information

The two existing ponds are located inside the RHCA but only one pond is proposed for use. This pond would serve as both a source water pond and a settling pond.

The pond is elevationally above East Ten Cent Creek, on a terrace created by mine tailings, separated from the creek by at least 25 feet, and in a stable location. The pond has silt and vegetation on the pond beds and thus is well sealed. The pond appears to hold water year round indicating that some groundwater is entering the pond. The slope of the terrace that borders the creek is composed of cobbles and fines and at the base of the slope there is a narrow, well vegetated flat area before reaching the creek. No seepage zones were noted in the terrace slope bordering the stream and none are expected as a result of the operation.

Road-specific information

Miner proposes to use two closed Forest Service roads and two existing temporary access (TA) roads (Appendix 6). The Forest Service roads and one of the TA roads have an aggregate surface. The other TA road is a native surface road.

Closed Forest Service road 7350-070 is outside the RHCA of East Ten Cent Creek and is not discussed further.

The remaining three roads are within the RHCA and evaluated for compliance with MM-2. The roads are separated from the creek either dense vegetation and/or old mine tailings. Road lengths are: FS closed road 7350-050 = 0.06 miles; TA road 7350-E1a = 0.12 miles; TA road 7350-M1a = 0.32 miles.

Bridge-specific information

Miner proposes to use an existing foot bridge that crosses East Three Cent Creek. The bridge is inside the RHCA of Clear Creek. The bridge would be used for foot traffic only.

Pond-specific Conclusions

1. The source water/settling pond should not be moved outside the RHCA for the following reasons. The pond is old mining ponds and if moved outside the RHCA the pond would be on the hillslope because the valley bottom width in the area of the ponds is less than 300 feet. A hillslope pond would be new construction and therefore new disturbance. The hillslope soils are shallow and the pond would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing pond is on flat ground, a highly stable location, dug into the ground and supplied by groundwater.

2. Use of the existing pond as a source water and as a settling pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the ponds are not in the channel.

   c) No impacts to channel morphology because the ponds are existing, at least 25 feet from East Ten Cent Creek, and above the creek. Therefore, there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because the ponds are existing.

   e) No impact to the riparian vegetation because the ponds are at least 25 feet from the creek as well as above the creek on a terrace. Therefore, there would be no impact to the riparian vegetation along the creek. In addition, no impacts to the riparian vegetation that has developed around the old dredge ponds because no activity is proposed in the riparian area around the dredge ponds that would alter vegetation.

3. *Source water pond*

   No potential for a discharge via surface flow from the source water pond into the creek because would only be withdrawing water.

   Settling pond

   No potential for a discharge via surface flow from the settling pond into East Ten Cent Creek because the pond is an old dredge pond and a berm exists between the creek and the pond which would effectively trap any sediment that moved off site.

   No potential for a discharge via subsurface flow from the settling pond because the pond is well-sealed with fines and vegetation. No changes are expected in the volume of water entering the pond during the operation.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of these existing roads is required in order to access the site which is located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the one closed Forest Service road inside the RHCA and the two TA roads inside the RHCA would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the roads are not in the stream.

   c) No impacts to channel morphology because the roads are existing and separated from the creek by more than 25 feet. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   d) No new soil disturbance because the roads are existing.

   e) No impact to the riparian vegetation because the roads are existing and do not cross areas with riparian vegetation.

3. No potential for a discharge from use of any of the roads because they are all separated from the creek either dense vegetation and/or old mine tailings. Both are effective at trapping any sediment that is generated by road use and prevent it from reaching the creek. In addition, three of the existing roads proposed for use have an aggregate surface and the amount of sediment that could be generated as a result of use is minimal.

4. Conclusions are the same regardless of alternative.

Bridge-specific Conclusions

1. The existing bridge is a structure that is designed to cross a creek and decrease impacts to the stream banks and channel bed. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary. While use of the bridge is not required to access the mining sites and the processing site, it would only be used by the miner to cross between the mining site and the cabin on foot. Use of the bridge by the miner would eliminate any impacts to stream banks and thus on fisheries (*See Chapter 3, Fisheries Section)*.

2. Use of the foot bridge inside the RHCA would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the bridge is not in the stream.

   c) No impacts to channel morphology because the bridge is existing and spans the creek. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

   d) No new soil disturbance because the bridge is existing.

   e) No impact to the riparian vegetation because the bridge is existing.

3. No potential for a discharge from use of the foot bridge because it is existing, stable, and no modifications are planned.

4. Conclusions are the same regardless of alternative.

Eddy Shipman (Lode/Placer)

East site (lode adit) visited by the district hydrologist on October 21, 2004 (Field book 3) and west sites on June 24, 2013 (Field book 11).

Structures related to the Eddy Shipman operation that were evaluated for compliance with MM-2 are 1) proposed source water pond, 2) proposed settling ponds, 3) two closed FS roads, and 4) four existing temporary access roads. The proposed ponds would be used for both lode processing and placer processing.

Plan information

Lode portion: Water from wells at the Buffalo enters Chipman Gulch, and this water is used for milling. Existing ponds will contain process water (p. 7).

Placer portion: Process water is pumped from Chipman Gulch or taken from off channel ponds. This water is recycled in the existing ponds. …. The main pond has been in place for many years and is well sealed. Two more small ponds also exist (p.7).

Source of processing water = Chipman Gulch

Field observations

Granite Creek is perennial and fish-bearing. RHCA = 300 ft/side. Chipman Gulch is perennial but non fish-bearing as a result of a fish barrier at the confluence of Chipman Gulch and Granite Creek. Therefore, Chipman Gulch is considered perennial and non-fish bearing and has an RHCA of 150dft/side.

Pond-specific information

The Eddy-Shipman ponds are ponds created by old placer tailings. They are located inside the RHCA of Granite Creek and Chipman Gulch. The ponds are within about 60 feet from the creek and separated from the creek by a flat, densely vegetated wet meadow The ponds would be used for the lode and placer portions of the operations.

Road-specific information

Miner proposes to use two closed Forest Service roads and four existing temporary access roads (Appendix 6). These six roads are within the RHCA of Granite Creek and/or Chipman Gulch.

West Side Access

Forest Service closed road 7300-590, and existing temporary access roads 7300-E1a and 7300-E1b are used to access the sites west of Forest Service 7300. Forest Service 7300-590 crosses Granite Creek via a culvert and E1a and E1bare on flat ground and are separated from the creek by dense wetland/wet meadow vegetation and/or tailings. Road lengths are: 7300-590 = 0.04 miles; 7300-E1a = 0.42 miles; 7300-E1b = 0.1 miles;

East Side Access

Forest Service closed road 7300-680 and existing temporary access road 7300-E1d are used to access the adit east of the Forest Service 7300 highway and are connected via a ford crossing. Both roads slope towards Granite Creek and are composed of a mix of fines and coarser material. Road lengths are: 7300-680 = 0.1 miles; 7300-E1d = 0.07 miles.

Pond-specific Conclusions

1. The same proposed ponds would be used for both lode mining and placer mining. They cannot be moved out of the RHCA for the following reasons. If the proposed ponds were moved out of the RHCA, they would be on a hillslope because the valley bottom width between the creek and the hillslope in the area of the proposed ponds is less than 300 feet. There are some old tailings along the base of the hillslope from past lode mining that may be high in heavy metals. The hillslope soil depths are shallow and groundwater inputs into the ponds are expected to be limited. If the ponds filled (e.g. in the spring) there would be the potential for a pond failure and hillslope and tailings erosion. Sediment would enter Granite Creek via surface erosion.

2. Use the existing depressions as the source water and settling ponds would NOT be in compliance with MM-2 under Alternative 2 because

   a) Potential impact to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because no activity in the creek or gulch.

   c) No impacts to channel morphology because ponds are existing and not on the stream bank.

   d) No new soil disturbance because ponds are existing

   e) No impact to riparian vegetation because ponds are existing and the vegetation in the dry ponds is upland vegetation.

3. *Source water pond*

Potential discharge under Alternative 2 because the lower portion of the pond is not sufficient bermed to prevent water from entering the wet meadow.

Under Alternative 3, discharge potential **would be eliminated** as a result of the addition of a Forest Service WRPM which would require that the source water pond be bermed to keep pond water from entering the wet meadow via surface flow.

Settling ponds

Under Alternative 2, there would be a potential for a discharge via surface and subsurface flow of sediment and heavy metals into Granite Creek because the lower portion of the pond is not sufficient bermed to prevent water from entering the wet meadow.

Under Alternative 3, discharge potential **would be eliminated** as a result of the addition for a Forest Service WRPM and General Requirements L3, L4, and L5. The WRPM would require that the settling pond be sufficient bermed to prevent water and sediment from entering into the

wet meadow. Forest Service General Requirements L3, L4, and L5 would address concerns related to the potential for inputs of heavy metals

4. Conclusions vary as a function of alternatives. The Forest Service WRPM and General Requirements added to Alternative 3 bring the settling pond into compliance with MM-2 by eliminating the potential for a discharge.

Road-specific Conclusions

West Side Access

1. Use of Forest Service closed road 7300-590, and existing TA roads 7300-E1a and 7300-E1b are required to access sites west of Forest Service road 7300, which are inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of Forest Service closed road 7300-590, and existing TA roads 7300-E1a and 7300-E1b would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the roads are not in the stream.

   c) No impacts to channel morphology because the roads are existing and are separated from the creek by tailings and distance. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   d) No new soil disturbance because they are existing roads.

   e) No impact to the riparian vegetation for the same reasons noted for 2c.

3. No potential for a discharge from use of any of the roads under either alternative because Forest Service 7300-590 crosses Granite Creek via a culvert and E1a and E1bare on flat ground and are separated from the creek by dense wetland/wet meadow vegetation and/or tailings. Vegetation and tailings are effective at trapping any sediment that is generated by road use and would prevent it from reaching the creek.

4. Conclusions are the same regardless of alternative.

East side Access

1. Use of Forest Service closed road 7300-680 and existing TA road 7300-E1d are required to access the lode on the east side of Forest Service 7300 which is located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Under Alternative 2, use of these two roads would NOT be in compliance with MM-2 as it pertains to streams because

   a) Potential to impact water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the roads are existing and not in the stream except at the designated ford. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

   However, use of these two roads would be in compliance with MM-2 as it pertains to activity inside the RHCA

   c) No new soil disturbance because they are existing roads.
   d) No impact to the riparian vegetation because they are existing roads and they don't cross any seeps or wetlands.

   Under Alternative 3, use of these roads **would be in compliance** with MM-2 for the reasons listed in #3 below.

3. Under Alternative 2, potential for a discharge because both roads slope towards Granite Creek and are composed of a mix of fines and coarser material. Sediment would enter the creeks as a result of road use which would locally alter water clarity.

   Under Alternative 3, discharge potential **would be eliminated** as a result of the addition of a Forest Service site-specific WRPM. This WRPM requires that the ford approaches to the creek be rocked, thereby removing the sediment source.

4. Conclusions vary as a function of alternatives. The Forest Service WRPMs are added to Alternative 3 and these WRPMs bring use of the proposed mine access roads into compliance with respect to MM-2 by eliminating the potential for a discharge.

Grubsteak (Placer)

Operation has two mining areas and one processing site. Sites visited by the district hydrologist on October 4, 2010 (Field book) and September 19, 2012 (Field book 7).

Structures related to the Grubsteak operation that were evaluated for compliance with MM-2 are 1) one existing pond which serves as both source water and settling pond, 2) several proposed ponds, 3) one existing TA road, and 4) an existing bridge.

Plan information

Water for the operation will be pumped from the off channel pond….Small settling/recycling ponds (at least 10'x 10' x 4' deep) will be used to control muddy water (p. 7)

Source of processing water = Groundwater. The pond is distant from Clear Creek and there is no surface connection between the pond and the creek.

Field observations

Clear Creek is a perennial and fish-bearing steam. RHCA = 300 ft/side. The existing pond is both the source water pond and the settling pond. It is located inside the RHCA.

Pond-specific information

The existing Grubsteak pond is located at Site A and inside the RHCA of Clear Creek. The pond was estimated at about 15' deep from lip to bottom and is similar about 20' x 30'. The ground between the creek and the pond is mostly flat. Ground cover is 100% and there is a lot of downed wood.

The pond at site A is both a source water pond and the settling pond. The pond is dug into fine-grained sediments.

The location and number of the proposed small settling ponds has not been identified. They are also expected to be located inside the RHCA of Clear Creek. Valley width between Clear Creek and the existing processing pond is 240 feet from the creek.

Road-specific information

Miner proposes to use one existing native surface temporary access road (Appendix 6). The road is inside the RHCA of Clear Creek. The access road is across flat ground and at least 50 feet from the creek except where in the vicinity of where it crosses the creek at the designated ford. The ground between the road and the creek is well vegetated with grasses, needles and forbs.

Bridge-specific information

Miner proposes to use an existing wooden bridge which crosses Clear Creek, a perennial, fish-bearing stream. The bridge is inside the RHCA. The bridge is also adjacent to an existing ford. However, given the size and structure of the bridge, it can only handle regular vehicle or ATV traffic. The ford use would be limited to moving heavy equipment. Use of the bridge and ford combination would reduce the number of ford crossings and thus potential impacts to fish (*See Fisheries Section* for discussion of impacts of ford use on fisheries).

Pond-specific Conclusions

Existing pond at Site A

1. The existing source water/settling pond should not be moved outside the RHCA for the following reasons. If the pond is moved outside the RHCA the pond would be on the hillslope because the valley bottom width in the area of the ponds is less than 300 feet. Hillslope pond would be new construction and therefore new disturbance. The hillslope soils are shallow and the pond would receive limited groundwater inputs. When filled (e.g. in the

spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing pond is on flat ground, in a highly stable location, dug into the ground and supplied by groundwater

2. Use of the existing source water/settling pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the ponds are not in the channel.

   c) No impact to channel morphology because the pond is existing and separated from Clear Creek by about 240 feet of flat, vegetated ground. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because the pond is existing.

   e) No impact to the riparian vegetation because the pond is separated from Clear Creek by about 240 feet of flat vegetated ground. No riparian vegetation has developed in the area of the existing pond.

3. *Source Water Pond*

   No potential for a discharge via surface or subsurface flow when pond at Site A used as a source water pond because only withdrawing water.

   Settling ponds

   No potential for a discharge via surface or subsurface flow under either alternative when the existing pond at Site A is used as a settling pond because 1) there is good ground cover between the pond and the creek which would effectively trap any sediment that left the pond, 2) the pond is more than 200 feet from the creek and the sediments between the pond and the creek are a mix of coarse and fine sediments resulting in low permeability. Therefore, use of the existing pond is not expected to create seepage zones along the Clear Creek stream bank or transport sediment via the subsurface to the creek.

4. Conclusions are the same regardless of alternative.

<u>Proposed Ponds</u>

1. The proposed settling ponds should not be moved outside the RHCA for the same reasons noted above for the existing source water/settling pond at site A.

2. Use of the proposed settling ponds **could not be evaluated** for compliance with MM-2 under Alternative 2 because no location was provided by the miner.

   However, under Alternative 3, these ponds **would be in compliance** with MM-2 for the because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology because of the addition of FS WRPM which requires that the ponds be located with FS input and protection measures identified and implemented.

   c) While there would be some new soil disturbance, the new disturbance would be keep to a minimum with the addition of one Forest Service WRPM and General Requirement R-15. The WRPM requires that the ponds be located with Forest Service input and protection measures identified and implemented. The General Requirement requires that the pond be reclaimed when mining was completed.

   d) No impacts to any riparian vegetation because the ponds would be located in areas where no riparian vegetation exists as per the additional Forest Service WRPM.

3. Under Alternative 2, the potential for discharge **could not be evaluated** because the pond locations had not been identified by the miner.

   Under Alternative 3, no potential for a discharge via surface or subsurface flow from the proposed ponds because the addition of Forest Service site-specific WRPMs. This WRPM would require that the miner locate these ponds with input from the Forest Service and the appropriate protection measures identified and implemented.

4. Conclusions vary as a function of alternatives. The Forest Service WRPM and General Requirement are added to Alternative 3 and these protection measures bring the proposed settling ponds into compliance with respect to MM-2 by eliminating the potential for a discharge, minimizing the amount of soil disturbance, and ensuring reclamation upon completion of mining.

Road-specific Conclusions

1. Use of the existing temporary access (TA) road is required in order to access the site which is located inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of the existing TA road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

a) No impacts to water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity or channel morphology because the road is not near the stream, except at the designated ford. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

c) No new soil disturbance because the road is existing.

d) No impact to the riparian vegetation because the road is not near any riparian vegetation except near the stream where it crosses at the designated ford.

3. No potential for a discharge from use of the road under either alternative because it is located on flat ground and in the forest except for the area just after it crosses the creek. There is good ground cover between the road and the creek. Gentle topography and good ground cover are effective at trapping any sediment that is generated by road use and would prevent it from reaching the creek.

4. Conclusions are the same regardless of alternative.

Bridge-specific Conclusions

1. The existing bridge is a structure that is designed to cross a creek and decrease impacts to the stream banks and channel bed. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary. While use of the bridge is not required to access the mining sites and the processing site because there is an adjacent existing ford, use of the bridge by the miner would decrease how often the existing ford would be used and thus decrease potential impacts on fisheries (*See Chapter 3, Fisheries Section)*.

2. Use of the bridge inside the RHCA would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the bridge is not in the stream.

   c) No impacts to channel morphology because the bridge is existing, stable and spans the creek. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

   d) No new soil disturbance because the bridge is existing.

   e) No impact to the riparian vegetation because the bridge is existing.

3. No potential for a discharge from use of the bridge because it is existing and stable and no modifications are planned.

4. Conclusions are the same regardless of alternative.

Hopeful 1 (Placer)

Sites visited by the district hydrologist on September 24, 2010 (Field book 5). Operation has one mining area and one processing area. They are located in the same place.

Structures related to the Hopeful 1 operation that were evaluated for compliance with MM-2 are 1) an existing source water pond, 2) an existing settling pond, 3) one Forest Service closed road and 4) one existing temporary access road.

Plan information

A ½ hp pump will be used to pump water from Granite Creek and wash water will drain into nearby dredge hole (p. 4).

The water from an existing dredge hole near the cabin or the dig site is used to wash the tailings in the spring when creek levels are high; later in the season water is pumped from the creek. The waste water is put into depression in the dredge tailings (p. 6)

Source of processing water = Granite Creek and old dredge hole. There is no surface connection between the dredge hole and Granite Creek.

Field observations

Granite Creek is perennial and fish bearing. RHCA = 300 ft/side. Valley width on the north side of Granite Creek is less than 100 feet and bounded by the creek and a hillslope.

Pond-specific information

There are two ponds, a source water pond and a settling pond. The ponds are between 50 to 100 feet from the creek and located inside the RHCA of Granite Creek.

The source water pond is an old existing dredge hole. Water for the source water pond comes from spring melt and groundwater. It had water in it at time of visit. Miner proposes to pump water from the stream later in the season when the pond goes dry. Ground is flat and pond is dug into the ground.

The settling pond is located behind a berm of old placer tailings 8 to 10 feet tall, estimated from the creek bed to the top of the berm. The settling pond is a depression in the dredge tailings. This depression is also located behind the old placer tailings berm.

Road-specific information

Miner proposes to use one closed Forest Service road and one existing temporary access road (1035-E2a) (Appendix 6). The roads are inside the RHCA of Granite Creek. The roads have an aggregate surface. Forest Service road 1035-012 is separated from the creek by more than 100 feet of forested ground. Forest Service road 1035-E2a is separated from the creek by at least 100 feet of ground that is well vegetated with grasses and forbs. Road lengths are: FS 1035-012 = 0.7 miles; TA road 1035-E2a = 0.17 miles.

Pond-specific Conclusions

1. The source water pond and the settling pond should not be moved outside the RHCA for the following reasons. If ponds were moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 100 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing ponds are dug into flat ground, which is a highly stable location, and receive some groundwater.

2. Use of the existing source water pond and the settling pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the existing ponds are not in the channel.

   c) No impact to channel morphology because the existing ponds are on a terrace and separated from Granite Creek by at least 50 feet. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because the ponds are existing.

   e) No impact to the riparian vegetation because the ponds are in an area that do not have riparian vegetation. They are at least 50 feet back from the creek and up on a terrace. In addition, there would be no impacts to the riparian vegetation that has developed in the ponds because only processing water will be discharged into the ponds.

3. *Source water pond*

   No potential for a discharge from use of the source water pond into Granite Creek under either alternative because would only be withdrawing water.

Settling pond

No potential for a discharge via surface flow from the settling pond into Granite Creek under either alternative because the ponds are old dredge ponds, are up on a terrace and separated from the creek by an 8 to 10 foot high berm of old placer tailings.

No potential for a discharge via subsurface flow from the settling pond to the creek under either alternative because the pond bottoms are vegetated with lush rushes, sedges and brush which indicate that the ponds are effectively trapping any fine sediment that enters them.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of these existing roads is required in order to access the site which is located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the closed Forest Service road and the existing TA road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology because the roads are not in the stream and separated from Granite Creek by about 100 feet of forested ground. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because the roads are existing.

   d) No impact to the riparian vegetation because the roads are existing and are separated from Granite Creek by about 100 feet. In addition, there would be no impact to the riparian vegetation that has developed in the two ponds because the roads do not enter the ponds.

3. No potential for a discharge from use of either road because 1) Forest Service road 1035-012 is separated from the creek by more than 100 feet of forested ground and 2) existing TA road 1035-E2a is separated from the creek by at least 100 feet of ground that is well vegetated with grasses and forbs. The ground cover and distance are effective at trapping any sediment that is generated by road use and prevent it from reaching the creek. In addition, both roads have an aggregate surface which limits the amount of fines that would be generated as a result of use.

4. Conclusions are the same regardless of alternative.

Hopeful 2 & 3 (Placer)

Sites were visited by the district hydrologist on September 24, 2010 (Field book 5) and on June 24, 2013 (Field book 10).

Structures related to the Hopeful 2 & 3 operation that were evaluated for compliance with MM-2 are 1) construction and use of two proposed ponds on the north side of Granite Creek (*North processing site*), 2) one existing pond on the south side of Granite Creek (*South processing site*), and 3) four existing temporary access roads.

Plan information

All process water is contained in the ponds, and there would be no discharge of process water. Ponds on the south side of Granite Creek are approximately 20'x30'x4' in size (ponds were reclaimed on the north side of Granite Creek but the plan is to reconstruct them when mining takes place again in this location), and both processing sites are location over 50 feet from Granite Creek. These are pit type ponds without dams (p. 3).

The off-channel settling recycling ponds on both the north and south sides of the creek are sized at 20'x30'x4' and are located 50 feet from Granite Creek (p. 4).

Water from a spring on the south side of the creek provides water for each area and there is a pipeline that crosses the creek on the north side…. Additional water for processing placer gravels at the two processing sites comes from groundwater (p. 2).

Source of processing water = a spring on the south of the creek and groundwater.

Field observations

Granite Creek is perennial and fish bearing. RHCA = 300 ft/side. The Hopeful 2&3 has two processing sites, one proposed and one existing. The proposed processing site is located on the north side of the creek and the existing processing site is on the south side.

<u>Pond-specific information</u>

North processing site (2 proposed ponds)

The two proposed ponds on the north side would be located inside the RHCA. One would be used as a source water pond and one as a settling pond. They would be on a terrace and about 30 feet from the creek. There is good microtopography between the creek and proposed pond area and vegetation is lush grasses, forbs and rushes.

South processing site (one pond)

The existing south pond is inside the RHCA. It would be used as both a source water pond and as a settling pond. Valley width on the south side of Granite Creek is in this area is less than 50 feet. The pond is adjacent to Granite Creek (within 10 feet) and elevationally above it. The pond was holding water at the time and the pond bed was covered with fines and has sedges all around the perimeter of the pond. The pond is well bermed with the berm more than 5 feet tall. The pond has a large capacity to hold water. The berm sediments are composed of fines and large gravels. The front of the berm, facing the stream, is composed of large cobbles and boulders and appears stable. There was no indication that water and sediment is making it through the berm. There is no surface connection between the pond and the creek.

Road-specific information

Miner proposes to use four existing temporary access (TA) roads (Appendix 6). Roads are inside the RHCA. Two of the mine access roads have an aggregate surface (1035-E1a and 1035-E1b). The other two mine access roads have a native surface (1035-E1c and 1035-E1d). All roads are separated from the creek by vegetated ground. Road lengths are: TA 1035-E1a = 0.21 miles, TA 1032-E1b = 0.08 miles; TA 1035-E1c = 0.27 miles; TA 1035-E1d = 0.19 miles.

Pond-specific Conclusions

North processing site (2 proposed ponds)

1. The proposed source water and setting ponds cannot be moved outside the RHCA for the following reasons. If moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area is less than 200 feet. The hillslope soils are shallows and ponds would receive limited groundwater inputs.

2. **Alternative 2**

   Pond construction of the source water and settling ponds and use of the settling pond would NOT be in compliance with MM-2 under Alternative 2 as it pertains to streams because

   a) Potential impact to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity or channel morphology because the ponds are not in the channel.

However, construction and use of the two ponds would be in compliance under both alternatives as it pertains to activity inside the RHCA

   c) No new soil disturbance despite being new construction because they would be located in an area that has been previously disturbed.

d) No impacts to riparian vegetation because the ponds are on a terrace and separated from Granite Creek by 30 feet. The terrace has upland vegetation.

Use of the source water pond would be in compliance with MM-2 because the miner would only be withdrawing water and there would be no impacts to streams or the RHCA.

Alternative 3

Pond construction of both ponds and use of the settling pond would now be in compliance with MM-2 as a result of the addition of Forest Service site-specific WRPMs for the reasons listed in #3 below.

Use of the source water pond would be in compliance for the reasons noted under Alternative 2.

3. **Alternative 2**

Potential for a discharge of sediment via surface flow during construction of both the source water and settling pond and use of the settling pond because the edge of the terrace is only 7 feet away and then it drops down to the active floodplain. In addition, there is a small swale at the edge of the terrace by the settling pond area that would funnel any surface water and sediment that left the settling pond during use onto the floodplain.

Use of the source water pond: No potential for a discharge because would only be withdrawing water.

Alternative 3

Potential for a discharge would be eliminated with the addition of Forest Service site-specific WRPMs (Appendix 11). These WRPMs would ensure that effective sediment trapping mechanisms were in place during construction of the source water and settling ponds and during use of the settling pond to prevent sediment from leaving the terrace during construction and use.

Use of source water pond: Same as Alternative 2. No potential for a discharge.

4. Conclusions differ as a function of alternative. Forest Service site-specific WRPM are added to Alternative 3. These WRPMs eliminate the potential for a discharge of sediment during construction and use.

South processing site (one pond)

1. The existing source water/settling pond should not be moved outside the RHCA for the following reasons. If the existing pond was moved outside the RHCA the pond would be on

the hillslope because the valley bottom width in the area is less than 50 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallows and ponds would receive limited groundwater inputs. When filled in the spring there would be the potential for pond failure and hillslope erosion into Granite Creek. In contrast, the existing pond is on flat ground, in a highly stable location, dug into the ground and supplied by ground water.

2. Use of the existing source water/settling pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the pond is not in the channel.

   c) No impact to channel morphology, under despite being only 10 feet from the creek, because the pond is separated from Granite Creek by a large stable berm that is composed of coarse sediment.

   d) No new soil disturbance because the pond is existing.

   e) No impacts to the riparian vegetation are expected even though the pond contains some riparian vegetation because the pond would only receive sediment.

3. *Source water pond*

   No potential for a discharge via surface or subsurface flow from use of the pond as a source water pond because only withdrawing water.

   Settling pond

   No potential for a discharge via surface or subsurface flow from use of the pond as a settling pond under either alternative because the pond is well sealed and has a tall, well-constructed and stable berm that separates it from Granite Creek.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

<u>Existing Temporary Access roads EXCEPT TA 1035-E1d</u>

1. Use of these existing temporary access (TA) roads is required in order to access the sites which are inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of all existing TA roads, except 1035-E1d, would be in compliance with MM-2 under both alternatives because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology because the roads are not in the stream, except at the designated ford, and are separated from Granite Creek by vegetated ground. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because the roads are existing.

   d) No impact to the riparian vegetation along Granite Creek because the roads are existing and are separated from Granite Creek and any riparian vegetation except in the vicinity of the designated ford.

3. No potential for a discharge from use of any of the roads under either alternative because they are separated from the creek by vegetated ground that would effectively trap any sediment that might leave the roads prior to it reaching the creek. In addition, two of the roads have an aggregate surface and sediment generated by use would be minimal.

4. Conclusions are the same regardless of alternative.

<u>Existing Temporary Access road 1035-E1d</u>

1. Use of this existing temporary access (TA) road is required in order to access mining site #4 and the south processing site which are inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Under Alternative 2, use of existing TA road 1035-E1d would NOT be in compliance with MM-2 as it pertains to streams because

   a. Potential impacts to water quality for the reasons listed in #3 below.

   b. No impacts to inchannel complexity or channel morphology because the roads are not in the stream, except at the designated ford, and are separated from Granite Creek by vegetated ground. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

However, use would be in compliance with MM-2 as it pertains to activity inside the RHCA under both alternatives because:

   c. No new soil disturbance because the road is existing.

d. No impact to the riparian vegetation along Granite Creek because the road is existing and separated from Granite Creek and any riparian vegetation except in the vicinity of the designated ford.

Under Alternative 3, road use **would be in compliance** with MM-w as it pertains to streams because discharge potential **would be eliminated** for reasons noted in #3 below.

3. Under Alternative 2, there would be the potential for a discharge of sediment during use of the road because it has a steep slope that feeds into the ford, is rutted and composed of easily eroded sediment (gruss).

   Under Alternative 3, the discharge potential **would be eliminated** because of the addition of Forest Service WRPMs which would prevent any sediment that eroded from the road from reaching the creek. WRPMs vary depending on the segment of road and include rocking the road and putting in water bars in select areas on the road.

4. Conclusions vary as a function of alternative. Forest Service site-specific WRPMs are added to Alternative 3 for this road. These requirements would eliminate the potential for a discharge of sediment.

L & H (Placer and Lode)

Site was visited by the district hydrologist on October 15, 2004 (Field book 2) and October 26, 2004 (Field book 3) and by Allison Johnson (UNF fisheries biologist) on August 12, 2010.

Structures related to the L & H operation that were evaluated for compliance with MM-2 are two existing temporary access (TA) roads. The ponds are outside the RHCA and therefore not evaluated for compliance with MM-2.

Plan information

…a small washing plant set up near the three ponds in the draw. Water collects in these ponds during snowmelt and from seepage from the Rabbit portal and the Pete Mann Ditch…. The processing area is approximately 200 feet from a spring that runs off during snow melt but later seeps into the ground (p. 2).

Water for processing will come from three ponds which collect surface snow melt water and also ground water. These are approximately 8’x10’x8’ each. Water is recirculated out of the third pond back to the trommel. These ponds are pit-type ponds without dams (p. 4).

Source of processing water = Snowmelt and seepage from the Rabbit portal and the Pete Mann Ditch.

Field observations

The operation is in the headwaters of Olive Creek. The area have been extensively hydraulically mined in the past. Most of the operation is more than 300 feet from any creek except Adit 3. Adit 3 discharges water that enters into Olive Creek.

Pond-specific information

On October 15, 2004, the district hydrologist found an area with two ponds that are separated by berms. Her field notes state that a channel cuts through both berms. There was question at the time if these were indeed the ponds referred to in the plan. On August 12, 2010, the fisheries biologist saw them and determined that the existing L &H ponds are outside the RHCAs of any streams.

Road-specific information

Miner proposes to use two existing temporary access (TA) roads (Appendix 6). The TA roads are native surface roads. Road 1305-E5a is at least 90 feet from the drainage in an area that has been hydraulically mined. There is no channel in this area. Road 1305-E5b is a short spur that accesses Adit 3 and is separated from Olive Creek by about 70 feet of forested ground. Road lengths are: 1305-E5a = 0.29 miles; 1305-E5b = 0.06 miles.

Pond-specific Conclusions

1. N/A. Ponds are outside the RHCA
2. N/A. Ponds are outside the RHCA
3. N/A. No streams nearby.
4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of these existing roads is required in order to access the some of the sites which are inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the two existing TA roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology because the roads are not the stream and separated from Olive Creek by about 70 feet of forested ground. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because the roads are existing.

d) No impacts to the riparian vegetation because the roads are existing and at least 70 feet from Olive Creek.

3. No potential for a discharge from use of these TA roads under either alternative because 1) 1305-E5a in an area that has been hydraulically mined that lacks channels, and 2) 1305-E5b is separated from Olive Creek by about 70 feet of forested ground. The ground cover in this area is sufficient to effectively trap any sediment that would leave the road prior to its reaching the creek.

4. Conclusions are the same regardless of alternative.

Lightning (Placer)

Site was visited by the district hydrologist on October 4, 2010 (Field book 5).

Structures related to the Lightning operation that were evaluated for compliance with MM-2 are 1) existing ponds, 2) proposed ponds, 3) one existing temporary access (TA) road (1305-E6a), and 4) an existing bridge TA road 1305-E6b is outside the RHCA and therefore not evaluated for compliance with MM-2.

Plan information

Water for processing will be pumped from Lightning Creek under a 1921 water right. Just north of the bridge, three settling ponds exist, one with a headgate. The first is approximately 60' x 40' (horseshoe shaped) and collects seepage water from the open pit, which is site 1. The second pond is approximately 20'x20'. These will be deepened 10 – 15" (p. 3).

There are several sets of settling/recycling ponds existing on the claims, and these will be cleaned out as needed to keep the capacity sufficient for providing process water for site #1, to site #2 and then to site #3. Settling/recycling ponds will be improved as needed, but at site #1 right now there are three ponds, 10'x10', 40'x60' and 20'x20'. At site 3 all these ponds will be used, plus the pond north of the pit which is approximately 30'x40' in size.

At site #3, a small proposed pond approximately 10' x 10' will be excavated on the bench to catch the silt and sand, and then the water will move down into the tail race and into the two ponds that area west of the main access road. If necessary, the ponds east of the road will also be available to contain excess water in case of a storm event (p. 11).

Source of processing water = Lightning Creek

Field observations

Lightning Creek is perennial and fish-bearing. RHCA = 300 feet/side. Valley width in area proposed for processing is less than 300 feet and bounded by Lightning Creek and a hillslope. Area has been heavily mined historically.

Pond-specific information

The existing source water pond and settling ponds are located inside the RHCA of Lightning Creek and at least 60 feet from the creek. They are old dredge ponds and located on the east side of the creek and north of the bridge. Ponds are bounded by the creek and the hillslope and are separated from the creek by temporary access road 1305-E6a. The topography is flat in their vicinity. Other ponds exist east of the creek and south of the bridge but are not proposed for use.

Another settling pond is proposed for construction at mining site 3. The area where it is proposed is about 250 to 300 feet from the creek and thus inside the RHCA. The topography in this area is flat ground.

Road-specific information

Miner proposes to use two existing temporary access (TA) roads (Appendix 6). Road 1305-E6a is a native surface road. The road is at least 50 feet from the creek and is inside the RHCA. It is on flat ground, parallels the creek, and separated from the creek by a low berm of old placer tailings. Road length is: 0.07 miles

Road 1305-E6b is a native surface road and is used to access two of the mining area. It is almost 400 feet from the creek and outside the RHCA. This road is separated from the creek by road 1305-E6a, old dredge ponds, the berm and areas of flat ground. Road length = 0.1 miles

Bridge-specific information

Miner proposes to use an existing wooden bridge that crosses Lightning Creek and thus inside an RHCA. The bridge is adjacent to an existing ford. The bridge would be used to transport regular vehicles. The ford would be used to transport the heavy equipment to the mining sites because the bridge was not designed for heavy equipment.

Pond-specific Conclusions

Existing Source Water Ponds and Settling Ponds

1. The existing source water pond and settling ponds should not be moved outside the RHCA for the following reasons. If ponds were moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 100 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing ponds are old dredge ponds dug into flat ground, which is a highly stable location, and receive groundwater.

2. Use of the existing source water pond and settling ponds would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

a) No impacts to water quality for the reasons listed in #3 below.

b) No impact to inchannel complexity because the ponds are not in the channel.

c) No impact to channel morphology because the ponds are existing and separated from Lightning Creek by at least 60 feet, TA road 1305-E6a, and a low berm of old tailings. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

d) No new soil disturbance because ponds are existing.

e) No impacts to the riparian vegetation along the creek because the ponds are separated from Lightning Creek by at least 60 feet feet, TA road 1305-E6a and a low berm of old tailings. In addition, there would be no impact to the riparian vegetation that has developed in the old dredge ponds because only processing water will be discharged into the ponds.

3. *Source water pond*

No potential for a discharge related to use of the source water pond under either alternative into Lightning Creek because would only be withdrawing water.

Settling ponds

Surface flow: No potential for a discharge via surface flow from use of the settling ponds under either alternative into Lightning Creek because the ponds are old dredge ponds and separated from the creek by at least 60 feet, a road, and a low berm of old placer tailings.

Subsurface flow: No potential for a discharge subsurface flow from use of the the settling ponds under either alternative because 1) the pond bottoms are vegetated with lush rushes, sedges and brush which are effective at trapping fine sediment and 2) the ponds are at about the same elevation level as the stream.

4. Conclusions are the same regardless of alternative.

<u>Proposed Settling Pond</u>

1. The proposed settling pond should not be moved out of the RHCA for the same reasons noted above for the existing ponds.

2. Use of the proposed settling pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

a) No impact to water quality for the reasons listed in #3 below.

b) No impact to inchannel complexity because the pond would not be in the channel.

c) No impact to channel morphology because the pond would be at least 250 feet from Lightning Creek. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

d) No new detrimental soil conditions, despite being new construction, because the proposed pond would be located in a previously mined area.

e) No impacts to riparian vegetation from construction of the proposed pond because it would be at least 250 feet from Lightning Creek and would be constructed in an area with no riparian vegetation.

3. No potential for a discharge via surface or subsurface flow because the settling pond would be 250 to 300 feet from the creek in flat ground. In addition to the flat ground, there is a road and tailings separating the area from the creek. All of these features are effective sediment traps and would prevent any sediment generated by use of the pond from reaching the creek.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of TA road 1305-E6a is required in order to access the sites which are inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of TA road 1305-E6a would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the road is not in the stream and separated from Lightning Creek by at least 50 feet of flat ground and a low berm of old tailings. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because it is an existing road.

   d) No impact to the riparian vegetation for the same reasons noted for 2b.

3. No potential for a discharge from use under either alternative because it is separated from the creek by a low berm of old placer tailings, on flat ground and at least 50 feet from the

creek. The berm and the flat ground provide effective sediment traps. Therefore, any sediment generated as a result of use of this road that might erode off the road would be effectively trapped prior to reaching the creek.

4. Conclusions are the same regardless of alternative.

Bridge-specific Conclusions

1. The existing bridge is a structure that is designed to cross a creek and decrease impacts to the stream banks and channel bed. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary. While use of the bridge is not required to access the mining sites and the processing site, use of the bridge by the miner would decrease how often the existing ford would be used and thus decrease potential impacts on fisheries (*See Chapter 3, Fisheries Section)*.

2. Use of the bridge inside the RHCA would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the bridge is not in the stream.

   c) No impacts to channel morphology because the bridge is existing, stable and spans the creek. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

   d) No new soil disturbance because the bridge is existing.

   e) No impact to the riparian vegetation because the bridge is existing.

3. No potential for a discharge from use of the bridge because it is existing and stable and no modifications are planned.

4. Conclusions are the same regardless of alternative.

Little Cross 1 (Placer)

Site visited by district hydrologist on October 4, 2010 (Field book 5) and September 18, 2012 (Field book 7).

Structures related to the Little Cross operation that were evaluated for compliance with MM-2 are 1) one proposed ponds and 2) one existing temporary access road.

Plan information

Groundwater in the hole will be used to process tailings (p.4).

Source of processing water = Groundwater

Field observations

Granite Creek is perennial and fish-bearing. RHCA = 300 feet/side. Valley bottom width on north side of Granite Creek between the creek and County Road 24 is less than 300 feet.

Pond-specific information

The test hole, which is also going to be both the source water pond and the settling pond, is on the road that leads to the Granite Creek ford. The pond would be inside the RHCA of Granite Creek. The test hole will be on the ford approach which is unvegetated and old dredge tailings. There are some fines in the tailings. The distance between the proposed test hole/pond and the creek is than 25 feet.

Road-specific information

Miner proposes to use one existing temporary access road (Appendix 6). Road is inside the RHCA of Granite Creek. Road 1000-E3a is composed of old placer tailings. The road is along flat ground, is within 50 feet of the creek at its closest point, and separated from the creek by a berm composed of old placer tailings. Road length is 0.03 miles.

Pond Conclusion

1. The proposed source water/settling pond cannot be moved outside the RHCA because the pond is also the test hole which is located insider the RHCA.

2. Under Alternative 2, construction and use of the pond/test hole would NOT be in compliance with MM-2 as it pertains to streams because

   a) Potential for a discharge and therefore a local impact on water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity under either alternative because the pond is not in the channel.

   c) No impact to channel morphology under either alternative because the pond would be located on the ford approach to Granite Creek and therefore there would be no impact to stream banks and no change in channel width/depth ratios.

However, construction and use of the pond/test hole would be in compliance with MM-2 as it pertains to activity inside the RHCA because

d) No new detrimental soil disturbance under either alternative, despite being new construction, because it would be located in an area that was has been previously mined and has little ground vegetation. However, even though there would not be new detrimental soil disturbance, Forest Service General Requirement R-15 (appendix 2) would be added under Alternative 3. R-15 requires that the pond be reclaimed once mining activity was done.

e) No impact to the riparian vegetation because there is no riparian vegetation in this area.

Under Alternative 3, construction and use of the source water/settling pond **would be in compliance** with MM-2 as a result of the addition of the FS WRPM discussed in #3 below.

3. **Alternative 2**

Surface flow: Potential for a discharge via surface flow of sediment into the creek when both source water and settling pond because the test hole/pond would be dug into the road that leads to the ford that crosses Granite Creek. The road slopes towards the creek, has no ground cover and area of the road to be mined is within 15-20 feet of the stream bank.

Subsurface flow: Potential for a discharge via subsurface flow because the hole is into old tailings and the permeability of the sediments is likely high. As a result, there would be the possibility that water in the hole could create a seepage zone in the road, and in the process remobilize fine sediment on the surface of the road. In both cases, sediment entering the creek would result in a local reduction of water clarity.

Alternative 3

Discharge potential via surface or subsurface flow **would be eliminated** as a result of the addition of a Forest Service site-specific WRPM. The WRPM would eliminate the potential for sediment to reach the creek by placing straw bales between the activity and creek to trap any sediment that moves down the ford approach.

4. Conclusions vary as a function of alternative. A site-specific Forest Service WRPM would be added to Alternative 3. This WRPM would bring the construction and use of the pond into compliance with MM-2 by eliminating the potential for a discharge as a result of Pond-specific information activity. In addition, as stated under 2d, Forest Service General Requirement R-15 would still require that the pond be reclaimed once mining activity was done.

Road-specific Conclusions

1. Use of the existing TA road is required in order to access the site which is inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of the road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the road is not in the stream and separated from Granite Creek by an berm of old placer tailings and at least 50 feet except at the ford approach. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because it is an existing road.

   d) No impact to the riparian vegetation because no riparian vegetation in the road area.

3. No potential for a discharge from use of this road under either alternative because it is along flat ground and is separated from the creek by a berm composed of old placer tailings. The berm and the flat ground provide effective sediment traps. Any sediment generated as a result of road use and might erode off the road would be trapped prior to reaching the creek.

4. Conclusions are the same regardless of alternative.

Lucky Strike (Placer/Lode)

Site visited by district hydrologist on October 19, 2004 (Field book 2).

There are no structures inside the RHCA as the site is located on a ridge. Therefore, the question of compliance with MM-2 does not apply.

Plan information

Local water source (existing spring) (p. 5).

Source of processing water = spring

Field observations

In the Quartz Gulch drainage. More than 300 feet from any stream. RHCA = N/A. Material would be processed at the mill.

Pond-specific information

There are no ponds.

Road-specific information

Miner would only use open Forest Service roads that are also used by the general public or private roads.

Ponds Conclusions

1. N/A. There are no ponds.
2. N/A. There are no ponds.
3. N/A. There are no ponds.
4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. N/A. Only open Forest Service roads used to access the site. The road in the vicinity of the site is outside the RHCA. .

2. N/A. MM-2 does not apply because the roads in the vicinity of the site are outside the RHCA.

3. No potential for a discharge from use of roads under either alternative because they are more than 300 feet from any stream.

4. Conclusions are the same regardless of alternative.

Make It (Placer)

Site visited by district hydrologist on November 5, 2004 (Field book 4). Name at that time was Rock-O-Gold. Name changed but the Plan has remained the same.

Structures related to the Make-It operation that were evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing depressions to be used as settling ponds, and 3) one existing temporary access road.

Plan information

Water to be obtained from existing ponds (using buckets) and disposal of dirty water into depressions in old dredging's…. Water will be returned to an existing off channel pond (p. 3).

Water for the processing will be from the existing pond…The discharge water will go into existing depressions (settling pond) in old dredging's (p.4).

NOTE: the "off channel ponds" referenced in the miner's Plan are actually the old depressions located back against the hillslope.

Source of processing water = existing pond which has a surface connection to Granite Creek.

Field observations

Granite Creek is perennial and fish-bearing. RHCA = 300 ft/side. Valley bottom width in area proposed for activity less than 300 feet and is bounded by Granite Creek and a hillslope.

Pond-specific information

The source water pond is an existing pond that has a surface connection to Granite Creek via a side channel. Water will only be withdrawn from this pond. No sediment will be added. The pond is inside the RHCA.

The existing settling ponds are old depressions related to past mining activity. Settling ponds are located between the creek and a gated miner's access road to old cabins to the east and about 80 feet from the creek. Ground is largely flat with limited vegetation. The area is old placer tailings that have been flattened. Soil productivity is very low.

Road-specific information

Miner proposes to use one existing temporary access (TA) road (Appendix 6). The road is inside the RHCA of Granite Creek. TA road 7300-E2a is native surface and runs along the base of the hillslope. It is separated from creek by 80 feet of flat ground and a forested strip that has developed on the road's fill slope. Road length is 0.37 miles.

Pond-specific Conclusions

1. The existing source water pond and the existing settling ponds (depressions) should not be moved outside the RHCA for the following reasons. If ponds were moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 300 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing ponds are dug into flat ground, which is a highly stable location, and receive some groundwater.

2. Use of the existing source water pond and the settling ponds would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impact to water quality for the reasons listed in #3 below.

b) No impact to inchannel complexity because the pond is not in the channel, though it is connected to it by a side channel.

c) No impact to channel morphology because the pond is used as source water only. Therefore no changes would occur to the stream banks and thus channel width/depth ratios.

d) No new soil disturbance because it is an existing pond.

e) No impact to the riparian vegetation along Granite Creek for the reasons noted in #2c.

3. *Source water pond*

No potential for a discharge as a result of using of the source water pond because water would only be withdrawn from the pond. No sediment would be added.

Settling ponds

Surface flow: No potential for a discharge via surface flow from the settling ponds into Granite Creek under either alternative because the ponds are old depressions ponds and separated from the creek by about 80 feet across flat ground.

Subsurface flow: No potential for a discharge via subsurface flow from the ponds to the creek under either alternative because the ponds are at least 80 feet from the creek, at a similar elevation as the stream, and the flattening of the placer tailings across the valley bottom has likely decreased the permeability of the old tailings.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of the existing TA road is required in order to access the sites which are inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of the existing TA road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the road is not in the stream and separated from Granite Creek by more than 80 feet of flat ground. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

c) No new soil disturbance because it is an existing road.

d) No impact to the riparian vegetation because there is no riparian vegetation in this area.

3. No potential for a discharge from use of the road under either alternative because it is separated from creek by 80 feet of flat ground and a forested strip that has developed on the road's fill slope. The intervening ground and forested strip are effective sediment traps.

4. Conclusions are the same regardless of alternative.

Muffin (Placer)

Site visited by district hydrologist on September 18, 2012 (Field book 7) and on September 21 and 24, 2012 (Field book 8).

Structures related to the Muffin operation that were evaluated for compliance with MM-2 are 1) one existing source water pond, 2) two existing settling ponds, 2) one Forest Service closed road and 3) one existing temporary access road.

Plan information

There is one processing site. Processed water comes from reservoir approximately 45'x25'x3'. Off channel settling recycling ponds are approximately 10'x80'x6 and 8'x20'x4' (p. 6).

Source of processing water = Ground water. There is no surface connection between the pond and Last Chance Creek.

Field observations

Last Chance Creek has become disconnected from Boulder Creek as the result of past mining activity which built multiple berms across the valley bottom creating a series of ponds. Thus there is no surface connection between Boulder Creek and Last Chance Creek. Last Chance has perennial flow in places but is <u>not</u> fish-bearing. RHCA = 150 ft/side. Total valley bottom width is less than 150 feet and bounded on both sides by hillslopes.

<u>Pond-specific information</u>

Three existing ponds are proposed for use. They are located inside the RHCA of Last Chance Creek. The pond designated a source water pond is located on the edge of the valley floor meadow. The pond is well bermed and water is at least 2 feet below the top of the berm. To the west of the pond, the valley floor is well vegetated.

There are two settling ponds. One is designated as the primary pond and one as the overflow pond. The primary settling pond is up out of the gulch on flat ground and separated from the gulch by the source water pond and the overflow settling pond.

The overflow settling pond is separated by a berm from the source water pond and is downstream of the source water pond. There are small channels in the valley bottom of the gulch west of the ponds and at least one of the channels carries water in each of segments between the valley dams. Water table is high and the valley bottom contains dense lush grasses. Ground is flat and spongy. Valley bottom width varies at the different mining sites. Site 1 = 36 feet paced, Site 2 = 40 feet paced, and Site 3 = 68 feet paced. Site 4 is more than 300 feet from Last Chance Creek.

Road-specific information

Miner proposes to use one Forest Service closed road and one existing temporary access (TA) road (Appendix 6). Both roads are native surface roads and portions are within the RHCA of Last Chance Creek. Forest Service closed road 7355-012 ends in the camp site and does not reach the creek. The existing temporary access road (7355-M1a) crosses the creek on an old berm to access mining areas 1 and 3 and the processing site and then parallels the valley. TA 7355-M1a is more than 100 feet from the creek after it crosses the creek at the designated crossing point and the intervening ground is well forested and has 80 to 100% ground cover. In addition, the creek itself is 20 feet from the hillslope edge and located within a meadow composed of very lush grasses and forbs. Road lengths are: FS 7355-012 = 0.18 miles; TA road 7355-M1a = 0.08 miles

Pond-specific Conclusions

1. The existing source water pond and the settling ponds should not be moved outside the RHCA for the following reasons. If ponds were moved outside the RHCA the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 100 feet. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing ponds are dug into flat ground, which is a highly stable location, and receive groundwater.

2. Use of the existing source water pond and the two settling ponds would be in compliance with MM-2 under both alternatives as it pertains to stream and activity inside the RHCA because

   a) No impact to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the ponds are not in the channel.

c) No impact to channel morphology because the ponds are existing and separated from the little creek that flows through the meadow in this area by at least 25 feet. Therefore there would be no effect on stream banks and no change in channel width/depth ratios.

d) No new soil disturbance because they are existing ponds.

e) No impact to the riparian vegetation in Last Chance Creek meadow area. The ponds are separated from the meadow by a low berm. In addition, there would be no impact to the riparian vegetation that has developed around the old dredge ponds because only processing water will be discharged into the ponds. There is no activity proposed in the riparian area around the dredge ponds that would alter vegetation.

3. Source Water Pond

No potential for a discharge via surface or subsurface flow under either alternative into Last Chance Creek because only withdrawing water.

Settling Ponds

No potential for a discharge via surface or subsurface flow under either alternative into Last Chance Creek from use of the existing ponds because the ponds are well sealed, dug into the ground and surrounded by a low berm.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. Use of these existing roads is required in order to access Sites1, 2, and 3 which are located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the closed Forest Service road and the existing TA road would be in compliance with MM-2 under both alternatives because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the roads are not in the stream and the TA road crosses the Last Chance Creek meadow area on an old berm. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because they are existing roads.

d) No impact to the riparian vegetation because riparian vegetation is not in the roaded area.

3. *TA 7355-M1a:* No potential for a discharge from use of this road because the forested ground, the meadow vegetation and the distance from the creek would effectively trap any sediment that leaves the road and prevent it from reaching the creek.

   FS closed road 7355-012: No potential for a discharge from using this road because it ends in the camp site and does not reach the creek.

4. Conclusions are the same regardless of alternative.

Old Eric 1 & 2 (Placer)

Site visited by district hydrologist on August 25, 2010 (Field book 5). Additional discussion occurred with Chris Helberg, the minerals administrator, in 2012 related to clarify areas to be used.

Structures related to the Old Eric 1 & 2 operation that were evaluated for compliance with MM-2 are 1) one existing source water pond, 2) one existing settling pond, 3) one existing temporary access road, and 4) one existing bridge.

Plan information

Water for processing will come from ground water which fills an old settling pond and is recirculated. Water from processing is discharged into a settling pond…The old ditch which intersects with the creek will be closed off so that water cannot drain from the settling pond (p. 6).

Source of processing water = Ground water. There is no surface connection between the pond and Granite Creek. Pond back against the hillside.

Field observations

Granite Creek is perennial and fish-bearing. RHCA = 300 ft/side. Valley bottom width is less than 300 feet on the west side of Granite Creek.

<u>Pond-specific information</u>

Two existing ponds are proposed for use. They are located inside the RHCA of Granite Creek. The source water pond is an old mining test hole and located against the hillslope. It is about 175 feet from the creek and about 60 feet from an old ditch that connects to the creek. The ground between the source water pond and the creek has 100% ground cover of lush grasses and forbs.

The existing settling pond parallels the creek, is elevationally above the creek, and 15 feet from Granite Creek. It is 80 feet long and 54 feet wide according to the map provided in the Plan. The bottom of the pond is lush with grasses, sedges, forbs, and rushes and some cropped willows. The Plan provides an alternate settling pond which has a ditch that connects it to the stream. This alternate pond is smaller and more distant from the creek.

Road-specific information

Miner proposes to use one existing temporary access (TA) road to access his campsite (Appendix 6). The road is inside the RHCA of Granite Creek and composed of old tailings (limited sediment source) and ends at the campsite. It does not cross the creek. Road length is 0.4 miles.

Bridge-specific information

There is an existing wooden bridge that crosses Granite Creek. The bridge is inside the RHCA.

Pond-specific Conclusions

Source water pond

1. The pond should not be moved outside the RHCA for the same reasons noted for the settling pond.

2. Use of the processing pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impact to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the pond is not in the channel.

   c) No impact to channel morphology because the pond is existing and separated from Granite Creek by about 175 feet of flat, well-vegetated ground. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because it is an existing pond.

   e) No impact to the riparian vegetation because the pond is separated from Granite Creek by 175 feet.

3. No potential for a discharge because the pond would only be used as source water. No sediment would be added.

4. Conclusions are the same regardless of alternative.

Settling Pond

1. The existing source water pond and the settling pond should not be moved outside the RHCA for the following reasons. If the pond were moved outside the RHCA it would be on the hillslope because the valley bottom width in the area of the pond is less than 100 feet. Hillslope pond would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, The settling pond is into flat ground, the walls and bottom of the pond are well vegetated with grasses and sedges and it is in a highly stable location.

2. Under Alternative 2, the use of the settling pond would NOT be in compliance with MM-2 as it pertains to streams because

   a) Potential impact to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity under either alternative because the ponds are not in the channel.

   c) No impact to channel morphology under either alternative because the pond is existing and separated from Granite Creek by 15 feet and a low berm. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   Pond use would be in compliance with MM-2 as it pertains to activity inside the RHCA because

   a) No new soil disturbance because it is an existing pond.

   b) No impact to the riparian vegetation along Granite Creek because the pond is 15 feet from the creek, is existing and no changes are proposed for the pond.

3. **Alternative 2**

   Surface flow: No potential for a discharge via surface flow because the pond is large is size and is bermed.

   Subsurface flow: No potential for a discharge via subsurface flow of **sediment** because the pond bottom and sides are well vegetated with lush grasses and rushes which are effective at trapping sediment.

   However, there is a potential for a discharge via subsurface flow of **elevated water temperatures** because pond is large and unshaded. Therefore, if the amount of water in the pond was such that it remained in the pond for multiple days there is the potential for it to heat up. As the pond is elevationally above the creek, parallels the creek for 80 feet, and

within 15 feet of the creek the result could be the influx of warmer water entering Granite Creek. This would result in a localized increase in stream temperatures and loss of local refugia as a result warm pond water entering the creek via subsurface flow.

Alternative 3

Surface flow: Same as Alternative 2. No potential for a discharge via surface flow because the pond is large is size and is bermed.

Subsurface flow: Potential for discharge via subsurface flow of warm water **would be eliminated** with the addition of a Forest Service site-specific WRPM (Appendix 11). This WRPM limits the length of time that there can be standing water in the settling pond to 1 day or less.

4. The conclusions vary as a function of alternative because a Forest Service site-specific WRPM is added to Alternative 3. This site-specific WRPM brings the use of the settling pond into compliance under Alternative 3 with respect to MM-2 because it would eliminate the potential for a discharge of warm water into Granite Creek. Therefore, there would be no change in existing water quality.

Road-specific Conclusions

1. Use of the existing TA road is required in order to access the site which is inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of the existing TA road would be in compliance with MM-2 under both alternatives as it pertains to stream and activity inside an RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity or channel morphology from road use because the road is not in the stream and used to only access the campsite. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because it is an existing road.

   d) No impact to the riparian vegetation because there is no riparian vegetation in the roaded area.

3. No potential for a discharge from use of the road under either alternative because the road is composed of old tailings (limited sediment source), does not cross the creek, the ground is flat and the road ends about 20 feet from the creek. Topography and the distance are effective at trapping any sediment that leaves the road prior to it reaching the creek.

4. Conclusions are the same regardless of alternative.

Bridge-specific Conclusions

Existing bridge

1. The existing bridge is a structure that is designed to cross a creek and decrease impacts to the stream banks and channel bed and is required for access to the mining and processing sites. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary.

2. Use of the bridge inside the RHCA would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the bridge is not in the stream.

   c) No impacts to channel morphology because the bridge is existing, stable and spans the creek. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

   d) No new soil disturbance because the bridge is existing.

   e) No impact to the riparian vegetation because the bridge is existing.

3. No potential for a discharge from use of the bridge because it is existing and stable and no modifications are planned.

4. Conclusions are the same regardless of alternative.

Olive Tone (Placer)

Site visited by district hydrologist on October 3, 2012 (Field book 10).

Structures related to the Olive Tone operation that were evaluated for compliance with MM-2 are 1) two proposed settling ponds and 2) two existing temporary access roads.

Plan information

Two off channel ponds located approximate 40 feet from the creek will be approximately 20’ by 10’ each in size. Process water will come from the spring…..A second processing site may be established near the north end…(p.8).

Correspondence (10/2/11): Will be establishing 2 new ponds on the west side of Olive Creek. The first pond will be for sediment and the second pond will be used to store overflow from the first pond….The second pond will be used for replenishing process water and evaporation purposes. Both ponds will be bermed on the stream side to prevent runoff…

Source of processing water = spring and Olive Creek.

Field Observations

Olive Creek is perennial and fish-bearing. RHCA = 300 ft/side. Valley width on the west side of Olive Creek is less than 100 feet and bounded by the creek and a hillslope. Valley bottom width measured from the valley floor terrace-channel break in slope to the old tailings up against the west hillslope is about 60 feet paced

Pond-specific information

Proposed ponds would be located in the RHCA and would be settling ponds only. Ponds would be elevationally above Olive Creek as the terrace is about 4.5 to 5 feet above the creek and at least 50 feet from the creek. The ponds would be in old, flattened placer tailings. Permeability of the tailings may be high enough to allow subsurface flow from the ponds towards the creek especially since the ponds are elevationally above the creek.

The water for processing would come from either Olive Creek or a spring and there is no source water pond identified for construction and use.

Road-specific information

Miner proposes to use two existing temporary access (TA) roads (Appendix 6). The roads are within the RHCA of Olive Creek. Road 1305-E4a is an existing native surface road used to access the site. It is on the east side of Olive Creek and about 30 feet from it. The road parallels the creek and is elevationally above the creek. The ground between the creek and the road is forested. Road length is 0.2 miles.

Road 1305-E4b is an existing native surface and tailings road. It is located on the west side of Olive Creek. It is about 20 feet from the creek, on flat ground and parallels the hillslope. Ground cover is very limited as soil productivity is low being old tailings. It consists mainly of scattered colonizers.

Pond-specific Conclusions

1. The settling ponds should not be moved outside the RHCA for the following reasons. If ponds were moved outside the RHCA, the ponds would be on the hillslope because the valley bottom width in the area of the ponds is less than 100 feet. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the area where the ponds are proposed for construction would be dug into flat ground, which is a highly stable location, and would receive some groundwater.

No source water pond proposed for construction and use. Water would come directly from either Olive Creek or a spring.

Pond Construction

2. Pond construction of the settling ponds would be in compliance with MM-2 under both alternatives as it pertains to stream and activity inside the RHCA because

   a) No impact to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the ponds are not in the channel.

   c) No impact to channel morphology because the ponds would be at least 50 feet from Olive Creek. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new detrimental soil disturbance, despite being new construction, because it would occur in an area that was has been previously mined and has little ground vegetation.

   e) No impact to the riparian vegetation because the ponds are separated at least 50 feet from Olive Creek and there is no riparian vegetation where the ponds are to be located.

3. No potential for a discharge via surface flow during pond construction into Olive Creek under either alternative because the ponds would be dug into the ground and are separated from the creek by 50 feet of flat ground.

4. Conclusions are the same regardless of alternative.

Pond Use

2. Under Alternative 2, pond use of the settling ponds would NOT be in compliance with MM-2 as it pertains to streams because

   a) Potential impact water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity under either alternative because the ponds are not in the channel.

   c) No impact to channel morphology under either alternative because the ponds are existing and separated from Granite Creek by County Road 24. Therefore there would be no impact to stream banks and no change in channel width/depth ratios

However, pond use of the settling ponds would be in compliance with MM-2 as it pertains to activity inside the RHCA because

d) No new detrimental soil disturbance, despite being new construction, because it would be located in an area that was has been previously mined and has little ground vegetation.

e) No impact to the riparian vegetation because there is no riparian vegetation in this area.

3. **Alternative 2**

Surface flow: No potential for a discharge via surface flow because the settling ponds would be dug into the ground and would be at least 60 feet from the creek on flat ground.

Subsurface flow: Potential for a discharge via subsurface flow from the settling ponds into the creek because the settling ponds 1) would be in old placer tailings, 2) would be elevationally above the creek resulting in groundwater flow would be towards the creek, and 3) the old tailings have a high permeability and large pores allowing both sediment and water to move through the subsurface. In addition to the sediment from the pond potentially reaching the creek, the water moving towards Olive Creek via subsurface flow could mobilize the bank sediments when the water reemerged at the stream bank face. These seepage zones have the potential to also add sediment into the creek.

Alternative 3

Surface flow: Same as Alternative 2. No potential for a discharge via surface flow.

Subsurface flow: Different than Alternative 2. Under Alternative 3, discharge potential via subsurface flow **would be eliminated** as a result of the addition of a Forest Service site-specific WRPM that decreases the permeability of the settling pond sediments (Appendix 11 and 1B). This WRPM would create a buried barrier between the pond and the stream that would prevent any sediment that left the pond from moving via groundwater to the stream bank.

4. Conclusions vary as a function of alternative. A Forest Service site-specific WRPM would be added to Alternative 3. This WRPM brings the use of the settling ponds into compliance under Alternative 3 with respect to MM-2 by eliminating the potential for a discharge as a result of pond use.

Road-specific Conclusions

1. Use of these existing TA roads is required in order to access the site because the site is inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the existing TA roads would be in compliance with MM-2 under both alternatives because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity or channel morphology from road use because the roads are not in the stream except at the designated ford. TA road 1305-E4a is separated from Olive Creek by 30 feet. TA road 1305-E4b is separated from Olive Creek by 20 feet. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because they are existing roads.

   d) No impact to the riparian vegetation because the roads are existing and there is no riparian vegetation in the roaded area except in the area of the designated ford.

3. *TA Road 1305-E4a (existing)*

   No potential for a discharge from use of this existing TA road under either alternative because the forested ground cover is an effective sediment trap and would trap any sediment that left the road before it reaching the creek.

   TA Road 1305-E4b (existing)

   No potential for a discharge from use of this existing TA road under either alternative even though the ground cover is limited because the flat topography and distance from the creek are effective sediment traps and would trap any sediment that left the road before it reached the creek. In addition, the road surface is old tailings and therefore sediment production from road use is expected to be minimal.

4. Conclusions are the same regardless of alternative.

Rosebud (Placer)

Site visited by district hydrologist on September 8, 2011 (Field book 6).

Structures related to the Rosebud operation that were evaluated for compliance with MM-2 are 1) two ponds (a source water pond and a settling pond) and 2) one existing TA road.

Plan information

Water used in processing will come from existing depressions filled with water. Waste water from processing will be captured in nature depressions and allowed to soak into the ground (p.2-3).

Only water used will be pumped from existing holes to the small trommel….Water from processing will be directed to settling ponds (p.3).

Source of processing water = Ground water. There is no surface connection between the old dredge ponds and Granite Creek.

Field observations

Granite Creek is perennial and fish-bearing. RHCA = 300 ft/side. Valley bottom width from creek to base of east hillslope is less than 150 feet.

<u>Pond-specific information</u>

The existing source water pond is 375 feet from Granite Creek and located outside the RHCA. Ponds are located on the east side of Granite Creek and separated from Granite Creek by County Road 24. The source water pond is located between County Road 24 and the powerline road and is an old dredge pond. It taps into groundwater.

The existing settling ponds are a series of dry depressions along the base of the hillslope related to past mining as well. The settling ponds are between the powerline road and the hillslope and composed of fine-grained sediments. Some of the settling ponds have well-defined boundaries and are sufficiently bermed, while others are not. They are 475 feet from Granite Creek and outside the RHCA as well.

<u>Road-specific information</u>

Miner proposes to use one temporary access road (TA road 1000-E2a). It is also referred to as the powerline road (Appendix 6). The road is a native surface road. Road length is 0.46 miles and is outside the RHCA.

The road is more than 300 feet from Granite Creek and is separated from the creek by County Road 24 and old dredge ponds and outside the RHCA. Abundant riparian vegetation has become established around the old dredge ponds sediment.

Pond-specific Conclusions

Source water pond

1. N/A. Ponds are outside the RHCA
2. N/A. Ponds are outside the RHCA and therefore the question of compliance with MM-2 does not apply.
3. N/A. Nearest stream is 375 feet away and separated from activity by a County road 24..
4. Conclusions are the same regardless of alternative.

Settling ponds

1. N/A. Ponds are outside the RHCA
2. N/A. Ponds are outside the RHCA and therefore the question of compliance with MM-2 does not apply.
3. N/A. Nearest stream is 375 feet away and separated from activity by a County road 24..
4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. N/A. Road is outside the RHCA.

2. N/A. Road is outside the RHCA and therefore the question of compliance with MM-2 does not apply.

3. No potential for a discharge from use of the road under either alternative because the road is more than 300 feet from Granite Creek, is separated from the creek by County Road 24 and old dredge ponds that have extensive riparian vegetation around them. County Road 24, the dredge ponds and the riparian vegetation are all effective sediment traps which would prevent any sediment generated as a result of road use from reaching Granite Creek or the dredge ponds.

4. Conclusions are the same regardless of alternative.

Royal White (Lode)

Site visited by district hydrologist on October 19, 2004 (Field book 2).

There are no structures located inside any RHCA because the ponds, roads and site are located on a ridge.

Plan information

Water from runoff fills the lower Royal White portal #2 in the spring and this water is pumped up to the Royal White #1 and is used for milling while it is available. Process water is caught in tanks and recycled. When water becomes too muddy to use in the milling process, it is drained into the existing pond at the Royal White site #1 and allowed to seep and/or evaporate. When this source of water dries up, water is hauled in from the storage reservoir located at the Blackhawk portal…..The pond, approximately 20'x30'x6' has been in placer for many years and is well sealed (p.7).

When the process water is too muddy to reuse, it is deposited in a pond approximately 20'x30'x6' and allowed to evaporate (p. 9).

Source of processing water = Runoff and storage reservoir. There are no streams nearby.

Field observations

Site located in the Irish Gulch drainage of Olive Creek and on a ridge. Site is more than 300 feet from any stream. RHCA = N/A.

Pond-specific information

Royal White ponds are outside the RHCA. They are more than 300 feet from any drainage being located on a ridge.

Road-specific information

Miner proposes to use three existing temporary access roads (Appendix 6). All are native surface roads. The roads are on a ridge and there are no streams or stream channels or wetlands in the area. They are outside the RHCA.

Pond-specific Conclusions

1. N/A. Ponds are outside the RHCA
2. N/A. Ponds are outside the RHCA and therefore the question of compliance with MM-2 does not apply.
3. N/A. No streams nearby.
4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. N/A. Roads are outside the RHCA.
2. N/A. Roads are outside the RHCA and therefore the question of compliance with MM-2 does not apply.

3. No potential for a discharge from use of any of the roads because the roads are on a ridge and there are no streams or stream channels or wetlands in the area.

4. Conclusions are the same regardless of alternative.

Ruby (Placer)

Sites visited by district hydrologist on October 4, 2010 (Field book 5), September 24, 2012 (Field book 8), and September 28, 2012 (Field book 9).

Structures related to the Ruby operation that were evaluated for compliance with MM-2 are 1) six existing temporary access (TA) roads and 2) a temporary ATV bridge. There are no ponds as the miner would be using a self-contained processing unit.

Plan information

Water for processing will be from the self-contained wash plant and the test hole. The only land application is the immediate area of the washing procedure….Will stay a minimum of 10 feet from the edge of the water and the riparian vegetation will remain intact in that area. (p. 5).

Source of processing water = unknown. The Plan says that they will be using a self-contained wash plant but does not identify where the water for the wash plant will be coming from. The Forest Service is assuming that the miner is trucking in the water because he hasn't requested an on-site source.

Field observations

Sites are located on Ruby Creek which has intermittent flow and is seasonally fish-bearing. RHCA = 300ft/side and Lightning Creek with is perennial and fish-bearing. RHCA = 300 ft/side.

<u>Pond-specific information</u>

There are no ponds. A self-contained unit serves as "source water pond and settling ponds."

<u>Road-specific information</u>

Miner proposes to use six existing temporary access (TA) roads to access the various sites and one temporary ATV bridge (Appendix 6). The roads are all native surface and all of the roads are within the RHCA of Clear Creek.

Road 1310-E1a is used to access Sites 1, 2 and 3. This road is native surface and composed of fine sediment. During high flows, there are places where Ruby Creek overtops its stream banks and water flows onto and down the road to the Ruby Creek ford area. Road length is 0.62 miles need to work up because of soil generated by use.

Road 1310-E1b is used to access Site 2. This road is native surface and composed of fine sediment. Road is outside the influence of Ruby Creek. Road length is 0.03 miles.

Road 1310-E3a is used to access sites 4 and 5. This road is separated from Clear Creek by 85 to 100 feet of vegetated ground. The topography is flat. Road length is 0.07 miles.

Road 1310-E3b is used to access site 6. The road at site 6 is 150 feet from Clear Creek. The topography is flat and there is 80 to 100% ground cover of grasses and forbs between the road and the creek. Road length is 0.06 miles

Road 1310-E3c is used to access site 7. It is more than 100 feet from the creek and behind a low ridge. Road length is 0.02 miles.

Road 1310-E4a is used to access Site 8. The road is more than 200 feet from the creek. The ground cover between the creek and the road is lush grasses and forbs. The road is on flat ground. Road length is 0.09 miles.

Bridge-specific information

The proposed ATV bridge would be used to cross Clear Creek and access Sites 1, 2, and 3 with ATV. Miner plans to still ford Clear Creek with equipment. Stream banks were the bridge would go are composed of fine grained sediment and the banks are unvegetated. While use of the proposed bridge is not required to access mining sites 1, 2, and 3, use of the bridge by the miner would decrease how often the existing Clear Creek ford would be used and thus decrease potential impacts on fisheries (*See Chapter 3, Fisheries Section)*.

Pond-specific Conclusions

1. N/A. There are no ponds
2. N/A. There are no ponds so the question of compliance with MM-2 does not apply.
3. No discharge potential. Processing unit is self-contained.
4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

All Temporary Access Roads **EXCEPT** TA 1310-E1a

1. Use of these five existing TA roads is required in order to access the sites which are all located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of these five TA access roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

a) No impacts to water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity or channel morphology from road use because the roads are not in the creeks and separated from creek by 25 feet or more. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

c) No new soil disturbance because they are existing roads.

d) No impact to the riparian vegetation because the road are existing and not next to the creeks.

3. *1310-E1b to Site 2*

No potential for a discharge for under either alternative because the road is outside the influence of Ruby Creek, on flat ground, and the ground cover between the creek and road is lush grasses. Any sediment that would leave the road would be effectively trapped prior to reaching the creek.

1310-E3a to Sites 4 and 5

No potential for a discharge for under either alternative because the road is separated from Clear Creek by 85 to 100 feet of vegetated ground and the topography is flat. The combination of distance, flat, and well-vegetated ground would effectively trap any sediment that left the road prior to it reaching Clear Creek.

1310-E3b to Site 6

No potential for a discharge for under either alternative for the same reasons stated for 130-E3a above.

1310-E3c to Site 7

No potential for a discharge for under either alternative because it is completely disconnected from Clear Creek by the low ridge and sediment would be trapped behind the ridge.

1310-E4a to Site 8

No potential for a discharge for under either alternative for the same reasons for the same reasons stated for 130-E3a above.

4. Conclusions are the same regardless of alternative.

Temporary Access Road 1310-E1a

1. Use of this existing TA road is required in order to access sites 1, 2, and 3 which are all located inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. **Alternative 2**

   Use of 1310-E1a would NOT be in compliance with MM-2 as it pertains to streams because

   a) Impact to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the road is existing. Therefore, there would be no impacts to stream banks and no change to width/depth ratios even though the creek flows down the road at high flows.

However, use of 1310-E1a would be in compliance with MM-2 as it pertains to activity inside the RHCA because

   c) No new soil disturbance because it is an existing road.

   d) No impact to the riparian vegetation for the same reasons noted for 2b.

   Alternative 3

   Under Alternative 3, the use of this road would come into compliance with MM-2 as it pertains to streams for the reasons stated in #3 below.

   Use of 1310-E1a would still be in compliance with MM-2 as it pertains to activity inside the RHCA for the same reasons noted under Alternative 2.

3. **Alternative 2**

   Potential for a discharge into Ruby Creek as a result of using this road because 1) it is a native surface road composed of fine sediment and 2) the road becomes part of the creek during the spring high flows. Use of the road by vehicles would break up any armoring that has developed on the road bed and generate fines (Burroughs and King, 1989; Luce and Black 1999; Luce and Black 2001; Swift 1984). The sediment would then be transported down the road and into Ruby Creek at the ford when the creek waters flows overtopped it banks.

Alternative 3

Discharge potential **would be eliminated** because the Forest Service site-specific WRPMs would 1) prevent the stream from flowing onto the road and transporting sediment generated by use into the creek at the ford, 2) require that sections of the road be rocked, and 3) require that the ford approaches be rocked. These protection measures would eliminate the sources of sediment that could enter into Ruby Creek as a result of road use related to mining activity.

4. Conclusions vary as a function of alternative. Forest Service site-specific WRPMs for the Road 1301-E1a are added to Alternative 3. These WRPMs bring the use of the road into compliance with MM-2 by eliminating the potential for a discharge.

Bridge-specific Conclusions

1. The proposed ATV bridge is NOT required to access these sites because an existing ford exists adjacent to the proposed bridge site that could be used to cross Clear Creek. However, due to fisheries concerns, this bridge is the preferred option in order to minimize potential fisheries impact.

   The proposed bridge is a structure that would be designed to cross the creek and decrease impacts to the stream banks and channel bed and fisheries. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary. While use of the bridge is not required to access mining sites 1, 2, and 3, use of the bridge by the miner would decrease how often the existing ford would be used and thus decrease potential impacts on fisheries (*See Chapter 3, Fisheries Section)*.

2. **Alternative 2**

   The installation and removal of the proposed ATV bridge would NOT be in compliance with MM-2 as it pertains to streams because

   a) Potential impact to water quality for the reasons listed in #3 below.

   b) Potential impact to inchannel complexity for the reasons listed in #3 below.

   c) No impacts to channel morphology because the bridge would be located at the ford to Clear Creek where the stream banks are already impacted. Therefore, there would be no new impact to stream banks and no change from existing channel width/depth ratios.

However, the installation and removal of the proposed ATV bridge would be in compliance with MM-2 as it pertains to activity inside the RHCA because

d) No new detrimental soil disturbance because the bridge would be located at the existing ford.

e) No impact to the riparian vegetation for the same reasons noted for 2c.

Alternative 3

Under Alternative 3, the installation and removal of the proposed ATV bridge would now be in compliance with MM-2 as it pertains to streams for the reasons listed in #3 below.

The installation and removal of the proposed ATV bridge would still be in compliance with MM-2 as it pertains to activity inside the RHCA for the same reasons listed for Alternative 2.

3. **Alternative 2**

   Potential for a discharge because the ford approaches are unvegetated and fine grained. The placement and removal of the bridge would result in stream bank sediment entering the Clear Creek.

   In addition, the miner proposes to leave the bridge in place over the winter months. As the stream flows through forest, there is large wood in the stream and during the spring high flows, some of this wood moves. Therefore, there is the potential for large wood to pile up behind the bridge, create a dam and blow out the bridge. This would result in the input of non-native material and potential impacts downstream in inchannel complexity.

   Alternative 3

   Discharge potential **would be eliminated** because of the addition of two Forest Service site-specific WRPMs. One WRPM would require that the ford approaches to Clear Creek would be rocked and sloped. This WRPM would eliminate the sediment source by protecting the stream banks. The second WRPM would require that the bridge be removed in the late fall to prevent it from acting as a barrier in the spring to wood moving downstream. This would eliminate concerns related to wood potentially piling up behind the bridge during high spring flows and blowing out the bridge.

4. Conclusions vary as a function of alternative. Forest Service site-specific WRPMs for the temporary ATV bridge are added to Alternative 3. These WRPMs bring the use of the bridge into compliance under Alternative 3 with respect to MM-2 by eliminating the potential for a discharge and changes to inchannel complexity.

Sunshine/McWillis (Placer)

Site visited by district hydrologist on October 28, 2010 (Field book 4) and October 3, 2012 (Field book 10) and by Chris Helberg (Mineral Administrator, UNF) on October 3, 2012.

Structures related to the Sunshine/McWillis operation that were evaluated for compliance with MM-2 are 1) existing ponds at Processing site 1, 2) proposed pond at Processing site 2, 3) one FS decommissioned road, 4) one existing temporary access road, and 5) existing bridge. The miner also proposes to use a FS closed road but this road is outside the RHCA. Therefore, it is not discussed in this section.

Plan information

All process water is contained in the ponds and there would be no discharge of process water. The main process ponds are approximately 20'x30'x10' in size, the secondary site has smaller ponds, approximately 8'x10'x4' in size. Both sets of ponds are located over 30 feet from McWillis Gulch. These are pit type ponds without dams (p. 3).

Source of processing water to be used at Processing Site #1 = Groundwater. There is no connection between the ponds and McWillis Gulch.

Source of processing water to be used at Processing Site #2 = Plan states groundwater but the pond is in the channel of McWillis Gulch.

Field observations

Site is located in McWillis Gulch with is tributary to Olive Creek. McWillis Gulch is an intermittent, non-fish bearing stream. RHCA = 100 ft/side because in a priority watershed. It has been historically hydraulically mined. A 90-foot long culvert connects McWillis Gulch to Olive Creek and the culvert is a fish barrier. Total valley bottom width is 150 feet at most. The gulch is less than 100 feet wide between creek and hillslope where the ponds are located.

<u>Pond-specific information</u>

The ponds are existing and inside the RHCA of McWillis Gulch.

Processing site 1: Three existing ponds observed.

Pond 1 would be the source water pond. It has water and is in McWillis Gulch. The gulch was historically placer mined in this area and the creek/gulch is not well defined at this point. Old tailings piles are present.

Pond 2 is the primary settling pond. This pond is 10 to 12 feet from McWillis Gulch. It is about 7.5'x 10'x 5' deep and had a small amount of water in 2012.

Pond 3 is the overflow settling pond. It is a long pond that may have been part of an old ditch. This pond is up off the drainage along the hillside and not connected to the drainage. It was dry when visited in 2012.

Processing site 2: This site is downstream of Processing site 1 and less distinct. A small depression was noted in the creek on the south side of the channel in the area of Worksite 2. This may be the other processing site. This depression is in old placer tailings.

Road-specific information

Miner proposes to use one Forest Service closed road (1305-054), one Forest Service decommissioned road (1305-130) and one existing temporary access road (1305-M1a) to access the various sites (Appendix 6). All are native surface roads.

The closed Forest Service road (1305-054) is more than 100 feet from the gulch and outside the RHCA. The intervening ground is well vegetated with grasses, forbs, needles, and downed wood. It is not discussed further.

The decommissioned Forest Service road (1305-130) leaves the closed road and is used to access the cabin area. It is inside the RHCA.Distance between the road and the gulch varies but is more than 50 feet from the gulch at its closest. The intervening ground cover is 100 % and composed of grasses, forbs, needles, and downed wood.

The existing temporary access (TA) road (1305-M1a) is on flat ground, parallels the gulch, and crosses the gulch at a bridge. It is inside the RHCA. The intervening ground cover is a mix of riparian shrubs, grass, forbs, and needles. Road lengths are: closed FS road 1305-054 = 0.4 miles; decommissioned FS road 1305-130 = 0.45 miles; TA 1305-M1a = 0.18 miles.

Bridge-specific information

Miner proposes to use an existing wooden bridge to cross McWillis Gulch for both heavy equipment and vehicle traffic. No fording is required. The bridge is stable.

Pond-specific Conclusions

Processing site 1

1. The existing source water pond and the existing settling ponds should not be moved outside the RHCA because the valley bottom width on the side where the ponds are located is less than 100 feet which would place the ponds on the hillslope in old placer tailings. The hillslope soils are old tailings and the ponds would receive limited groundwater inputs. In contrast, the existing ponds are dug into flat ground, in a highly stable location, and Ponds 1 and 2 receive some groundwater.

2. *Ponds 1 and 3*

Ponds 1 and 3 would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

a) No impacts to water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity or channel morphology because the ponds are not in the channel. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

c) No new soil disturbance because they are existing ponds.

d) No impact to the riparian vegetation because there isn't any where the ponds are located.

Pond 2

Alternative 2

The use of settling pond 2 would NOT be in compliance with MM-2 as it <u>pertains to streams</u> because

a) Potential impact to water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity or channel morphology under either alternative because the pond is note in the channel. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

However, use would be in compliance with MM-2 as it <u>pertains to activity inside the RHCA</u> because

c) No new soil disturbance because it is an existing pond.

d) No impact to the riparian vegetation because there isn't any riparian vegetation around the pond.

Alternative 3

Use of Pond 2 as it <u>pertains to streams</u> would now be in compliance with MM-2 as a result of the addition of a Forest Service site-specific WRPM for the reasons listed in #3 below.

Use would still be in compliance with MM-2 as it pertains to activity inside the RHCA for the reasons noted under Alternative 2.

3. *Pond 1 (Source water Pond)*

No potential for a discharge via surface flow from this pond under either alternative because it would only be withdrawing water.

Pond 2 (primary settling pond)

Alternative 2

Potential for a discharge because there is a low spot in the pond where water and sediment could exit and enter the drainage rather then enter the pipe that connects settling Ponds 2 and 3. Sediment would then have the potential to move downstream into Olive Creek during the spring runoff period.

Alternative 3

Discharge potential **would be eliminated** as a result of the addition of a Forest Service site-specific WRPM which requires that the low spot be bermed. The berm would ensure that Ponds 2 and 3 are connected and overflow from Pond 2 enters Pond 3.

Pond 3 (overflow settling pond)

No potential for a discharge via surface flow under either alternative because this pond is not directly connected to the drainage. It is the overflow settling pond and the amount of water it is expected to receive is limited.

4. Conclusions differ as a function of alternative. One Forest Service site-specific WRPM is added to Alternative 3. This WRPM brings the use Pond 2 at Processing site #1 into compliance under Alternative 3 with respect to MM-2 by berming Pond 2. The berm eliminates the potential for a discharge of sediment into McWillis Gulch and eventually Olive Creek during the spring flows.

Processing site 2

1. The pond could not be moved outside the RHCA because the valley width is less than 100 feet wide total. The result is that this pond would end up on the hillslope in old placer tailings. The pond would receive limited groundwater inputs. However, this pond is NOT required for the miner to process material. Processing site #1 is close enough to easily access.

2. **Alternative 2**

Use of the pond would NOT be in compliance with MM-2 as it pertains to streams because

a) Potential to alter existing water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity under either alternative because the pond is existing and in old placer tailings.

c) No impacts to channel morphology under either alternative, even though the pond is in the channel, because the pond is existing and stable. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

However, use of the pond would be in compliance with MM-2 as it pertains to activity inside the RHCA because

d) No new detrimental soil disturbance because it is an existing depression in old placer tailings.

e) No impact to the riparian vegetation because the pond is existing and in old tailings. Riparian vegetation in the depression is absent.

Alternative 3

Processing would be restricted to Processing site #1. Therefore, the question of compliance with MM-2 for Processing site 2 would no longer applies.

3. **Alternative 2**

Potential for a discharge via surface flow into McWillis Gulch from use of *Processing site #2* because the pond is a shallow depression and seasonally become part of the channel. Therefore, sediment that is put into the pond will be mobilized during spring high flows and transported downstream to Olive Creek. There is no potential for a discharge via subsurface flow because the pond is already dug into the channel.

Alternative 3

Discharge potential **would be eliminated** as a result of a Forest Service site-specific WRPM that restricts processing to Processing site #1.

4. Conclusions differ as a function of alternative. A Forest Service site-specific WRPM is added to Alternative 3. This WRPM eliminates use of Processing site #2 and therefore the potential for a discharge of sediment into McWillis Gulch that could locally influence water quality in Olive Creek.

Road-specific Conclusions

1. Use of the decommissioned FS road (1305-130) and the one TA road (1305-M1a) is required in order to access the sites which are inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the one Forest Service decommissioned road and one existing TA road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the roads are not in the stream. The FS decommissioned road is more than 50 feet from the gulch and the TA road crosses the gulch via a bridge. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because they are existing roads.

   d) No impact to the riparian vegetation because the roads are existing and do not cross riparian areas except at the bridge.

3. No potential for a discharge from use of the roads because they are separated from the creek by 50 feet or more of ground that is well-vegetated by grasses, forbs, needles, and downed wood and/or riparian shrubs and/or old mine tailings. The ground cover and distances are effective sediment trapping mechanisms and would capture any sediment that leaves the roads prior to it reaching the gulch.

4. Conclusions are the same regardless of alternative.

Bridge-specific Conclusions

1. The existing bridge is a structure that is designed to cross a creek and decrease impacts to the stream banks and channel bed. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary. The bridge is required to access the mining sites.

2. Use of the bridge inside the RHCA would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the bridge is not in the stream.

c) No impacts to channel morphology because the bridge is existing, stable and spans the creek. Therefore, there would be no new impacts to stream banks and no change to width/depth ratios.

d) No new soil disturbance because the bridge is existing.

e) No impact to the riparian vegetation because the bridge is existing.

3. No potential for a discharge from use of the bridge because it is existing and stable and no modifications are planned.

4. Conclusions are the same regardless of alternative.

Tetra Alpha Placer

Site visited by district hydrologist on August 25, 2010 (Field book 5) and September 9, 2011 (Field book 6) and October 19, 2011 (photos only).

Structures related to the Tetra Alpha Placer operation that were evaluated for compliance with MM-2 are 1) an existing pond (used as source water and settling pond), 2) one FS closed road, 3) one existing temporary access road and 4) four proposed TA roads.

Plan information (2007)

Water from the operation will be pumped from the existing ponds… Only small amount of makeup water will be pumped from Boulder Creek (p. 5).

There is a letter dated July 20, 2011 from Mr. Nazer to Jeff Tomac, WhiTAn District Ranger, providing clarification to the Tetra Alpha Placer. Letter includes an aerial photo showing the location of the pre-existing placer processing area, the location of the three fords, and the two areas to be mined.

Source of processing water = Groundwater in the pond and make up water from Boulder Creek. There is no surface connection between the pond and Boulder Creek.

Field observations

Boulder Creek is perennial and fish-bearing. RHCA = 300 ft/side. Valley width is between creek and hillslope in the area of the processing site is less than 300 feet.

Pond-specific information

The existing Tetra Alpha Placer pond is located inside the RHCA of Boulder Creek and would serve as both the source water pond and the settling pond. The pond is large and horseshoe shaped. It is 110 feet from the creek and separated from the creek by a wet meadow that has very lush grasses and sedges and rushes. The pond is elevationally above the meadow but there is no overflow point into the meadow.

Road-specific information

Miner proposes to use one Forest Service closed road, one existing temporary access (TA) road and four proposed TA roads (Appendix 6). All are native surface roads.

Forest Service closed road 7355-011

This existing closed FS road would be used to access the placer processing site and serves as the starting point for the roads that access the two mining areas. The road is inside the RHCA. The road is within 50 feet of the creek in places. Once it reaches the processing site the distance to the creek increased to more than 200 feet. The intervening ground is composed of lush grasses and forbs. Road length is 0.72 miles.

TA road 7355-M3a

This existing TA road would be used to access a portion of the Stage 1 mining area. The road is inside the RHCA. Road length is 0.27 miles.

Proposed TA road 7355-M3b

This proposed road would be a two-track mine access road that would be used to access the upper portion of the Stage 1 mining area. The road is inside the RHCA. The road would be separated from the creek by about 50 feet of vegetated ground that is a mix of downed wood, grasses, needles and forbs. Road length is 0.06 miles.

Proposed two-track TA roads 7355-M3c and M3d (*except meadow portion of M3d)*

These proposed roads would be used to access the Stage 2 area. All are inside the RHCA. TA 7355-M3d crosses the meadow for about 350 feet. This section of M3d is referred to as M3d (meadow section) for analysis purposes.

M3c and M3d, except the meadow portion, would occur about 25 feet from the edge of the meadow on the hillslope. The ground cover in the meadow is lush grasses, forbs and sedges and the ground cover on the hillslope is needles, grasses, forbs, and downed wood. Road lengths are: TA road 7355-M3c = 0.03 miles; TA road 7355-M3d = 0.02 miles.

The meadow portion of M3d would create a two-track across the meadow. The meadow has lush grasses, forbs and sedges. The road would cross Boulder Creek at a designated ford yet to be determined.

Pond-specific Conclusions

1. The existing source water/settling pond should not be moved outside the RHCA for the following reasons. If the pond is moved outside the RHCA it would be on the hillslope because the valley bottom width between the creek and hillslope, in the area of the pond, is less than 300 feet. A hillslope pond would be new construction and therefore new disturbance. The hillslope soils are shallow and the pond would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing pond is dug into flat ground, which is a highly stable location, and receives some groundwater.

2. Use of the source water/settling pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impact to existing water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity or channel morphology because the pond is not in the channel. It is more than 50 feet from the creek. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   c) No new soil disturbance because it is an existing pond.

   d) No impact to the riparian vegetation because the pond is more than 50 feet from Bould Creek. In addition, there would be no impact to the riparian vegetation that has developed in the pond because only processing water will be discharged into it.

3. *Source water pond*

   No potential for discharge into Boulder Creek under either alternative when the existing pond is used as a source water pond because would only be withdrawing water.

   Settling pond

   No potential for discharge via surface flow into Boulder Creek under either alternative when the existing pond is used as a settling pond because the pond has a large capacity, is dug into the ground and is in a stable location. Between the creek and pond is a wet meadow with lush vegetation.

No potential for a discharge via subsurface flow into the creek under either alternative when used as a settling pond because pond is dug into fine sediments and the pond is separated from the creek by more than 100 feet.

4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

<u>Forest Service closed road 7355-011</u>

1. Use of the existing FS road is required in order to access the sites which are within the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of the Forest Service closed road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the road is not in the stream and separated from Boulder Creek by at least 50 feet of well vegetated ground. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because it is an existing road.

   d) No impact to the riparian vegetation because it is an existing road. The road parallels Boulder Creek but does not enter into the riparian areas.

3. No potential for a discharge related to use of this road because 1) the distance between the creek and the road varies from 50 to more than 200 feet and 2) the intervening ground is composed of lush grasses and forbs. This ground cover type and distance would effectively trap any sediment that exits the road and prevent it from reaching the creek.

4. Conclusions are the same regardless of alternative.

<u>Existing Temporary Access (TA) Road 7355-M3a</u>

1. Use of the existing TA road would be required in order to access the sites which are within the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of the existing TA access road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

b) No impacts to inchannel complexity or channel morphology from road use because the road is along the base of the hillslope and separated from the creek by 50 feet and old placer tailings. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

c) No new soil disturbance because it is an existing road.

d) No impact to the riparian vegetation because the road is existing and located at the base of the hillslope on the south side of the creek where there isn't any riparian vegetation.

3. No potential for a discharge into Boulder Creek as a result of using this road under either alternative because the road is separated from the creek by tailings piles.

4. Conclusions are the same regardless of alternative

<u>Proposed TA Roads EXCEPT the meadow portion of 7355-M3d</u>

1. Use of the proposed TA roads 7355-M3b, M3c, and M3d roads is required in order to access the sites which are within the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Construction and use of these proposed TA roads would be in compliance with MM-2 under both alternatives as it pertains to streams because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the roads are not in the stream and separated from Boulder Creek by at least 25 feet. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

Construction and use of these proposed TA roads would NOT be in compliance with MM-2 under Alternative 2 as it pertains to activity inside the RHCA because

   c) New detrimental soil disturbance would occur. There are no provisions in the Plan to minimize disturbance necessary for access or ensure that these newly constructed two-tracks are obliterated and revegetated.

   d) No impact to the riparian vegetation for the reasons noted for 2b.

Under Alternative 3, these roads **would be in compliance** with MM-2 as it pertains to activity inside the RHCA for the reasons listed in #3 below.

3. *TA road 7355-M3b*

No potential for a discharge into Boulder Creek as a result of creation and use of this road under either alternative because the road would be separated from the creek by about 50 feet of vegetated ground that is a mix of downed wood, grasses, needles and forbs. This ground cover would be effective at trapping any sediment that might exit the road and prevent it from reaching the creek.

TA roads 7355-M3c and 7355-M3d (except meadow portion of M3d)

No potential for a discharge into Boulder Creek as a result of creation and use of these two roads under either alternative because 1) they would occur about 25 feet from the edge of the meadow on the hillslope and 2) the ground cover between the creek and the road is lush grasses, forbs and sedges in the meadow and needles, grasses, forbs, and downed wood on the hillslope. This ground cover would effectively trap any sediment generated by construction and use of these two roads and prevent it from reaching Boulder Creek.

In addition, the concerns related to the creation of new roads, as it pertains to <u>activity inside the RHCA,</u> would be eliminated because of the addition of Forest Service General Requirements R13 and Z 1-14 (Appendix 2). These requirements bring construction and use of these roads into compliance under Alternative 3 with respect to MM-2 by ensuring that the roads are obliterated and closed once mining is completed.

4. Conclusions vary as a function of alternative as a result of the addition of Forest Service General Requirements R-13 and Z-14 (Appendix 2) under Alternative 3 which being construction and use of these roads into compliance with MM-2.

<u>Proposed TA Road 7355-M3d (meadow portion)</u>

1. Use of the proposed meadow portion of M3d is required in order to access the Stage 2 area which is within the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Under Alternative 2, construction and use of this proposed temporary access road would NOT be in compliance with MM-2 as it pertains to streams or activity inside the RHCA because

   a) Potential impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity from road construction and use because the road would not be in the stream except at the designated ford.

c) Local impact to channel morphology at the ford site because this would be a new ford that would require changes in the stream banks. The banks would need to be laid back. Therefore, there would be no impacts to stream banks and no change to width/depth

d) New detrimental soil disturbance would occur. There are no provisions in the Plan to minimize disturbance necessary for access or ensure that these newly constructed two-tracks are obliterated and revegetated.

e) Local impacts to the riparian vegetation in the areas where the new two-track would cut through the meadow and cross the stream.

Under Alternative 3, road creation and use **would be in compliance** with MM-2 as it pertains to streams and activity inside the RHCA because discharge potential **would be eliminated** for reasons noted in #3 below. Concerns related to detrimental soil disturbance would be eliminated as a result of the addition of Forest Service General Requirements R13, and Z-1 through 14 (Appendix 2). The requirements would also ensure that the road was obliterated and revegetated when mining was completed.

3. Under Alternative 2, there would be the potential for a discharge as a result of creation and use of this road in the vicinity of the creek because the meadow sediments are fine grained and have a high potential to rut. The ruts would channel water and could convey the exposed road sediment into the creek because the road would cross the creek and create a new ford. The ford approaches would be composed of fine sediment which have the potential to erode into the creek.

   Under Alternative 3, the discharge potential **would be eliminated** related to the creation and use 7355-M3e because of the addition of a Forest Service site-specific WRPM and Forest Service General Requirements Z1-14 and R13. The WRPM would require that the portion of the road that is within 25 feet of the creek be rocked. Rocking would eliminate the sediment source and thus prevent a discharge. The General Requirements would further minimize the discharge potential by minimizing the amount of new soil disturbance and requiring that the road be obliterated and revegetated when mining was completed.

4. Conclusions vary as a function of alternative. Forest Service site-specific WRPMs and General Requirements are added to Alternative 3 for this road. These requirements bring construction and use of this two-track road into compliance under Alternative 3 with respect to MM-2 by eliminating the potential for a discharge, minimizing the amount of new soil disturbance, and ensuring that the road is obliterated and revegetated.

Tetra Alpha Mill and Lode

Site visited by district hydrologist on October 27, 2004 (Field book 3) and August 25, 2010 (Field book 5).

Structures related to the mill site that were evaluated for compliance with MM-2 are 1) existing source water pond, 2) existing settling ponds (dry depressions), 3) one FS closed road, and 4) two existing temporary access roads (TA roads 7355-M4a and M4b).

TA road 7355-E1a which is used to access the Lode adit is outside the RHCA and not discussed further with respect to compliance with MM-2.

Plan information (1996)

Ponds will be constructed in the area already impacted by mining years ago. Water will be recycled to a degree, however, a second set of ponds may be necessary…. Settling ponds will be long and narrow and constructed as far from Boulder Creek as possible (p.3).

Water for milling will come from the Last Chance reservoir or from Boulder Creek. The mill site is for the Lode part of this operation (p.5).

Source of processing water = Last Chance Creek pond or Boulder Creek.

Field observation

Pond-specific information

The source water pond is an inchannel pond that exists as a result of Last Chance Creek being historically dammed throughout its length and becoming a series of ponds. The pond is located by the mill site. The existing pond proposed for use is only connected to Boulder Creek via subsurface flow. The source water pond and the existing settling ponds are located inside the RHCA of Boulder Creek, a perennial fish-bearing stream. RHCA = 300 ft/side.

FS NOTE: Tetra Alpha Mill Plan, dated 1996, indicates that it will be constructing up to two sets of ponds. However, the settling ponds have already been constructed and are located between the road and the hillslope. The creek is on the other side of the road. The settling ponds are dug into the ground.

Road-specific information

Mill Site

Forest Service road 7355-011 is a closed road and is used to access the mill site. The road is within 50 feet of the creek and inside the RHCA of Boulder Creek. The intervening ground is composed of lush grasses and forbs. Road length is 0.31 miles.

Temporary Access (TA) road 7355-M4a is an existing, native surface road and used to access the mill site. Road is 140 feet from Boulder Creek and is separated from the creek by FS 7355-011 road and 56 feet of vegetated ground between the two roads. Road is inside the RHCA. Road length is 0.05 miles.

TA road 7355-M4b is an existing native surface road used to access the mill site. Road varies between 50 and 140 feet from Boulder Creek. It connects FS 7355-011 and TA road 7355-M4a. Road is inside the RHCA. Road length is 0.03 miles.

Lode adit

TA road 7355-M5a is an existing native road and used to access the lode. Road is more than 300 feet from Boulder Creek and outside the RHCA. It is not discussed further with respect to compliance with MM-2. Road length is 0.01 miles.

Pond-specific Conclusions

1. The existing source water pond (Last Chance Creek pond) and the settling ponds (dry depressions) should not be moved outside the RHCA for the following reasons. The valley width is narrow near the mill and if the ponds were moved outside the RHCA they would be on the hillslope. Hillslope ponds would be new construction and therefore new disturbance. The hillslope soils are shallow and the ponds would receive limited groundwater inputs. When filled (e.g. in the spring) there would be the potential for a pond failure and hillslope erosion. In contrast, the existing pond is dug into flat ground, which is a highly stable location and separated from the creek by the access road. They receive some groundwater.

<u>Source water pond</u> (Last Chance Creek pond)

2. The source water pond would be in compliance with MM-2 under both alternatives because water would only be withdrawn from the pond. Therefore, there would be no impacts to water quality, inchannel complexity, channel morphology, soils or riparian vegetation.

3. No potential for a discharge because only withdrawing water from an existing pond.

4. Conclusions are the same regardless of alternative.

<u>Settling Ponds</u>

2. Under Alternative 2, use of the settling ponds would NOT be in compliance with MM-2 as it pertains to streams because

   a) Local impact to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity because the ponds are not in the channel.

   c) No impact to channel morphology because the ponds are at least 50 feet from the creek and separated from the creek by FS 7355-011. Therefore, there would be no impact to stream banks and no change in channel width/depth ratios.

However, use of the settling ponds would be in compliance with MM-2 as it pertains to activity inside the RHCA because

d) No new soil disturbance because they are existing ponds.

e) No impact to the riparian vegetation because the ponds are existing and there isn't riparian vegetation in the ponds. In addition, the ponds would only receive processing water.

Under Alternative 3, the use of the settling ponds would be in compliance with MM-2 because the potential to alter the existing water quality **would be eliminated** for the reasons listed in #3 below.

3. **Alternative 2**

Surface flow: No potential for discharge via surface flow into Boulder Creek because the ponds have a large capacity, are dug into the ground and separated from the creek by the mine access road.

Subsurface flow: Potential for a discharge of heavy metals in the waste rock to move through the road fill **via subsurface flow** of and into the creek.

Alternative 3

Surface flow: No potential for discharge via surface flow into Boulder Creek because the ponds have a large capacity, are dug into the ground and separated from the creek by the mine access road.

Subsurface flow: Discharge potential of heavy metals <u>via subsurface flow</u> **would be eliminated** because of the addition of Forest Service General Requirements L1 – L11 related to lode mining. The Lode General Requirements address the concerns related to heavy metals. For example, L-5 requires that the first run of adit ore be tested for heavy metals (L-5). If heavy metals were present and above the State standards, then operator would have to amend his plan and it would be reevaluated. As a result no material would go into the pond if it tested for heavy metals.

4. Conclusions differ as a function of alternative. Forest Service General Requirements related to lode mining are added to Alternative 3. These requirements bring use of the ponds into compliance under Alternative 3 with respect to MM-2 by eliminating the potential for a discharge of heavy metals as a result of use of the settling ponds.

Road-specific Conclusions

<u>Lode adit</u>

TA road 7355-M5a is an existing native road and used to access the lode. It is more than 300 feet from Boulder Creek and outside the RHCA. Therefore, the question of compliance with MM-2 does not apply.

Mill Site

1. Use of this existing close Forest Service road and TA roads is required in order to access the site which is located inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of these roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the road is not in the stream and separated from Boulder Creek by about 50 feet. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because it is an existing road.

   d) No impact to the riparian vegetation for the same reasons noted for 2b.

3. Forest Service closed road 7355-011

No potential for a discharge related to use of FS 7355-011 because 1) the distance between the creek and the road varies from 50 to 68 feet and 2) the intervening ground is composed of lush grasses and forbs. This ground cover type and distance would effectively trap any sediment that exits the road and prevent it from reaching the creek.

TA 7355-M4a

No potential for a discharge related to use of TA 7355-M4a because 1) the distance between the creek and the road is 140 feet, 2) separated from the creek by FS 7355-011, and 3) the ground between the two roads is well vegetated. This ground cover type, FS 7355-011, and distance would effectively trap any sediment that exits the road and prevent it from reaching the creek.

TA 7355-M4b

No potential for a discharge related to use of TA 7355-M4b because 1) the distance between the creek and the road is between 50 and 140 feet, and 2) merges into FS 7355-011. FS 7355-011 and the distance between FS 7355-011 and the ground cover would effectively trap any sediment that exits TA 7355-M4b and would prevent it from reaching the creek.

4. Conclusions are the same regardless of alternative.

Troy D (Placer)

Site visited by district hydrologist on November 4, 2004 (Field book 4) and October 11, 2010 (Field book 5).

Structures related to the Troy D operation that were evaluated for compliance with MM-2 are 1) one pond which would be used as both a source water pond and a settling pond, 2) two existing temporary access (TA) roads.

Plan information

The ponds are located are located over 100' from Granite Creek…. Ponds will be periodically cleaned of silt….(p.3).

At least two ponds 20'x15'x10' will be used to settle/recycle water. Ponds exist presently (p.5).

Source of processing water = Groundwater. Dredge ponds are elevationally above and distant from Granite Creek. There is no surface connection to Granite Creek.

Field observations

Granite Creek is perennial and fish-bearing. RHCA = 300 ft/side. Valley bottom width on north side of Granite Creek between the creek and County Road 24 is less than 300 feet.

Pond-specific information

Two existing ponds are located inside the RHCA of Granite Creek (Pond A and Pond B). The ponds are old dredge ponds and located behind the high berm of old placer tailings that line the terrace that borders Granite Creek. The distance between the back edge of the berm and the ponds are at least 136 feet (paced) and dug into the old tailings. Pond A is large, has cattails and standing water. Pond B is much smaller. Both ponds would be used as settling ponds. While not stated in the Plan, one of the ponds, likely Pond A, would also be used as the source water pond.

Road-specific information

Miner proposes to use two existing temporary access (TA) roads (Appendix 6). The are both within the RHCA. They are composed of old placer tailings and fines are limited. The roads are behind the old tailings berm, more than 136 feet (paced) from the back edge of the terrace berm of old tailings, and on flat ground. TA road lengths are: 1000-E4a = 0.05 miles; 1000-E4b = 0.11 miles

Pond-specific Conclusions

1. The two existing source water/settling ponds should not be moved outside the RHCA because the ponds would be on the other side of County Road 24 away from the site and outside the claim.

2. Under Alternative 2, use of the existing source water/settling ponds would NOT be in compliance with MM-2 as it pertains to streams because

   a) Impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity because the ponds are not in the channel.

   c) No Impact to channel morphology because the ponds are behind the terrace berm and more than 136 feet (paced) from the back edge of the berm. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

However, use of the existing source water/settling ponds would be in compliance with MM-2 under both alternatives as it pertains to activity inside the RHCA because

   d) No new detrimental soil disturbance, despite being new construction, because it would be located in an area that was has been previously mined. This area have very little ground vegetation.

   e) No impact to the riparian vegetation because there isn't any in the area surround the pond. The riparian vegetation that has developed in the pond would not be impacted because no activity is proposed for the pond except discharging processing water..

Under Alternative 3, use of the ponds would be in compliance with MM-2 because the addition of Forest Service site-specific WRPMs **would eliminate** the potential to impact water quality for the reasons listed in #3 below.

3. Under Alternative 2, potential for a discharge via subsurface flow from the ponds into the creek because 1) the ponds are be in old placer tailings which may have a high permeability and large pores allowing both sediment and water to move through the subsurface, 2) are elevationally above the creek which would result in flow towards the creek and 3) have water in the larger pond indicating groundwater flow through the ponds.

No potential for a discharge via surface flow from the proposed ponds into Granite Creek under either alternative because 1) the ponds are dug into the ground and 2) are separated from the creek by the berm of old tailings that line the terrace edge. The ponds are at least 136 feet (paced) from the back edge of the berm.

Under Alternative 3, discharge potential via subsurface flow **would be eliminated** as a result of the addition of two Forest Service site-specific WRPMs. One WRPM would designate Pond A (the larger pond) as the source water pond and Pond B as the settling pond. The other WRPM addresses the potential for a discharge from Pond B. This WRPM **would eliminate** the potential for a discharge by creating a buried barrier between the pond and the stream that would prevent pond sediment moving via groundwater to the stream bank.

4. Conclusions differ as a function of alternative. Two Forest Service WRPMs are added to Alternative 3. These WRPMs bring use of the existing ponds into compliance under Alternative 3 with respect to MM-2 by eliminating the potential for a discharge as a result of pond related activity.

Road-specific Conclusions

1. Use of these existing TA roads is required in order to access the site which is located inside the RHCA. Therefore, they cannot be moved out of the RHCA without eliminating site access.

2. Use of the two existing temporary access roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because 1) the road is not in the stream and 2) is separated from Granite Creek by the berm of old tailings that line the terrace edge. The distance between the back edge of the berm and the road is at least 136 feet (paced) of flat ground. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because they are existing roads.

   d) No impact to the riparian vegetation because the road is existing and crosses old tailings. There isn't any riparian vegetation in this area.

3. No potential for a discharge from use of the roads under either alternative for the reasons noted in 2b.

4. Conclusions are the same regardless of alternative.

Yellow Gold (Placer)

Site visited by district hydrologist on July 6, 2004 (Field book 1).

Structures related to the Yellow Gold operation that were evaluated for compliance with MM-2 are 1) an existing source water pond, 2) proposed settling ponds, 3) five Forest Service closed roads, 4) one existing temporary access (TA) road, and 5) a proposed foot bridge.

Plan information

….water for processing is supplied by an existing reservoir located in Last Chance Creek. Three off-channel ponds located approximately 100 feet from Last Chance Creek, each about 20'x15'x10' are used in the operation… Process ponds are pit-type ponds with low 2-3' dams and are 100' from the creek...Water in the ponds slowly evaporates until late fall when it is gone (p.7).

Water is recycled out of the off-channel ponds… Water is brought from the reservoir to the settling ponds via firehouse or a plastic or metal pipeline (p. 9).

Field observations

Last Chance Creek has been historically mined and bermed in multiple places. As a result the creek is now a series of ponds. Flow is perennial but NOT fish-bearing. RHCA = 100 ft/side. Total valley bottom width (hillslope toe to hillslope toe) is less than 150 feet.

Source of processing water = Surface water that is ponded in Last Chance Creek as a result of the berm and possibly some groundwater.

Pond-specific information

The Last Chance pond is the result of a berm across the stream and would be used as the source water pond. It is inside the RHCA. A wetland is forming upstream of the pond.

The settling ponds mentioned in the Plan and shown on the miner's sketch as existing, however, were not found in 2004. The miner's sketch shows the word "ponds" downstream of the reservoir and on the west side of the creek. Chris Helberg (Minerals Administrator) and Allison Johnson (Fisheries Biologist) also did not find these ponds when they visited the site in 2010. Therefore, the settling ponds could not be found and therefore are treated as "proposed".

Road-specific information

Miner proposes to use five Forest Service closed roads and one existing temporary access (TA) road (Appendix 6). They are all native surface roads. All of the roads are within the RHCA.

All Forest Service closed roads are separated from the creek by at least 35 feet (and in most cases much more) with the intervening ground cover is a mix of needles, grasses, forbs and downed wood. FS closed road lengths are: 7355-025 = 0.05 miles; 7355-026 = 0.11 miles; 7355-050 = 0.61 miles, 7355-055 to junction with 7355-050 = 0.37 miles.

TA road 7355-E2a: This is an existing two-track road that makes its way down to Last Chance Creek and a portion of the area to be mined. The two-track is separated from Last Chance Creek by 35 or more feet and the intervening ground cover is a mix of grasses, forbs, and downed wood. Road length is 0.11 miles

Bridge-specific information

The miner proposes to install a foot bridge each season so that the miner can walk over to the processing site. It will be a board or plank of wood. The foot bridge is inside the RHCA.

Pond-specific Conclusions

Source Water Pond

1. The source water pond is existing and should not be moved outside the RHCA for the following reasons. The valley width is narrow and if the source water pond was moved outside the RHCA it would be on the hillslope. The pond would be new construction and therefore new disturbance. The hillslope soils are shallow and groundwater inputs would be limited. In contrast, the existing pond, which is part of Last Chance Creek, is stable and contains water year round.

2. Use of the source water pond would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impact to inchannel complexity, despite the pond being in the channel, because water would only be removed. No activity in the pond is proposed.

   c) No impact to channel morphology because the pond is existing and no activity is proposed for this pond except to remove water for processing. Therefore there would be no impact to stream banks and no change in channel width/depth ratios.

   d) No new soil disturbance because it is an existing pond.

e) No impact to the riparian vegetation which is present in the pond because this is a source water pond only and no activity, except withdrawing water, is proposed.

3. The source water pond is part of Last Chance Creek and it would only be used as a clean water source. Therefore, no potential for a surface or subsurface discharge into Last Chance Creek under either alternative.

4. Conclusions are the same regardless of alternative.

Settling Ponds

1. The location of the settling ponds is currently unknown and could not be evaluated under Alternative 2.

2. Under Alternative 2, a determination of compliance with MM-2 **could not be made** because the miner did not provide the location of the ponds.

   Under Alternative 3, the construction and use of the ponds would be in compliance with MM-2 as it pertains to streams and activity inside the RHCA as a result of the addition of a Forest Service site-specific WRPM and FS General Requirement R-15. With these additions,

   a) No potential for a discharge for the reasons listed below in #3.

   b) No impacts to to inchannel complexity because the settling ponds would not in the channel as a result of the Forest Service WRPM.

   c) No impact to channel morphology because the ponds would be located away from the stream banks as part of Forest Service site-specific WRPM discussed in #3 below. Therefore, there would be no impact to stream banks and no change in channel width/depth ratios.

   d) Minimal amount of new detrimental soil disturbance necessary to meet miner's needs as a result of FS site-specific WRPM and FS General Requirement R-15 (Appendix 2) discussed in #3 below.

   e) No impact to the riparian vegetation or only the minimum necessary as a result of the two Forest Service requirements..

3. Under Alternative 2, the "potential for a discharge" assessment **could not be made** because the miner did not provide site locations.

   Under Alternative 3, no potential for discharge via surface or subsurface flow from construction and use of the ponds because a Forest Service site-specific WRPM (Apppendix 1A) and General Requirement R-15 are added. The site-specific WRPM requires that the

ponds be located, constructed, and protection measures implemented with input from the district hydrologist and the mineral administrator. General Requirement R-15 would ensure that the ponds were properly reclaimed once mining activity was over.

4. Conclusions differ as a function of alternative. A Forest Service WRPM and FS General Requirement are added to Alternative 3. These additional requirements bring the Plan into compliance under Alternative 3 with respect to MM-2 by eliminating the potential for a discharge via surface or subsurface flow into Last Chance Creek, ensuring minimal new detrimental soil disturbance and proper pond reclamation once mining activity is completed.

Road-specific Conclusions

Closed Forest Service roads

1. The roads are required to access the site which is inside the RHCA. Therefore, the roads could not be moved out of the RHCA without eliminating site access.

2. Use of all closed Forest Service roads would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the roads are separated from the creek by at least 35 feet or more. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because they are existing roads.

   d) No impact to the riparian vegetation because these are existing roads and they do not go through areas with riparian vegetation.

3. No potential for a discharge related to use of the Forest Service closed roads because the roads are separated from the creek by at least 35 feet of well-vegetated ground composed of needles, grasses, forbs and downed wood. This ground cover would effectively trap any sediment that exits these roads and prevent it from reaching the creek/pond.

4. Conclusions are the same regardless of alternative.

Temporary Access Road 7355-E2a

1. Using of the existing TA road is required in order to access the site which is inside the RHCA. Therefore, it cannot be moved out of the RHCA without eliminating site access.

2. Use of the TA road would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from road use because the road is not in the stream and separated from Last Chance Creek by at least 35 feet. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because it is an existing road.

   d) No impact to the riparian vegetation because the road is existing and does not cross areas with riparian vegetation.

3. No potential for a discharge related to use of this existing mine access road because 1) this road is separated from Last Chance Creek by 35 or more feet and 2) the intervening ground cover is a mix of grasses, forbs, and downed wood. The distance, combined with the limited disturbance and ground cover, are sufficient to effectively trap any sediment that might leave the two-track and prevent it from reaching the creek.

4. Conclusions are the same regardless of alternative.

Bridge-specific Conclusions

1. The proposed foot bridge is a structure that is designed to cross a creek and decrease impacts to the stream banks and channel bed. Therefore, it cannot be moved outside the RHCA because to do so would place it in an area where a bridge is not necessary.

2. Installation and removal of the foot bridge would be in compliance with MM-2 under both alternatives as it pertains to streams and activity inside the RHCA because

   a) No impacts to water quality for the reasons listed in #3 below.

   b) No impacts to inchannel complexity or channel morphology from the bridge because only a foot bridge made of up boards of wood that would cross the creek. The foot bridge would not exert any pressure on the stream banks or result in bank disturbance. Therefore, there would be no impacts to stream banks and no change to width/depth ratios.

   c) No new soil disturbance because only planks of wood.

   d) No impact to the riparian vegetation because these are existing roads and they do not go through areas with riparian vegetation.

3. No potential for a discharge related to seasonal installation, removal or use of the foot bridge because the foot bridge is simply boards of wood placed so that the miners can walk across the creek. No bank disturbance is anticipated and no impacts to existing ground cover. Therefore, no sediment is expected to be generated as a result of the foot bridge or soil exposed and that could be eroded.

4. Conclusions are the same regardless of alternative.

Yellow Jacket (Placer)

Site visited by district hydrologist on November 1, 2004 (Field book 4).

Structures related to the Yellow Jacket operation that were evaluated for compliance with MM-2 are an existing temporary access road only. The ponds and TA road 1305-E1b are on private land.

Plan information

Water from Orofino adit located on private land will be used for processing (p. 3).

Water from the adit on private land is used for processing…. Orofino Gulch downstream of the processing site flows through old dredge ponds and seeps into the gravel before entering Olive Creek…..All water will be contained in ponds (p.5).

The Plan sketch shows two ponds located on private land. One of them has been filled in (C. Helberg, pers. comm., 9/19/10).

Source of processing water = adit discharge

Field observations

Orofino Gulch is in the Olive Creek drainage. It has intermittent flow and is non-fish bearing. RHCA = 100 ft/side as in a priority watershed The gulch has been historically hydraulically mined and there is no continuous channel that connects the gulch with Olive Creek. Orofino Gulch has seasonal flow with water disappearing into the tailings.

Pond-specific information

Processing takes places on private land. The Yellow Jacket ponds are on private land and the RHCAs do not apply.

Road-specific information

Miner proposes to use two existing temporary access (TA) roads (Appendix 6). They are a mix of native surface and tailings.

1305-E1a: This road is more than 300 feet from any stream channel and occurs through the old tailings. Road length is 0.11 miles. It is outside the RHCA and MM-2 does not apply.

1305-E1b: This road occurs on private land. It is discussed under Cumulative Effects. Road length is 0.15 miles.

Pond-specific Conclusions

1. N/A. The ponds are on private land.
2. N/A. The ponds are on private land.
3. Potential for a discharge is discussed in the Cumulative Effects section of the *Water and Soil Resources* section in Chapter 3 because the ponds are on private land.
4. Conclusions are the same regardless of alternative.

Road-specific Conclusions

1. N/A. The existing TA road on national forest land is outside the RHCA.
2. N/A. The existing TA road on national forest land is outside the RHCA.
3. Potential impacts of using 1305-E1b are addresses in the Cumulative Effects section because on private land.
4. Conclusions are the same regardless of alternative.

Appendix 4A

Effects of Suction Dredging On Water and Fisheries Resources
In the Granite Mining Watershed

Appendix 4A

Effects of Suction Dredging On Water and Fisheries Resources In the Granite Mining Watershed

Motorized mining, such as suction dredging, is currently not permitted in Essential Salmon Habitat. A State of Oregon moratorium for suction dredging is currently in effect until 2021, or until the Oregon State legislature changes the law. However, since the Plans approved under the Granite Mining FEIS will extend beyond the 2021 moratorium, activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations. If the moratorium is lifted this effects analysis will be re-evaluated to determine if the proposed activities meet the requirements of the 700PM permit that is in place at that time.

Several miners have notified the Forest Service of their intent to suction dredge in selected streams in the Granite watershed by including this activity in their Plans of Operation. Bull Run, Clear, Granite, and Lightning Creeks, proposed for suction dredging, have been identified as *essential salmon habitat*. McWillis Gulch and Orofino Gulch, also proposed for suction dredging, are NOT *essential salmon habitat.*

Introduction

To determine the potential effects of suction dredging on streams proposed for dredging, site-specific analyses of streams and stream reaches were necessary. Factors examined included channel morphology, water quality, and channel complexity. The analysis used a series of questions raised by Harvey and Lisle (*1998*), as well as questions raised in other studies to define potential areas of concern. Channel morphology parameters evaluated were stability of the dredge tailings, stability of the channel bed, pool characteristics, and abundance and stability of roughness elements (i.e. beaver dams, log jams). Water quality parameters evaluated were turbidity and stream temperature. Fish habitat parameters evaluated were turbidity, stream temperature, spawning gravels, pool habitat, and channel complexity.

Additionally, several operational factors were considered -- the spatial distribution of suction dredging operations, the specific timing of operations, the size of the dredges and hoses, and in particular, the terms and conditions of the Oregon Department of Environmental Quality's (ODEQ) 700-PM permit (as of May 15, 2015).

ODEQ has generated two fact sheets that discuss the changes that have occurred to the 700PM permit and the reasoning behind the requirements. These fact sheets are found in Appendix 4B.

Analysis Area

The analysis area is limited to the specific streams and reaches with proposed suction dredging. The analysis is further bounded, relative to the potential impacts on the various fisheries and their habitat, by the timing of spawning and re-emergence with respect to dredging. Plans that propose suction dredging are found in Table 4A-1.

Table 4A-1

Plans of Operation that list suction dredging as an activity

Operation Name	Creek	Flow	Essential Salmon Habitat	May 2015 700 PM Permit applicable sections	303(d) listed for sediment
Blue Sky Bull Run	Bull Run	Perennial/Fish Bearing	Yes	Schedules A, B, and C	Yes
Blue Smoke	Granite	Perennial/Fish Bearing	Yes	Schedules A, B, and C	No
Lightning	Lightning	Perennial/Fish Bearing	Yes	Schedules A, B, and C	No
Little Cross	Granite	Perennial/Fish Bearing	Yes	Schedules A, B, and C	No
Old Eric	Granite	Perennial/Fish Bearing	Yes	Schedules A, B, and C	No
Sunshine McWillis	McWillis Gulch	Intermittent, non fish bearing	No	Schedules A, B, and C	No
Yellow Jacket	Orofino Gulch	Intermittent, non fish bearing.	No	Schedules A, B, and C	No

Information Used

This appendix provides the background information used to assess potential effects of suction dredging in the Plan-specific effects analyses (Appendix 8). The following information was used to evaluate potential impacts:

1. Peer-reviewed literature and various reports,
2. Dredge hose size and distribution of suction dredging activity, and
3. The Oregon Department of Environmental Quality's 2015 700-PM permit requirements.
4. State map showing streams listed as essential salmon habitat:
   http://www.oregon.gov/dsl/PERMITS/Pages/counties_ess.aspx

ODEQ May 2015 700-PM permit

The May 2015 700-PM permit states that "This general permit does not authorize discharges from suction dredges greater than 16 horsepower or an inside diameter intake nozzles greater than 4 inches in Essential Salmon Habitat. (p. 3)". The permit does not specify a location and is not submitted to the Forest Service. Any effects analysis of dredging is a minimal effects analysis because the impact of dredging varies as a function of dredge size, distribution and number of dredges, stream size, the fineness of the sediments, and flow regime (*Harvey 1986*). However, unless given permission by the miner who has a claim in an area, another individual

may not suction dredge the portion of the stream that flows through the claim. As such, the spacing of mining claims provides zones of limited suction dredging activity. Operations are restricted by the State of Oregon to daylight hours and the particular instream work window for each watershed. See the following website for details:
www.dfw.state.or.us/lands/inwater/Oregon_Guidelines_for_Timing_of_%20InWater2008.pdf

All dredging operations included in this analysis proposed to adhere to the terms of the May 2015 700-PM permit, and were subsequently evaluated on a site-by site basis following Forest Service mining regulations at 36 CFR 228 Subpart A.

It should be noted that the May 2015 700-PM permit restrictions and requirements do not replace or supersede Federal laws and Forest Service regulations. How the Forest Service regulates mining operators on National Forest System lands under the Forest Service's locatable mineral operations regulations at 36 CFR 228 Subpart A remains unchanged. A mining operator conducting or proposing to conduct instream suction dredge operations within National Forest System lands must be in compliance with 36 CFR 228 Subpart A regulations, whether operating under a Notice of Intent or an approved Plan of Operations. The operator is responsible for his or her own compliance with all applicable State and Federal laws and regulations.

Literature Review and May 2015 700 PM permit

The peer-reviewed literature on suction dredging impacts is limited and focuses largely on impacts to fish, aquatic insects and benthic invertebrates. Channel morphology and water quality information was sometimes included because of their influence on the habitat requirements of these organisms. When reviewing the literature, dredge size and numbers, channel characteristics and study location were noted to place the literature in its proper site context. To varying degrees the papers discuss the spatial and temporal extent of the changes. Information specifically relevant to understanding and determining the direct, indirect, and cumulative effects of suction dredging in the Granite watershed is presented in the following paragraphs. All literature is located in the project file along.

Channel width and sinuosity

Low-flow channel width can be increased and low-flow channel sinuosity decreased by suction dredging as a result of removal of gravel/cobble bars. However, the 700-PM permit restricts the types and amount of channel bars that can be suction dredged, thereby decreasing the extent of impact. In streams that are NOT essential salmon habitat, dredging is allowed into non-vegetated gravel bars up to 10 feet outside the wet perimeter of the stream (*Schedule C.14*), but the gravel bar must be devoid of "any rooted vegetation, located either between the stream banks and the wet perimeter of the stream or entirely within the wet perimeter of the stream" (Definition #5). This would apply to McWillis Gulch and Orofino Gulch.

In *essential salmon habitat* dredging is further restricted to within the wetted perimeter (p.4). This restriction applies to Bull Run, Clear, Granite, and Lightning Creeks.

Channel complexity and roughness

Channel complexity and roughness are provided by boulders, log jams, beaver dams, and stream bank vegetation. The ODEQ 700-PM permit limits the amount and conditions by which boulders, logs, or other stream infrastructure can be removed Schedule C.8, C.9, and C.10.

"Undercutting or eroding stream banks and removal or disturbance of boulders, rooted vegetation, or embedded woody plants and other habitat structure from stream banks is prohibited…. (C.8)."

"Moving boulders, logs, or other habitat structure within the stream channel is allowed by hand or non-motorize equipment. However, in no case may this habitat structure be removed entirely from the stream. Boulders and other habitat structures must be returned to their original position upon completion of the mining activity. The mining activity is considered complete if a person authorized by this permit does not return to that location to conduct the activity within 24 hours (C.9)."

"Removal of habitat structure that extends into the stream channel from the stream bank is also prohibited. Examples of habitat structure are boulders, woody materials, vegetation, and other natural features (C.10)."

Therefore, log jams attached to the stream bank and beaver dams would not be disturbed or destabilized because both features are directly attached to the stream banks. However, boulders or log jams contained within the channel and not attached to the stream banks could be moved. As a result, suction dredging has the potential to locally alter channel complexity and roughness.

Channel bed stability and morphology

Channel bed composition determines channel bed stability and thus the potential for suction dredging to alter pool/riffle distributions and characteristics and/or create a knickpoint which would might headcut and lead to channel incision. Harvey and Lisle (*1999*) found that scour and fill varied spatially as a function of bed composition and variability in stream flow. Thomas (*1985*) found that deposited sediment increased 10-20 times over background levels immediately downstream of a dredge, and then decreased exponentially downstream. His study found that the bulk of the sediment stirred up by dredging was redeposited within 6-11 meters, and in one case the gravel deposited by the dredge had moved into and filled a pool. Somer and Hassler (*1992*) found increases in sedimentation below dredges on some streams and not others, suggesting the role of substrate composition in determining the potential for pool infilling. Therefore, it is possible that if a pool exists immediately downstream from a dredging operation, there may be some reduction in that particular pool's depth as a result of infilling by sands and gravels.

The literature distinguishes between natural riffles and dredge tailings and found that the stability of these features differ. The natural riffles have adjusted over time to variable instream flow conditions and tend to be stable. The stability of the suction dredge tailings, however, is a function of the tailings composition, and its impact on channel bed morphology varies accordingly. Thomas (*1985*) found that gravel tailings are unstable. All the gravels deposited by the dredge in his study stream had moved downstream one year after dredging. Somer and Hassler (*1992*) also found that that the "dredge pocket and pile" stream morphology was short term, and that the dredge holes and tailings were no longer visible the following summer. In contrast, Harvey and Lisle (*1998*) noted that rocks too large to pass through dredges are commonly piled, and that these piles can persist during high flows. These imposed topographic

high points have the potential to destabilize channels during high flows, depending on site characteristics. They also noted that suction dredging may cause natural riffle crests to erode, causing upstream pools to become shallower. The potential for natural riffle crests to erode depends on the riffle composition and location of the dredging operation with respect to riffle crests. Therefore, there is the potential for suction dredging to alter distribution of riffles and destabilized channels under certain site conditions.

Stream bank stability

Dredging of stream banks can result in large amount of fines entering the stream, decrease stream bank stability, and decrease shade. However, Schedule C.7 of the ODEQ May 2015 700-PM permit prohibits dredging of stream banks, undercutting or eroding them or removing boulders, rooted vegetation, or embedded woody plants from stream banks. In addition, so long as the channel bed composition was resistant to instream scour, a suction dredge pool would not be expected to trigger a headcut which, if it happened, would increase stream bank sensitivity to instream erosion by increasing bank heights. Therefore, dredging would not destabilize the banks and contribute sediment into the creeks, either by removing bank vegetation or undercutting the banks.

Stream Temperature

Current temperature conditions in the NFBR watershed are the result of historic activity which resulted in channel incision, widening, and straightening, a lowering of the groundwater table, and the removal of riparian woody vegetation. The May 2015 700-PM permit prohibits dredging in the stream banks or removing stream side vegetation. Therefore, suction dredging will not alter either the actual stream temperatures or their patterns, unless dredging triggers a channel headcut. In this case, the increased bank heights, as a result of channel incision, would make the stream banks more sensitive to instream erosion and the evolution of a wider channel. The increase in channel widths would result in a decrease in water depths for the same discharge and thus an increase in stream temperatures. Channel incision would also lead to a lowering of the water table, reducing the influx of cooler groundwater base flows into the stream. This would also lead to increased stream temperatures and a potential shift from perennial to intermittent flow.

Turbidity

With respect to potential turbidity plumes, the 700-PM permit requires the following:

> "…must not create visible turbidity above background beyond 300 feet downstream or down current of the mining operation. In no case may visible turbidity cover the entire wetted perimeter (from stream bank to opposite stream bank) (Schedule A.1)"
>
> "If any visible increase in turbidity… is observed above background turbidity beyond any point more than 300 feet downstream or down current from the activity at any time, the operation must be modified, curtailed or stop immediately so that a violation as defined in Schedule A does not exist…. (Schedule A.2).

> "Registrants must visually monitor the turbid wastewater discharges from the suction dredge each day of the operation. Visual monitoring must be performed at least once a day during daylight hours (Schedule B.1)"
>
> "Registrants must visually monitoring the wastewater discharge immediately downstream or down current from the mining activity until the turbidity plume is no longer visible (Schedule B.2)."

Research examining turbidity plumes found that depending on the amount and type of fines in the substrate and the stream gradients, plume distances varied from being non-detectable below a dredge or only a few meters in length (*Griffith and Andrews 1981*), to 80 plus meters (*Harvey 1986*), to more than 123 meters downstream (*Somer and Hassler 1992*). Only Griffith and Andrews (*1981*) identified the percentages or makeup of the fines in the substrate. They found that sediment less than 0.5 mm (silt) composed 13 and 18 percent of the substrate on their two streams. Sediment less than 4mm (fine gravel) made up 58% of the material dredged in both streams.

Thomas (*1985*) found in his study that deposited sediment increased 10-20 times over background levels immediately downstream of a dredge, and then decreased exponentially downstream. His study found that the bulk of the sediment stirred up by dredging was redeposited within 6-11 meters, and in one case the gravel deposited by the dredge had moved into and filled a pool. Somer and Hassler (*1992*) found increased in sedimentation below dredges on some streams and not others suggesting the role of substrate composition in determining the potential for pool infilling. Harvey and Lisle (*1999*) found that scour and fill varied spatially as a function of bed composition and variability in stream flow. Therefore, there is the potential for suction dredging to increase turbidity and suspended sediment in a stream depending on the channel bed composition.

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Appendix 4B

State of Oregon 700PM Permit and Evaluation Report

GENERAL PERMIT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTEWATER DISCHARGE PERMIT

Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204
Telephone: (503) 229-5630

Issued pursuant to ORS 468B.050 and Section 402 of the Federal Clean Water Act

---

ISSUED TO:

Name	
Address	
Assigned Permit Number (display on dredge)	
Permit Coverage Expiration Date	

This general permit provides coverage under the National Pollutant Discharge Elimination System for three kinds of discharges:

1. **Discharges from suction dredges not exceeding 30 horsepower and suction hoses with inside diameters no larger than six inches in diameter that do not operate in areas designated as essential salmon habitat**. Operators seeking coverage for this type of discharge must apply for registration under the permit and registration must be approved by DEQ.

2. **Discharges from suction dredges not exceeding 16 horsepower and suction nozzles with inside diameters no larger than four inches in diameter that operate in areas designated as essential salmon habitat**. Operators seeking coverage for this type of discharge must apply for registration under the permit and registration must be approved by DEQ.

3. **Discharges from in-water, non-motorized mining equipment or devices.** Operators seeking coverage for this type of discharge are not required to apply for registration but are required to comply with all applicable permit terms.

All other mining activities that discharge to surface waters of the state are required to apply for an individual permit, except for hand panning which is exempt from permitting requirements.

Issue date:_____
Effective date:___May 15, 2015

_____
Lydia Emer
Operations Division Administrator

SCOPE OF PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, a person covered under this permit is authorized to discharge wastewater from authorized mining equipment to waters of the state in accordance with all the requirements, limitations, and conditions set forth in the permit as follows:

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SCHEDULE D - General Conditions 10

DEFINITIONS

1. *Background Turbidity* means turbidity that represents the ambient turbidity of undisturbed waters as measured or observed at least 10 feet upstream or up-current from the suction dredge or in-water non-motorized mining equipment operation at the time dredging occurs.
2. *Boulder* means a rock 12 inches in diameter or greater.
3. *Combination highbanker/suction dredge* means a type of mineral processing equipment constructed on an elevated support structure (e.g., legs or a box) with water supplied to a sluice box by hand or pumping and placer material is delivered to the hopper by hand or by an attached suction hose system.
4. *Daylight hours* means the hours between sunrise and sunset.
5. *DEQ* or *Department* means Oregon Department of Environmental Quality.
6. *Essential salmon habitat* means essential indigenous anadromous salmonid habitat pursuant to ORS 196.810(1)(f)(B).
7. *Gravel Bar* means a transitional gravel deposit that lacks any rooted vegetation, located either between the stream banks and the wetted perimeter of the stream or entirely within the wetted perimeter of the stream.
8. *Habitat structure* means physical composition of natural or restoration material that provides function and complexity in a stream. And includes but is not limited to:
   - *Boulders*
   - *Woody material* such as living or dead trees, shrubs, stumps, large tree limbs, and logs;
   - *Vegetation* such as grasses, shrubs, wildflowers, or weeds; and
   - *Other natural features* necessary to provide fish with areas for spawning, resting, food, *refuge from predators and shade.*
9. *Highbanker* means mineral processing equipment that is constructed on an elevated support structure (e.g., legs or a box) with water supplied to a sluice box by hand or pumping and placer material is delivered to the hopper by hand.

10. *In-water non-motorized mining equipment or device* means any equipment or device used for prospecting and small scale mining, including equipment used for gravity separation or other processing of precious metals or minerals from stream deposits within the wetted perimeter of a stream. These devices include but are not limited to a hand sluice box, mini rocker, or hand suction tool.
11. *OAR* means Oregon Administrative Rule.
12. *ORS* means Oregon Revised Statute
13. *Pollution* or *water pollution* means alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof. ORS 468B.005(5).
14. *Stream bank* means a slope of land adjoining and confining a stream channel.
15. *Suction dredge* means a mechanical device with a suction nozzle and hose for conveyance of streambed material to a sluice box, where suction is created by a power source (electric motor or combustion engine) or gravity. The sluice box and power source of a suction dredge are mounted on a floating platform. For purposes of this permit, a suction dredge includes a gravity or siphon suction dredge.
16. *Visible Turbidity* means turbidity that is visible when compared to background turbidity.
17. *Wastes* mean sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances that will or may cause pollution or tend to cause pollution of any waters of the state. ORS 468B.005(9).
18. *Wetted perimeter* means the area of the stream that is underwater, or is exposed as a non-vegetated dry gravel bar island surrounded on all sides by water that is actively moving at the time the activity occurs.

DISCHARGES NOT AUTHORIZED BY THIS PERMIT

The coverage for discharges provided by this general permit does not extend to all waters of the State. The waters where discharges are not authorized by the general permit are set out below. Subject to applicable laws, a person wishing to mine in these areas may apply for coverage under an individual permit.

Oregon State Scenic Waterways

1. This general permit does not authorize discharges from suction dredges in Oregon State Scenic Waterways. Pursuant to ORS 390.805 to ORS 390.925 motorized suction dredge mining is restricted in Oregon State Scenic Waterways. Location information on Oregon State Scenic Waterways will be provided with the application.

Essential Salmon Habitat

2. This general permit does not authorize discharges from suction dredges greater than 16 horsepower or an inside diameter intake nozzles greater than 4 inches in Essential Salmon Habitat. Location information on Essential Salmon Habitat waterways will be provided with the application.

3. This general permit does not authorize discharges from mining outside the wetted perimeter of the stream in essential salmon habitat.

Tribal Lands

4. This general permit does not authorize discharges from suction dredges or in-water non-motorized mining equipment operating on tribal lands, or waterways that constitute a boundary of a tribal reservation. Information on water bodies that serves as tribal reservation boundaries will be provided with the application.

Water Quality Limited Streams 303(d) List

5. This general permit does not authorize discharges from suction dredges operating on any stream segment that is listed as water quality limited in categories 4 and 5 for sedimentation, turbidity or toxics other than chlorine, on the list published by DEQ pursuant to OAR 340-041-0046 unless a stream segment is subject to a total maximum daily load (TMDL) that includes a wasteload allocation for mining under the 700PM permit. The 303(d) list as approved or established by EPA that is in effect as of January 1 of each year will be used to determine if coverage is available.

Other discharges

6. This general permit does not authorize discharges from highbanker and combination highbanker/suction dredge equipment.

HOW TO REGISTER FOR COVERAGE UNDER THIS GENERAL PERMIT

A. Persons Seeking To Register Under This 700PM General Permit

1. To register for coverage under this permit, Suction dredge operators must take the following steps:
   a. Obtain a DEQ application form by:
      i. mail or in person from a DEQ office, or
      ii. downloading the application from the DEQ website;

   b. Submit a completed application to DEQ, requesting coverage under this permit at least thirty days prior to the planned activity. The Department may accept applications filed less than thirty days from the planned activity on a case by case basis;

   c. Submit an annual fee or the optional five-year fee with the application. Except for persons paying a five-year fee for full permit term coverage, an annual fee payment form is due each year for persons seeking coverage for that calendar year. Permit registrants must submit a new application if contact information, mining location, or the operation has changed; and

   d. Pursuant to OAR 340-045-0033(7), any person required to have coverage under a general permit must pay applicable permit fees as described in Section 3 below to obtain and maintain coverage under that permit. DEQ will not assign permit coverage without fee payment in advance.

2. DEQ will review the application and will take one of the following actions:
   a. Issue written notice of permit registration approval;

   b. Request additional information; or

   c. Deny registration under this permit. The applicant will be notified if the applicant's operation cannot be approved for registration under the permit, and if the applicant may need to apply for an individual permit. The procedures for denial of an application to register and for requesting a hearing on a denial are contained in OAR 340-045-0050.

3. Fees for sources seeking registration.
   a. To obtain and maintain coverage under this permit, the applicable fees provided in OAR 340-045-0075, Table 70G and ORS 468B.052 must be received by the Department.

   b. Applicants may pay for permit coverage by submitting:
      i) an annual fee for each year the person registers under the general permit; or
      ii) a five-year fee for full permit term coverage under this general permit.

   c. For persons with permit coverage under a five-year registration, DEQ will inform the registrant of any applicable 303(d) listings approved by EPA during the period of coverage.

   d. Payment of a nonrefundable $150 surcharge is required for obtaining or maintaining coverage under DEQ's 700-PM suction dredge mining permit for calendar year 2015.

4. To renew coverage prior to the January 1, 2020 expiration date.
   a. Before July 1, 2019, registrants must:

      i. Submit a complete application form to DEQ. The DEQ Director may grant permission to submit the application later than July 1, 2019 but no later than the permit expiration date.
      ii. Submit all applicable fees with the permit application.

<u>B. Sources Covered By This Permit But Not Required To Register Under The Permit</u>

1. In-water non-motorized mining. No application or fee is required for discharges from in-water non-motorized mining equipment. Persons conducting in-water non-motorized mining must have a copy of the permit in their possession or readily available for inspection at the mining location.

COVERAGE AND ELIGIBILITY

1. A person covered by this permit may not discharge wastes to waters of the state except in compliance with this permit.

2. Suction dredge and in-water non-motorized mining equipment authorized under this permit must be located within the wetted perimeter.

3. Any person not wishing to be covered by this permit may apply for an individual permit in accordance with the procedures in OAR 340-045-0030.

4. At no time may permit coverage apply to simultaneous operation of more than one suction dredge or one in-water non-motorized mining device. The person covered by this permit may supervise another person operating either a single suction dredge or a single in-water non-motorized mining device as long as the person covered by this permit is present. A person operating under the supervision of a person covered by the permit must comply with all conditions and limitations in the permit.

5. During mining activities, a person covered by this permit must have a copy of the permit in the person's possession or readily available for inspection at the mining location. Registered suction dredge operators must possess the permit copy assigned to them through registration. Copies of this permit are available for operators using in-water non-motorized equipment at DEQ's website: http://www.deq.state.or.us/wq or by requesting a copy from a DEQ office.

6. An assigned permit number is provided by DEQ upon registration. DEQ's assigned permit number must be displayed at all times on a suction dredge located within the wetted perimeter. The assigned permit number identifies the operator – not the equipment – and may be transferred from one piece of equipment to another depending on which equipment the operator is using.

   The assigned permit number must be displayed in a manner that is visible and legible for purposes of identification from banks and shorelines. The identification number shall read left to right and be in block characters not less than three inches in height and of a color that contrasts with the background.

SCHEDULE A

DISCHARGE LIMITATIONS FOR ALL EQUIPMENT

1. Discharges from Suction dredges and in-water non-motorized equipment authorized by this permit must not create visible turbidity above background beyond 300 feet downstream or downcurrent of the mining operation. In no case may visible turbidity cover the entire wetted perimeter (from stream bank to opposite stream bank). No wastes may be discharged and no activities may be conducted that will cause or contribute to a violation of water quality standards as adopted in OAR Chapter 340, Division 41.

2. If any visible increase in turbidity of wastewater discharges is observed above background turbidity beyond any point more than 300 feet downstream or downcurrent from the activity at any time, the operation must be modified, curtailed, or stopped immediately so that a violation as defined in Schedule A does not exist. Options to prevent, mitigate or correct turbid water discharges include, but are not limited to, ceasing operations, moving the location of the operation, reducing process flow or using a smaller machine.

3. Suction dredge and in-water non-motorized mining operations are prohibited during non-daylight hours.

4. Mining must not cause any measurable increase in turbidity in the Diamond Peak, Kalmiopsis, Eagle Cap, Gearhart Mountain, Mount Hood, Mount Jefferson, Mount Washington, Mountain Lakes, Oregon Islands, Strawberry Mountain, Three Arch Rocks and Three Sisters wilderness areas. Measureable increase in turbidity for purposes of this permit is any visible turbidity.

5. Suction dredge equipment must be properly maintained and petroleum products must be managed so that no visible oily sheen is created in the water.

6. Operation of a suction dredge is not allowed in waters less than 500 feet upstream from a stream segment of the same stream or a tributary of a stream with a stream segment that is listed as water quality limited in categories 4 and 5 for sedimentation, turbidity or toxics other than chlorine, on the list published by DEQ pursuant to OAR 340-041-0046 unless a stream segment is subject to a total maximum daily load (TMDL) that includes a wasteload allocation for mining under the 700PM permit. The 303(d) list as approved or established by EPA that is in effect as of January 1 of each year will be used for water quality limited waters.

SCHEDULE B

MONITORING REQUIREMENTS FOR SUCTION DREDGE REGISTRANTS

1. Registrants must visually monitor the turbid wastewater discharges from the suction dredge each day of the operation. Visual monitoring must be performed at least once a day during daylight hours.

2. Registrants must visually monitor the wastewater discharge immediately downstream or down current from the mining activity until the turbidity plume is no longer visible.

3. Registrants must record all of the information listed below in a monitoring log:
    a. assigned permit number;
    b. date of visual monitoring;
    c. time of visual monitoring;
    d. location of visual monitoring:
        i) using township, range and section and latitude and longitude and
        ii) stream name;
    e. suction dredge nozzle inside diameter, hose inside diameter and maximum horsepower rating;
    f. date that equipment was checked and date equipment was decontaminated for invasive species according to Schedule C, Condition 16;
    g. account of any mercury observed in sluice box or concentrate during cleanout process and amount of mercury collected;
    h. whether operations were modified, curtailed or stopped and if so, what actions were taken, in order to comply with the 300 foot turbidity limit;

i. other noncompliance according to General Condition D3; and
j. the printed name of the person performing the visual monitoring and recording the observations in the monitoring log.

4. The monitoring log must be legible and available to authorities upon request.

5. Registrants must submit the monitoring log as part of the DEQ annual report by February 28 of each calendar year. Permit registrants must submit an annual report even if no dredging occurred. Annual reports must be submitted to DEQ Headquarters at 811 SW 6th Avenue, Portland OR, 97204. An annual report form will be available on DEQ's web page or at a DEQ office.

6. Registrants must maintain monitoring logs and annual reports required by this permit and records of all data used to complete the application for this permit for at least three years from the expiration date of this permit.

7. When a registrant becomes aware that it has failed to properly report any relevant facts or has submitted incorrect information in a permit application or any report to DEQ, the registrant must promptly submit or correct the submission of such facts or information.

SCHEDULE C

BEST MANAGEMENT PRACTICES FOR
SUCTION DREDGES OR NON-MOTORIZED EQUIPMENT

1. Suction dredges or in-water non-motorized mining equipment must be operated to ensure that there is no overlap of turbidity plumes from equipment used in the same waters.

2. Suction dredging is not allowed outside the periods set in the in-water work schedule (*Timing of In-Water Work To Protect Fish and Wildlife Resources*) established by the Oregon Department of Fish and Wildlife.

3. Mining equipment, including suction dredges and in-water non-motorized mining equipment must not be used where fish eggs are present.

4. No activities authorized by this permit, including operation of mining equipment, location of mining equipment, or turbid discharge, may obstruct a migrating fish from advancing upstream or downstream.

5. Mining equipment, including suction dredges and in-water non-motorized mining equipment must not be used where live freshwater mussels are present. Operations must be relocated if live mussels are encountered during excavation.

6. Mining equipment, including suction dredges and in-water non-motorized mining equipment must not be used where Pacific Lamprey ammocoetes are present. If Pacific Lamprey ammocoetes are found, the operator must salvage the ammocoetes by sifting through

streambed material in the area of operation and in the removed substrate and returning salvaged ammocoetes to the stream away from the activity.

7. Dredging or mining material from stream banks is prohibited under this permit.

8. Undercutting or eroding stream banks and removal or disturbance of boulders, rooted vegetation, or embedded woody plants and other habitat structure from stream banks is prohibited.

9. Moving boulders, logs, or other habitat structure within the stream channel is allowed by hand or non-motorized equipment. However, in no case may this habitat structure be removed entirely from the stream. Boulders and other habitat structures must be returned to their original position upon completion of the mining activity. The mining activity is considered complete if a person authorized by this permit does not return to that location to conduct the activity within 24 hours.

10. Removal of habitat structure that extends into the stream channel from the stream bank is also prohibited. Examples of habitat structure are boulders, woody materials, vegetation, and other natural features.

11. This permit does not authorize operations that may affect bridge footings, dams, and other structures in or near the stream.

12. Suction dredge equipment must be maintained, and petroleum products managed, to prevent water pollution as follows:

    a. Discharging oil, grease and fuel from suction dredge activity is prohibited. Permit registrants must report spills according to requirements of Schedule D, Section D.2.

    b. Equipment used for suction dredging must not release petroleum products. Equipment surfaces must be free of oils and grease, and must be checked for fuel and oil leaks prior to start of operation on a daily basis.

    c. Oil absorbent material and an American National Standards Institute (ANSI) or Underwriters Laboratories (UL) approved safety container and self-closing nozzle must be used when refueling to prevent possible contamination of surface waters or groundwater.

    d. Fuel and oil storage must be located at least 25 feet back from the wetted perimeter of the stream. Where a 25 foot setback is not possible (due to circumstances such as steep bank, storage security, movement of operations), fuel and oil must be stored in secondary containment. When it is not practical to store fuel and oil on land, secondary containment must be used when storing fuel on the dredge or in a support boat. Secondary containment capacity must be able to hold an amount greater than the fuel container volume.

e. In the event a spill occurs, suction dredge operators must contain, remove and mitigate such spills immediately. All waste oil or other clean up materials contaminated with petroleum products must be properly disposed off-site.

13. No visible turbidity plume may reach the intake of a drinking water source. Drinking water source information tools to identify downstream intake locations are provided by the DEQ Drinking Water Protection Program and the Oregon Department of Water Resources.

14. Except as restricted in essential salmon habitat, suction dredging and in-water non-motorized mining is allowed on non-vegetated gravel bars up to 10 feet outside the wetted perimeter of the stream.

15. Motorized wheeled or tracked equipment is prohibited below the ordinary high water mark except for the suction dredge and life support system (for example, breathing air supply). Dredges may be launched and taken out at boat ramps, stream crossings/fords and other public water access points that are authorized by land management authorities.

16. Mining equipment must not carry or contain invasive species. Equipment must be decontaminated prior to its placement in Oregon waters and when transferring from one water body to another. The Oregon Marine Board provides information including decontamination steps on aquatic invasive species. Discharge of decontamination solutions to waters of the state is prohibited.

17. Use of chemical agents such as mercury to improve mineral processing or metal extraction from ore or high-grade fines is not allowed under this permit.

SCHEDULE D
NPDES GENERAL CONDITIONS – INDUSTRIAL FACILITIES

Where the above permit requirements are in conflict with these general conditions, the permit requirements supersede these general conditions.

SECTION A. STANDARD CONDITIONS

A1. Duty to Comply with Permit

The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and the federal Clean Water Act and is grounds for an enforcement action. Failure to comply is also grounds for DEQ to terminate, modify and reissue, revoke, or deny renewal of a permit.

A2. Penalties for Water Pollution and Permit Condition Violations

The permit is enforceable by DEQ or EPA, and in some circumstances also by third-parties under the citizen suit provisions 33 USC § 1365. DEQ enforcement is generally based on provisions of state statutes and Environmental Quality Commission (EQC) rules, and EPA enforcement is generally based on provisions of federal statutes and EPA regulations.

ORS 468.140 allows DEQ to impose civil penalties up to $10,000 per day for violation of a term, condition, or requirement of a permit. The federal Clean Water Act provides for civil penalties not to

exceed $32,500 and administrative penalties not to exceed $11,000 per day for each violation of any condition or limitation of this permit.

Under ORS 468.943, unlawful water pollution, if committed by a person with criminal negligence, is punishable by a fine of up to $25,000, imprisonment for not more than one year, or both. Each day on which a violation occurs or continues is a separately punishable offense. The federal Clean Water Act provides for criminal penalties of not more than $50,000 per day of violation, or imprisonment of not more than 2 years, or both for second or subsequent negligent violations of this permit.

Under ORS 468.946, a person who knowingly discharges, places, or causes to be placed any waste into the waters of the state or in a location where the waste is likely to escape into the waters of the state is subject to a Class B felony punishable by a fine not to exceed $250,000 and up to 10 years in prison per ORS chapter 161. The federal Clean Water Act provides for criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment of not more than 3 years, or both for knowing violations of the permit. In the case of a second or subsequent conviction for knowing violation, a person is subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

A3. Duty to Mitigate

The permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment. In addition, upon request of DEQ, the permittee must correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

A4. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application must be submitted at least 180 days before the expiration date of this permit.

DEQ may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

A5. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

a. Violation of any term, condition, or requirement of this permit, a rule, or a statute.
b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts.
c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
d. The permittee is identified as a Designated Management Agency or allocated a wasteload under a total maximum daily load (TMDL).
e. New information or regulations.
f. Modification of compliance schedules.
g. Requirements of permit reopener conditions.
h. Correction of technical mistakes made in determining permit conditions.
i. Determination that the permitted activity endangers human health or the environment.
j. Other causes as specified in 40 CFR §§ 122.62, 122.64, and 124.5.

The filing of a request by the permittee for a permit modification, revocation or reissuance, termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

A6. Toxic Pollutants
The permittee must comply with any applicable effluent standards or prohibitions established under Oregon Administrative Rules (OAR) 340-041-0033 and 307(a) of the federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

A7. Property Rights and Other Legal Requirements
The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other private rights, or any infringement of federal, tribal, state, or local laws or regulations.

A8. Permit References
Except for effluent standards or prohibitions established under section 307(a) of the federal Clean Water Act and OAR 340-041-0033 for toxic pollutants, and standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

A9. Permit Fees
The permittee must pay the fees required by OAR.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

B1. Proper Operation and Maintenance
The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

SECTION C. MONITORING AND RECORDS

C1. Representative Sampling
Sampling and measurements taken as required herein must be representative of the volume and nature of the monitored discharge. All samples must be taken at the monitoring points specified in this permit, and must be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points must not be changed without notification to and the approval of DEQ.

C2. Monitoring Procedures
Monitoring must be conducted according to test procedures approved under 40 CFR part 136 or, in the case of sludge use and disposal, approved under 40 CFR part 503 unless other test procedures have been specified in this permit.

C3. Penalties of Tampering
The federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit

may, upon conviction, be punished by a fine of not more than $10,000 per violation, imprisonment for not more than two years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than $20,000 per day of violation, or by imprisonment of not more than four years, or both.

C4. Additional Monitoring by the Permittee
If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR part 136 or as specified in this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the discharge monitoring report.

C5. Averaging of Measurements
Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean, except for bacteria which must be averaged as specified in this permit.

C6. Retention of Records
Records of monitoring reports required by this permit and records of all data used to complete the application for this permit must be retained for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of DEQ at any time.

C7. Records Contents
Records of monitoring information must include:
a. The date, exact place, time, and methods of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used; and
f. The results of such analyses.

C8. Inspection and Entry
The permittee must allow DEQ or EPA upon the presentation of credentials to:
a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

C9. Confidentiality of Information
Any information relating to this permit that is submitted to or obtained by DEQ is available to the public unless classified as confidential by the Director of DEQ under ORS 468.095. The permittee may request that information be classified as confidential if it is a trade secret as defined by that statute. The name and address of the permittee, permit applications, permits, effluent data, and information required by NPDES application forms under 40 CFR § 122.21 are not classified as confidential [40 CFR § 122.7(b)].

SECTION D. REPORTING REQUIREMENTS

D1. Transfers

This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and EQC rules. No permit may be transferred to a third party without prior written approval from DEQ. DEQ may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under 40 CFR § 122.61. The permittee must notify DEQ when a transfer of property interest takes place.

D2. Twenty-Four Hour Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) within 24 hours from the time the permittee becomes aware of the circumstances, unless a shorter time is specified in the permit. During normal business hours, the DEQ regional office must be called. Outside of normal business hours, DEQ must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

a. A description of noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected;
d. Steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and

DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

D3. Other Noncompliance

The permittee must report all instances of noncompliance not reported under General Condition D2, at the time monitoring reports are submitted. The reports must contain:

a. A description of the noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected; and
d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

D4. Duty to Provide Information

The permittee must furnish to DEQ within a reasonable time any information that DEQ may request to determine compliance with the permit or to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit. The permittee must also furnish to DEQ, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it has failed to submit any relevant facts or has submitted incorrect information in a permit application or any report to DEQ, it must promptly submit such facts or information.

D5. Signatory Requirements

All applications, reports or information submitted to DEQ must be signed and certified in accordance with 40 CFR § 122.22.

D6. Falsification of Information

Under ORS 468.953, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, is subject to a Class C felony punishable by a fine not to exceed $125,000 per violation and up to 5 years in prison per ORS chapter 161. Additionally, according to 40 CFR § 122.41(k)(2), any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or non-compliance will, upon conviction, be punished by a federal civil penalty not to exceed $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

For DEQ Use Only		For DEQ Use Only
Date Permit Issued	State of Oregon Department of Environmental Quality 811 SW 6th Avenue, Portland, OR 97204	Date
File No.	**Application for 700-PM General Permit**	Amount Received Check No.

Registration is only required for suction dredges including siphon/gravity dredges. The applicant must provide all requested information for this application to be considered complete. An application that is incomplete or unsigned will be returned to the applicant to complete. Application submittal and permit issuance information is provided on page 2.

Were you previously registered under the 700PM? ☐ **Yes** ☐ **No**

If Yes, enter the File No.:

APPLICANT NAME

MAILING ADDRESS

Street Address

City	State	Zip Code

CONTACT INFORMATION

Telephone	Alternate Telephone/Mobile

Email Address

SITE / SUCTION DREDGE INFORMATION

Location*: Township:		Range:		Section:	

Is this location in Essential Salmon Habitat (ESH)?** ☐ Yes ☐ No

*For location, please provide the primary mining claim or area where you plan to operate.

**If "Yes", the maximum allowed equipment size is 4 inch intake nozzle and 16 horsepower (hp) engine.

Note: Suction dredging is not allowed in state scenic waterways.

If you have more than one dredge, list the largest inside hose diameter, nozzle size, and horsepower rating:

Suction hose inside diameter (inches):		(Maximum 6 inches inside diameter)
Nozzle inside diameter (inches)		(Maximum 4 inches within ESH)
Horsepower rating:		(Maximum 16hp within ESH or 30hp outside ESH)

Please read and initial the following statements. (Failure to initial does not render the application incomplete.) These statements relate to Senate Bill 838, found at https://olis.leg.state.or.us/liz/2013R1/Measures/Text/SB838/Enrolled adopted during Oregon's 2013 legislative session. More information on Senate Bill 838 and the surcharge is available at http://www.oregon.gov/deq/WQ/Pages/Water%20Quality%20Permits/Mining/miningfaq.aspx

_____ I understand that I must complete and return this application to DEQ with the $25 permit fee and $150 surcharge fee to be registered under the 700-PM permit for 2014.

_____ I understand that the $150 surcharge fee is non-refundable.

_____ I understand that I must obtain a General Authorization (GA) from the Department of State Lands (DSL) before I may lawfully operate a suction dredge in Essential Salmon Habitat (ESH) waters, and that DSL is statutorily limited to issuing no more than 850 GAs and individual permits for motorized mining in ESH waters in 2014 and 2015. [*For comparison, in 2013, DSL issued more than 2400 GAs.*]

SIGNATURE

I hereby certify that the information in this application is true and correct to the best of my knowledge and belief.

Signature _____ Date _____

-Important Information-

A separate Recreational/Small Scale Placer Mining *General Authorization* or a Removal/Fill *Permit* is required from the Oregon Department of State Lands for Recreational/Small Scale Placer Mining within Essential Salmon Habitat. Please contact DSL at (503) 986-5200 or http://www.statelandsonline.com for information regarding suction dredge requirements in Essential Salmon Habitat waterbodies and state scenic waterways.

Permit Fees: SEND CHECK OR MONEY ORDER PAYABLE TO DEQ WITH SIGNED APPLICATION

Amount Enclosed: ☐ $175 ($25 Annual Fee and $150 Surcharge Fee)

Send Completed Application and Surcharge/Annual Fee Payment Check to:
Oregon Department of Environmental Quality
Attn: Business Office
811 SW Sixth Avenue, Portland OR 97204
(503) 229-6114 | (800) 452-4011

APPLYING FOR COVERAGE UNDER DEQ's 700-PM GENERAL PERMIT

How do I obtain coverage under the new 700-PM General Permit?

1. Complete a 700-PM application.
   For suction dredge only. There is no registration required for non-motorized in-water mining equipment or devices.
   New dredge operators may obtain a 700-PM application by:
   a. Mail or in person from the DEQ regional offices. Call 503-229-6114 or 800-452-4011 for the location of the nearest DEQ regional office.
   b. Download the application from the DEQ website at: http://www.deq.state.or.us/wq/wqpermit/mining.htm

2. Submit the complete 700-PM application and fee to DEQ's Portland office.
   A complete application and $175 fee ($25 annual fee and $150 surcharge fee) must be submitted to DEQ. DEQ expects to receive a large volume of applications each spring. Applicants should expect a 15 day processing time for assignment to the 700-PM General Permit during that period. Thereafter, DEQ will be able to process and assign coverage within 10 business days after receiving a complete application.

3. DEQ will review the 700-PM application and assign or deny coverage.
   After reviewing the application DEQ will do one of the following:
   a. Issue a written notice of assignment to the 700-PM General Permit.
      DEQ will send an assignment letter and a copy of the 700-PM General Permit to the applicant.
   b. Deny coverage under the 700-PM General Permit.
      The applicant will be notified if the applicant's operation cannot be approved for coverage under the General Permit, and that the applicant may need to obtain an individual permit.
   c. Request additional information.
      An application that is incomplete or unsigned will be returned to the applicant to complete. DEQ requires a complete application in order to assign or deny coverage under the 700-PM General Permit.

   The DEQ 700-PM General Permit is considered valid when the applicant receives the DEQ authorization letter and the 700-PM with the applicant's name and DEQ permit number.

Other Agency Requirements

You must comply with all applicable local, state, and federal laws and regulations. Prior to initiating recreational and small-scale placer mining, you should consult with affected local land use planning agencies and public land managing agencies.

DEQ State of Oregon Department of Environmental Quality	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT EVALUATION REPORT Oregon Department of Environmental Quality 811 SW Sixth Avenue Portland, OR 97204

PROPOSED ACTION: 700PM NPDES general permit renewal

PERMIT WRITERS: Beth Moore (503-229-6402) and Jim Billings (503-229-5073)

PERMIT CATEGORY: General Permit

SOURCES REQUIRED TO REGISTER FOR COVERAGE TO BE EFFECTIVE UNDER THIS PERMIT:

1) In areas not designated as essential salmon habitat, suction dredges used for recovering precious metals or minerals from stream deposits, not to exceed 30 horsepower or a suction hose with an inside diameter no greater than six inches.
2) In areas designated as essential salmon habitat, suction dredges used for recovering precious metals or minerals from stream deposits, not to exceed 16 horsepower or an intake nozzle no greater than 4 inches inside diameter.

SOURCES FOR WHICH REGISTRATION IS NOT REQUIRED IN ORDER TO OBTAIN PERMIT COVERAGE:[1]

The following types of sources must comply with all the terms and conditions of this permit but are not required to register in order for permit coverage to be effective.

1) In-water non-motorized mining equipment used for recovering precious metals or minerals from stream deposits.

SOURCE LOCATION: Statewide

Issue Date:

Effective Date: January 1, 2015

[1] DEQ does not view panning as non-motorized mining equipment and a water quality permit is not required for panning.

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INTRODUCTION

The Oregon Department of Environmental Quality (DEQ) is proposing to renew the 700PM NPDES General Permit, which will expire on December 31, 2014. Suction dredge mining and in-water non-motorized mining equipment are commonly used for in-water placer mining operations. A person may not discharge from a suction dredge or in-water non-motorized mining equipment without a permit under the federal Clean Water Act National Pollutant Discharge Elimination System (NPDES). DEQ has been delegated the authority by the U.S. Environmental Protection Agency (EPA) to issue NPDES permits in Oregon. This is a general permit issued by order under Oregon Adminitrative Rule 340-045-0033. General permits cover activities with similar operations, similar wastes and similar monitoring conditions.

This 700PM NPDES General Permit (Permit) allows and regulates the discharge of pollutants, including turbid water. Turbid water is a cloudy or muddy looking discharge consisting of stream water and bed material. It is discharged back into the receiving water from equipment used in state waters for recovering precious metals or minerals from stream deposits. Suction dredge and in-water non-motorized mining equipment are defined in the permit.

Persons operating suction dredges in Oregon waters must register for coverage under the Permit or seek coverage under an individual permit. The allowable size of such suction dredges depends on whether suction dredging will occur in waters designated as essential salmon habitat. Essential salmon habitat means habitat pursuant to Oregon Revised Statute 196.810. Suction dredges operating in essential salmon habitat can be no more than 16 horsepower or an intake nozzle no more than four inches in inside diameter. Suction dredges operating in waters outside essential salmon habitat may be up to 30 horsepower or a suction hose no more than six inches in inside diameter. Persons operating non-motorized mining equipment to recover precious metals or minerals

from stream deposits, are automatically covered under this Permit and are not required to register for coverage, but they must comply with the terms and conditions of the Permit.

The proposed Permit retains coverage of the non-motorized small scale mining equipment. The Department has determined that it is appropriate for in-water sluicing equipment and other in-water non-motorized small scale mining equipment commonly used in Oregon be covered by this Permit. Hand panning is not considered in-water non-motorized mining equipment. A water quality permit is not required for hand panning.

Operators of in-water non-motorized small scale mining equipment are required to obtain a copy of the Permit and follow the applicable requirements; however, registration under the Permit is not required. Under 40 CFR 122.28(b)(2)(v) and OAR 340-045-0033(3)(a), DEQ can determine that the submittal of an registration application is not necessary. DEQ determined that in-water non-motorized mining moves less of the same type of material over time than suction dredges. For an estimated number of discharges of non-motorized mining equipment DEQ can use Department of State Lands records.

Placer mining is the recovery of precious metal or minerals from stream deposits. Miners normally target gold-bearing placer or deposits of streambed material and former fluvial deposits of a meandering stream. In general, in-water placer mining covered by this Permit, typically occurs for a period ranging from 2 to 8 hours a day and is limited to seasonal in-water work periods authorized by the Department of Fish and Wildlife. In general, the activity moves a small amount of material, and it is common for multiple mining activities to occur along the same stream. The table below provides information on product specifications. An amount of material moved is also dependent the type of streambed material encountered and number of operators working the site. Less streambed material is moved in areas with rocky substrate compared to a gravel substrate. (California Department of Fish and Game, 2011). An operation that includes more people can increase the amount of material moved. (Milch, Ceasar J., 5 Inch Dredge Model 5109H, Product Report, No Date)

Equipment		**Amount of material moved**	
Non-motorized hand sluice		Typical amount of material processed is 5 cubic yards per year.	
		Proline dredge specifications www.prospectinggear.com/products	Keene manufacturers specifications (maximum reported) [1]
Suction dredge 2-inch		Up to 2 cubic yards per hour	1.4 cubic yards per hour
Suction dredge 3-inch		Up to 8 cubic yards per hour	3 cubic yards per hour
Suction dredge 4-inch		Up to 12 cubic yards per hour	5.2 cubic yards per hour
Suction dredge 6 -inch		Up to 20 cubic yards per hour	17 cubic yards per hour

1(California Department of Fish and Game Draft Subsequent Environmental Impact Report,2011) http://www.dfg.ca.gov/suctiondredge

Dredge operators will move cobble rocks by hand and/or use the suction dredge to remove streambed material (waste material or overburden above a targeted mineral bearing zone) to reach gold deposits in areas near the top of bedrock. Miners also target material collected behind boulders and streambed deposits immediately above barriers that act as a barrier to downward migration of gold. Bedrock acts as a barrier to downward migration of gold. Miners often dig and suction the irregular surface and crevices of the bedrock for gold. In general, placer material is conveyed from the stream bottom through the suction hose to the sluice box on a floating platform where the power source and pump is also mounted. Dredgers often use breathing air supplied by a compressor powered by the dredge engine in addition to the suction pump. The sluice box processes the placer material where the heavier gold and minerals like magnetite (black sand) or hematite are caught and separated by means of metal riffles, metal screens and textured synthetic matte material. Waste rock and sediment passes through the sluice box. Waste material is deposited off the back end of the sluice box on the stream bottom and pollutants of turbidity, sediments and toxics are introduced to the water column.

Suction dredge discharge often appears as a turbid plume of varying lengths and cloudiness depending on the characteristics of placer material processed. Elemental mercury may be captured in sluice boxes. (DEQ has guidance for proper disposal of such mercury.) Miners often capture lead fishing sinkers and other metal items. (DEQ encourages the recycling of these materials.)

Persons using in-water non-motorized equipment like a hand sluice box will move overburden to gather material from gold bearing zones with shovels and other tools then bring targeted placer material back to sluice box positioned in shallow water with optimum angle and stream flowing through it to catch the gold and minerals in the riffles of the sluice box. Gold and minerals are captured by the sluice box and waste material and pollutants are discharged.

DEQ's authority to regulate mining arises from both the federal Clean Water Act (33 USC Section 1251 et. seq.) and Oregon Revised Statutes (ORS) Chapter 468B. DEQ is authorized to require a water quality permit with limitations for point sources (such as a suction dredges and sluice box) that discharge to waters of the state and that may cause water quality problems such as elevated turbidity. Best management practices and other conditions in this Permit protect, maintain and improve the quality of the waters of the state for public water supplies, for the propagation of wildlife, fish and aquatic life and for domestic, agricultural, industrial, municipal, recreational and other beneficial uses as authorized by ORS 468B.020 and consistent with the policies in ORS 468B.015.

Permit History

This is a permit renewal of the Permit was reissued in July 2010 with an expiration date of December 31, 2014. DEQ held a large group meeting in Medford in March 2013 and small group meetings of mining and environmental stakeholders in October and December 2013 and February 2014 prior to putting this draft Permit out for general public review and comment. In addition, DEQ met with Tribal representatives at a separate meeting in Roseburg in October 2013.

The meeting in March was an initial meeting to share concepts and begin thinking about topics, conditions, strategies associated with Permit renewal. Discussions in small group meetings served to capture thoughts on Permit conditions. DEQ sought feedback on challenges of following the Permit. DEQ sought input on clarity and understanding on types of operations covered and fuel handling. DEQ also discussed the need for an annual report containing Department of State Lands and DEQ information and a visible identification number on a suction dredge. DEQ sought input on how to establish which operations are "existing dischargers" to a waterbody listed as impaired on a 303(d) list.

Proposed Changes
Conditions relating to permit operations that were located in various parts of the2010 Permit are proposed to be placed in one place at the front of the Permit. Definitions have been changed for clarity. Best management practices on movement of habitat structure and petroleum have been revised and an effluent limit for narrative criteria related to petroleum has been added. Changes to Schedule C, Condition 7, clarify that non-motorized tools can be used to move habitat structure but key habitat elements such as large wood and boulders must be put back in place for restoration project progress and to prevent degradation of existing beneficial habitat and stream channel structure.

Best management practices associated with fuel handling and refueling suggest that there are various methods to achieve compliance to prevent spills and an oily petroleum sheen in water. Schedule A, Condition 5 has been added to ensure a visible oily sheen will not be created by equipment operation and petroleum handling. DEQ recognizes that refueling may take place over water. Schedule C, Condition 10 revisions provide practical and common practices for equipment operation and storage to prevent, contain and manage oily sheens and spills of petroleum.

Equipment covered by this Permit can be mobile, operating in areas where gold may be present. The assigned permit number displayed on the dredge will assist in identifying miners are registered for coverage under the Permit.

Water that is listed as water quality limited for turbidity, sediments and toxics requires a more site specific mixing zone, assigned permit conditions and monitoring to regulate pollutants that can cause or contribute to an increase above a water quality standard. This Permit is not for water quality limited water listed in categories 4 and 5 on DEQ’s 303(d) list for turbidity, sediments and toxics except when a total maximum daily load has been established for that water that provides for placer mining under a Permit. A site- specific individual permit may be available for recovery of precious metals and minerals in water quality limited water

Land Use Issues
When the Permit was reissued in 2005, DEQ and the EQC determined that registration under the Permit is not a program affecting land use and that determination is carried forward in this proposed Permit.

Other Federal and State Laws

There are other federal laws like the Federal Endangered Species Act and state laws that apply to placer mining activities. U.S. Army Corps of Engineers under Section 404 of the Federal Clean Water Act regulates the discharge of dredged material and Oregon Department of State Lands (DSL) under Oregon Revised Statute (ORS) 196.795 regulates the fill or removal of materials from waters of the state.

A Removal Fill permit is required by DSL for any placer mining operation that alters, removes or fills more than fifty (50) cubic yards of material per year in any waterway and in some cases a permit or general authorization may be required for operations involving less than fifty cubic yard per year. DEQ's water quality regulations and permit requirements apply in addition to any other requirements imposed by the U.S. Army Corps of Engineers or Oregon DSL. A permit from DSL does not eliminate the requirement for a DEQ permit.

Use of a six-inch suction dredge in or outside essential salmon habitat requires an individual removal-fill permit from DSL.

Out-of-stream mining with no wastewater discharge to surface waters requires a DEQ 600 WPCF General permit if there are disposal systems that may discharge to groundwater. Off-stream mining and ore processing with a wastewater discharge to surface waters of the state requires an individual NPDES permit. Suction dredges larger than those covered by this Permit also require an individual NPDES permit.

Protecting Quality of Receiving Waters

This is a statewide general permit. General permit conditions are established to be protective of water quality standards statewide so that DEQ can administer permit coverage efficiently.

Placer mining is focused in areas where gold or other precious metals may be present. In western Oregon, suction dredging and non-motorized mining typically occur in Applegate, Chetco, Illinois, Sixes, Rogue, Umpqua and Upper Willamette and Santiam (Quartzville creek) river basins. In eastern Oregon, suction dredging activity is prevalent in the Burnt and Powder river basins, and John Day river basin.

The proposed Permit ensures that placer mining activities do not cause or contribute to violations of water quality standards. The Environmental Quality Commission adopts water quality standards to protect beneficial uses in waters of the state. Some of these standards are numeric and some are narrative. Beneficial uses protected by water quality standards are:

Public Domestic Water Supply	Salmonid Fish Rearing	Boating
Industrial Water Supply	Salmonid Fish Spawning	Water Contact Recreation
Irrigation	Resident Fish and Aquatic life	Aesthetic Quality
Livestock Water	Wildlife and Hunting	Hydro Power
Anadromous Fish Passage	Fishing	Commercial Navigation and Transportation

To the extent data is available, DEQ regularly assesses whether water bodies are meeting the water quality standards applicable to each water body. DEQ lists water bodies not meeting applicable standards as being impaired, on the "303(d) list." As data and resources allow DEQ must determine whether a TMDL is required, and, if so, develop one.

DEQ's current 303(d) list of water quality limited waters (approved by EPA in 2010) can be found on DEQ's web site http://www.deq.state.or.us/WQ/assessment/assessment.htm. DEQ's 2012 assessment of water quality limited water is under development. This Permit does not apply to discharges to water bodies that are water quality limited for sediment, turbidity or toxics.

This Permit regulates water quality in federal wilderness areas established prior to 1972 (OAR 340-013-0020(1)(A)). These wilderness areas are Diamond Peak, Kalmiopsis, Eagle Cap, Gearhart Mountain, Mount Hood, Mount Jefferson, Mount Washington, Mountain Lakes, Oregon Islands, Strawberry Mountain, Three Arch Rocks and Three Sisters wilderness areas.

This Permit does not authorize suction dredge mining in State Scenic Water Ways (ORS 390.805 to 390.925) or in waters that constitute boundaries to tribal lands.

Oregon Plan for Salmon and Watersheds for the Protection of Salmon recognizes the need to coordinate state water pollution programs to make sure they are consistent with watershed restoration efforts (Oregon Department of Environmental Quality, October 2000). To protect salmon, this statewide Permit does not allow discharges from suction dredges greater than 16 horsepower or an intake nozzle more than 4 inches in inside diameter in essential salmon habitat (ORS 196.795 to 196.990). Suction dredges greater than 16 horsepower or suction hose greater than an inside diameter of four inches may operate outside of essential salmon habitat.

Practices associated with operation of suction dredges and in-water non-motorized mining can impact beneficial habitat and stream channel structure that are interrelated with water quality parameters. Best management practices associated with operation of suction dredge and in-water non-motorized mining are proposed to protect stream function associated with water quality.

Antidegradation Analysis

Since the current Permit was issued, there have been a significant number of new registrations. When gold prices increased, applications increased starting in 2009.

The number of permits issued each year is shown below.

Year	Number of Registrants	Percent increase since 2009
2009	934	NA
2010	1,205	29%
2011	1,385	48%
2012	1,941	108%
2013	1,831	96%

Over the years, DEQ has worked with state and federal agencies to identify suction dredging operations throughout Oregon. Estimates of placer mining operations are based on claims, Department of State Lands records and registration to this general Permit. In 1996, an estimated 1600 suction dredges were covered under the Permit. In 2010, DEQ collected information on primary mining locations. Mining takes place in eastern and southwestern Oregon. Approximately 70% of the registrations to this Permit are in southwestern Oregon, which is similar to previous years.

By reviewing information from registrations to DEQ's 2010 Permit, DEQ has a record of the number and residence of registrants, primary mining locations and size of dredge but did not request monitoring logs be submitted each year. To date, the highest number of registrations for suction dredges with a nozzle size of 4 inches or less was 1,941, recorded in 2012. The proposed Permit requires annual reporting to document when and where suction dredge mining occurred for the previous year.

This Permit as proposed will require annual reporting to confirm number of operations, dates and location of operations. Annual reporting can be used to look at number of registrants versus reports received to determine that mining did occur but more importantly annual reports will be used to quantify total number of suction dredge operations in a waterbody.

This is a renewal of a general permit for activities that are conducted statewide. Permit limits and best management practices were developed to be protective of water quality standards in waters of the state. The Permit as proposed does not result in the lowering of water quality in high quality water, or water quality limited water. There is no outstanding resource water in the state.

DEQ's antidegradation rules and policies are in place to protect existing water quality when existing water quality meets or exceeds standards and restore water quality limited water. Permit conditions ensure compliance with narrative and numeric criteria to be protective of water quality criteria for pollutants of concern and beneficial use of water. This Permit is not for water quality limited water categories 4 and 5 on DEQ's 303(d) list.

DEQ evaluated pollutants associated with suction dredging activities in a March 15, 1999 memo, addendum to the July 25, 1996 fact sheet, which is part of the record for renewal of this Permit. Turbidity and sediments, toxic pollutants, dissolved oxygen, temperature and pH were evaluated. Findings were that turbidity, sediments and toxic pollutants are pollutants of concern. Permit conditions were developed to address pollutants associated with the recovery of precious metals and minerals from stream deposits.

The 1999 memorandum stated that the condition for no visible turbidity beyond 300 feet minimized and localized turbidity from suction dredging. A prohibition for suction dredging in water quality limited water, listed for turbidity, protects water quality limited streams. A condition prohibiting suction dredging in streams listed as water quality limited for toxics prevented the release of toxics pollutants associated with sediments into the water column. To ensure dissolved oxygen is not a problem for vulnerable life stages of anadromous fish, a condition aligned suction dredging to Oregon Department of Fish and Wildlife's in stream work schedule. Suction dredging was found not to adversely affect stream temperature and included a

condition to prevent activities from creating obstructions that could cause ponding and a localized temperature increase. DEQ has not found any new studies that relate in-stream turbidity from suction dredging to an increase in temperature. The protection of the habitat structure in the proposed best management practices will protect the riparian areas that provide shade. Best management practices also provide protection from erosion that can contribute to stream channel profile changes that may increase temperature.

This Permit renewal keeps the above mentioned conditions that are protective of water quality for turbidity, sediments, toxic pollutants, dissolved oxygen and temperature and includes requirements to manage natural and restoration placement of habitat structure in areas where mining occurs. Protections to restore threatened and endangered fish and salmon runs in coastal streams through partnering with other natural resource agencies was also recognized.

In the addendum to the July 25, 1996 suction dredge mining Permit, DEQ noted the importance of work performed as part of Oregon's Salmon and Stream Restoration Plan (now titled The Oregon Plan for Salmon and Watersheds). At that time, DEQ stated Permit conditions for protections in coastal streams would be revisited. In this proposed Permit, best management practices for habitat structure has changed to include restoration of boulders and habitat structure to their original location, to prevent erosion from misplaced structures and continue to protect function and complexity of a stream.

For this Permit renewal, the size of equipment covered has not changed. Effluent limits for turbidity no greater than 10% above background have not changed. The size of the mixing zone for turbidity has not changed and nor has the prohibition on overlapping mixing zones or bank to bank (entire wet perimeter) turbidity changed. Narrative criteria for no visible oily sheen was added as an effluent limit. These best management practices are protective of water quality standards.

Operation of suction dredges in essential salmon habitat is restricted to smaller equipment: not to exceed 16 horsepower or an intake nozzle no greater than 4 inches inside diameter. Operation of a suction dredge not to exceed 30 horsepower or a suction hose with an inside diameter no greater than six inches in waters not designated as essential salmon habitat will require both a DEQ Permit and Department of State Lands authorization under a DSL individual permit. To date, Department of State Lands has not issued an individual permit for a 6 inch suction dredge. Discharges from suction dredges and in-water non-motorized mining equipment operated in accordance with the proposed Permit conditions will not result in a new or increased load of pollutants to waters of the state.

The in-water non-motorized mining processes are not expected to create pollutants that are different than those evaluated under suction dredging. The Permit requirements are the same for all dredging activities under this Permit with the exception of compliance with OAR 340-041-0350. OAR 340-041-0350 prohibits suction dredging in certain areas of the Clackamas River, McKenzie River, and North Santiam River. DEQ finds that keeping these same conditions in the Permit for in-water non-motorized mining equipment will ensure protection of water quality.

Suction dredging is prohibited during periods when native migratory fish are rearing and spawning through fry emergence, as identified by ODFW. Non-motorized mining equipment may not be used where fish eggs are present. This condition aligns with Department of State Lands requirement for non-motorized mining equipment.

This Permit renewal retains the antidegradation requirements from previous Permits necessary to protect water quality limited streams for turbidity, sediments and toxics.

A water quality limited water often will not have assimilative capacity for additional input of the pollutant causing the impairment. This Permit is not for Oregon streams that are water quality limited for sediments, turbidity, or toxics. DEQ will provide a list of water quality limited streams on the 303(d) list for those registering under the Permit and on DEQ's web site. A current list of water quality limited water is found in Oregon's 2010 integrated report-assessment database and 303(d) list located at this web address http://www.deq.state.or.us/wq/assessment/2010Report.htm. Oregon's 2010 Integrated Report – Assessment database and 303(d) list includes EPA's final comments.

Proposed Permit

COVER PAGE

The cover page describes the scope of permitted activities and type of operation covered by this Permit. Equipment covered under this is the same as the previous Permit and includes:

- In areas not designated as essential salmon habitat, suction dredges used for recovering precious metals or minerals from stream deposits, not to exceed 30 horsepower or a suction hose with an inside diameter no greater than six inches .
- In areas designated as essential salmon habitat, suction dredges used for recovering precious metals or minerals from stream deposits, not to exceed 16 horsepower or an intake nozzle no greater than 4 inches inside diameter.
- In-water non-motorized mining equipment used for recovering precious metals or minerals from stream deposits.

REGISTRATION REQUIREMENTS

Registration is required for Permit coverage of suction dredges. A registrant under the Permit can obtain coverage each year or under a five-year term of the Permit. This Permit will be effective January 1, 2015 and will expire January 1, 2020. For each registrant, the cover page of the Permit will indicate whether the Permit has been assigned on an annual basis or the full term of the Permit based on fee payment.

The Permit registration fees are determined by statute in ORS 468B.052, as follows:

- $25 annual fee for each year the person registers under the Permit, OR
- $100 for a five-year registration under the Permit.

In 2013, the Oregon legislature required each person who registers under the Permit to pay a nonrefundable surcharge payment of $150. As proposed, the effective date of this Permit is January 1, 2015; therefore a nonrefundable surcharge payment of $150 is required in 2015.

In-water non-motorized equipment will be covered under the Permit and the operator will be required to follow all the applicable conditions, including having a copy of the Permit, but a person operating non-motorized equipment will not have to register for Permit coverage or pay a fee. DEQ does not view panning as non-motorized equipment and DEQ does not believe that NPDES permit coverage is required for panning.

This Permit does not cover either highbanking equipment operations such as using a power sluicebox, or other motorized classifying equipment used for mining below ordinary high water level of state waters. If a person's proposed operation or type of equipment for placer mining does not conform to this Permit, then an individual NPDES permit may be required.

An individual permit is required to operate a suction dredge having a hose greater than 6 inches in diameter. A $300 individual NPDES permit is available for suction dredges having a hose no greater than 8 inches in diameter.

The cover page describes the format of the Permit. The Schedules contain the requirements, limitations, and conditions of the 700PM General Permit. Definitions and a summary of Permit application requirements to register under the Permit follow the cover page.

Definitions were changed for clarity and a definition of suction dredge was added. The definition of suction dredge includes gravity and suction dredges. Operators of gravity or siphon dredges are required to register for coverage under this Permit.

SCHEDULE A - WASTE DISCHARGE LIMITATIONS

Operations covered under this Permit may not cause or contribute to water quality standards violations. Water quality standards include beneficial uses of the water, numeric and narrative criteria to protect the uses and antidegradation measures including protection of water quality limited waters.

Water quality-based effluent limits and technology-based effluent limits are the primary means used to meet water quality standards. Technology-based effluent limits require a minimum level of treatment of pollutants based on available treatment technologies.

Technology-based effluent limits have been established by EPA regulations for only some types of discharges. These EPA established technology-based effluent limits are also known as effluent limit guidelines. When effluent limit guidelines have not been established, permits must include technology-based effluent limits that are based on the best professional judgment of the permit writer. There are technology-based requirements developed by EPA in 40 CFR § 440.140 to 440.148, but these technology-based effluent limits do not apply to placer mining activities processing less than 5,000 cubic yards per year. For point sources not covered by effluent limit guidelines, permit writers develop technology-based effluent limits using best professional judgment.

Permits must contain technology-based effluent limits and any additional limits needed to ensure the permitted activity does not cause or contribute to a violation of water quality standards. This

Permit includes best management practices used in previous Permits and commonly used in other state permits and regulations for placer mining, including EPA's 2013 NPDES general permit in Idaho and Montana's NPDES general permits. Other state's permits and regulations give an indication of what is reasonably expected as best management practices. Plans of operation for suction dredge mining, which are a part of federal land use authorizations, include similar terms and conditions to mitigate impacts on water quality, aquatic habitat and species. In this Permit best management practices are technology-based effluent limits.

Suction dredge operations create suspended particles that can be measured as turbidity. Literature on dredging recognizes that gravel and course sand will remain as "loose tailings" and the finer sediment will be carried further downstream in suspension. (Harvey 1998) Turbidity can adversely impact water quality and can have indirect effects on fish and other aquatic life. Turbidity is a measure of light transmission. EPA analytical methods for measurement of turbidity are found in 40 CFR part 136. Turbidity is seen as muddy or cloudy water. Visual monitoring is required to determine compliance with turbidity limits.

This Permit has effluent limits for turbidity and narrative criteria. Under narrative criteria in OAR 340-041-0071(1) conditions need to be provided to control activities to protect water quality. This Permit protects and maintains beneficial uses with best management practices.

Sedimentation is a significant water quality parameter needing to be addressed for salmon recovery. (Oregon Department of Environmental Quality Oct. 2000) Sediments are transported downstream when bed material or bank material is disturbed by human or natural processes.

Suction dredges that do not exceed 16 horsepower or an intake nozzle no greater than 4 inches inside diameter can operate within essential salmon habitat. This restriction will minimize water quality impacts in environmentally sensitive areas. Less material is mobilized by a suction dredge intake nozzle no greater than 4 inches inside diameter so that less turbidity will be generated from movement of bed material.

DEQ is restricting the size of the dredge inside of essential salmon habitat because DEQ's 2004 field study on the four-inch dredge showed that it is more likely to meet the water quality effluent limit for turbidity. Turbidity is limited to a 300 feet mixing zone. An operator is required to take corrective action when for example disturbance of silt and clay results in turbidity extending beyond 300 feet. Nozzle size limitations for a suction dredge operation in essential salmon habitat also aligns with Department of State Land's requirement for a general authorization (permit).

The proposed Permit includes the same permit limitations in Schedule A and C for all equipment, whether motorized or non-motorized as in the current Permit. Monitoring requirements apply only to suction dredges.

Effluent Limits

This proposed Permit has conditions to minimize turbidity, suspended sediment that is seen a turbidity and toxics. Turbidity is muddiness or cloudiness in water. Suspended sediment can

cause a turbid plume in the water. Disturbance of stream deposits in streams listed as water quality impaired for toxics can lead to the release of toxic pollutants in the water column. Use of petroleum products can cause an oily sheen.

OAR 340-041-0036 Turbidity Criteria

The water quality criterion for turbidity under OAR 340-041-0036 allows no more than a ten percent cumulative increase in natural stream turbidities, as measured relative to a control point immediately upstream of the turbidity causing activity.

The turbidity criterion (OAR 340-041-0036(2)) allows the turbidity to be exceeded for limited duration activities necessary to address an emergency or to accommodate essential dredging, construction or *other legitimate activities* provided all practicable turbidity control techniques have been applied and one of the following has been granted: a permit or certification authorized under terms of section 401 or 404 or OAR 141-085-0100 (Removal and Fill Permits, Department of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.

The Army Corps of Engineers has not issued a National General Permit for small scale suction dredge mining under 404. DEQ cannot issue a 401 certification without a 404 permit; therefore OAR 340-041-0036 (2) is not applicable.

Mixing Zone OAR 340-041(2)(c)

DEQ has the authority under OAR 340-041-0053 to suspend water quality standards in a specified limited area called the regulatory mixing zone.

A regulatory mixing zone is a portion of a water body designated in an NPDES permit where water quality standards may be suspended, as long as the proposed mixing zone under OAR 340-041(2)(c) is:

- as small as feasible;
- avoid overlap with any other mixing zones and be less than the total stream width minimizes the adverse affects on the indigenous biological community;
- allows the passage of fish and other aquatic organisms; and
- does not threaten public health and minimizes the adverse effect on other designated beneficial uses outside the mixing zone.

DEQ believes that 300 feet is the distance at which there is no reasonable potential to violate the water quality criterion for turbidity. After the initial fallout, lingering suspended material will remain. The vast majority of sediment discharge will fall out of the water column and be diluted within distances much less than 300 feet. Toxics return to background levels within 300 feet. (Royer, et al., April 1999)

For puposes of comparison, Table 1 summarizes information on regulation of turbidity plumes from placer mining.

Table 1		
Suction dredge size	**Turbidity distance**	**Source of Information**
Less than or equal to 4 inch nozzle, 12 HP, no throat more than 48 inches.	40 feet	Utah Division of Water Rights Recreational Dredging Application 2013-2014 Conditions of Approval located at http://www.waterrights.utah.gov/streamdb/rds/
Nozzle diameter of 5 inch or less and HP 15 or less	150	Record of Decision ,Small-Scale Suction Dredging in Lolo Creek and Moose Creek ,Environmental Impact Statement ,Lochsa and North Fork Ranger Districts, USDA Forest Service, Clearwater National Forest. Clearwater and Idaho Counties, Idaho http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5420675.pdf
Intake size less than or equal to six inches	160 to 260 feet	DEQ March 15, 1999 Memo Suction Dredge Mining Permit—Addendum to Fact Sheet dated July 25, 1996
Intake nozzle up to 5 inch diameter	200 feet	Biological Evaluation for Small Placer Miners in Idaho National Pollutant Discharge Elimination System (NPDES) General Permit, August 2012 Prepared by:US EPA Region 10 Office of Water and Watersheds Office of Environmental Assessment
Intake nozzle up 5 inch diameter and multiple dredges equivalent to a 5 inch diameter intake nozzle	500 feet	EPA National Discharge Elimination System Permit in Idaho http://yosemite.epa.gov/r10/water.nsf/npdes+permits/idsuction-gp
Intake nozzle up to 10 inch diameter	500 feet	Alaska Pollutant Discharge Elimination System Permits GP #AKG375000 and GP # AKG371000 http://www.dec.alaska.gov/Water/WPSdocs/AKG375000_docs.pdf http://www.dec.alaska.gov/Water/WPSdocs/AKG371000_docs.pdf

The mixing zone is being minimized because the limitation on hours of operation, along with the 300 foot length, no overlapping with other plumes and a turbidity plume cannot cover an entire stream width. Drinking water will be protected by not allowing a visible turbid plume to impact a drinking water intake.

Compliance with effluent limits for turbidly in Schedule A, Conditions 1 and 2 is required at all times. Schedule A, Condition 3 limits operation to daylight hours so that a visible plume can be seen. If turbidity is visible over 300 feet downstream or downcurrent of suction dredging and non-motorized in stream mining, then turbidity exceeds the allowable in-stream water quality criterion and the Permit requires the operator to take immediate corrective measures. Corrective measures can include the options of moving to a location where the dredging of concentrated silt and clay are avoided, moving to increase the distance between dredging operations, using reasonable care to avoid dredging silt and clay materials, or reducing the volume of effluent discharged by limiting the amount of materials dredged or speed of the suction dredge.

In this proposed Permit, a mixing zone is not assigned in water quality limited water for turbidity, sediments or toxics.(Oregon Department of Environmental Quality, 2012) A mixing zone in water quality limited water is more appropriately in an individual permit where a site specific evaluation and monitoring can be performed.

OAR 340-013-0020 Environmental Standards for Wilderness Areas
Pursuant to OAR 340-013-0020(1)(b)(A) and OAR 340-013-0035, no measurable turbidity is allowed in wilderness areas established prior to 1972. The term 'no measurable increase' is not defined. For the purpose of implementing this standard in Schedule A, Condition 4, a measureable increase is any visible turbidity. Visible turbidity is defined in the Permit as turbidity that is distinctly visible when compared to background turbidity.

OAR 340-041-0007(13) oily sheen
The necessity of using, handling and storing petroleum products near water for operation of a suction dredge creates the potential for creating an oily sheen in water. An effluent limit for no visible oily sheen is included in Schedule A, Condition 5 Consistent with statewide narrative criteria in OAR 340-041-0007(13), Schedule C of the proposed Permit prohibits the creation of an oily sheen.

SCHEDULE B - MONITORING REQUIREMENTS

Frequency of monitoring, information collected with the monitoring and record-keeping required for suction dredges are specified in Schedule B. The proposed Permit requires visual monitoring once per day during daylight hours to determine compliance with the turbidity limits. Monitoring and record-keeping are not required for the non-motorized in-stream equipment and devices.

The following monitoring and record retention requirements from General Conditions are also in Schedule B.

- Section C6. regarding retention of records;
- Section C7. records contents;
- Section D3. other noncompliance;
- Section D4. duty to provide information

Persons registered are required to submit an annual report to DEQ. This submittal is required even if suction dredging did not occur. DEQ can use annual reports to determine location of waterbodies where suction dredging occurs, number of suction dredges operating in a waterbody and compliance-related issues. Information from annual reports are necessary to renew permits and document effectiveness of the Permit or when necessary support development of total maximum daily loads or other load analysis.

SCHEDULE C - BEST MANAGEMENT PRACTICES

Best Management Practices

Oregon's water quality standards are based on the protection of designated and existing uses, including aquatic organisms and public health, and the prevention of degradation of water quality. Best management practices together with effluent limits protect beneficial uses and water quality in the receiving waters of the state.

Placer mining activities have been studied for their turbidity impacts, the movement of bed material that can contribute to erosion and create deposition, as well as, more recently, toxic pollutants. The Institute for Natural Resources Policy Paper 2003-01, prepared by Oregon State University and entitled "Recreational Placer Mining in the Oregon Scenic Waterway System," states " [T]he result of not adopting all best management practices,… even by only a handful of recreational miners, can cause serious long-term damage to the ecological health of a particular stretch of river." (Bernell 2003)

This Permit contains best management practices to minimize the impacts recovering precious metals and minerals from stream deposits has on beneficial uses and water quality.

In the process of dredging, sediments are taken up and re-deposited in water. The re-deposited sediments can have effect on fish spawning and benthic habitat. OAR 340-041-0007(12) does not allow the formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits that are harmful to fish or other aquatic life, public health, recreation or industry. This proposed Permit retains best management practices that prevent creation of excess suspended material and sedimentation that can threaten the survival of fish and other aquatic species.

<u>Schedule C, Condition 1 (no overlapping plumes), Schedule C, Condition No. 2 & 3 (in water work and the presence of fish eggs) Schedule C, Condition 4 (fish passage)</u>
This Permit retains the condition to provide a continuous zone of passage that meets mixing zone rule requirements for free-swimming and drifting organisms. Visible turbidity must not cover the entire wet perimeter (wetted width) as required in Schedule A, Condition 1. Schedule C, Condition 1 of the proposed Permit requires that there be no overlap in turbidity plumes where more than one piece of equipment is operating in the same waters. Unobstructed fish passage is required in Schedule C, Condition.4.

Re-depostion of suspended sediments downstream of dredging that covers fish eggs reduces the availability of oxygen. Excavation and deposition that would disturb fish eggs and their spawning grounds are protected by specifying in Schedule C, Conditions 2 and 3, that suction dredge operations need to observe in-water work periods. The in-water work periods are based on the protection of fish and fish spawning and are developed by the Oregon Department of Fish & Wildlife and gives primary consideration to anadromous and other game fish, and threatened, endangered or sensitive species. In-water non-motorized mining equipment may not be used where fish eggs are present.

<u>Schedule C, Conditions 5 (no mining of stream banks), 6 (undercutting), 7 and 8 (moving habitat), 9 (bridge footings, dams), 12 (10 feet into wet perimeter), 13 (motorized equipment)</u>
This proposed Permit limits areas where suction dredging and non-motorized mining can occur to prevent excess sedimentation and turbidity and protect beneficial uses, such as aquatic life. In Schedule C, Condition 5, dredging or mining from stream banks is not allowed. Undercutting or eroding stream banks and removal or disturbance of boulders, rooted vegetation or embedded woody plants from the stream bank is prohibited in Schedule C, Condition 6.

The requirement in Schedule C, Conditions 7 and 8, for movement of in-stream habitat structure has changed from the current Permit. The proposed Permit requires boulders, woody debris, and other key pieces of habitat structure that are moved in the course of mining to be returned to their original locations once a mining activity is complete. This condition also provides clarity on the type of equipment that may be used when moving in-stream habitat structure. Only non-motorized or hand equipment may be used.

Studies have shown that placer mining can have a negative impact on habitat structure that is necessary for fish and benthic communities (Bernell 2003), (R2 Resource Consultants 2006), (Harvey1986). Changes in habitat can affect the ability of a watershed to meet water quality standards (Oregon Department of Environmental Quality 2000). More water quality limited streams have been added to DEQ's 303(d) list for impairment of biological conditions. Waters of the state, including habitats, must be of sufficient quality to support aquatic species without detrimental changes in resident biological communities.

Coarse woody debris and large boulders are beneficial to a stream and its biological community. Course woody debris can stabilize banks, provide a place for gravel build up and deep pools that add to a stream's complexity and function. Aquatic habitat restoration projects conducted around the state involve placement of large wood and boulders in stream and riparian areas to promote fish habitat.

In Schedule C, Conditions 7 and 8, boulders and habitat structure may be moved around in the stream but not removed. This Permit condition with its requirement to return habitat structure to its original location will limit adverse effects on restoration and prevent further degradation of natural complexity and function of streams.

Erosion increases the sediment load to a stream and increases turbidity. In Schedule C, Condition 12, mining into non-vegetated gravel bars up to 10 feet outside the wet perimeter can occur only in non-essential salmon habitat. Under Schedule C, Condition 13, stream bank erosion is minimized by prohibiting motorized wheeled or tracked equipment from being used in-water. Access points for a suction dredges are kept to established areas.

These best management practices minimize the impact of erosion and protects the habitat for beneficial uses by keeping dredging excavating activities in the stream and along the wet perimeter. Stream bank erosion can accelerate production of stream fines. Movement of a boulder may redirect flow in a stream to cause channeling or bank erosion. Finer sediments cause sediment and turbidity problems in the receiving stream. Dredging activities are regulated within the wet perimeter to prevent erosion, release of finer material, loss of riparian shade, and change in stream morphology.

In Schedule C, Condition 9, the requirement to manage operations to avoid affecting infrastructure, such as bridge footings and dams prevents potential impacts from erosion and may satisfy requirements for a 401 certification if one is necessary.

<u>Schedule A, Condition 1 (meet water quality standards), Schedule A, Condition 5 (no oily sheen), Schedule C, Conditions 10 (oil), 11 (drinking water sources), 15(chemical agents)</u>

Pollutants include toxics. Schedule A, Condition 1 requires that no pollutants or wastes be discharged and no activities be conducted that will violate water quality standards. While compliance with the technology-based effluent limits in the Permit will generally meet the applicable water quality standards, the Permit registrant remains responsible for ensuring discharges do not violate water quality standards.

DEQ added clarity and new best management practices in Schedule C, Condition 10 for proper handling, storage and refueling or petroleum products. OAR 340-041-0007(13) states that objectionable discoloration, scum, oily sheens, or floating solids or coating of aquatic life with oil films may not be allowed. Preventing contamination from petroleum products can be managed in various ways. The requirement for no visible oily sheen is in keeping with DEQ's water quality criterion and along with best management practices required in Schedule C, Condition 10 will protect water from leaks and spills of petroleum products resulting from operation or refueling of a suction dredge.

Schedule A, Condition 1 and Schedule C, Conditions 11 and 15 remain unchanged from the existing Permit. Schedule A, Condition 1 requires that no pollutants or wastes be discharged and no activities be conducted that will violate water quality standards. Schedule C, Condition 16 states that use of chemical agents such as mercury are prohibited. Prohibiting the use of chemical agents will prevent chemical waste from entering water and protect water quality.

Some streams contain sediments contaminated with toxic pollutants. Suction dredging in streams that are water quality limited for toxics could disturb stream deposits and lead to the release of toxic pollutants (Oregon Department of Environmental Quality 1999). Sediments contaminated with toxic pollutants are then transported downstream and deposited and can ultimately be ingested by benthic organisms and passed up the food chain (Oregon Department of Environmental Quality 2000). It is generally known that clay because of its properties adsorbs metals. Studies show higher concentrations of mercury are associated with silty and clay bed sediments (Hunerlach et.al 2004), (Fleck 2010). A mixing zone limitation of 300 feet serves to regulate disturbance of material like clay that may harbor contaminants and tends to stay in suspension. Monitoring and reporting on compliance with the mixing zone requirement are part of this Permit. This Permit continues to require in-stream turbidity to be minimized and localized to the general area of the in-stream mining activity. This Permit is not for water quality limited streams in categories 4 and 5 on DEQ's 303(d) list for toxics unless there is a total maximum daily load that expressly provides for mining under the Permit.

In 2011, DEQ's water quality criterion for mercury changed from being based on mercury present in a water column to methyl-mercury in fish tissue. Mercury is present in the environment from past mining practices, and other natural and man-made sources. This Permit will continue to protect water listed as impaired due to mercury in fish tissue. DEQ's 2012 proposed list of water quality limited water for methyl-mercury in fish tissue includes areas in southwestern Oregon where most suction dredge mining occurs.

Schedule C, Condition 11, states that the Permit registrant may not allow the visible plume discharged from the suction dredge operation to impact the intake of a drinking water source. This condition minimizes turbidity and contaminated sediment from being entrained in a

drinking water uptake. Tools to identify know drinking water intakes are provided on DEQ's Drinking Water Protection Program web page and Oregon Department of Water Resources web page.

Schedule A, Condition 14 (invasive species)
Schedule C, Condition No. 14 protects fish habitat. Best management practices for the prevention of invasive species remain in this Permit.

SCHEDULE D: NPDES GENERAL CONDITIONS – INDUSTRIAL FACILITIES

Schedule D includes conditions that describe operation and maintenance, monitoring and recordkeeping, and reporting requirements as they apply to suction dredge activity. The conditions in this section were taken from a more recent 2011 list of NPDES conditions that were reviewed by EPA, and are included in all industrial NPDES Permits issued in Oregon. DEQ has removed conditions from the standard General Condition that do not apply to suction dredging discharges. When requirements in Schedules A, B, and C contain requirements that are more explicit than the general conditions, the provisions in the Permit supersede the general conditions.

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Appendix 5A

Stream Temperature data

7-day running average of the maximum daily stream temperature

Sorted by Subwatershed

Appendix 5A

Stream Temperature data

7-day running average of the maximum daily stream temperature

Sorted by Subwatershed

NOTE: (*) Stream temperature data for hobo CLEARBRU on Clear Creek in 1999 is much colder than other years for that site. However, it is correct.

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Wallowa-Whitman National Forest						
Beaver Creek	170702020203	Beaver	Beaver.93M.1	1995	70	4788
Beaver Creek	170702020203	Beaver	Beaver.93M.1	1997	71	4788
Beaver Creek	170702020203	Beaver	Beaver.93M.1	2006	72.46	4788
Beaver Creek	170702020203	Beaver	Beaver.93M.1	2008	66.2	4788
Beaver Creek	170702020203	Beaver	Beaver.93M.2	1997	66.6	4948
Beaver Creek	170702020203	Beaver	Beaver.93M.2	2006	69.71	4948
Beaver Creek	170702020203	Clear	Clear.93M.1	1995	71	4767
Beaver Creek	170702020203	Clear	Clear.93M.1	1996	71.78	4767
Beaver Creek	170702020203	Clear	Clear.93M.1	2006	70.79	4767
Beaver Creek	170702020203	Clear	Clear.93M.1	2008	64	4767
Beaver Creek	170702020203	Olive	Olive.93L.1	1995	56.42	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	1996	57.1	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	2006	55.77	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	2008	56.3	5181
Beaver Creek	170702020203	Olive	Olive.93L.2	1996	55.9	5266
Beaver Creek	170702020203	Olive	Olive.93L.2	2006	53.09	5266
Beaver Creek	170702020203	Olive	Olive.93L.2	2008	55.7	5266
Beaver Creek	170702020203	South Fork Beaver	S_Fk_Beaver.93M.1	1995	73.5	4866
Beaver Creek	170702020203	South Fork Beaver	S_Fk_Beaver.93M.1	2006	78.91	4866

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Beaver Creek	170702020203	South Fork Beaver	S_Fk_Beaver.93M.1	2008	74.6	4866
Bull Run Creek	170702020202	Boundary	Boundary.93N.1	1995	59.87	4722
Bull Run Creek	170702020202	Boundary	Boundary.93N.1	1998	60.77	4722
Bull Run Creek	170702020202	Boundary	Boundary.93N.1	2002	64.59	4722
Bull Run Creek	170702020202	Boundary	Boundary.93N.1	2003	65.33	4722
Bull Run Creek	170702020202	Boundary	Boundary.93N.1	2005	62.85	4722
Bull Run Creek	170702020202	Boundary	Boundary.93N.2	1998	54.9	5520
Bull Run Creek	170702020202	Boundary	Boundary.93N.2	1999	53.26	5520
Bull Run Creek	170702020202	Boundary	Boundary.93N.2	2003	56.85	5520
Bull Run Creek	170702020202	Boundary	Boundary.93N.2	2005	54.5	5520
Bull Run Creek	170702020202	Bull Run	Bull_Run.93N.1	1995	69.9	4709
Bull Run Creek	170702020202	Bull Run	Bull_Run.93N.1	1996	70.6	4709
Bull Run Creek	170702020202	Bull Run	Bull_Run.93N.1	1997	70.9	4709
Bull Run Creek	170702020202	Bull Run	Bull_Run.93O.2	1996	68.2	5036
Bull Run Creek	170702020202	Bull Run	Bull_Run.93O.3	1997	68.04	5133
Bull Run Creek	170702020202	Bull Run	Bull_Run.93O.3	1998	70	5133
Bull Run Creek	170702020202	Bull Run	Bull_Run.93O.3	1999	67.12	5133
Bull Run Creek	170702020202	Bull Run	Bull_Run.93O.3	2003	70.26	5133

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Bull Run Creek	170702020202	Bull Run	Bull_Run.93O.3	2005	67.99	5133
Bull Run Creek	170702020202	Bull Run	Bull_Run.93O.4	1997	72.88	5297
Bull Run Creek	170702020202	Deep	Deep.93O.1	1995	63.3	4880
Bull Run Creek	170702020202	Deep	Deep.93O.1.5	1998	63.14	4941
Bull Run Creek	170702020202	Deep	Deep.93O.1.5	1999	62.07	4941
Bull Run Creek	170702020202	Deep	Deep.93O.1.5	2003	65.69	4941
Bull Run Creek	170702020202	Deep	Deep.93O.1.5	2005	63.54	4941
Bull Run Creek	170702020202	Deep	Deep.93O.2	1998	55.77	5129
Bull Run Creek	170702020202	Deep	Deep.93O.2	1999	54.58	5129
Bull Run Creek	170702020202	Deep	Deep.93O.2	2002	56.66	5129
Bull Run Creek	170702020202	Deep	Deep.93O.2	2003	57.55	5129
Bull Run Creek	170702020202	Deep	Deep.93O.2	2005	55.86	5129
Upper Granite Creek	170702020201	Boulder	Boulder.93C.1	1996	70.65	4671
Upper Granite Creek	170702020201	Boulder	Boulder.93C.2	1996	67.5	4700
Upper Granite Creek	170702020201	Boulder	Boulder.93C.2	1997	69.01	4700
Upper Granite Creek	170702020201	Boulder	Boulder.93C.3	1997	67.1	4731

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1996	56.9	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1997	59.26	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1998	61.22	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	2002	61.91	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	2005	61.13	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	1998	56.54	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2002	57.37	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2003	57.53	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2005	55.22	5094
Upper Granite Creek	170702020201	Granite	Granite.93C.1	1995	68.24	4590
Upper Granite Creek	170702020201	Granite	Granite.93C.1	1997	69.09	4590
Upper Granite Creek	170702020201	Granite	Granite.93C.2	1997	65.7	4655
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1996	61.7	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1997	62.2	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1998	65.5	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2002	63.8	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2003	63.97	4670

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2005	61.26	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.4	1997	57.85	5006
Upper Granite Creek	170702020201	Granite	Granite.93C.5	1998	57.09	5200
Upper Granite Creek	170702020201	Granite	Granite.93C.5	2005	54.39	5200
Umatilla National Forest						
Upper Granite Creek	170702020201	Granite	GRANITUP	2011	52	5160
Upper Granite Creek	170702020201	Granite	GRANITUP	2012	55	5160
Clear Creek	170702020204	Clear	CLEAR@FB	2005	74	4520
Clear Creek	170702020204	Clear	CLEAR@FB	2006	75	4520
Clear Creek	170702020204	Clear	CLEAR@FB	2007	75	4520
Clear Creek	170702020204	Clear	CLEAR@FB	2008	71	4520
Clear Creek	170702020204	Clear	CLEAR@FB	2009	73	4520
Clear Creek	170702020204	Clear	CLEAR@FB	2010	71	4520
Clear Creek	170702020204	Clear	CLEAR@FB	2011	68	4520
Clear Creek	170702020204	Clear	CLEAR@FB	2012	72	4520
Clear Creek	170702020204	Clear	CLEARBRU	1996	64	5050
Clear Creek	170702020204	Clear	CLEARBRU	1997	62	5050
Clear Creek	170702020204	Clear	CLEARBRU	1998	65	5050
Clear Creek	170702020204	Clear	CLEARBRU	1999	56*	5050
Clear Creek	170702020204	Clear	CLEARBRU	2000	66	5050
Clear Creek	170702020204	Clear	CLEARBRU	2001	66	5050
Clear Creek	170702020204	Clear	CLEARBRU	2002	66	5050
Clear Creek	170702020204	Clear	CLEARBRU	2003	67	5050
Clear Creek	170702020204	Clear	CLEARBRU	2004	65	5050
Clear Creek	170702020204	Clear	CLEARBRU	2005	66	5050
Clear Creek	170702020204	Clear	CLEARBRU	2006	68	5050

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Clear Creek	170702020204	Lightning	LIGHTACC	2000	64	5240
Clear Creek	170702020204	Lightning	LIGHTACC	2001	65	5240
Clear Creek	170702020204	Lightning	LIGHTACC	2002	65	5240
Clear Creek	170702020204	Lightning	LIGHTACC	2003	66	5240
Clear Creek	170702020204	Lightning	LIGHTACC	2004	63	5240
Clear Creek	170702020204	Lightning	LIGHTACC	2005	63	5240
Clear Creek	170702020204	Lightning	LIGHTACC	2006	63	5240
Clear Creek	170702020204	Lightning	LIGHTAPL	1997	56	5520
Clear Creek	170702020204	Lightning	LIGHTAPL	1998	57	5520
Clear Creek	170702020204	Lightning	LIGHTAPL	2000	56	5520
Clear Creek	170702020204	Lightning	LIGHTAPL	2001	59	5520
Clear Creek	170702020204	Lightning	LIGHTAPL	2002	59	5520
Clear Creek	170702020204	Lightning	LIGHTAPL	2003	60	5520
Clear Creek	170702020204	Lightning	LIGHTAPL	2011	56	5520
Clear Creek	170702020204	Lightning	LIGHTAPL	2012	56	5520
Clear Creek	170702020204	Ruby	RUBY@MTH	2011	63	5080
Clear Creek	17070202020	Ruby	RUBY@MTH	2012	66	5080

Stream Turbidity data

Sorted by Subwatershed

Note: Two water quality samples taken each time and both results are listed.

SWS Name	Creek	GPS pt	Latitude	Longitude	Elevation (ft)	Date	Time	Turbidity (NTU)	Location	Plan in area
Beaver Creek SWS										
	Beaver	Be1	44.77993	118.4559	4753	7/16/2014	16:23	0.52, 0.46	upstream of confluence with Clear Creek	None
	Olive	Ol1	44.72717	118.4696	5364	7/16/2014	17:08	0.91, 0.54	upstream of Quartz Gulch and McWillis Gulch	Upstream of Olive Tone
	Olive	Ol2	44.73284	118.468	5271	7/16/2014	17:28	0.77, 0.51	downstream of McWillis Gulch	downstream of Olive Tone and Belvadear
Bull Run Creek SWS										
	Boundary	Bo1	44.7874	118.3758	4729	7/16/2014	15:12	1.13, 1.08	Upstream of confluence with Bull Run Creek.	Downstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, and 4)
	Bull Run	BR 1	44.76865	118.3358	5051	7/16/2014	11:41	0.95, 1.28	FS road 7375 culvert area. Downstream of area disturbed for 2013 culvert replacement	Upstream of Blue Sky Bull Run, Bull Run sites 1, 2
	Bull Run	BR 2	44.76793	118.3355	5023	7/16/2014	12:09	1.02, 1.03	Background value . FS road 7375 culvert area. Upstream of area disturbed for 2013 culvert replacement.	Upstream Blue Sky Bull Run, Bull Run sites 1, 2
	Bull Run	BR3	44.77991	118.3473	4865	7/16/2014	14:43	1.37, 0.92	Background value. Upstream of its confluence with Deep Creek.	upstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, 4)

SWS Name	Creek	GPS pt	Latitude	Longitude	Elevation (ft)	Date	Time	Turbidity (NTU)	Location	Plan in area
	Bull Run	BR3	44.77991	118.3473	4865	8/6/2014	13:55	2, 2.16	Upstream of its confluence with Deep Creek but downstream of the area disturbed for the August 2014 culvert replacement.	upstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, 4)
	Bull Run	BR4	44.78727	118.3759	4712	7/16/2014	15:24	1.63, 1.53	Upstream of confluence with Boundary Creek	Downstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, and 4)
	Deep	De1	44.78074	118.3455	4903	7/16/2014	13:49	1.36, 1.9	Background value. Upstream of area being disturbed for 2014 culvert replacement and channel realignment.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
	Deep	De2	44.78009	118.3473	4897	7/16/2014	14:26	6.32, 6.41	Downstream of area being disturbed for 2014 ongoing culvert replacement and channel realignment. Lower fish net had been clean about 20 minutes prior to measurement and sediment released.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
	Deep	De2	44.78009	118.3473	4897	8/8/2014	11:00	sample needs to be diluted. Values > 800 NTUs and exceed instrument	Reading taken just after water turned into new channel. Culvert had been replaced with a concrete bridge.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
	Deep	De2	44.78009	118.3473	4897	8/8/2014	15:00	40, 37.7	Reading taken 4 hours after water turned into new channel.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.

SWS Name	Creek	GPS pt	Latitude	Longitude	Elevation (ft)	Date	Time	Turbidity (NTU)	Location	Plan in area
	Deep	De2	44.78009	118.3473	4897	8/14/2014	13:33	1.09, 0.56	Same spot	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
Clear Creek SWS										
	Clear	Cl1	44.77.979	118.4562	4750	7/16/2014	16:37	0.66, 0.54	upstream of confluence with Beaver Creek	downstream of Grubsteak
Lower Granite SWS										
	Granite	Gr1	44.809	118.4237	4585*	7/16/2014	15:51	2.13, 1.84	Downstream of confluence with Bull Run Creek	At Old Eric 1, 2
	Granite	Gr2	44.80751	118.4306	4614*	7/16/2014	16:05	1.72, 1.37	Downstream of confluence with Bull Run Creek	Across from Blue Smoke and Rosebud. NOTE: Gr1 is upstream of Gr2 despite what elevation says. Elevation taken from road not at creek.
Upper Granite SWS										
	Granite	Gr3	44.84933	118.4003	5125	7/21/2014	10:10	0.53, 0.56	Upstream of confluence with Bull Run Creek.	downstream of Eddy Shipman by China Creek
	Granite	Gr4	44.85443	11839158	5226	7/21/2014	10:40	0.46, 0.59	Upstream of confluence with Bull Run Creek.	Eddy Shipman (west side)

Appendix 5B

Stream Temperature data

7-day running average of the maximum daily stream temperature

Sorted by Creek

Appendix 5B

Stream Temperature data

7-day running average of the maximum daily stream temperature

Sorted by Creek

NOTE: (*) Stream temperature data for hobo CLEARBRU on Clear Creek in 1999 is much colder than other years for that site. However, it is correct.

Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)	2010 NHD HUC 12 name	2010 NHD HUC 12
Beaver	Beaver.93M.1	1995	70	4788	Beaver Creek	170702020203
Beaver	Beaver.93M.1	1997	71	4788	Beaver Creek	170702020203
Beaver	Beaver.93M.1	2006	72.46	4788	Beaver Creek	170702020203
Beaver	Beaver.93M.1	2008	66.2	4788	Beaver Creek	170702020203
Beaver	Beaver.93M.2	1997	66.6	4948	Beaver Creek	170702020203
Beaver	Beaver.93M.2	2006	69.71	4948	Beaver Creek	170702020203
Boulder	Boulder.93C.1	1996	70.65	4671	Upper Granite Creek	170702020201
Boulder	Boulder.93C.3	1997	67.1	4731	Upper Granite Creek	170702020201
Boulder	Boulder.93C.2	1996	67.5	4700	Upper Granite Creek	170702020201
Boulder	Boulder.93C.2	1997	69.01	4700	Upper Granite Creek	170702020201
Boulder	Boulder.93C.4	1996	56.9	4769	Upper Granite Creek	170702020201
Boulder	Boulder.93C.4	1997	59.26	4769	Upper Granite Creek	170702020201
Boulder	Boulder.93C.4	1998	61.22	4769	Upper Granite Creek	170702020201
Boulder	Boulder.93C.4	2002	61.91	4769	Upper Granite Creek	170702020201
Boulder	Boulder.93C.4	2005	61.13	4769	Upper Granite Creek	170702020201
Boulder	Boulder.93C.5	1998	56.54	5094	Upper Granite Creek	170702020201

Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)	2010 NHD HUC 12 name	2010 NHD HUC 12
Boulder	Boulder.93C.5	2002	57.37	5094	Upper Granite Creek	170702020201
Boulder	Boulder.93C.5	2003	57.53	5094	Upper Granite Creek	170702020201
Boulder	Boulder.93C.5	2005	55.22	5094	Upper Granite Creek	170702020201
Boundary	Boundary.93N.1	1995	59.87	4722	Bull Run Creek	170702020202
Boundary	Boundary.93N.1	1998	60.77	4722	Bull Run Creek	170702020202
Boundary	Boundary.93N.1	2002	64.59	4722	Bull Run Creek	170702020202
Boundary	Boundary.93N.1	2003	65.33	4722	Bull Run Creek	170702020202
Boundary	Boundary.93N.1	2005	62.85	4722	Bull Run Creek	170702020202
Boundary	Boundary.93N.2	1998	54.9	5520	Bull Run Creek	170702020202
Boundary	Boundary.93N.2	1999	53.26	5520	Bull Run Creek	170702020202
Boundary	Boundary.93N.2	2003	56.85	5520	Bull Run Creek	170702020202
Boundary	Boundary.93N.2	2005	54.5	5520	Bull Run Creek	170702020202
Bull Run	Bull_Run.93N.1	1995	69.9	4709	Bull Run Creek	170702020202
Bull Run	Bull_Run.93N.1	1996	70.6	4709	Bull Run Creek	170702020202
Bull Run	Bull_Run.93N.1	1997	70.9	4709	Bull Run Creek	170702020202
Bull Run	Bull_Run.93O.2	1996	68.2	5036	Bull Run Creek	170702020202
Bull Run	Bull_Run.93O.3	1997	68.04	5133	Bull Run Creek	170702020202
Bull Run	Bull_Run.93O.3	1998	70	5133	Bull Run Creek	170702020202
Bull Run	Bull_Run.93O.3	1999	67.12	5133	Bull Run Creek	170702020202
Bull Run	Bull_Run.93O.3	2003	70.26	5133	Bull Run Creek	170702020202
Bull Run	Bull_Run.93O.3	2005	67.99	5133	Bull Run Creek	170702020202
Bull Run	Bull_Run.93O.4	1997	72.88	5297	Bull Run Creek	170702020202
Clear	Clear.93M.1	1995	71	4767	Beaver Creek	170702020203
Clear	Clear.93M.1	1996	71.78	4767	Beaver Creek	170702020203
Clear	Clear.93M.1	2006	70.79	4767	Beaver Creek	170702020203
Clear	Clear.93M.1	2008	64	4767	Beaver Creek	170702020203
Clear	CLEAR@FB	2005	74	4520	Clear	170702020204
Clear	CLEAR@FB	2006	75	4520	Clear	170702020204

Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)	2010 NHD HUC 12 name	2010 NHD HUC 12
Clear	CLEAR@FB	2007	75	4520	Clear	170702020204
Clear	CLEAR@FB	2008	71	4520	Clear	170702020204
Clear	CLEAR@FB	2009	73	4520	Clear	170702020204
Clear	CLEAR@FB	2010	71	4520	Clear	170702020204
Clear	CLEAR@FB	2011	68	4520	Clear	170702020204
Clear	CLEAR@FB	2012	72	4520	Clear	170702020204
Clear	CLEARBRU	1996	64	5050	Clear	170702020204
Clear	CLEARBRU	1997	62	5050	Clear	170702020204
Clear	CLEARBRU	1998	65	5050	Clear	170702020204
Clear	CLEARBRU	1999	56*	5050	Clear	170702020204
Clear	CLEARBRU	2000	66	5050	Clear	170702020204
Clear	CLEARBRU	2001	66	5050	Clear	170702020204
Clear	CLEARBRU	2002	66	5050	Clear	170702020204
Clear	CLEARBRU	2003	67	5050	Clear	170702020204
Clear	CLEARBRU	2004	65	5050	Clear	170702020204
Clear	CLEARBRU	2005	66	5050	Clear	170702020204
Clear	CLEARBRU	2006	68	5050	Clear	170702020204
Deep	Deep.93O.1	1995	63.3	4880	Bull Run Creek	170702020202
Deep	Deep.93O.1.5	1998	63.14	4941	Bull Run Creek	170702020202
Deep	Deep.93O.1.5	1999	62.07	4941	Bull Run Creek	170702020202
Deep	Deep.93O.1.5	2003	65.69	4941	Bull Run Creek	170702020202
Deep	Deep.93O.1.5	2005	63.54	4941	Bull Run Creek	170702020202
Deep	Deep.93O.2	1998	55.77	5129	Bull Run Creek	170702020202
Deep	Deep.93O.2	1999	54.58	5129	Bull Run Creek	170702020202
Deep	Deep.93O.2	2002	56.66	5129	Bull Run Creek	170702020202
Deep	Deep.93O.2	2003	57.55	5129	Bull Run Creek	170702020202
Deep	Deep.93O.2	2005	55.86	5129	Bull Run Creek	170702020202
Granite	Granite.93C.1	1995	68.24	4590	Upper Granite Creek	170702020201
Granite	Granite.93C.1	1997	69.09	4590	Upper Granite Creek	170702020201
Granite	Granite.93C.2	1997	65.7	4655	Upper Granite Creek	170702020201

Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)	2010 NHD HUC 12 name	2010 NHD HUC 12
Granite	Granite.93C.3	1996	61.7	4670	Upper Granite Creek	170702020201
Granite	Granite.93C.3	1997	62.2	4670	Upper Granite Creek	170702020201
Granite	Granite.93C.3	1998	65.5	4670	Upper Granite Creek	170702020201
Granite	Granite.93C.3	2002	63.8	4670	Upper Granite Creek	170702020201
Granite	Granite.93C.3	2003	63.97	4670	Upper Granite Creek	170702020201
Granite	Granite.93C.3	2005	61.26	4670	Upper Granite Creek	170702020201
Granite	Granite.93C.4	1997	57.85	5006	Upper Granite Creek	170702020201
Granite	Granite.93C.5	1998	57.09	5200	Upper Granite Creek	170702020201
Granite	Granite.93C.5	2005	54.39	5200	Upper Granite Creek	170702020201
Granite	GRANITUP	2011	52	5160	Upper Granite Creek	170702020201
Granite	GRANITUP	2012	55	5160	Upper Granite Creek	170702020201
Lightning	LIGHTACC	2000	64	5240	Clear	170702020204
Lightning	LIGHTACC	2001	65	5240	Clear	170702020204
Lightning	LIGHTACC	2002	65	5240	Clear	170702020204
Lightning	LIGHTACC	2003	66	5240	Clear	170702020204
Lightning	LIGHTACC	2004	63	5240	Clear	170702020204
Lightning	LIGHTACC	2005	63	5240	Clear	170702020204
Lightning	LIGHTACC	2006	63	5240	Clear	170702020204
Lightning	LIGHTAPL	1997	56	5520	Clear	170702020204
Lightning	LIGHTAPL	1998	57	5520	Clear	170702020204
Lightning	LIGHTAPL	2000	56	5520	Clear	170702020204
Lightning	LIGHTAPL	2001	59	5520	Clear	170702020204
Lightning	LIGHTAPL	2002	59	5520	Clear	170702020204
Lightning	LIGHTAPL	2003	60	5520	Clear	170702020204

Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)	2010 NHD HUC 12 name	2010 NHD HUC 12
Olive	Olive.93L.1	1995	56.42	5181	Beaver Creek	170702020203
Olive	Olive.93L.1	1996	57.1	5181	Beaver Creek	170702020203
Olive	Olive.93L.1	2006	55.77	5181	Beaver Creek	170702020203
Olive	Olive.93L.1	2008	56.3	5181	Beaver Creek	170702020203
Olive	Olive.93L.2	1996	55.9	5266	Beaver Creek	170702020203
Olive	Olive.93L.2	2006	53.09	5266	Beaver Creek	170702020203
Olive	Olive.93L.2	2008	55.7	5266	Beaver Creek	170702020203
Ruby	RUBY@MTH	2011	63	5080	Clear	170702020204
Ruby	RUBY@MTH	2012	66	5080	Clear	17070202020
South Fork Beaver	S_Fk_Beaver.93M.1	1995	73.5	4866	Beaver Creek	170702020203
South Fork Beaver	S_Fk_Beaver.93M.1	2006	78.91	4866	Beaver Creek	170702020203
South Fork Beaver	S_Fk_Beaver.93M.1	2008	74.6	4866	Beaver Creek	170702020203

Stream Turbidty data

Sorted by Creek

Note: Two water quality samples taken each time and both results are listed.

Creek	SWS	GPS pt	Latitude	Longitude	Elevation (ft)	Date	Time	Turbidity (NTU)	Location	Plan in area
Beaver	Beaver	Be1	44.77993	118.4559	4753	7/16/2014	16:23	0.52, 0.46	upstream of confluence with Clear Creek	None
Boundary	Bull Run	Bo1	44.7874	118.3758	4729	7/16/2014	15:12	1.13, 1.08	Upstream of confluence with Bull Run Creek.	Downstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, and 4)
Bull Run	Bull Run	BR 1	44.76865	118.3358	5051	7/16/2014	11:41	0.95, 1.28	FS road 7375 culvert area. Downstream of area disturbed for 2013 culvert replacement	Upstream of Blue Sky Bull Run, Bull Run sites 1, 2
Bull Run	Bull Run	BR 2	44.76793	118.3355	5023	7/16/2014	12:09	1.02, 1.03	**Background value** . FS road 7375 culvert area. Upstream of area disturbed for 2013 culvert replacement.	Upstream Blue Sky Bull Run, Bull Run sites 1, 2
Bull Run	Bull Run	BR3	44.77991	118.3473	4865	7/16/2014	14:43	1.37, 0.92	**Background value.** Upstream of its confluence with Deep Creek.	upstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, 4)
Bull Run	Bull Run	BR3	44.77991	118.3473	4865	8/6/2014	13:55	2, 2.16	Upstream of its confluence with Deep Creek but downstream of the area disturbed for the August 2014 culvert replacement.	upstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, 4)

Creek	SWS	GPS pt	Latitude	Longitude	Elevation (ft)	Date	Time	Turbidity (NTU)	Location	Plan in area
Bull Run	Bull Run	BR4	44.78727	118.3759	4712	7/16/2014	15:24	1.63, 1.53	Upstream of confluence with Boundary Creek	Downstream of Blue Sky Bull Run (Blue Sky sites 1, 2, 3, and 4)
Clear	Clear	Cl1	44.77.979	118.4562	4750	7/16/2014	16:37	0.66, 0.54	upstream of confluence with Beaver Creek	downstream of Grubsteak
Deep	Bull Run	De1	44.78074	118.3455	4903	7/16/2014	13:49	1.36, 1.9	**Background value.** Upstream of area being disturbed for 2014 culvert replacement and channel realignment.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
Deep	Bull Run	De2	44.78009	118.3473	4897	7/16/2014	14:26	6.32, 6.41	Downstream of area being disturbed for 2014 ongoing culvert replacement and channel realignment. Lower fish net had been clean about 20 minutes prior to measurement and sediment released.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
Deep	Bull Run	De2	44.78009	118.3473	4897	8/8/2014	11:00	sample needs to be diluted. Values > 800 NTUs and exceed instrument	Reading taken just after water turned into new channel. Culvert had been replaced with a concrete bridge.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.

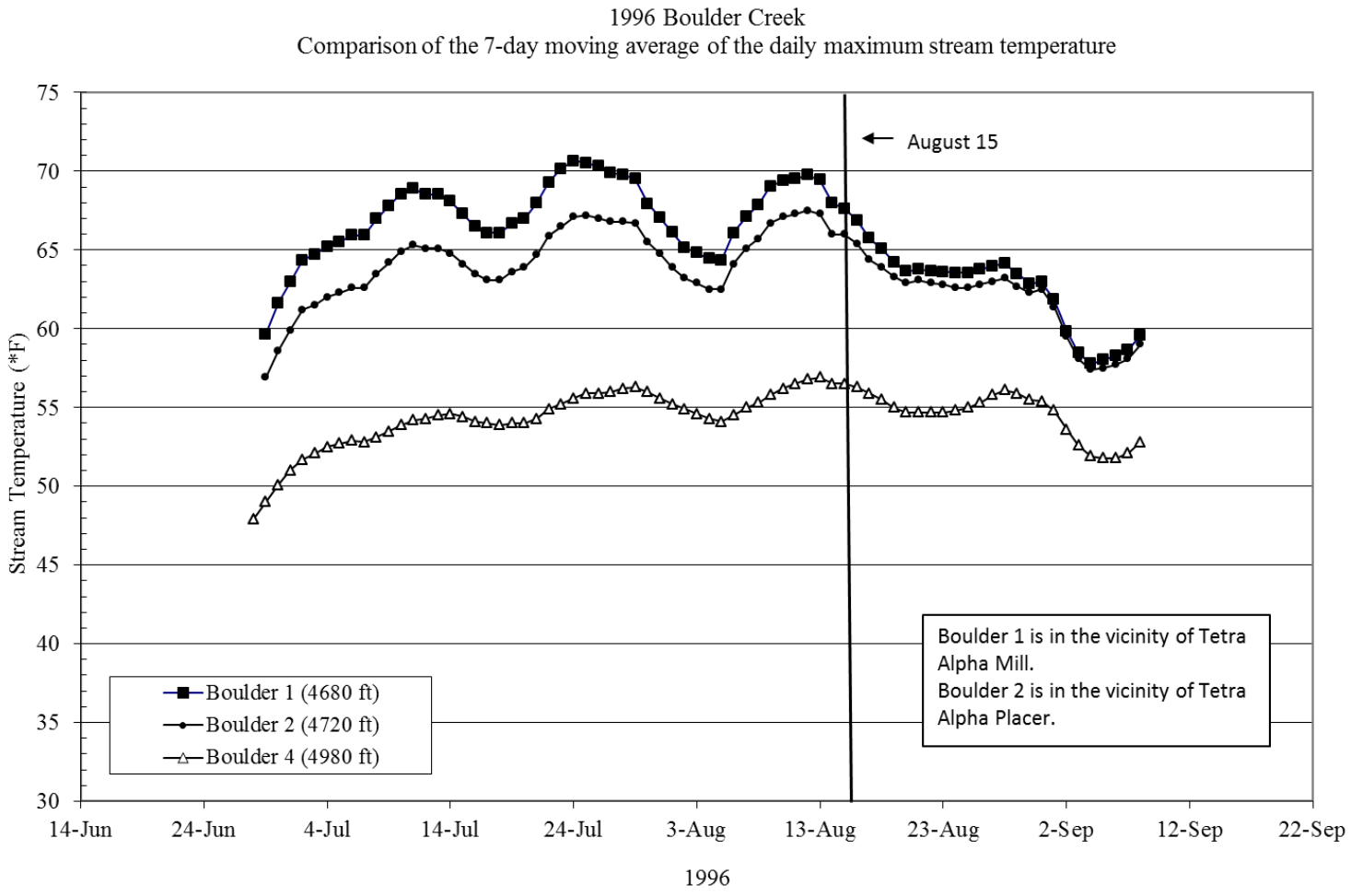
Creek	SWS	GPS pt	Latitude	Longitude	Elevation (ft)	Date	Time	Turbidity (NTU)	Location	Plan in area
Deep	Bull Run	De2	44.78009	118.3473	4897	8/8/2014	15:00	40, 37.7	Reading taken 4 hours after water turned into new channel.	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
Deep	Bull Run	De2	44.78009	118.3473	4897	8/14/2014	13:33	1.09, 0.56	Same spot	Deep Creek enters Bull Run Creek upstream of Blue Sky sites 1, 2, 3, and 4.
Granite	Lower Granite	Gr1	44.809	118.4237	4585*	7/16/2014	15:51	2.13, 1.84	Downstream of confluence with Bull Run Creek	At Old Eric 1, 2
Granite	Lower Granite	Gr2	44.80751	118.4306	4614*	7/16/2014	16:05	1.72, 1.37	Downstream of confluence with Bull Run Creek	Across from Blue Smoke and Rosebud. NOTE: Gr1 is upstream of Gr2 despite what elevation says. Elevation taken from road not at creek.
Granite	Upper Granite	Gr3	44.84933	118.4003	5125	7/21/2014	10:10	0.53, 0.56	Upstream of confluence with Bull Run Creek.	downstream of Eddy Shipman by China Creek
Granite	Upper Granite	Gr4	44.85443	11839158	5226	7/21/2014	10:40	0.46, 0.59	Upstream of confluence with Bull Run Creek.	Eddy Shipman (west side)
Olive	Beaver	Ol1	44.72717	118.4696	5364	7/16/2014	17:08	0.91, 0.54	upstream of Quartz Gulch and McWillis Gulch	Upstream of Olive Tone
Olive	Beaver	Ol2	44.73284	118.468	5271	7/16/2014	17:28	0.77, 0.51	downstream of McWillis Gulch	downstream of Olive Tone and Belvadear

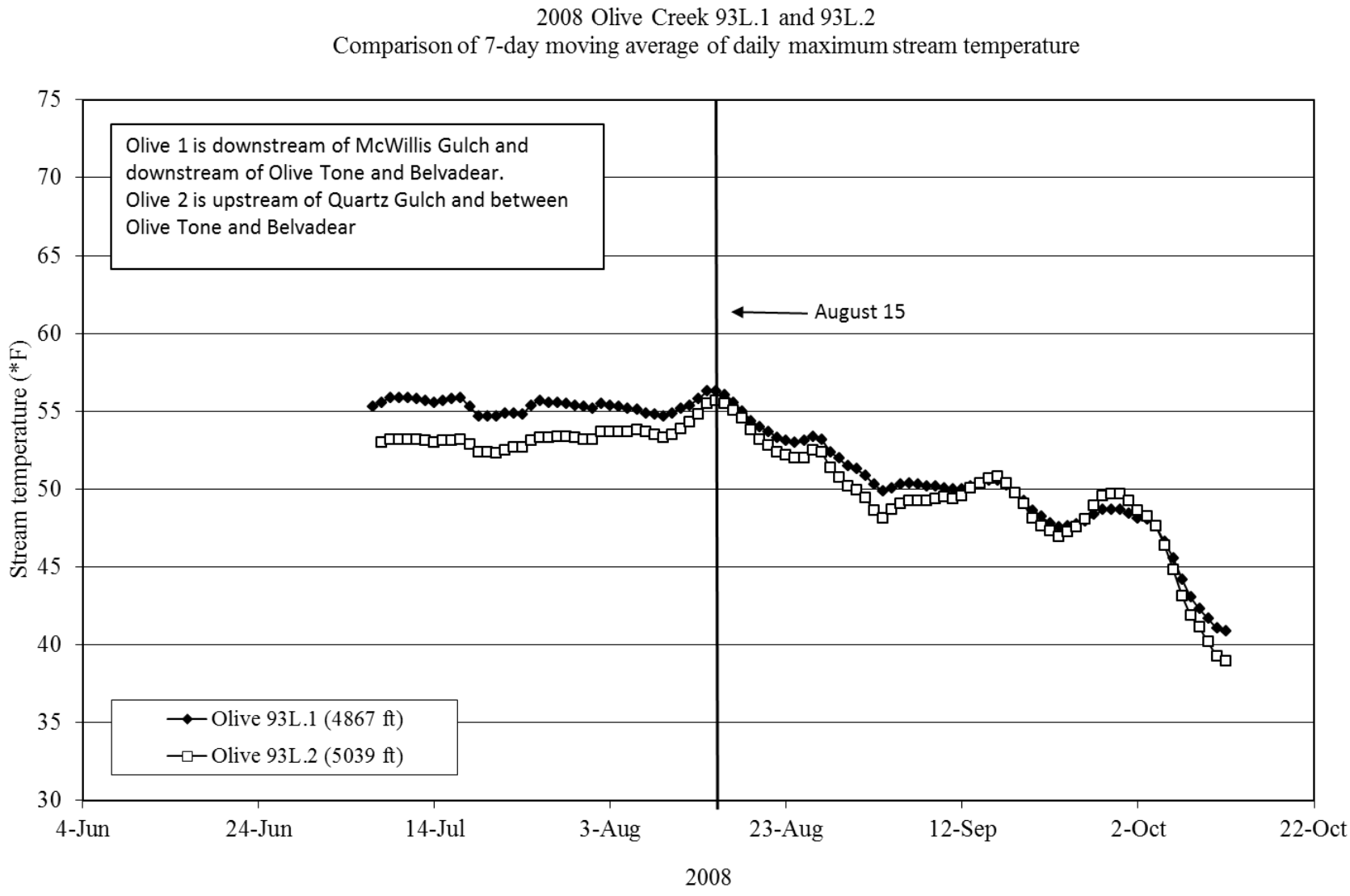
Appendix 5C

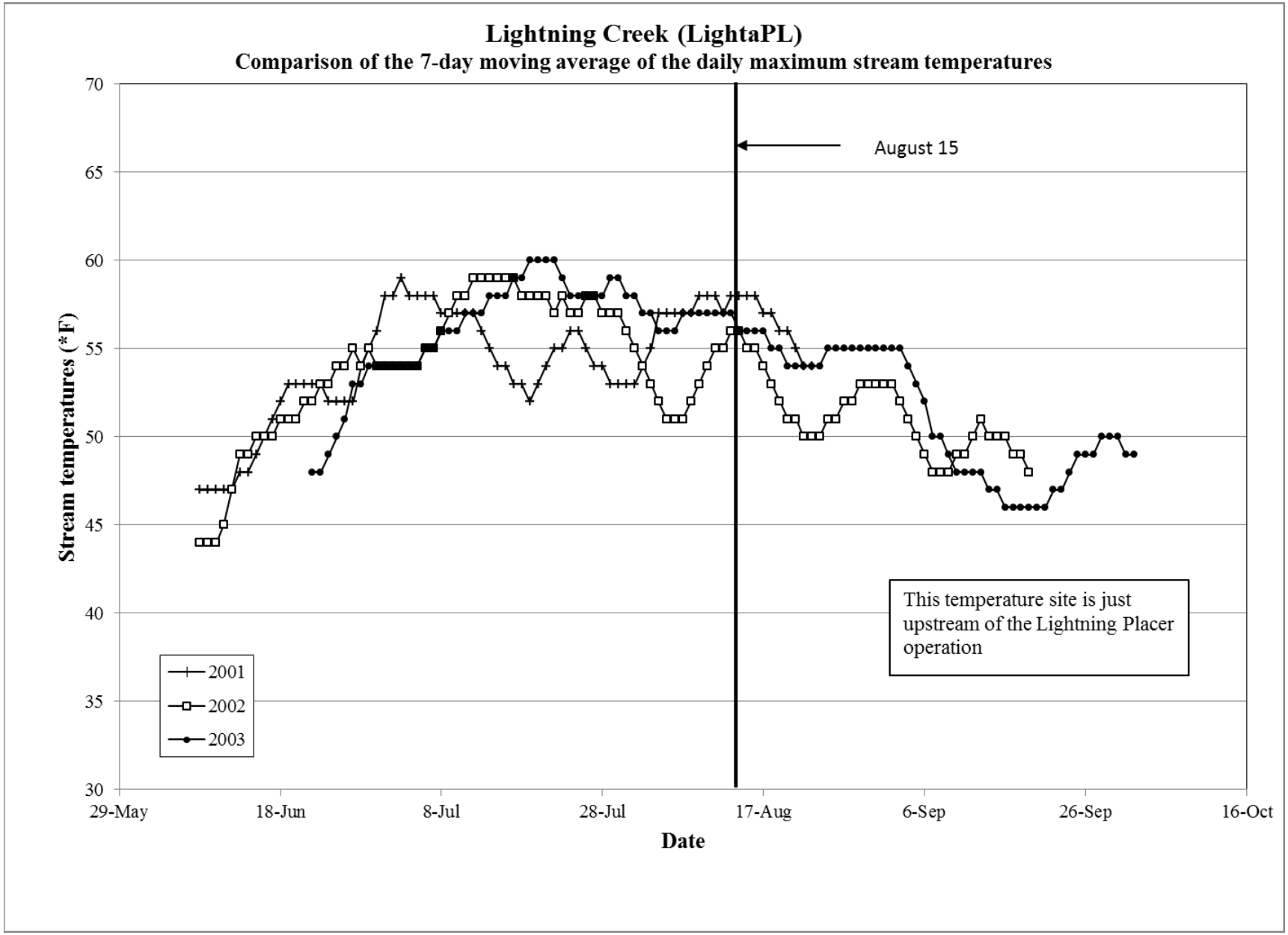
Graphs of selected Stream Temperature data

7-day running average of the maximum daily stream temperature

NOTE: the August 15 line identifies when the FS Fish Protection Measure related to withdrawals would go into effect on selected streams


1996 Boulder Creek
Comparison of the 7-day moving average of the daily maximum stream temperature
Stream Temperature (*F)
75
70
65
60
55
50
45
40
35
30
14-Jun
24-Jun
4-Jul
14-Jul
24-Jul
3-Aug
13-Aug
23-Aug
2-Sep
12-Sep
22-Sep
1996
August 15
Boulder 1 (4680 ft)
Boulder 2 (4720 ft)
Boulder 4 (4980 ft)
Boulder 1 is in the vicinity of Tetra Alpha Mill.
Boulder 2 is in the vicinity of Tetra Alpha Placer.


2008 Olive Creek 93L.1 and 93L.2
Comparison of 7-day moving average of daily maximum stream temperature
Olive 1 is downstream of McWillis Gulch and downstream of Olive Tone and Belvadear.
Olive 2 is upstream of Quartz Gulch and between Olive Tone and Belvadear
August 15
Olive 93L.1 (4867 ft)
Olive 93L.2 (5039 ft)
Stream temperature (°F)
75
70
65
60
55
50
45
40
35
30
4-Jun
24-Jun
14-Jul
3-Aug
23-Aug
12-Sep
2-Oct
22-Oct
2008


Lightning Creek (LightaPL)
Comparison of the 7-day moving average of the daily maximum stream temperatures
Stream temperatures (°F)
70
65
60
55
50
45
40
35
30
29-May
18-Jun
8-Jul
28-Jul
17-Aug
6-Sep
26-Sep
16-Oct
Date
August 15
This temperature site is just upstream of the Lightning Placer operation
2001
2002
2003

Appendix 6A

Existing FS Closed and Decommissioned roads and Temporary Access Roads proposed for use

Sorted by Plan

Appendix 6A

Existing FS Closed and Decommissioned roads and Temporary Access Roads proposed for use

Sorted by Plan

					Length (miles)					
Plan	**SWs Name**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3)**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Altona	Beaver	1042E1a	1042E1c	1042E1b	0.56	0	Native	Temporary -E	Y	N
Altona	Beaver	1042E1b	1042E1a	1042M1a	0.59	0.59	Native	Temporary -E	Y	Y
Altona	Beaver	1042E1c	1305098	1042E1a	0.21	0	Native	Temporary - E	Y	N
Altona	Beaver	1042M1a	1042E1b	Processing	0.05	0.05	Native	Temporary - P	Y	Y
Altona	Beaver	1305098	1305092	1041E1c	0.2	0	Native	FS Closed (unusable)	Y	N
Altona	Beaver	1305099	1305080	1305092	0.3	0	Native	FS Closed (unusable)	Y	N
Altona	Beaver	1305092	1305099	1305098	0.03	0	Native	FS Closed (unusable)	y	N
Belvadear	Beaver	1305-E2	1305080	Claim	0.15	0.15	Native	Temporary - E	Y	Y
Blue Sky/Bull Run	Bull Run	7300-E4a	Co 24	7300-E4b	0.11	0.11	Native	Temporary - E	Y	Y
Blue Sky/Bull Run	Bull Run									
Blue Sky/Bull Run	Bull Run	7300-E4b	7300-E4a	Processing	0.15	0.15	Native	Temporary - E	Y	Y
Blue Sky/Bull Run	Bull Run	7300-E4c	7300-E4a	Site 2 Blue Sky	0.02	0.02	Tailings	Temporary - E	Y	Y
Blue Sky/Bull Run	Bull Run	7300-M4a	7300-E4a	Site 3 Blue Sky	0.07	0.07	Native	Temporary - P	Y	Y
Blue Sky/Bull Run	Bull Run	7300-M4b	Co 24	Site 2 Bull Run	0.07	0	Native	Temporary - P	Y	N
Blue Sky/Bull Run	Bull Run	7375-M1a	7375-000	Site 1 Bull Run	0.05	0.05	Native	Temporary - E	Y	Y

					Length (miles)					
Plan	**SWs Name**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3)**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Blue Sky/Bull Run	Bull Run	7375-M1b	7375-M1a	Site 2 Bull Run	0	0.2	Native	Temporary- P	N	Y
Blue Smoke	Lower Granite	1000-E1a	1000000	Claim	0.46	0.46	Native	Temporary - E	Y	Y
Bunch Bucket	Clear	1310-E2a	1310000	Site 1	0.08	0.08	Aggregate	Temporary - E	Y	Y
Bunch Bucket	Clear	1310-E2b	Site1,2	Processing	0.09	0.09	Native	Temporary - E	Y	Y
Bunch Bucket	Clear	1310-E2c	Processing	Site 2	0.08	0.08	Native	Temporary - E	Y	Y
City Limits	Upper Granite	7300-E3a	7300000	Claim	0.11	0.11	Tailings	Temporary - E	Y	Y
City Limits	Upper Granite	7300-E3b	7300000	Claim	0.02	0.02	Tailings	Temporary - E	Y	Y
East Ten Cent Creek	Lower Granite	7350050	7350000	Claim	0.06	0.06	Aggregate	FS Closed	Y	Y
East Ten Cent Creek	Lower Granite	7350070	7350000	Claim	0.39	0.39	Aggregate	FS Closed	Y	Y
East Ten Cent Creek	Lower Granite	7350-E1a	7350070	Pond	0.12	0.12	Aggregate	Temporary - E	Y	Y
East Ten Cent Creek	Lower Granite	7350-M1a	7350050	Shed	0.32	0.32	Native	Temporary - E	Y	Y
Eddy Shipman	Upper Granite	7300590	7300000	7300-E1a	0.04	0.04	Native	FS Closed	Y	Y
Eddy Shipman	Upper Granite	7300680	7300000	7300-E1d	0.1	0.1	Native	FS Closed	Y	Y
Eddy Shipman	Upper Granite	7300-E1a	7300590	Cabin/Adit B	0.42	0.42	Native	Temporary - E	Y	Y
Eddy Shipman	Upper Granite	7300-E1b	7300-E1a	7300-E1c	0.1	0.1	Native	Temporary - E	Y	Y
Eddy Shipman	Upper Granite	7300-E1d	7300680	Adit A	0.07	0.07	Native	Temporary - E	Y	Y
Grubsteak	Clear	1300-M1a	Co 24	Dig Site	0.19	0.19	Native	Temporary - E	y	Y
Hopeful 1	Lower Granite	1035-E2a	1035012	Cabin/Claim	0.17	0.17	Aggregate	Temporary - E	Y	Y
Hopeful 1	Lower Granite	1035012	1035011	Claim	0.7	0.7	Aggregate	FS Closed	Y	Y
Hopeful 2-3	Lower Granite	1035-E1a	1035000	1035-E1b	0.21	0.21	Aggregate	Temporary - E	Y	Y
Hopeful 2-3	Lower Granite	1035-E1b	1035-E1a	1035-E1d/cabins	0.08	0.08	Aggregate	Temporary - E	Y	Y
Hopeful 2-3	Lower Granite	1035-E1c	1035-E1a	1035-E1d/filter plant	0.27	0.27	Native	Temporary - E	Y	Y
Hopeful 2-3	Lower Granite	1035-E1d	1035-E1b	1035-E1c	0.19	0.19	Native	Temporary - E	Y	Y
L&H	Beaver	1305-E5a	1042950	1305200	0.29	0.29	Native	Temporary - E	Y	Y

					Length (miles)					
Plan	**SWs Name**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3)**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
L&H	Beaver	1305-E5b	1305200	Adit	0.06	0.06	Native	Temporary - E	Y	Y
Lightning Creek	Clear	1305-E6a	1305100	Final Pond	0.07	0.07	Native	Temporary - E	Y	Y
Lightning Creek	Clear	1305-E6b	1305100	Dig Site	0.1	0.1	Native	Temporary - E	Y	Y
Little Cross	Lower Granite	1000-E3a	Co 24	Campsite	0.03	0.03	Tailings	Temporary - E	Y	Y
Lucky Strike	Clear	Only using open FS roads								
Make-it	Upper Granite	7300-E2a	7300700	Cabin	0.37	0.37	Native	Temporary - E	Y	y
Muffin	Upper Granite	7355012	7355000	Claim	0.18	0.18	Native	FS Closed	Y	y
Muffin	Upper Granite	7355M1a	7355012	Work Site	0.08	0.08	Native	Temporary - E	Y	y
Old Eric 1&2	Upper Granite	10000-E2a	Co 24	Campsite	0.4	0.4	Tailings	Temporary - E	Y	y
Olive Tone	Beaver	1305-E4a	1305082	1305-E4b	0.02	0.02	Native	Temporary - E	Y	y
Olive Tone	Beaver	1305-E4b	1305-E4A	Pond/Minin g Site	0.16	0.16	Native and Tailings	Temporary - E	Y	y
Rosebud 1-4	Lower Granite	1000-E1a	1000000	Claim	0.46	0.46	Native	Temporary - E	Y	Y
Royal White	Beaver	1042-E2a	Pvt Rd	Upper Adit	0.11	0.11	Native	Temporary - E	Y	Y
Royal White	Beaver	1042-E2b	Pvt Rd	Mine Bldings	0.14	0.14	Native	Temporary - E	Y	Y
Royal White	Beaver	1042-E2c	1042982	Shafts	0.06	0.06	Native	Temporary - E	Y	Y
Ruby Group	Clear	1310-E1a	1310000	Cabin/Sites 1,2,3	0.62	0.62	Native	Temporary - E	Y	Y
Ruby Group	Clear	1310-E1b	1310-E1a	Site 2, staging area	0.03	0.03	Native	Temporary - E	Y	Y
Ruby Group	Clear	1310-E3a	1310000	Site 4,5	0.07	0.07	Native	Temporary - E	Y	Y
Ruby Group	Clear	1310-E3b	1310-E3a	Site 6	0.06	0.06	Native	Temporary - E	Y	Y
Ruby Group	Clear	1310-E3c	1310-E3a	Site 7	0.02	0.02	Native	Temporary - E	Y	Y
Ruby Group	Clear	1310-E4a	1310000	Site 8	0.09	0.09	Native	Temporary - E	Y	Y
Sunshine/McWillis	Beaver	1305054	1305050	1305-M1s	0.4	0.4	Native	FS Closed	Y	Y
Sunshine/McWillis	Beaver	1305-M1a	1305054	Claim site	0.18	0.18	Native	Temporary - E	Y	Y

					Length (miles)					
Plan	**SWs Name**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3)**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Sunshine/McWillis	Beaver	1305130	1305120	Diversion Dam	0.45	0.45	Native	Decommissioned	Y	Y
Tetra Alpha Mill and Lode (Lode portion)	Upper Granite	7355- M5a	7355020	adit	0.01	0.01	Native	Temporary - E	Y	Y
Tetra Alpha Mill and Lode (Mill portion)	Upper Granite	7355011**	7355000	7355011-M4a	0.31**	0.31**	Native	FS Closed	Y	Y
Tetra Alpha Mill and Lode (Mill portion)	Upper Granite	7355-M4a	7355011	Top Mill	0.05	0.05	Native	Temporary - E	Y	Y
Tetra Alpha Mill and Lode (Mill portion)	Upper Granite	7355-M4b	7355-M4a	7355011	0.03	0.03	Native	Temporary - E	Y	Y
Tetra Alpha Placer	Upper Granite	7355011**	7355000	7355011-M4a	0.72**	0.72**	Native	FS Closed	Y	Y
Tetra Alpha Placer	Upper Granite	7355-M3a	7355011	Processing	0.27	0.27	Native	Temporary - E	Y	Y
Tetra Alpha Placer	Upper Granite	7355-M3b	7355-M3a	Claim	0.06	0.06	Native	Temporary - P	Y	Y
Tetra Alpha Placer	Upper Granite	7355-M3c	7355011	Claim	0.03	0.03	Native	Temporary - P	Y	Y
Tetra Alpha Placer	Upper Granite	7355-M3d	7355011	Claim	0.02	0.02	Native	Temporary - P	Y	Y
Troy	Lower Granite	1000-E4a	Co 24	Claim	0.05	0.05	Tailings	Temporary - E	Y	Y
Troy	Lower Granite	1000-E4b	1000-E4a	Claim	0.11	0.11	Tailings	Temporary - E	Y	Y
Yellow Gold	Upper Granite	7355025	7355020	7355026	0.05	0.05	Native	FS Closed	Y	Y
Yellow Gold	Upper Granite	7355026	7355025	Alternate Processing	0.11	0.11	Native	FS Closed	Y	Y
Yellow Gold	Upper Granite	7355050	7355000	Claim Trail	0.61	0.61	Native	FS Closed	Y	Y
Yellow Gold	Upper Granite	7355055	7355050	Claim	0.37	0.37	Native	FS Closed	Y	Y
Yellow Gold	Upper Granite	7355-E2a	7355055	Processing site	0.11	0.11	Native	Temporary - E	Y	Y
Yellow Jacket	Beaver	1305-E1a	1305035	Claim	0.11	0.11	Native	Temporary - E	Y	Y

** Forest Service road 7355-011 for Tetra Alpha Placer and Tetra Alpha Mill and Lode are the same road. Tetra Alpha Placer is upstream of Tetra Alpha Mill and therefore the 0.31 miles for Tetra Alpha Mill and Lode (mill portion) are contained within the 0.72 miles for Tetra Alpha Placer for this road. Therefore, when calculating the miles of Forest Service closed roads proposed for use, the 0.31 miles is not included because including it would result in those miles being double counted.

Appendix 6B

Existing FS Closed and Decommissioned roads and Temporary Access Roads proposed for use

Sorted by Subwatershed

Appendix 6B

Existing FS Closed and Decommissioned roads and Temporary Access Roads proposed for use

Sorted by Subwatershed

					Length (miles)					
SWS Name	**Plan**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Beaver	Altona	1305092	1305099	1305098	0.03	0	Native	FS Closed (unusable)	y	N
Beaver	Altona	1305098	1305092	1041E1c	0.2	0	Native	FS Closed (unusable)	Y	N
Beaver	Altona	1305099	1305080	1305092	0.3	0	Native	FS Closed (unusable)	Y	N
Beaver	Altona	1042E1a	1042E1c	1042E1b	0.56	0	Native	Temporary - E	Y	N
Beaver	Altona	1042E1b	1042E1a	1042M1a	0.59	0.59	Native	Temporary - E	Y	Y
Beaver	Altona	1042E1c	1305098	1042E1a	0.21	0	Native	Temporary - E	Y	N
Beaver	Altona	1042M1a	1042E1b	Processing	0.05	0.05	Native	Temporary - P	Y	Y
Beaver	Belvadear	1305-E2	1305080	Claim	0.15	0.15	Native	Temporary - E	Y	Y
Beaver	L&H	1305-E5a	1042950	1305200	0.29	0.29	Native	Temporary - E	Y	Y
Beaver	L&H	1305-E5b	1305200	Adit	0.06	0.06	Native	Temporary - E	Y	Y
Beaver	Olive Tone	1305-E4a	1305082	1305-E4b	0.02	0.02	Native	Temporary - E	Y	y
Beaver	Olive Tone	1305-E4b	1305-E4A	Pond/Mining Site	0.16	0.16	Native and Tailings	Temporary - E	Y	y
Beaver	Royal White	1042-E2a	Pvt Rd	Upper Adit	0.11	0.11	Native	Temporary - E	Y	Y
Beaver	Royal White	1042-E2b	Pvt Rd	Mine Bldings	0.14	0.14	Native	Temporary - E	Y	Y
Beaver	Royal White	1042-E2c	1042982	Shafts	0.06	0.06	Native	Temporary - E	Y	Y
Beaver	Sunshine/McWillis	1305054	1305050	1305-M1s	0.4	0.4	Native	FS Closed	Y	Y
Beaver	Sunshine/McWillis	1305130	1305120	Diversion Dam	0.45	0.45	Native	Decommissioned	Y	Y

					Length (miles)					
SWS Name	**Plan**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Beaver	Sunshine/McWillis	1305-M1a	1305054	Claim site	0.18	0.18	Native	Temporary - E	Y	Y
Beaver	Yellow Jacket	1305-E1a	1305035	Claim	0.11	0.11	Native	Temporary - E	Y	Y
Bull Run	Blue Sky/Bull Run	7300-E4a	Co 24	7300-E4b	0.11	0.11	Native	Temporary - E	Y	Y
Bull Run	Blue Sky/Bull Run	7300-E4b	7300-E4a	Processing	0.15	0.15	Native	Temporary - E	Y	Y
Bull Run	Blue Sky/Bull Run	7300-E4c	7300-E4a	Site 2 Blue Sky	0.02	0.02	Tailings	Temporary - E	Y	Y
Bull Run	Blue Sky/Bull Run	7375-M1a	7375-000	Site 1 Bull Run	0.05	0.05	Native	Temporary - E	Y	Y
Bull Run	Blue Sky/Bull Run	7375-M1b	7375-M1a	Site 2 Bull Run	0	0.2	Native	Temporary- P	N	Y
Bull Run	Blue Sky/Bull Run	7300-M4a	7300-E4a	Site 3 Blue Sky	0.07	0.07	Native	Temporary - P	Y	Y
Bull Run	Blue Sky/Bull Run	7300-M4b	Co 24	Site 2 Bull Run	0.07	0	Native	Temporary - P	Y	N
Clear	Bunch Bucket	1310-E2a	1310000	Site 1	0.08	0.08	Aggregate	Temporary - E	Y	Y
Clear	Bunch Bucket	1310-E2b	Site1,2	Processing	0.09	0.09	Native	Temporary - E	Y	Y
Clear	Bunch Bucket	1310-E2c	Processi ng	Site 2	0.08	0.08	Native	Temporary - E	Y	Y
Clear	Grubsteak	1300-M1a	Co 24	Dig Site	0.19	0.19	Native	Temporary - E	y	Y
Clear	Lightning Creek	1305-E6a	1305100	Final Pond	0.07	0.07	Native	Temporary - E	Y	Y
Clear	Lightning Creek	1305-E6b	1305100	Dig Site	0.1	0.1	Native	Temporary - E	Y	Y
Clear	Lucky Strike	Only using open FS roads								
Clear	Ruby Group	1310-E1a	1310000	Cabin/Sites 1,2,3	0.62	0.62	Native	Temporary - E	Y	Y
Clear	Ruby Group	1310-E1b	1310-E1a	Site 2, staging area	0.03	0.03	Native	Temporary - E	Y	Y
Clear	Ruby Group	1310-E3a	1310000	Site 4,5	0.07	0.07	Native	Temporary - E	Y	Y
Clear	Ruby Group	1310-E3b	1310-E3a	Site 6	0.06	0.06	Native	Temporary - E	Y	Y
Clear	Ruby Group	1310-E3c	1310-E3a	Site 7	0.02	0.02	Native	Temporary - E	Y	Y

					Length (miles)					
SWS Name	**Plan**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Clear	Ruby Group	1310-E4a	1310000	Site 8	0.09	0.09	Native	Temporary - E	Y	Y
Lower Granite	Blue Smoke	1000-E1a	1000000	Claim	0.46	0.46	Native	Temporary - E	Y	Y
Lower Granite	East Ten Cent Creek	7350050	7350000	Claim	0.06	0.06	Aggregate	FS Closed	Y	Y
Lower Granite	East Ten Cent Creek	7350070	7350000	Claim	0.39	0.39	Aggregate	FS Closed	Y	Y
Lower Granite	East Ten Cent Creek	7350-E1a	7350070	Pond	0.12	0.12	Aggregate	Temporary - E	Y	Y
Lower Granite	East Ten Cent Creek	7350-M1a	7350050	Shed	0.32	0.32	Native	Temporary - E	Y	Y
Lower Granite	Hopeful 1	1035012	1035011	Claim	0.7	0.7	Aggregate	FS Closed	Y	Y
Lower Granite	Hopeful 1	1035-E2a	1035012	Cabin/Claim	0.17	0.17	Aggregate	Temporary - E	Y	Y
Lower Granite	Hopeful 2-3	1035-E1a	1035000	1035-E1b	0.21	0.21	Aggregate	Temporary - E	Y	Y
Lower Granite	Hopeful 2-3	1035-E1b	1035-E1a	1035-E1d/cabins	0.08	0.08	Aggregate	Temporary - E	Y	Y
Lower Granite	Hopeful 2-3	1035-E1c	1035-E1a	1035-E1d/filter plant	0.27	0.27	Native	Temporary - E	Y	Y
Lower Granite	Hopeful 2-3	1035-E1d	1035-E1b	1035-E1c	0.19	0.19	Native	Temporary - E	Y	Y
Lower Granite	Little Cross	1000-E3a	Co 24	Campsite	0.03	0.03	Tailings	Temporary - E	Y	Y
Lower Granite	Rosebud 1-4	1000-E1a	1000000	Claim	0.46	0.46	Native	Temporary - E	Y	Y
Lower Granite	Troy	1000-E4a	Co 24	Claim	0.05	0.05	Tailings	Temporary - E	Y	Y

					Length (miles)					
SWS Name	**Plan**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Lower Granite	Troy	1000-E4b	1000-E4a	Claim	0.11	0.11	Tailings	Temporary - E	Y	Y
Upper Granite	City Limits	7300-E3a	7300000	Claim	0.11	0.11	Tailings	Temporary - E	Y	Y
Upper Granite	City Limits	7300-E3b	7300000	Claim	0.02	0.02	Tailings	Temporary - E	Y	Y
Upper Granite	Eddy Shipman	7300590	7300000	7300-E1a	0.04	0.04	Native	FS Closed	Y	Y
Upper Granite	Eddy Shipman	7300680	7300000	7300-E1d	0.1	0.1	Native	FS Closed	Y	Y
Upper Granite	Eddy Shipman	7300-E1a	7300590	Cabin/Adit B	0.42	0.42	Native	Temporary - E	Y	Y
Upper Granite	Eddy Shipman	7300-E1b	7300-E1a	7300-E1c	0.1	0.1	Native	Temporary - E	Y	Y
Upper Granite	Eddy Shipman	7300-E1d	7300680	Adit A	0.07	0.07	Native	Temporary - E	Y	Y
Upper Granite	Make-it	7300-E2a	7300700	Cabin	0.37	0.37	Native	Temporary - E	Y	y
Upper Granite	Muffin	7355012	7355000	Claim	0.18	0.18	Native	FS Closed	Y	y
Upper Granite	Muffin	7355M1a	7355012	Work Site	0.08	0.08	Native	Temporary - E	Y	y
Upper Granite	Old Eric 1&2	10000-E2a	Co 24	Campsite	0.4	0.4	Tailings	Temporary - E	Y	y
Upper Granite	Tetra Alpha Mill and Lode (Mill portion)	7355011**	7355000	7355011-M4a	0.31**	0.31**	Native	FS Closed	Y	Y
Upper Granite	Tetra Alpha Mill and Lode (Mill portion)	7355-M4a	7355011	Top Mill	0.05	0.05	Native	Temporary - E	Y	Y
Upper Granite	Tetra Alpha Mill and Lode (Mill portion)	7355-M4b	7355-M4a	7355011	0.03	0.03	Native	Temporary - E	Y	Y

					Length (miles)					
SWS Name	**Plan**	**Road Number**	**From**	**To**	**Alt 2**	**Alt 3**	**Surface Type**	**Existing Condition**	**Alt 2**	**Alt 3**
Upper Granite	Tetra Alpha Mill and Lode (Lode portion)	7355- M5a	7355020	adit	0.01	0.01	Native	Temporary - E	Y	Y
Upper Granite	Tetra Alpha Placer	7355011**	7355000	7355011-M4a	0.72**	0.72**	Native	FS Closed	Y	Y
Upper Granite	Tetra Alpha Placer	7355-M3a	7355011	Processing	0.27	0.27	Native	Temporary - E	Y	Y
Upper Granite	Tetra Alpha Placer	7355-M3b	7355-M3a	Claim	0.06	0.06	Native	Temporary - P	Y	Y
Upper Granite	Tetra Alpha Placer	7355-M3c	7355011	Claim	0.03	0.03	Native	Temporary - P	Y	Y
Upper Granite	Tetra Alpha Placer	7355-M3d	7355011	Claim	0.02	0.02	Native	Temporary - P	Y	Y
Upper Granite	Yellow Gold	7355025	7355020	7355026	0.05	0.05	Native	FS Closed	Y	Y
Upper Granite	Yellow Gold	7355026	7355025	Alternate Processing	0.11	0.11	Native	FS Closed	Y	Y
Upper Granite	Yellow Gold	7355050	7355000	Claim Trail	0.61	0.61	Native	FS Closed	Y	Y
Upper Granite	Yellow Gold	7355055	7355050	Claim	0.37	0.37	Native	FS Closed	Y	Y
Upper Granite	Yellow Gold	7355-E2a	7355055	Processing site	0.11	0.11	Native	Temporary - E	Y	Y

** Forest Service road 7355-011 for Tetra Alpha Placer and Tetra Alpha Mill and Lode are the same road. Tetra Alpha Placer is upstream of Tetra Alpha Mill and therefore the 0.31 miles for Tetra Alpha Mill and Lode (mill portion) are contained within the 0.72 miles for Tetra Alpha Placer for this road. Therefore, when calculating the miles of Forest Service closed roads proposed for use, the 0.31 miles is not included because including it would result in those miles being double counted.

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Appendices - Volume 2

(Appendices 7 – 11)

Final Environmental Impact Statement

Granite Creek Watershed Mining Project

North Fork John Day Ranger District
Umatilla National Forest

Whitman Ranger District
Wallowa-Whitman National Forest

Baker and Grant Counties, Oregon

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APPENDIX 7

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS TO WATER RESOURCES BY PLAN

APPENDIX 7

DIRECT, INDIRECT, AND CUMULATIVE EFFECTS TO WATER RESOURCES BY PLAN

The notes below identify what is and is not analyzed in this appendix and the scale of that analysis for the Plans.

Analysis Area for Water Resources

This appendix analyzes the direct and indirect impact to water resources for each Plan individually for Alternatives 2 and 3 only. The analysis areas are 10 acres or less and based on what the miner proposed to do. The analysis area is identified for each Plan. Direct and indirect impacts to water resources for Alternative 1 are found in Chapter 3, Table 3-11.

Cumulative effects to water resources are found in **Table 7-15** at the end of this appendix and summarized in Chapter 3. Chapter 3 evaluates the combined direct and indirect effects of all the Plans that occur within a subwatershed, and the potential cumulative effects between Plans and then at the downstream end of a subwatershed.

Soils

The direct, indirect, and cumulative effects to soils from these operations are not addressed in this appendix but only in Chapter 3 because areas proposed for disturbance in the Plans are 10 acres or less and the operations are scattered throughout five subwatersheds. The cumulative effects on soil productivity are addressed at the subwatershed scale in the Soil Resource Cumulative Effects.

Fords

Only fords on Forest Service closed or decommissioned roads or fords on existing or proposed temporary access roads were analyzed. Fords on open roads were NOT analyzed because they are used by the general public and there is no way to assess what if any potential impacts from use could be attributed to the miner and their mining operation.

Suction Dredging

Eight Plans propose suction dredging which is permitted under ODEQ 700PM permit that allows for inchannel dredging of the channel bed (Appendix 4A). For the purposes of the water resources analysis, the analysis area for suction dredging is limited to the Plan area boundary. The site characteristics presented under the suction dredging section for that Plan is therefore limited to this area. Analysis area for suction dredging is specified for this appendix because the State of Oregon 700PM permit only asks the miner for a Township, Range and Section.

The stream name and area within the stream is not identified and was not provided by the miners.

Effects on Wetlands and Floodplains

Three operations (Belvadear, Blue Sky Bull Run, and Tetra Alpha) were identified as proposing some activity in either wetlands or floodplains. They are discussed for compliance with the following Executive Orders.

Executive Order 11988 (Protection of Floodplains) requires government agencies to take actions that reduce the risk of loss due to floods, to minimize the impact of floods on human health and welfare, and to restore and preserve the natural and beneficial values served by floodplains. Executive Order 11988 defines the term “floodplain” as follows: “…that area subject to a one percent or greater change of flooding in any given year.”

Executive Order 11990 (Protection of Wetlands) requires government agencies to take actions that “avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands.” EO 11990 (Sec 2 (a)(1 and 2) further states “shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such constructions, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use…” Executive Order 11990 defines wetlands and new construction as follows:

Wetlands: The term "wetlands" means those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

New construction: The term "new construction" shall include draining, dredging, channelizing, filling, diking, impounding, and related activities and any structures or facilities begun or authorized after the effective date of this Order.

PACFISH: Analysis of Riparian Management Objectives (RMOs)

Seven RMO parameters are identified in PACFISH (1995) that relate to streams. They are Pool Frequency, Water Temperature, Large Woody Debris, Substrate Sediment, Bank Stability, Lower Bank Angle, and Width/Depth ratio. Because the areas proposed for mining are all less than 10 acres, with most less than 5 acres, and the length of stream that they could potentially influence in all cases is less than 300 feet, the mining areas are considered points along the stream. As such, the RMO standards do not apply because the standards are designed to be evaluated at the landscape scale rather than at a specific point along the stream. Therefore, the

discussions below examine the potential for local changes to the RMO parameters as a result of the various activities proposed in the Plans, NOT the RMO standards.

Other Potential Water Resource Impacts

Ten Plans propose activities that have the potential to impact water resources in unique ways. Eight Plans (Belvadear, Eddy Shipman, Hopeful 1, Lightning, Make It, Olive Tone, Tetra Alpha Placer, Tetra Group) propose to withdraw water from a creek. One (Grubsteak) proposes to dig a test hole that could reverse groundwater flow directions, and one (Muffin) proposes to dig at the edge of a wetland, Potential impacts to water resources from these activities are evaluated under this header.

Reclamation Activity post mining

Most Plans have proposed reclamation activities post mining activities. Under Alternative 2, some of the reclamation activities have the potential for a discharge because there insufficient water resource protection measures were identified to prevent a discharge of sediment. Under Alternative 3, the potential for a discharge related to reclamation activities would be eliminated as a result of the addition of Forest Service General Requirements (**Appendix 2).**

Cumulative Effects Analysis

The cumulative effects analysis for water resources for each Plan is found in **Table 7-15** at the end of Appendix 7.

Altona

Plan type: Placer
Subwatershed: Beaver Creek (HUC 170702020203)
Subwatershed size: 13,075 acres
Analysis area: 5 acres
Creek: Quartz Gulch (intermittent flow and non fish-bearing)
Stream Order: 1st order
303(d) listed: N/A
Suction Dredging: No
Essential Salmon Habitat: No

ALTERNATIVE 2

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Potential for a discharge because the description of the miner-proposed buffer zone is not specific enough to determine its effectiveness in preventing a discharge of sediment into Quartz Gulch. The area has been hydraulically mined in the past. Mining activity would occur up on a terrace above the Quartz Gulch. The terrace has a 5-foot bank height. The miner proposes a 20-foot buffer from the stream. Quartz Gulch is seasonally diverted into Pete Mann ditch.

Depending on the starting point the miner intended to use when measuring 20 feet from the creek, there “may” or “may not” be a potential for a discharge. As a result of this uncertainty, the worst-case scenario was used is assessing potential water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In scenario 1, there would be the potential for a discharge of sediment into the gulch.

Ponds

Source water pond and Settling ponds

The potential for a discharge or other impacts to water resources due to construction and use of the proposed settling and source water ponds **could not be evaluated** because the miner could not find the adit which was to be the source of the water for the ponds.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use three unusable Forest Service closed roads (1305-092, 098, and 099), one unusable open Forest Service (1305-080) road due to a washout, three existing temporary access (TA) roads and one proposed temporary access road (Appendix 6). All would require considerable work to make them usable. Several have portions that cross drainages. Use of these roads is not required to access the site and these roads are NOT discussed further.

The roads evaluated for potential effects to water resources are (TA) roads1042-E1a and 1042-E1b and proposed mine access road1042-M1a.

Existing TA roads

No potential for a discharge as a result of using the existing TA roads because they are more than 125 feet from the drainage and there is sufficient ground cover to trap any sediment that leaves the roads prior to reaching the drainage. See Appendix 3 for details.

Proposed TA road 1042-M1a

No potential for a discharge as a result of using the proposed TA road because it is more than 125 feet from the drainage and there is sufficient ground cover to trap any sediment that leaves the roads prior to reaching the drainage. See Appendix 3 for details.

Clean Water Act, Section 303(d) (antidegradation)

Quartz Gulch is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) two existing temporary access roads and 2) the proposed temporary access road. The source water pond could not be evaluated because the miner could not find the adit, which was to be the water source.

Ponds

The proposed source water and settling ponds **could not be evaluated** for compliance with MM-2 under Alternative 2 because the miner could not locate the adit which was to supply the water for the ponds.

Access roads

Existing TA roads

Use of the existing TA roads would be in compliance with MM-2 because no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Proposed TA road 1042-M1a

Construction and use of the proposed TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* because 1) the potential inputs of fine sediment would be small and move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes in *Large Woody Debris* recruitment or existing wood in the stream because 1) the only place where trees would be cut is in the spur road/skid trail so that potential LWD recruitment would not be affected, and 2) there would be no activity in the channel to alter existing amounts.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter substrate.

Bank Stability: No changes in *Bank Stability* because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* because there would be 1) no change to *Bank Stability* and 2) no instream activity which could trigger a headcut.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Different from Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** with the addition of the Forest Service WRPM (Water Resource Protection Measure) (Appendix 11) which clarifies the starting point of the buffer width measurement and requires a barrier of the straw bales/coils between the activity and the stream. The WRPM, which clarifies the Plan-specific buffer , results in the mining activities clearly on the terrace and back 20 feet from the terrace edge. Therefore, there would be sufficient sediment trapping mechanisms in place (distance and straw bales/coils) to prevent sediment from reaching the creek.

Ponds

Source water pond

Same as Alternative 2. Not evaluated because the water source (the adit) could not be located.

Settling ponds

Same as Alternative 2. Not evaluated because the miner could not find the adit which was to be the source of the water for the ponds.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No discharge potential from use of the two existing TA roads or construction and use of the proposed TA road. See Appendix 3 for detailed discussion.

Clean Water Act, Section 303(d) (antidegradation)

Quartz Gulch is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) two existing temporary access roads and 2) the proposed temporary access road. The source water pond could not be evaluated because the miner could not find the adit which was to be the water source.

Ponds

Same as Alternative 2. The ponds could not be evaluated due to the lack of information on location. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. The TA roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. None of the RMO parameters would be affected.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Belvadear

Plan type: Placer
Subwatershed: Beaver Creek (HUC 170702020203)
Subwatershed size: 13,075 acres
Analysis area: 3 acres
Creek: Olive Creek (perennial flow and fish-bearing)
Stream Order: 2nd
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Potential for a discharge via subsurface flow of sediment generated by mining in the riparian area into Olive Creek through the narrow berm which separates the area to be mined and Olive Creek. The berm is composed of old placer tailings and flow was observed entering the creek through the berm at two points indicting connection between the creek and the proposed mining area.

Ponds

Source water pond and Settling pond

The source water pond and the settling pond are the same pond. Water for the source water pond would be withdrawn from Olive Creek and a spring.

No potential for a discharge via surface or subsurface flow from the existing pond into Olive Creek because the pond is dug into the ground and has silt coating the pond bed, indicating effective trapping of fine sediment. See Appendix 3 for detailed discussion.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use one existing TA road to access the (Appendix 6). It is a native surface road and 0.15 miles long.

No potential for a discharge as a result of using the existing TA road because the road is separated from Olive Creek by about 25 feet of flat ground and a berm. The flat ground and the berm would trap any sediment that leaves the road prior to it reaching the creek. See Appendix 3 for details

Clean Water Act, Section 303(d) (antidegradation)

Olive Creek is not 303(d) listed.

Suction Dredging

None proposed

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the proposed mining operation that are evaluated for compliance with MM-2 are 1) an existing pond used as both source water and as a settling pond and 2) one existing TA road. Both structures are inside the RHCA of Olive Creek.

Ponds

Use of the pond would be in compliance with MM-2 because no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Use of TA road 1305-E2 would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in Pool Frequency as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment under Alternative 2 would be small and move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in Water Temperature because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees and none would be shade trees.

Large Woody Debris: No changes in Large Woody Debris recruitment or existing wood in the stream because 1) only limited removal is proposed and none of it near the stream so that potential LWD recruitment would not be affected, and 2) there would be no activity in the channel to alter existing amounts.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter substrate.

Bank Stability: No changes in Bank Stability because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in Lower Bank Angle for the same reasons listed under Bank Stability.

Width/Depth ratio: No changes in Width/Depth ratio because there would be 1) no change to Bank Stability and therefore no increase in channel width and 2) no instream activity which could trigger a headcut and increase channel depths.

Wetlands and Floodplains

Mining activity is proposed in the wetlands that have developed between the berm and the road in the old placer tailings. The Plan would NOT be in compliance with Executive Order 11990 because the miner has not clearly defined what he proposes to do to “minimize harm to the wetlands” and ensure restoration of their function once mining activity is completed. Executive Order 11988 (Protection of Floodplains) does not apply because the Plan does not propose any activity in floodplains.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

The Belvadear miner proposes to withdraw water from a spring and Olive Creek to use as source water for processing placer material. Based on the pump size (10 HP 3" pump), the pump would withdraw approximately 100 gallons per minute or 0.2 cfs. This is the amount assumed to be withdrawn from Olive Creek and all the water came from Olive Creek, and is what is analyzed below for effects.

Background

The potential effects of withdrawing water from Olive Creek on stream flow and stream temperatures were assessed using 1) stream temperature data, 2) water depths taken when installing and retrieving stream temperature monitors (hobos), 3) a stream flow measurement from July 19, 2013, and 4) examination of several stream gages from the larger area to determine the timing of summer low flows which are solely the result of groundwater inputs.

a. Stream Temperatures

There are two stream temperature monitors (hobos) on Olive Creek. Hobo Olive.93L.1 is downstream of the confluence of McWillis Gulch and Olive Creek and hobo Olive.93L.2 is upstream of the confluence of Quartz Gulch and Olive Creek. McWillis Gulch does not contribute flow during the summer to Olive Creek but Quartz Gulch, upstream of McWillis Gulch, does contribute flow to Olive Creek.

Hobo Olive.93L.2 is located between Olive Tone and Belvadear Placers. The ODEQ stream temperature standard for Olive Creek is 53.6*F. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at both sites most years (**Table 7-1**).

Table 7-1
7-day running average of the maximum daily stream temperature on Olive Creek in the vicinity of Belvadear

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Beaver Creek	170702020203	Olive	Olive.93L.1	1995	56.42	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	1996	57.1	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	2006	55.77	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	2008	56.3	5181
Beaver Creek	170702020203	Olive	Olive.93L.2	1996	55.9	5266
Beaver Creek	170702020203	Olive	Olive.93L.2	2006	53.09	5266
Beaver Creek	170702020203	Olive	Olive.93L.2	2008	55.7	5266

b. Water Depths

Hobo Olive.93L.2 is located between the Belvadear and Olive Tone operations. Water at the time of installation and removal at the site were 12.4 inches or less, and in most cases 6 inches or less (**Table 7-2**). Upstream of this hobo, but downstream of the Olive Tone operation, Olive Creek has been observed to go dry (C. Helberg, UNF Minerals Administrator, pers. com. 2014).

Maximum water depths were measured at hobo Olive.93L.1, located downstream of McWillis Gulch, on October 13, 2006. The water depth was measured every 10 feet for 100 feet, starting at the hobo site and heading upstream. Values ranged from 3.5 to 4 inches deep. The reduction in water depths in **Table 7-2** indicate that flows had decreased over the course of the summer months.

Table 7-2
Water depths at hobo site Olive.93L.2, located upstream of Belvadear, at installation and removal

Year	Water depth at installation (inches)	Water depth at removal (inches)	Installation Date	Removal Date
1999	6	3	June 2	Sept 7
2000	5	2	May 15	Sept 14

2006	12	4	July 11	Oct 13
2008	12.4	11.4	Jul 4	Oct 16

c. Stream Flow

There are no stream gages on Olive Creek. Therefore, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 and 2013 to look for patterns of flow (*project file)*. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles.

Year 2007 was selected because flows were very low on the NFBR, which is the closest stream gage to Olive Creek and therefore expected to reflect the similar climate conditions, and 2013 because this was the year that the point-in-time stream flow measurement was made on Olive Creek. The stream hydrographs were examined to determine when stream flows were reflecting groundwater inputs only (base flows) and would therefore be at their lowest. While there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would be occurring when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year.. Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

A point-in-time (instantaneous) stream flow measurement was made on July 19, 2013 by Umatilla Forest personnel about 1.5 miles downstream of the proposed activity area. The stream flow was 1.414 cfs with water depths ranging from 2 to 9.5 inches. This flow measurement included water from Quartz Gulch and Buck Gulch and therefore would be larger than the flow at the Belvadear site which is located just upstream of Quartz Gulch. However, using the discharge of 1.414 cfs, the amount proposed for removal by the miner (0.2 cfs) would be 14 percent of the flow. In a drought year or with extended drought, summer low flows are expected to be less, making the amount withdrawn (0.2 cfs) a greater percentage of the total flow.

Conclusions

The available data show that currently stream depths and flows are low in the summer and stream temperatures exceed the ODEQ standard. Therefore, the miner's proposal to withdraw up to 0.2 cfs during the summer has the potential to 1) increase stream temperatures

downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation. The magnitude of the impact would vary as a function of climate and flow conditions that year and prior years.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

The potential for a discharge remains. No additional protection measures could be identified that would prevent a discharge because the discharge determination is based on the location of the mining activity, the proposed activity, and the characteristics of the berm.

Ponds

Source water pond and Settling pond (same pond)
Same as Alternative 2. No discharge potential.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No discharge potential.

Clean Water Act, Section 303(d) (antidegradation)

Olive Creek is not 303(d) listed.

Suction Dredging

None proposed

PACFISH: MM-2 (structures inside RHCAs)

Ponds

Same as Alternative 2. Use of the existing pond as a source water and as a settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. None of the RMO parameters would be affected.

Wetlands and Floodplains

Different than Alternative 2. Under Alternative 3, the Plan would be in compliance with Executive Order 11990 as a result of the addition of Forest Service General Requirements W1-3 (Appendix 2) that address mining in wetlands and wetland reclamation. These Forest Service requirements would "minimize harm to the wetlands" and ensure restoration of their function to the extent possible once mining activity is completed.

Same as Alternative 2. Executive Order 11988 (Protection of Floodplains) does not apply because the miner does not propose any activity in floodplains.

Other Potential Water Resource Potential Impacts

Stream flow and stream temperature alteration related to water withdrawals

Same as Alternative 2. The available data show that currently stream depths and flows are low in the summer and stream temperatures exceed the ODEQ standard. Therefore, the miner's proposal to withdraw up to 0.2 cfs during the summer has the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation. The magnitude of the impact would vary as a function of climate and flow conditions that year and prior years.

Blue Sky Bull Run

Plan type: Placer
Subwatershed: Bull Run Creek (HUC 170702020202)
Subwatershed size: 19,398 acres
Analysis area: 1.7 acres
Creek: Bull Run Creek (perennial flow and fish-bearing); Swamp Creek (mix: perennial-fish bearing in the meadow area to where it connects with Bull Run Creek and intermittent flow and non-fish-bearing in area of ford, which is upstream of meadow area)
Stream Order: Bull Run = 3rd or 4th depending on the mining site; Swamp Creek = 2nd
303(d) listed: Yes for sedimentation
Suction Dredging: Yes
Essential Salmon Habitat: Bull Run Creek = Yes. Swamp Creek = No

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Blue Sky site #1

No potential for a discharge of any pollutants from mining at this site because the site is separated from Bull Run Creek by more than 100 feet and the ground in between is stable tailings covered with lodgepole. The area slopes gently and then flattens as it approaches Bull Run Creek and becomes a meadow. The site is adjacent to Swamp Creek, which seasonally has flow and is connected to Bull Run Creek via a channel. However, tailings line Swamp Creek and would prevent any sediment from entering the creek.

Blue Sky site #2

Potential for a discharge of sediment via surface flow into Swamp Creek because the activity area is 16 feet from the creek and is separated from the creek only by a low berm which is not continuous.

Blue Sky site #3

Potential for a discharge of sediment into Bull Run Creek via surface flow for two reasons: 1) mining activity on the valley floor and in the side channel and 2) the description where the measurement of the miner-proposed 30 foot buffer starts is ambiguous and therefore the effectiveness of the buffer is uncertain.

1. Valley bottom width where mining is proposed is less than 27 feet from the side channel bank to the hillslope, and is either the active floodplain or the 5 year floodplain. Therefore mining activity and the accompanying soil disturbance has a high potential to enter Bull Run Creek during high flow.

2. Depending on the starting point the miner intended to use, there “may” or “may not” be the potential for a discharge of pollutants into Bull Run Creek.

a) If buffer distance is measured from the low-flow channel then it could put the mining activity on the valley floor and in close proximity to Bull Run Creek.

b) If buffer distance is measured from the valley floor-channel break in slope then the mining area would be up on the gentle hillslope. The ground cover between the mining area and the creek is well vegetated and thus would provide effective sediment trapping.

As a result of this uncertainty in mining location, the worst-case scenario was used and assumes activity on the flat valley floor near the creek. In addition to sediment generated by mining on the valley floor reaching the stream, there is also the potential for the test hole activity to trigger bank failure which may result in a large volume of sediment entering the creek. Therefore, under the worst case scenario, there would be the <u>potential for a discharge</u> of sediment into Bull Run Creek via surface flow.

Blue Sky site #4

Potential for a discharge because the description where the measurement of the miner-proposed 30 foot buffer starts is ambiguous and therefore the effectiveness of the buffer is uncertain. Depending on the starting point the miner intended to use, there “may” or “may not” be the potential for a discharge of pollutants into Bull Run Creek.

a) If buffer distance is measured from the low-flow channel then it could put the mining activity on the valley floor and in close proximity to Bull Run Creek.

b) If buffer distance is measured from the valley floor-channel break in slope then the mining area would be up on the gentle hillslope. The ground cover between the mining area and the creek is well vegetated and thus would provide effective sediment trapping.

As a result of this uncertainty in mining location, the worst-case scenario was used and assumes activity on the flat valley floor near the creek. In addition to sediment generated by

mining on the valley floor reaching the stream, there is also the potential for the test hole activity to trigger bank failure which may result in a large volume of sediment entering the creek. Therefore, under the worst case scenario, there would be the potential for a discharge of sediment into Bull Run Creek via surface flow.

Bull Run site #1

Potential for a discharge because the description where the measurement of the miner-proposed 30 foot buffer starts is ambiguous and therefore the effectiveness of the buffer is uncertain. Depending on the starting point the miner intended to use, there “may” or “may not” be the potential for a discharge of pollutants into Bull Run Creek.

a) If the buffer distance is measured from the low-flow channel then it could put the mining activity on the valley floor and in close proximity to Bull Run Creek.

b) If the buffer distance is measured from the valley floor-channel break in slope then the mining area would be up on the gentle hillslope. The ground cover between the mining area and the creek is well vegetated and thus would provide effective sediment trapping.

As a result of the uncertainty in mining location, the worst-case scenario was used which may result in some activity on the flat valley floor close enough to the edge of the channel bank to trigger bank failure as a result of digging the test holes. This may result in a large volume of sediment entering the creek.

Bull Run site #2

No potential for a discharge of any pollutants related to mining activity because the activity is located 45 feet from the creek, the ground is flat and well vegetated and the sediment trapping capability is very high.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because water would be withdrawn from only an existing pond.

Settling ponds

No potential for a discharge via surface or subsurface flow from the settling ponds into either Swamp or Bull Run Creeks because 1) the ponds are old dredge ponds and are capable of holding volumes of water much greater then proposed by the operation and, and 2) the pond

bottoms are vegetated with lush grasses, rushes and sedges which are effective at trapping fine sediment. See Appendix 3 for detailed discussion.

Fords

There are two existing fords. One ford is across Bull Run Creek and the other is across Swamp Creek. The existing Bull Run Creek ford across Bull Run Creek is used by the public to access two dispersed camp sites via a non-system road which has been given a temporary access road identifier of 7300-E4a for this analysis. This ford would also be used by the miner.

The existing Swamp Creek ford would be accessed via temporary access road 7300-E4b. The Swamp Creek ford would be used for heavy equipment and trucks. The existing wooden bridge that crosses Swamp Creek would be used for ATVs. The area of Swamp Creek where the ford exists has been impacted by past mining and has only intermittent flow. This portion of the channel is expected to by dry by early to mid-June given the characteristics of the channel bed (coarse cobbles and past mining activity).

Bull Run Creek ford

No potential for a discharge because the ford is already hardened and the channel bed is stable.

Swamp Creek ford

Potential for a discharge of sediment from use of this ford because the stream banks are vertical and would be eroded into the creek during use.

Bridges

Existing bridge

In addition to the Swamp Creek ford discussed above, there is also an existing wooden bridge across the creek that would be used by ATVs to access the processing site and mining site 1. No potential for a discharge of sediment as a result of use because it is stable and would only be used by ATVs. Heavy equipment would be transported across Swamp Creek via the ford.

Proposed temporary bridge

The temporary bridge would be used to access Bull Run site #2 and would cross Bull Run Creek. This bridge exists ONLY under Alternative 2.

Potential for a discharge of sediment into Bull Run Creek as a result of placement of the temporary bridge because some disturbance of the stream banks is anticipated that may result in sediment entering the creek.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use four existing and three proposed temporary access roads to access the various sites (Appendix 6). All of these access roads are separated from Bull Run Creek by flat, well-vegetated ground. Distance between the creek and the roads vary from 90 to more than 200 feet. All of the roads are inside the RHCAs of Bull Run Creek and Swamp Creek.

TA 7300-E4a, E4b, E4c and 7300-Ma1 (existing)

No potential for a discharge related to use of these roads because there is sufficient distance and ground cover to trap any sediment that might leave these roads. See Appendix 3 for detailed discussion.

TA 7300-M4a and M4b (proposed)

Potential for a discharge because the roads would be close to the streams in order to access the sites, but the road locations have not yet been identified. See Appendix 3 for detailed discussion.

Clean Water Act, Section 303(d) (antidegradation)

Bull Run Creek is 303(d) listed for sedimentation by ODEQ. Sedimentation is defined by ODEQ as: "The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry…."

The activities proposed in this Plan would maintain the water quality condition for which this stream is listed for the following reasons. There would be no potential for increased sedimentation from the proposed activities (including suction dredging) despite the potential inputs of fine sediment due to mining-related activities on land because the sediment would move through the system as suspended load and not settle out on the channel bed. With respect to suction dredging, no new sediment would be added into the stream, but simply loosened and redistributed downstream during the spring high flows. The changes in substrate would be permanent but highly localized and restricted to the areas that are suction dredged.

Suction Dredging

Motorized mining, such as suction dredging, is currently not permitted in Essential Salmon Habitat. A State of Oregon moratorium for suction dredging is currently in effect until 2021, or until the Oregon State legislature changes the law. However, since the Plans approved under the Granite Mining FEIS will extend beyond the 2021 moratorium, activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of

Oregon rules and regulations. If the moratorium is lifted this effects analysis will be re-evaluated to determine if the proposed activities meet the requirements of the 700PM permit that is in place at that time.

The analysis below assumes that the miners would be in compliance with the 2015 700PM permit (Appendix 4B) and all its requirements.

In evaluating suction dredging on Bull Run Creek in the area of the proposed operation, impacts to the following parameters were considered: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability (Appendix 4A).

Site Characteristics

The channel bed in this area is predominantly cobbles with some gravels and sands and highly stable given the abundance of cobbles. Bull Run Creek was historically placer mined and therefore, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.7, 8, 9 and 10).

Water Quality and Channel Morphology analysis

Pool frequency and distribution: Localized changes in pool frequency and locations related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

Habitat complexity: Potential local change to habitat complexity because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be permanent.

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) therefore would remain intact thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local change on water clarity as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the 700 PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact is limited to the when the miner is suction dredging.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability even through dredging will create pools because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

Summary of Effects

The analysis found that suction dredging would have no impact on 1) stream temperature or 2) channel bed stability for the reasons stated above. Suction dredging would have a local impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. The changes to pool frequency, habitat complexity and substrate are expected to be permanent but limited to the area worked and therefore would not have a measurable impact on channel complexity or channel stability. Changes in turbidity would impact less than 300 feet of stream and not be permanent but limited to the period of time that the miner is suction dredging.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) existing source water pond, 2) existing settling ponds, 3) existing temporary access roads, 4)

the proposed temporary access roads, 5) an existing bridge, and 6) a proposed temporary bridge.

Ponds

Source water pond

Use of the existing source water pond would be would be in compliance with MM-2 because the miner proposes to only withdraw water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation.

Settling ponds

Use of the existing settling ponds would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Existing TA roads

Use of the existing TA roads would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Proposed TA roads (except TA 7375-M1b)

Construction and use of the proposed TA roads would NOT be in compliance with MM-2 because there is the potential for impacts to water quality, soils and riparian vegetation. See Appendix 3 for detailed discussion.

Proposed TA 7375-M1b

N/A. This road exists only under Alternative 3. It is instead of the proposed temporary bridge proposed under Alternative 2.

Bridges

Existing bridge

The existing wooden bridge would be in compliance with MM-2 because there is no potential for impacts to water quality, soils and riparian vegetation. See Appendix 3 for detailed discussion.

Proposed temporary bridge

The proposed bridge would NOT be in compliance with MM-2 because there is the potential for impacts to water quality, soils and riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: Localized changes in pool locations and frequency related to suction dredging would occur because dredging would create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

No changes would occur to pool frequency related to potential for inputs of fine sediment from mining activity because inputs would move through the system as suspended load and not settle out in the pools. There would be no changes in pool frequency related to *Large Woody Debris* recruitment because no trees are proposed for removal.

Water Temperature: No changes in *Water Temperature* because 1) there would be only very limited removal of trees, none of which would be shade trees and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit which would ensure that there would be no increase in stream channel widths or channel depths which would alter water depths and influence stream temperatures (Appendix 4A).

Large Woody Debris: No changes in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees are proposed for removal and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit. Schedule C.8, 9, and 10 of the permit limits the amount of instream habitat structures that can be moved or altered (Appendix 4A).

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

No changes would occur to substrate sediment as a result of potential for inputs of fine sediment related to mining activity because inputs would move through the system as suspended load.

Bank Stability: No changes in *Bank Stability* because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* because there would be 1) no change to *Bank Stability* and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit (Appendix 4B) which prevent dredging of the stream banks and altering stream channel widths. With respect to changes in channel depths, the channel bed composition is a mix of cobbles, sands and gravels and highly stable. Therefore, there would be no potential for suction dredging to trigger a headcut and increase channel depths.

Wetlands and Floodplains

Mining activity is proposed in the active to 5 year floodplain at Blue Sky site #3.
The Plan would NOT be in compliance with Executive Order 11988 (Protection of Floodplains) because the miner has not ensured that mining in this area would not have impacts beyond a season as it pertains to floodplain function. Because vegetation would be removed during mining, there is potential for the spring high flows to erode some of the material mined and create a new channel in the floodplain.

Executive Order 11990 (Protection of Wetlands) does not apply because the Plan does not propose any activity in floodplains.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Blue Sky site #1

Same as Alternative 2. No discharge potential.

Blue Sky site #2

Different from Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** with the addition of the Forest Service WRPM (Appendix 11) because the straw bales/coils would ensure an effective sediment barrier that would prevent sediment generated by the mining activity from reaching Swamp Creek.

Ground cover in the 16 feet that separates Swamp Creek from the test site is 100% grasses and forbs and the topography is flat.

Blue Sky site #3

Same as Alternative 2. Under Alternative 3, potential for a discharge into Bull Run Creek remains despite the additional Forest Service WRPMs because there are no WRPMs that could be identified that would address active mining in the side channel. However, the amount may be less than under Alternative 2.

Ground cover on the valley floor is 100% and composed of lush grasses and forbs.

Blue Sky site #4

Different from Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** with the addition of the Forest Service WRPM (Appendix 11) which clarifies the starting point of the buffer width measurement. The WRPM, which clarifies the Plan-specific buffer, places the mining activities clearly on a flat valley floor with a full 30 foot zone of flat, well-vegetated ground buffer, in addition to the active floodplain width, and have the added barrier of the straw bales/coils between the activity and the stream. Therefore, there would be sufficient sediment trapping mechanisms in place (ground cover and straw bales/coils) to prevent sediment from reaching the creek.

Ground cover on the valley floor is 100% with grasses and forbs. Ground is flat and valley bottom varies between 24 and 80 feet wide. Ground cover on hillslope is also 100% with grasses, needles, and forbs. Well forested with lodgepole and larch.

Bull Run site #1

Different from Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** with the addition of the Forest Service WRPM (Appendix 11) which clarifies the starting point of the buffer width measurement. The WRPM, which clarifies the Plan-specific buffer, places the mining activities clearly on a flat valley floor with a full 30-foot zone of flat, well-vegetated ground buffer, in addition to the active floodplain width, and have the added barrier of the straw

bales/coils between the activity and the stream. Therefore, there would be sufficient sediment trapping mechanisms in place (ground cover and straw bales/coils) to prevent sediment from reaching the creek.

Ground cover on the valley floor is 100% and composed of forbs, grasses and needles. Lodgepole is present. On the active floodplain, the ground cover is 100% and is dense with grasses, forbs, sedges, and riparian woody (willow, alder, other).

Bull Run site #2

Different from Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because of the addition of the Forest Service WRPMs (Appendix 1) which would not approve the bridge for use, thereby leaving the stream banks well vegetated and undisturbed. Instead, a two track road to the site would be sited through the forest with input from the Forest Service and would ensure that any areas of concern are avoided and the appropriate Forest Service WRPM put into place.

Ground cover on the terrace is estimated at 75% or more and is grasses and forbs. Terrace is flat to gently sloping.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Same as Alternative 2. No potential for a discharge.

Fords

Same as Alternative 2. No potential for a discharge.

Bridges

Existing bridge

Same as Alternative 2. No potential for a discharge as a result of use.

Proposed temporary bridge

Dropped under Alternative 3. Temporary bridge would be replaced with the proposed two-track road 7300-M4b.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Existing TA roads

Same as Alternative 2. No potential for a discharge.

Proposed temporary road 7300-M4a and M4b

Different from Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** as a result of the addition of Forest Service WRPMs (Appendix 11) and General Requirements (Appendix 2). See Appendix 3 for detailed discussion.

Proposed TA road 7300-M1b

Different than Alternative 2. Under Alternative 3, this road would be added to replace the temporary bridge option. This road would be a two-track native surface road and would connect to 7300-M4b. No potential for a discharge because of the additions of Forest Service WRPMs (Appendix 11) and General Requirements (Appendix 2). See Appendix 3 for detailed discussion.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Bull Run Creek is listed for sedimentation and the activities proposed in this Plan would maintain the water quality condition for which this stream is listed.

Suction Dredging

Same as Alternative 2. The analysis found that suction dredging would have no impact on stream temperature or channel bed stability for the same reasons stated under Alternative 2. Suction dredging would have localized and permanent impacts related to pool frequency and distribution, habitat complexity and substrate and localized but short-term impacts to turbidity for the same reasons stated under Alternative 2.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) existing source water pond, 2) existing settling ponds, 3) existing temporary access roads, 4)

the proposed temporary access roads, 5) an existing bridge, and 6) a proposed temporary bridge.

Ponds

Source water pond

Same as Alternative 2. Use of the ponds would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use of the ponds would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Existing TA roads

Same as Alternative 2. Use of the roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Proposed temporary road 7300-M4a and M4b

Different than Alternative 2. Under Alternative 3, construction and use of these roads would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs (Appendix 11) and General Requirements (Appendix 2). See Appendix 3 for detailed discussion.

Proposed TA road 7300-M1b

Different than Alternative 2. Under Alternative 3, this road would be added under Alternative 3 to replace the temporary bridge option. Construction and use of this road would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs (Appendix 11) and General Requirements (Appendix 2). See Appendix 3 for detailed discussion.

Bridges

Existing bridge

Same as Alternative 2. Use of the existing wooden bridge would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Proposed temporary bridge

DROPPED under Alternative 3. Replaced with proposed TA road 7300-M1b.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. Only *Pool Frequency* and *Substrate Sediment* have the potential to be affected as a result of suction dredging. The changes would be permanent but localized to the area dredged and there would be no measurable changes to these inchannel characteristics even within the Plan analysis area.

Wetlands and Floodplains

Different than Alternative 2. Under Alternative 3, the mining activity is proposed in the active to 5-year floodplain at Blue Sky site #3 would be in compliance with Executive Order 11988 (Protection of Floodplains) as a result of the addition of Forest Service WRPM. This WRPM requires that the hole at this site be filled at the end of the season and the disturbed area be seeded and covered with straw. The WRPM ensures that should the area flood in the spring, erosion would be minimal and channel formation on the valley floor would not occur.

Same as Alternative 2. Executive Order 11990 (Protection of Wetlands) does not apply because the miner does not propose any activity in wetlands.

Other Potential Water Resource Potential Impacts

None

Blue Smoke

Plan type: Placer
Subwatershed: Lower Granite (HUC 170702020203)
Subwatershed acres: 20,282 acres
Analysis area: 1.75 acres
Creek: Granite Creek (perennial flow and fish-bearing)
Stream Order: 5th
303(d) listed: No
Suction Dredging: Yes
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Sites 1, 2 and 3

No potential for a discharge of any pollutants from mining activity at site 1 into Granite Creek because the mining area is separated from Granite Creek by 1) the powerline road, 2) a series of old dredge ponds which have developed lush riparian vegetation adjacent to them, and 3) County Road 24.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because only withdrawing water from an existing pond.

Settling ponds

No potential for a discharge via surface flow from the settling pond into Granite Creek under because the proposed settling pond is an old dredge pond and capable of receiving volumes of water much greater then proposed by the operation and is separated from Granite Creek by County Road 24.

No potential for a discharge via subsurface flow from the settling pond because the County Road 24 road fill has limited permeability. Only a shift in vegetation type on the fill slope adjacent to Granite Creek suggests that some water is seeping through the fill, but no signs of erosion were observed on the fill slope in this area.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Existing temporary access road (1000-E1a) is proposed for use.

No potential for a discharge into Granite Creek from use of this road because the road is stable and separated from Granite Creek by a fill slope, small floodplains around the old dredge ponds and County Road 24.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

Motorized mining, such as suction dredging, is currently not permitted in Essential Salmon Habitat. A State of Oregon moratorium for suction dredging is currently in effect until 2021, or until the Oregon State legislature changes the law. However, since the Plans approved under the Granite Mining FEIS will extend beyond the 2021 moratorium, activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations. If the moratorium is lifted this effects analysis will be re-evaluated to determine if the proposed activities meet the requirements of the 700PM permit that is in place at that time.

The analysis below assumes that the miners <u>would be in compliance</u> with the 2015 700PM permit (Appendix 4B) and all its requirements.

In evaluating suction dredging on Granite Creek in the area of the proposed operation impacts to the following parameters were considered: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability (Appendix 4A, 4B).

<u>Site Characteristics</u>

The channel bed in this area is predominantly cobbles with some gravels and sands and highly stable given the abundance of cobbles. Granite Creek was historically placer mined and therefore, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.7, 8, 9 and 10).

<u>Water Quality and Channel Morphology analysis</u>

Pool frequency and distribution: Localized changes in pool frequency and locations related to suction dredging would occur as dredging will create pools and loosen the substrate. The

pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

Habitat complexity: Potential local changes in habitat complexity would occur because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be permanent

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) therefore would remain intact thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local change in water clarity would occur as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the 700 PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact is limited to the when the miner is suction dredging.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability would occur even through dredging will create pools because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

<u>Summary of Effects</u>

The analysis found that suction dredging would have no impact on 1) stream temperature or 2) channel bed stability for the reasons stated above. Suction dredging would have a local impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. The changes to pool frequency, habitat complexity and substrate are expected to be permanent but limited to the area worked and therefore would not have a measurable impact on channel complexity or channel stability. Changes in turbidity would impact less than 300 feet of stream and not be permanent but limited to the period of time that the miner is suction dredging.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) an existing settling pond and 3) an existing temporary access road (TA road 1000-E1a).

Ponds

Source water pond

Use of the existing source water pond would be in compliance with MM-2 because only water is being withdrawn. Therefore, there would be no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Use of the existing settling pond would be in compliance with MM-2 because there would no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Use of existing temporary access road 1000-E1a would be in compliance with MM-2 because there would be no impacts to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: Localized changes in *Pool Frequency* and locations would occur as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

No changes would occur to pool frequency related to potential for inputs of fine sediment from mining activity because inputs would move through the system as suspended load and not settle out in the pools. There would be no changes in pool frequency related to *Large Woody Debris* recruitment because no trees are proposed for removal.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be only very limited removal of trees and none would be shade trees and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit which would ensure that there would be no increases in stream channel widths which would alter water depths and influence stream temperatures (Appendix 4A). In addition, the channel bed is composed of cobbles, gravels and sand and is highly stable. Therefore, suction dredging would not trigger a headcut and alter channel depths.

Large Woody Debris: No changes in *Large Woody Debris* recruitment or existing wood in the stream would occur because 1) the only place where trees would be cut is in the spur road/skid trail so that potential LWD recruitment would not be affected, and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit. Schedule C.8, 9 and 10 of the permit limits the amount of instream habitat structures that can be moved or altered (Appendix 4B).

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

No changes would occur to substrate sediment as a result of potential for inputs of fine sediment related to mining activity because inputs would move through the system as suspended load.

Bank Stability: No changes in *Bank Stability* because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* because 1) there would be no change to *Bank Stability* and 2) suction dredging would occur under the requirements established in the

ODEQ 700 PM permit (Appendix 4B). Currently channel bed composition is a mix of cobbles, sands and gravels and highly stable. Therefore, there would be no potential for suction dredging to trigger a headcut.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts
None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Sites 1, 2 and 3

Same as Alternative 2. No discharge potential.

Ponds

Source water pond

Same as Alternative 2. No discharge potential.

Settling ponds

Same as Alternative 2. No discharge potential.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No discharge potential.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

Same as Alternative 2. The analysis found that suction dredging would have no impact on stream temperature or channel bed stability for the same reasons stated under Alternative 2. Suction dredging would have localized and permanent impacts related to pool frequency and distribution, habitat complexity and substrate and localized but short-term impacts to turbidity for the same reasons stated under Alternative 2.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) an existing settling pond and 3) an existing temporary access road (TA road 1000-E1a).

Ponds

Source water pond

Same as Alternative 2. Use of the source water pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling pond

Same as Alternative 2. Use of the settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. Only *Pool Frequency* and *Substrate Sediment* have the potential to be affected as a result of suction dredging. The changes would be permanent but localized to the area dredged and there would be no measurable changes to these inchannel characteristics even within the Plan analysis area.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts
None

Bunch Bucket

Plan type: Placer
Subwatershed: Clear Creek (HUC 170702020204)
Subwatershed size: 13,075 acres
Analysis area: 10 acres
Creek: Clear Creek (perennial flow and fish-bearing)
Stream Order: 3rd or 4th depending on the mining site
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Site 1

No potential for a discharge of sediment into Clear Creek because the site on flat ground and is separated from the creek by at least 82 feet of flat ground, with abundant ground cover composed of lush grasses and forbs, and a road that is 70 feet from the creek. Therefore, movement of sediment off the site would not be expected, but if it were to occur, the sediment would be trapped by the road before reaching the creek.

Site 2

No potential for a discharge of sediment into Clear Creek because the site is on a hillslope that is separated from the creek by 150 feet of flat ground and a road.

Small creek

This creek was identified by the miner as occurring in Site 1.

Potential for a discharge because the miner's WRPMs for the very small creek would likely create sediment. However, the small creek was not observed by either the hydrologist or the minerals administrator, so the creek and its connectivity to Clear Creek could not be determined. Therefore, the worst case scenario was used (small creek and Clear Creek are connected), and in this scenario there would be a potential for a discharge of sediment into Clear Creek.

Ponds

The source water pond and the settling pond are the same depression. The pond was dry during the site visit and the lack of any vegetation in the bottom of the pond indicates that the amount of water is limited.

Source water pond

No potential for a discharge via surface or subsurface flow because the miner would only be withdrawing water.

Settling ponds

No potential for a discharge via surface or subsurface flow from the settling pond into Clear Creek because the pond is 1) more than 100 feet from the creek, 2) is separated from the creek by a road that is bermed on the side closest to the stream with the road more than 70 feet from the creek, 3) the ground is flat, and 4) the ground vegetation is 100 percent and very lush.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use three existing Temporary Access roads (Appendix 6). All of these access roads are more than 100 feet from Clear Creek and separated from the creek by flat, well-vegetated ground. Therefore, any sediment that would erode off the road would be trapped by the vegetation and not reach the creek. Therefore, no potential for a discharge into Clear Creek as a result of road use. See Appendix 3 for detailed discussion.

Clean Water Act, Section 303(d) (antidegradation)

Clear Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are the existing temporary access roads.

Ponds

N/A. The pond proposed for use is outside the RHCA. The question of compliance with MM-2 does not apply.

Access Roads

Use of the TA roads would be in compliance with MM-2 because there would be no impacts to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment under Alternative 2 would be small and move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and

therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes in *Large Woody Debris* recruitment or existing wood in the stream would occur because 1) the only place where trees would be cut is in the spur road/skid trail so that potential LWD recruitment would not be affected, and 2) there would be no activity in the channel to alter existing amounts.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and 2) no instream activity which could trigger a headcut.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Site 1

Same as Alternative 2. No potential for a discharge

Site 2

Same as Alternative 2. No potential for a discharge

Small creek

Different than Alternative 2. Under Alternative 3, the discharge potential into the small creek **would be eliminated** because the Forest Service WRPMs (Appendix 11) would allow for appropriate protections measures to be identified prior to any activity.

Ponds

The source water pond and the settling pond are the same depression. The pond was dry during the site visit and the lack of any vegetation in the bottom of the pond indicates that the amount of water is limited.

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Same as Alternative 2. No potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Clear Creek is not 303(d) listed.

Suction Dredging

None proposed

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are the existing temporary access roads.

Ponds

N/A. Same as Alternative 2. The pond proposed for use is outside the RHCA. The question of compliance with MM-2 does not apply.

Access Roads

Same as Alternative 2. Use of the TA roads would be in compliance with MM-2. The pond is outside the RHCA.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. The RMO parameters would not be affected.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

City Limits

Plan type: Placer
Subwatershed: Upper Granite Creek (HUC 170702020201)
Subwatershed size: 9,312 acres)
Analysis area: 1 acre
Creek: Granite Creek (perennial flow and fish-bearing)
Stream Order: 4th
303(d) listed: Yes for sedimentation
Suction Dredging: No

Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Ground cover on the hillslope where the test holes will be dug is 100%. Cover is grasses, forbs and needles.

No potential for a discharge via surface or subsurface flow of sediment into Granite Creek because the mining activity area and the processing area is separated from Granite Creek by Forest Road 73 and old tailings.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because the miner would only withdraw water from an existing pond.

Settling ponds

No potential for a discharge via surface flow from the settling ponds into Granite Creek because the ponds are old dredge ponds and capable of receiving volumes of water much greater than proposed by the operation, and are separated from Granite Creek by Forest Road 73 and other old placer tailings.

No potential for a discharge via subsurface flow from the settling pond because Forest Road 73 road fill has limited permeability and the ponds have silt on their bottoms, indicating that the ponds have sealed and are not moving sediment through the subsurface.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use two existing Temporary Access roads (Appendix 6). No potential for a discharge into Granite Creek as a result of road use. All of these access roads are more than 100 feet from Granite Creek and separated from the creek by Forest Road 73 and old dredge ponds. There is sufficient ground to trap any sediment that is generated by road use and prevent it from reaching the creek. See Appendix 3 for detailed discussion.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is 303(d) listed for sedimentation by ODEQ. Sedimentation is defined by ODEQ as: "The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry…."

The activities proposed in this Plan would not alter the existing water quality condition because 1) there would be no sediment input into the creek and 2) no suction dredging is proposed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing settling ponds and 3) two existing temporary access roads.

Ponds

Source water pond

Use of the existing source water pond would be in compliance with MM-2 under Alternative 2 because the miner would only withdraw water from the pond. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation.

Settling ponds

Use of the existing settling ponds would be in compliance with MM-2 under Alternative 2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access roads

Use of the existing TA roads would be in compliance with MM-2 under Alternative 2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) no potential for a discharge of sediment as a result of any proposed activity, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes in *Large Woody Debris* recruitment or existing wood in the stream would occur because 1) only small saplings would be cut is in access road and on the hillslope were mining is proposed and these areas are more than 100 feet from the creek and separated from the creek by Forest Road 73 and 2) no instream activity is proposed that would alter existing amounts and distributions.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) no potential for a discharge of sediment from mining activities on land.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore channel widths and 2) no instream activity is proposed which could trigger a headcut and alter channel depths.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Same as Alternative 2. No potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is 303(d) listed for sedimentation and the activities proposed in this Plan would maintain the existing water quality condition for which this stream is listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing settling ponds, and 3) two existing temporary access roads.

Ponds

Source water pond

Same as Alternative 2. Use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access roads

Same as Alternative 2. Use of the existing TA roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

East Ten Cent

Plan type: Placer
Subwatershed: Lower Granite (HUC 170702020206)
Subwatershed size: 20,282 acres
Analysis area: 2 acres
Creek: East Ten Cent Creek (intermittent flow and non-fish bearing)
Stream Order: 2nd
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: No

ALTERNATIVE 2

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Potential for a discharge via surface flow of sediment into East Ten Cent Creek as a result of the mining activity. The miner proposes to mine from north to south. However, the north portion is in close proximity to the creek, elevationally above it and the old tailings which make up the fill slope of the bench feeds directly into the creek. The bench that separates the north mining area from the creek is narrow in this area and there is little room for equipment to turn around or for any overburden to be placed on the berm without it eroding and entering the creek.

Ponds

The source water pond and the settling pond are the same pond.

Source water pond

No potential for a discharge via surface or subsurface flow when used as a source water pond because the miner would only withdraw water.

Settling Ponds

No potential for a discharge via surface flow when used as a settling pond into East Ten Cent Creek because the pond is an old dredge pond and a berm exists between the creek and the ponds.

No potential for a discharge via subsurface flow when used as a settling pond because the pond is well-sealed with fines, contains vegetation, and no changes are expected in the volume of water entering the pond during the operation.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridges

One existing wooden foot bridge across East Ten Cent Creek is proposed for use. Bridge would only be used for foot traffic. No potential for a discharge of sediment as a result of use because bridge is existing and stable and no bridge modifications planned.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use two closed Forest Service roads and two existing Temporary Access roads (Appendix 6). The Forest Service roads and one of the mine access roads have an aggregate surface. The other mine access road is a native surface road.
No potential for a discharge from use of any of the roads because they are all separated from the creek by either dense vegetation and/or old mine tailings. Both are effective at trapping any sediment that is generated by road use and prevent it from reaching the creek.

Clean Water Act, Section 303(d) (antidegradation)

East Ten Cent Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing settling pond, 2) one closed Forest Service road (7350-050), 3) two existing temporary access roads, and 4) one existing bridge. Forest Service closed road 7350-070 is also proposed for use but is outside the RHCA and therefore not discussed further.

Ponds

The source water pond and the settling pond are the same pond.

Source water pond

Use of the pond as a source water pond would be in compliance with MM-2 because the miner would only be withdrawing water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation.

Settling ponds

Use of the pond as a settling pond would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

FS closed road (7350-050)

Use of the FS closed road would be in compliance with MM-2 because no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Existing TA roads

Use of the existing TA roads would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Bridges

Use of the existing wooden bridge across East Ten Cent Creek would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment would be small and

move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes would occur to *Large Woody Debris* recruitment or existing wood in the stream because 1) the only place where trees would be cut is in the small area to be mined and 2) there would be no activity in the channel to alter existing amounts and distributions.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore channel widths and 2) no instream activity which could trigger a headcut and alter channel depths.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because the change in the direction of work (FROM north to south TO south to north) allows the bench width at the northern part of the area to be mined to be increased PRIOR to activity. This, in combination with the placement of straw bales at the edge of the bench to separate the mining area from the fill slope of old tailings that feeds directly into the creek, would prevent sediment from entering the creek. In addition, the area where the overburden will be stockpiled is separated from the creek by the E1A-070 road, and the intervening area has ground cover of grasses and forbs.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Same as Alternative 2. No potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridge

Same as Alternative 2. No potential for a discharge from use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

East Ten Cent Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing settling pond, 2) one closed Forest Service road (7350-050), 3) two existing temporary access roads, and 4) one existing bridge.

Ponds

The source water pond and the settling pond are the same pond.

Source water pond

Same as Alternative 2. Use would be in compliance with MM-2.

Settling ponds

Same as Alternative 2. Use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

FS closed road (7350-050)

Same as Alternative 2. Use of this FS closed road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Existing TA roads

Same as Alternative 2. Use of the existing TA roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Bridges

Same as Alternative 2. Use of the existing wooden bridge would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Eddy Shipman

Plan type: Placer and Lode
Subwatershed: Upper Granite (HUC 170702020201)
Subwatershed size: 9,312 acres
Analysis area: 2.5 acres
Creek: Granite Creek (perennial flow and fish bearing) and Chipman Gulch (intermittent flow and non-fish-bearing)
Stream Order: Granite = 2nd, Chipman Gulch = 1st
303(d) listed: Yes for Granite Creek for sedimentation
Suction Dredging: No
Essential Salmon Habitat: Granite Creek = Yes. Chipman Gulch = No.

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Lode mining (east and west side adits)

Potential for a discharge of heavy metals via surface and subsurface flow into Granite Creek because the waste rock is expected to be high in heavy metals based on evaluations of the area (Cascade Earth Sciences 2006). Adit A, on the east side of Forest Road 73, is above Granite Cr. and about 150 feet from the creek. Therefore, if groundwater is encountered and it seeps into the ground then subsurface flow will be towards the creek. Adit B, on the west side of Forest Road 73, may also intercept groundwater. Water exiting the adit would enter the

ground. Given the close proximity of the gulch and the creek to the adits, contaminated groundwater could reach these creeks.

Placer mining

No potential for a discharge as a result of placer mining because the area to be mined is behind tailings which would effectively trap any sediment that moved off site.

Ponds

The source water pond and the settling ponds are the same for both Lode and Placer processing. They are existing dry ponds created by placement of old placer tailings.

Source water pond

Potential for a discharge of water via surface flow into Granite Creek because the existing depression to be used as a source water pond is not sufficiently bermed at its lower end where it is adjacent to the wet meadow. The distance between the pond and the creek is about 60 feet.

Settling ponds

Under Alternative 2, use of the settling pond would NOT be in compliance with MM-2 because of the potential to discharge sediment and heavy metals into Granite Creek via surface flow (sediment) and subsurface flow (heavy metals). See Appendix 3 for detailed discussion.

Fords

One existing ford proposed for use via closed Forest Service road 7300-680 and temporary access road 7300-E1d. Potential for discharge of sediment from use of the ford to access Adit A on the west side because the approaches are sloped and composed of fine-grained sediments and serve as a sediment source that could easily reach the creek. The ford is about 50 feet wide.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use two closed Forest Service roads and three existing Temporary Access roads (Appendix 6).

East side access

FS closed road 7300-680 and TA road 7300-E1d

Potential for a discharge related to use of FSR 7300-680 and existing temporary mine-access road 7300-E1d because both roads slope towards Granite Creek and are composed of a mix of fines and coarser material.

West side access

FS closed road 7300-590 and TA roads 7300-E1a and E1b

No potential for a discharge related to use of the other existing roads because they cross the creek via a culvert, are located on flat ground and/or are distant from the creek.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is 303(d) listed for sedimentation by ODEQ. Sedimentation is defined by ODEQ as: "The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry…."

The activities proposed in this Plan would not change the water quality condition for which this stream is listed, despite the potential inputs of fine sediment and or heavy metals because the sediment would move through as suspended load and the heavy metals would move through in solution.

Suction Dredging

None proposed

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) proposed source water pond, 2) proposed settling ponds, 3) two closed FS roads, and 4) four existing temporary access roads. The proposed ponds would be used for both lode processing and placer processing.

<u>Ponds</u>

Use of the source water pond <u>would be in compliance</u> with MM-2 because the miner would only withdraw water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Use of the settling pond would NOT be in compliance with MM-2 because there is the potential to discharge heavy metals and sediment into Granite Creek. See Appendix 3 for detailed discussion.

Access Roads (West side)

FS closed road 7300-590 and TA roads 7300-E1a and E1b

Use of these roads would be in compliance with MM-2 because there would be no impacts to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads (East side)

FS closed road 7300-680 and TA road 7300-E1d

Use of these roads would NOT be in compliance with MM-2 because of potential impacts to water quality. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur because 1) the potential inputs of fine sediment under Alternative 2 would move through the system as suspended load and 2) there would be no changes in pool frequency related to *Large Woody Debris* recruitment because any trees cut would be individually selected and at least 50 feet from the creek.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) only selected trees for mining timbers would be removed and these would be at least 50 feet from the creek and 2) there would be no activity in the channel to alter existing amounts.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes would occur in *Lower Bank Angle* for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and 2) no instream activity is proposed that could trigger a headcut.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

The miner proposes to use a tributary to Granite Creek as source water for processing water from Chipman Gulch. Based on the equipment used, the pump would withdraw approximately 100 or 150 gpm or 0.2 to 0.3 c fs. This is the amount that is assumed would be withdrawn from Chipman Gulch and what is analyzed below for effects.

Background

The potential effect of withdrawing water from Chipman Gulch on stream flow in Chipman Gulch and Granite Creek was limited to the examination of several stream gages from the larger area to determine the timing of summer low flows because 1) there is no temperature data for Chipman Gulch and 2) there is no flow data for Chipman Gulch. . Chipman Gulch appears to be perennial but non-fish bearing due to a fish barrier (Allison Johnson, Umatilla NF fisheries biologist, email comm. May 30, 2013). Stream temperature data for Granite Creek from monitoring sites located upstream and downstream of Chipman Gulch is provided for reference.

a. Stream Temperatures

There is no temperature data for Chipman Gulch. However, there is stream temperature data for Granite Creek. Granite.93C.4 is located downstream of Chipman Gulch and Granite.93C.5 is located upstream of Chipman Gulch. The ODEQ stream temperature standard for Granite Creek is 53.6*F. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at both sites most years (**Table 7-3).**

Table 7-3
7-day running average of the maximum daily stream temperature on Granite Creek in the vicinity of Eddy Shipman

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Granite	Granite.93C.4	1997	57.85	5006
Upper Granite Creek	170702020201	Granite	Granite.93C.5	1998	57.09	5200
Upper Granite Creek	170702020201	Granite	Granite.93C.5	2005	54.39	5200

b. Water Depths

There are no water depths for Chipman Gulch. The water depths measured at the Granite.93C.5 hobo site during installation and removal suggest that flows, at least in this section of Granite Creek, were relatively constant most years because water depths at the hobo site showed little reduction in depth over the season, except in 2003 (**Table 7-4**).

Table 7-4
Water depths at hobo site on Granite Creek upstream of Chipman Gulch at installation and removal in the vicinity of Eddy Shipman

Hobo number	Survey Yr	Elevation (ft)	water depth at installation (inches)	water depth at removal (inches)	Installation Date	Removal Date
Granite.93C.5	1998	5200	Not listed	1.0	July 15	Oct 1
Granite.93C.5	1999	5200	1.5	1.5	June 28	Sept 21
Granite.93C.5	2002	5200	1.3	1.1	July 2	Oct 8
Granite.93C.5	2003	5200	1.3	0.5	June 25	Oct 21
Granite.93C.5	2005	5200	1	0.9	June 29	Oct 13

c. Stream Flow

There is no stream flow data for Chipman Gulch. While there are no stream gages on Chipman Gulch or Granite Creek, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 and 2013 to determine when stream flows were reflecting groundwater inputs only (base flows), and would therefore be at

their lowest level(*project file)*. These years were selected because 2007 was a low flow year on some streams in the area, and 2013 includes some point-in-time stream flow measurements made on other streams in the analysis area. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles.

While there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would occur when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year. Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

Conclusions

Chipman Gulch has perennial flow and is non-fish bearing due to the presence of a fish barrier. The impact of withdrawing water from Chipman Gulch, under the right flow conditions, could cause the gulch to go dry. However, its contribution to Granite Creek is small compared to the flow on Granite Creek. Therefore, impacts to Granite Creek stream temperatures and flow as a result of water withdrawals are expected to be nonmeasurable.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Lode mining

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** relative to the lode mining for two reasons: 1) General Requirement L5 requires that there be testing of the first run of material. If testing of the lode material from any of the adits and potentially subsequent material finds the ore has the potential to release acidity or other contaminates into the ground and into Granite Creek via surface or subsurface flow, then based on General Requirement L5, the miner would need to submit a supplement to their Plan that

details how they would prevent heavy metals from entering Granite Creek. This supplement to their plan would then be evaluated and additional WRPMs would be put into place.

Placer mining

Same as Alternative 2. No discharge potential.

Ponds

Source water pond

Different Alternative 2. Under Alternative 3, the potential for a discharge via surface flow into Granite Creek during use **would be eliminated** as a result of the addition of Forest Service WRPMs (Appendix 11). This WRPM requires that the pond be sufficiently bermed to prevent water from entering into the wet meadow via surface flow.

Settling ponds

Different than Alternative 2. Under Alternative 3, the potential for a discharge of sediment and/or heavy metals **would be eliminated** as a result of a Forest Service WRPM and General Requirements L3, 4, and 5. The WRPM would ensure that the settling pond was properly bermed to prevent sediment from entering the wetland via surface flow.

With respect to heavy metals, Forest Service General Requirements L3 and L4 require that the first run of material from any of the adits and potentially subsequent material be tested to assess the potential to release acidity or other contaminates into the ground and into Granite Creek via surface or subsurface flow. If the results were positive, then based on General Requirement L5, the miner would cease any lode related activity and would need to submit a supplement to their Plan that detailed how they would prevent heavy metals from entering Granite Creek. This supplement to their plan would then be evaluated and additional WRPMs would be put into place. Therefore, L5 **would eliminate** the potential for a discharge related to heavy metals.

Fords

Different than Alternative 2. Under Alternative 3, discharge potential from use of the existing ford via closed Forest Service road 7300-680 and temporary access road 7300-E1d **would be eliminated** because of the addition of Forest Service WRPM (Appendix 11) which states that the ford approaches would be rocked. This WRPM would bury the fine sediments and eliminate the sediment source that could easily reach the creek.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use two closed Forest Service roads and four existing Temporary Access roads (Appendix 6).

East side access

FS closed road 7300-680 and TA road 7300-E1d

Different than Alternative 2. Discharge potential **would be eliminated** as a result of the addition of a Forest Service WRPM (Appendix 11) that requires that portions of the roads be rocked to prevent rutting which would funnel water and sediment into Granite Creek.

West side access

FS closed road 7300-590 and TA roads 7300-E1a and E1b

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is 303(d) listed for sedimentation. However, the activities proposed in this Plan would not alter the existing water quality conditions for which this stream is listed for the same reasons as noted under Alternative 2.

Suction Dredging

None proposed

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) proposed source water pond, 2) proposed settling ponds, 3) two closed FS roads, and 4) four existing temporary access roads. The proposed ponds would be used for both lode processing and placer processing.

Ponds

Similar to Alternative 2. Under Alternative 3, use of the ponds would be in compliance with MM-2 as a result of the addition of a Forest Service WRPM and Lode related General Requirements. See Appendix 3 for detailed discussion.

Access Roads (West side)

FS closed road 7300-590 and TA roads 7300-E1a and E1b

Same as Alternative 2. Use of these roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads (East side)

FS closed road 7300-680 and TA road 7300-E1d

Different than Alternative 2. Under Alternative 3, use of these two roads would be in compliance with MM-2 because as a result of the addition of a Forest Service WRPM (Appendix 11) which would rock the existing ford approaches and eliminate the potential for a discharge. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

Same as Alternative 2. The impact of withdrawing water from Chipman Gulch on Granite Creek would be minimal because its flow contribution to Granite Creek is small compared to the flow on Granite Creek. Therefore, impacts to Granite Creek stream temperatures and flow as a result of water withdrawals are expected to be nonmeasurable.

Grubsteak

Plan type: Placer
Subwatershed: Clear Creek (HUC 170702020204)
Subwatershed size: 20,467 acres)
Analysis area: 2 acres
Creek: Clear Creek (perennial flow and fish-bearing)
Stream Order: 4th
303(d) listed: No

Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Site A

No potential for a discharge into Clear Creek because the site is located about 200 feet from the creek. The intervening ground is well vegetated and mostly flat.

Site B

Potential for a discharge because the description where the measurement of the miner-proposed 20-foot buffer starts is ambiguous and therefore, the effectiveness of the 20-foot buffer is uncertain. Depending on the starting point the miner intended to use, there “may” or “may not” be a potential discharge of a pollutant into Clear Creek.

a) If the buffer distance is measured from the edge of the Clear Creek stream bank, then it would put the mining activity on the valley floor less than 10 feet from the side channel which is connected at high flow to Clear Creek.

b) If the buffer distance is measured from the valley floor-channel break in slope of the side channel, then the mining area would be 20 feet from the edge of the side channel. The ground between the mining area and the side channel is vegetated and flat and would provide effective sediment trapping.

As a result of the uncertainty in miner-proposed buffer zone, the worst-case scenario was used (Appendix 1A, Figure 1, Point A) which may result in some activity on the flat valley floor close enough to the edge of the channel bank to trigger bank failure as a result of digging the test holes and sediment entering the creek. Therefore, under Alternative 2, there would be the potential for a discharge of sediment into Clear Creek.

Ponds

Existing pond (serves as both source water and settling pond)

When being used as a source water pond, no potential for a discharge via surface or subsurface flow because the miner would only withdraw water.

When being used as a settling pond, no potential for a discharge via surface or subsurface flow because the pond is more than 200 feet from the creek and the sediments between the pond and the creek are a mix of coarse and fine sediments, resulting in low permeability.

Proposed settling ponds

The ponds could not be evaluated under Alternative 2 for compliance with MM-2 because the miner did not identify their location. They are only evaluated under Alternative 3.

Fords

One existing ford proposed for use on existing temporary mine access road 1300-M1a. Ford would be used to transport heavy equipment. Potential for a discharge of sediment into Clear Creek as a result of use of the ford because the approach on the southwest side is composed of fines can easily reach the creek. Ford would be used for movement of heavy equipment across the creek because the bridge wasn't designed for heavy equipment.

Bridges

One existing wooden bridge across Clear Creek is proposed for use. Bridge would be used for regular vehicle traffic only (i.e. ATV, pickup truck) because it was not designed for heavy equipment. Heavy equipment would be taken across the ford. No potential for a discharge of sediment as a result of use because bridge is existing and stable and no bridge modifications planned.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use one existing native surface Temporary Access road (Appendix 6).

No potential for a discharge because the access road is across flat ground, perpendicular to the stream where it crosses at the existing ford, and then goes through the forest. The only place where there is the potential for a discharge would be at the ford, and this potential impact was addressed above under the *Fords* section.

Clean Water Act, Section 303(d) (antidegradation)

Clear Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one existing pond which serves as both source water and settling pond, 2) several proposed ponds, 3) one existing TA road, and 4) an existing bridge.

Ponds

Existing pond when used as source water pond

Use of the existing pond as a source water pond would be in compliance with MM-2 because the miner would only withdraw water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation.

Existing pond when used as settling pond

Use of the existing pond as a settling pond would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Proposed ponds

Construction and use of the proposed ponds **could not be evaluated** for compliance with MM-2 because the miner did not provide a location. Ponds are only evaluated under Alternative 3.

Access Roads

Use of the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Bridges

Use of the existing wooden bridge to cross Clear Creek would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment under Alternative 2 would be small and move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: Potential effect to *Water Temperature* as a result of flow reduction if groundwater reverses its flow direction and moves into *Site B hole*. This flow reversal could cause parts of Clear Creek to go dry which would lead to a reduction of flow downstream and lead to an increase in stream temperatures.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees would be cut within 300 feet of the creek and 2) there would be no activity in the channel to alter existing amounts.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes would occur in *Lower Bank Angle* for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes would occur in *Width/Depth ratio* because there would be 1) no change to *Bank Stability* and therefore channel widths and 2) no instream activity which could trigger a headcut and alter channel depths.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

<u>Stream flow alteration potential at Site B</u>

There is a potential water quality impact to stream temperatures downstream if the test hole at Site B reverses groundwater flow and causes a portion of the stream to go dry while the hole was open. This effect does NOT fall under Section 401 of the CWA because it is a result of

water removal NOT the result of something added to the stream. Flow was measured on several days by one of the Umatilla National Forest hydrologists. Values were as follows: April 23, 2002 (126 cfs) measured at the junction of the FS road 1000 and 1031, September 2, 2005 (4.33 cfs) at the confluence of Granite Creek and Clear Creek, and October 26, 2007 (5.31 cfs) upstream of the Black Jack adit (E. Farren, Umatilla National Forest, email, 8/12/13). *Grubsteak* is located upstream of Beaver Creek and Olive Creek tributaries, so the flows in this portion of Clear Creek are expected to be lower than the values presented above.

The reasons for the potential reversal of flow are as follows: The proposed test hole would be less than 50 feet from Clear Creek, would be 10 to 12 feet deep and 20 to 25 feet in diameter. The area of the creek and side channel has been previously mined. Thus many of the fines have been removed from the channel sediments and the permeability of the buried sediment is expected to be high. A hole 10 to 12 feet deep would be below the elevation of the Clear Creek channel bed. It is possible this activity would change the direction of groundwater flow so that water moves from the creek into the hole and a portion of the creek would go dry or noticeably shallow. A reduction of flow has the potential to contribute to increased stream temperatures downstream.

ALTERNATIVE 3

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Site A

Same as Alternative 2. No potential for a discharge.

Site B

Different than Alternative 2. Under Alternative 3, the discharge potential related to mining activity at this site **would be eliminated** as a result of two Forest Service WRPMs (Appendix 11). One WRPM clarifies the starting point of the buffer measurement. This WRPM, which clarifies the Plan-specific buffer, places mining activity clearly on flat ground and 20 foot between the bank edge and mining activity. The second WRPM restricts the makeup of the berm to straw bales/coils rather than a berm composed of gravels, straw bales and filter cloth. These two Forest Service WRPMs ensure effective sediment trapping mechanisms between the mining site and the creek such that no sediment generated by the mining activity would reach the creek. Ground cover on the flat valley floor where site B is located is about 50 to 70% and a mix of grasses, forbs and needles.

Ponds

Source water pond and settling pond at Site A (same pond)

Same as Alternative 2. No potential for a discharge.

Proposed settling ponds

Different than Alternative 2. Under Alternative 3, no potential for a discharge as a result of the addition of Forest Service WRPM (Appendix 11) which requires that the ponds be location with Forest Service input and protection measures identified and implemented.

Fords

Different than Alternative 2. Under Alternative 3, the discharge potential from use of the existing ford via temporary access road 1300-1Ma **would be eliminated** because of the addition of Forest Service WRPM (Appendix 11) which states that the southwest approach to the ford would be rocked. This WRPM would bury the fine sediments and eliminate the source of sediment that could easily reach the creek.

Bridges

One existing wooden bridge is proposed for use. Same as Alternative 2. No potential for a discharge.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge

Clean Water Act, Section 303(d) (antidegradation)

Clear Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one existing pond which serves as both source water and settling pond, 2) several proposed ponds, 3) one existing TA road, and 4) existing bridge.

Ponds

Existing pond (serves as both source water and as a settling pond)

Same as Alternative 2. Use of the pond as both a source water and settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Proposed ponds

Different than Alternative 2. Under Alternative 3, construction and use of these ponds would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs (Appendix 11). This WRPM requires that the miner locate these ponds with input from the Forest Service and the appropriate protection measures identified and implemented.

Access Roads

Same as Alternative 2. Use of the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Bridges

Same as Alternative 2. Use of the existing wooden bridge would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Different than Alternative 2. Under Alternative 3, the potential impact to *Water Temperature* **would be eliminated** as a result of the addition of a Forest Service WRPM (Appendix 11). This WRPM requires that the miner monitor the amount of water that moves into the hole at Site B and limit further deepening once water starts entering the hole until Forest Service monitoring of Clear Creek and other protection measures are put into place to ensure that impacts to water temperature would not occur.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow alteration potential at Site B:

Different than Alternative 2. Under Alternative 3, the potential for a portion of the channel to go dry or flows to drop, leading to an increase of stream temperature downstream, **would be eliminated** by the addition of a Forest Service WRPM (Appendix 11). This WRPM limits the amount of water that would be allowed to move into the hole before additional Forest Service WRPMs are identified.

Hopeful 1

Plan type: Placer
Subwatershed: Lower Granite Creek (HUC 170702020206)
Subwatershed size: 20,282 acres
Analysis area: 1 acre
Creek: Granite Creek (perennial flow and fish-bearing)
Stream Order: 6th
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge via surface or subsurface flow as a result of the mining activity because the area is up on a terrace and about 150 feet from the creek.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because only withdrawing water.

Settling ponds

No potential for a discharge via surface flow from the existing settling pond (a depression) into Granite Creek because the pond is an old test pit and separated from the creek by an 8 to 10 berm of old placer tailings.

No potential for a discharge via subsurface flow from the existing settling pond (a depression) into Granite Creek because the pond bottoms are vegetated with lush rushes, sedges and brush which are effective at trapping fine sediment.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use one Forest Service closed road and one existing temporary access road (1035-E2a) (Appendix 6). The roads have an aggregate surface. FS closed road 1035-012 is separated from the creek by more than 100 feet of forested ground. TA road 1035-E2a is separated from the creek by at least 100 feet of ground that is well vegetated with grasses and forbs. Therefore, no potential for a discharge as a result of using these two roads.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) an existing settling pond, 3) one Forest Service closed road and 4) one existing temporary access road.

Ponds

Source water pond

Use of the existing source water pond would be in compliance with MM-2 because the miner would only withdraw water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation.

Settling ponds

Use of the settling ponds would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Use of the FS closed road and the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) There would be no sediment inputs related to the activities, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) no trees are proposed for removal.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees are proposed for removal and 2) there would be no activity in the channel to alter existing amounts and distributions.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) no potential for a discharge of sediment from mining activities on land.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore channel widths and 2) no instream activity would occur which could trigger a headcut and alter channel depths.

Wetlands and Floodplains

No activities are proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

The miner proposes to use water from Granite Creek and an old dredge pond as source water for processing. Based on the equipment used, the pump would withdraw up to 40 gpm or 0.09 cfs. For the analysis below, it is assumed that all of the water withdrawn would come from Granite Creek because this assumption analyzes for the largest potential impact on the creek.

Background

The potential effects on stream flow and stream temperatures from withdrawing water from Granite Creek were assessed using 1) stream temperature data and 2) examination of several stream gages from the larger area to determine the timing of summer low flows. No water depths or stream flow data exist for Granite Creek.

a. Stream Temperatures

There are five stream temperature monitors (hobos) on Granite Creek (**Table 7-5**). The closest stream temperature data for Granite Creek is located below the confluence of Granite Creek and Bull Run Creek and is at least 6 miles upstream of Hopeful 1. The ODEQ stream temperature standard for Granite Creek is 53.6*F. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at both sites most years.

Table 7-5
7-day running average of the maximum daily stream temperature on Granite Creek in the vicinity of Hopeful 1

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Granite	Granite.93C.1	1995	68.24	4590
Upper Granite Creek	170702020201	Granite	Granite.93C.1	1997	69.09	4590
Upper Granite Creek	170702020201	Granite	Granite.93C.2	1997	65.7	4655
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1996	61.7	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1997	62.2	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1998	65.5	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2002	63.8	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2003	63.97	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2005	61.26	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.4	1997	57.85	5006
Upper Granite Creek	170702020201	Granite	Granite.93C.5	1998	57.09	5200
Upper Granite Creek	170702020201	Granite	Granite.93C.5	2005	54.39	5200

b. Water Depths

There are no water depths available for Granite Creek in the area of Hopeful 1.

c. Stream Flow

There are no stream gages on Granite Creek. Therefore, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 and 2013 to determine when stream flows were reflecting groundwater inputs only (base flows) and would therefore be at their lowest (*project file)*. These years were selected because 2007 was a low flow year on some streams in the area and 2013 was selected because there was some point-in-time stream flow measurements made on other streams in the analysis area. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles.

While there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would be occurring when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year . Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

Conclusions

The available data show that stream temperatures exceed the ODEQ temperature standard. However, the miner proposes to withdraw no more than 40 gpm or 0.09 cfs from Granite Creek. Given the size of Granite Creek in the area of Hopeful 1, the withdrawal of 0.09 cfs would not have a measureable effect on stream flow or stream temperatures given the size of the stream flow compared to the amount proposed to be withdrawn.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge

Settling ponds

Same as Alternative 2. No potential for a discharge

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) an existing settling pond, 3) one Forest Service closed road and 4) one existing temporary access road.

Ponds

Source water pond

Same as Alternative 2. Use of the existing source water pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Use of the existing settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of the FS closed road and the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

Same as Alternative 2. The impact of withdrawing water from Granite Creek on stream flow or stream temperatures would not be measureable given the scale of the stream flow compared to the amount proposed to be withdrawn.

Hopeful 2, 3

Plan type: Placer
Subwatershed: Lower Granite (HUC 170702020206)
Subwatershed size: 20,282 acres
Analysis area: 3.5 acres
Creek: Granite Creek (perennial flow and fish bearing)
Stream Order: 6th
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Mining Site #1 (north side)

There would be no potential for a discharge of sediment because the mining site is at least 45 feet from the creek and the area between the creek and the mining area is forested. The forested ground is an effective sediment trap should any sediment leave the mining site.

Mining Site #3 (north side)

No potential for a discharge because the area to be mined is at least 48 feet (paced) from the creek and is separated from the creek by 1) an old ditch and 2) a road. Therefore, any sediment generated by the mining activity would be effectively trapped in the ditch and road before it could reach the creek.

Mining Site #4 (south side)

No potential for a discharge because the area to be mined is at least 25 feet from the creek and is separated from the creek by 1) a road and 2) forested ground. The road and the forested ground are both effective sediment traps. Therefore any sediment generated by the activity that left the site would be trapped prior to reaching the creek.

Ponds

FS NOTE: The Plan states that the processing sites are at least 50 feet from the creek. Both processing sites are ACTUALLY less than 50 feet from the creek. Each pond would be used as both the source water pond and the settling pond for the site.

North processing site (2 proposed ponds)

Source water pond related

Pond construction*:* Potential for a discharge of sediment via surface flow during construction because the edge of the terrace is only 7 feet away and then it drops down to the active floodplain.

Pond use: No potential for a discharge related to use of the pond for source water because the miner would only be withdrawing water.

Settling pond related

Pond construction*:* Potential for a discharge of sediment via surface flow during construction because the edge of the terrace is only 7 feet away and then it drops down to the active floodplain.

Pond use*:* Potential for a discharge of sediment via surface flow because because the edge of the terrace is only 7 feet away and then it drops down to the active floodplain and there is a small swale at the edge of the terrace by the settling pond area that would funnel any surface water that exited the settling pond onto the floodplain.

South Processing site (one pond)

Source water pond

This pond would serve as both source water pond and settling pond.

No potential for a discharge via surface or subsurface flow from the existing pond because the miner would only be withdrawing water.

Settling ponds

No potential for a discharge via surface or subsurface flow from the pond into Granite Creek (when used as a settling pond) because the pond is well sealed and has a tall, well-constructed and stable berm that separates it from Granite Creek.

Fords

FS NOTE: There are two existing fords proposed for use in the Plan but correspondence with the miner indicates that he intends to only use the existing east ford.

The miner has stated that in his Plan that “mitigation measures recommended by the Forest Service concerning the fords will be implemented (p. 5).” Therefore, discussion of discharge potential related to use of the ford occurs only under Alternative 3.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use four existing Temporary Access roads (Appendix 6).
Two of the mine access roads have an aggregate surface (1035-E1a and 1035-E1b). The other two mine access roads have a native surface (1035-E1c and 1035-E1d). All roads are separated from the creek by vegetated ground except at the ford which is addressed above. The ground cover would effectively trap any sediment that would leave the road prior to it reaching the creek.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) construction and use of two proposed ponds on the north side of Granite Creek (*North processing site*), 2) one existing pond on the south side of Granite Creek (*South processing site*), and 3) four existing temporary access roads.

North processing site (2 proposed ponds)

Two proposed ponds. One would serve as source water pond and the other as a settling pond.

Source water Pond

Construction*:* Pond construction would NOT be in compliance with MM-2 because there is the potential for a discharge of sediment via surface flow because the edge of the terrace is only 7 feet away and then it drops down to the active floodplain.

Use*:* Use of the source water pond would be in compliance with MM-2 because water would only be withdrawn.

Settling Pond

Construction: Pond construction would NOT be in compliance with MM-2 because there is the potential for a discharge of sediment via surface flow because the edge of the terrace is only 7 feet away and then it drops down to the active floodplain.

Use: Use of the settling pond would NOT be in compliance with MM-2 because there is the potential for a discharge of sediment via surface flow because the edge of the terrace is only 7 feet away and there is a small swale at the edge of the terrace by the settling pond area that would funnel any surface water that exited the settling pond onto the floodplain.

South processing site (one existing pond)

The existing pond would serve as both source water pond and settling pond. It currently contains water.

Source water pond

Use of the pond would be in compliance with MM-2 because the miner would only be withdrawing water. Therefore no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation.

Settling ponds

Use of the pond would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

There are four existing TA roads proposed for use. All TA roads except TA road 1035-E1d would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA road 1035-E1d would NOT be in compliance with MM-2 because there is the potential for a discharge of sediment. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment under Alternative 2 would be small and move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) the only places where trees would be cut are on the north and south sides where mining would occur, and neither of these areas are wood recruitment sources (small saplings occur along the existing miner access road on the south side), and 2) there would be no activity in the channel to alter existing amounts and distributions.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment from Site 2 on the north side would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore channel widths and 2) no instream activity which could trigger a headcut and alter channel depths.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Mining Site #1

Same as Alternative 2. No potential for a discharge.

Mining Site #3

Same as Alternative 2. No potential for a discharge.

Mining Site #4

Same as Alternative 2. No potential for a discharge.

Ponds

North processing site (2 proposed ponds)

Source water pond

Construction: Different from Alternative 2. Under Alternative 3, the discharge potential of sediment **would be eliminated** with the addition of Forest Service WRPMs (Appendix 11). These WRPMs would require effective sediment traps to prevent any sediment from exiting the terrace and ending up on the active floodplain.

Use: Same as Alternative 2. No potential for a discharge.

Settling pond related

Construction and Use: Different from Alternative 2. Under Alternative 3, the discharge potential of sediment **would be eliminated** with the addition of Forest Service WRPMs (Appendix 11). These WRPMs would require effective sediment traps to prevent any sediment from exiting the terrace and ending up on the active floodplain.

South processing site (one existing pond)

Same as Alternative 2. No potential for a discharge.

Fords

One existing ford proposed for use via temporary access roads 1035-E1b and 1035-E1d.

East ford

There is no discussion under Alternative 2 regarding discharge related to use of this existing ford because the miner deferred to the Forest Service with respect to any protection measures. Therefore, this ford is discussed only under Alternative 3.

Under Alternative 3, no potential for a discharge as a result of the addition of a Forest Service WRPM (Appendix 11). This WRPM would require that both ford approaches be rocked. Rocking would effectively eliminate the input of the fine sediment into Granite Creek.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Different than Alternative 2. No potential for a discharge as a result of the addition of Forest Service WRPMs to TA 1035-E1d.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one existing pond on the south side of Granite Creek, 2) proposed construction and use of two ponds on north side of Granite Creek, and 3) four existing temporary access roads.

North processing site (2 proposed ponds)

Source water pond

Same as Alternative 2. Use of the pond as a source water pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use of the pond as a settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

South processing site (one existing pond)

Existing pond would serve as both source water pond and settling pond.

Source water pond

Same as Alternative 2. Use of the pond as a source water pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling pond

Same as Alternative 2. Use of the pond as a settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Different than Alternative 2. Under Alternative 3, all of the existing TA roads proposed for use would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs to TA 1035-E1d. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

L & H

Plan type: Placer and Lode
Subwatershed: Beaver Creek (HUC 170702020203)
Subwatershed size: 13,075 acres
Analysis area: 8 acres
Creek: Olive Creek (intermittent flow and non fish-bearing)
Stream Order: 1st
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: No

ALTERNATIVE 2

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Placer mining

No potential for a discharge because the placer activity would occur in an area that was historically hydraulically mined and the drainage in this area no longer has a defined channel.

Lode mining

Potential for a discharge of heavy metals in solution and sediment via surface flow related to proposed reclamation for adit 3. The miner proposes to put the waste rock back into the adits once milled. Adit 3 currently discharges water and is adjacent to Olive Creek. The waste rock may contain heavy metals and heavy metal concentrations in the adit discharge water would increase as groundwater flowed through the waste material and then entered Olive Creek. The other two adits are dry, up on a hillslope and are separated from Olive Creek by a road.

Ponds

No discharge potential. The existing L & H ponds are outside the RHCAs of any streams.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use two existing Temporary Access roads (Appendix 6). The mine access roads are native surface roads.

TA Road 1305-E5a

No potential for a discharge related to use of this road because there are not channels in this area, as the area has been hydraulically mined. In addition, the road is about 90 feet from the drainage.

TA Road 1305-E5b

No potential for a discharge related to use of this road because the road is a short spur that accesses Adit 3, and is separated from Olive Creek by about 70 feet of forested ground. The ground cover in this area is sufficient to effectively trap any sediment that would leave the road prior to its reaching the creek.

Clean Water Act, Section 303(d) (antidegradation)

Olive Creek is not listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are two existing temporary access (TA) roads. The ponds are outside the RHCA and therefore not evaluated for compliance with MM-2.

Access Roads

Use of the existing TA roads would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) no sediment would enter the channel under Alternative 2, 2) only limited trees would be removed from the area, and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) the only places where trees would be removed is from the rock piles at the east end of the cabin and a few from the area around the portal (adit 3) so that the backhoe can access the adit, and 2) there would be no activity in the channel to alter existing amounts and distribution.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) no potential for a discharge of sediment from mining activities on land.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore channel widths and 2) no instream activity which could trigger a headcut and alter channel depths.

Wetlands and Floodplains
No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Placer mining

Same as Alternative 2. No potential for a discharge.

Lode mining

Different than Alternative 2. Under Alternative 3, the discharge potential of heavy metals in solution and sediment via surface flow **would be eliminated** as a result of the addition of Forest Service General Requirements L3, 4, 5 and 8 (Appendix 2) and Forest Service WRPMs

(Appendix 11). The Forest Service General Requirements L3 and L4 require that the first run of any lode material, as well as any water discharging from the adit, be tested for heavy metals. If a dry adit began to discharge water, the Forest Service would be notified and the water be required to be tested prior to further activity (L8). General Requirement L5 states that test results must be submitted to the Forest Service. If heavy metals were above what was allowed by the State, then the miner would cease operation of this portion of their activity and submit a supplement to the Forest Service for analysis.

The Forest Service WRPM is specific to adit 3 activity. It prevents the miner from returning the milled waste rock back into adit 3 where it can interact with adit water which is discharging into Olive Creek.

Ponds

Same as Alternative 2. No potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Olive Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are two existing temporary access roads. The ponds are outside the RHCA and therefore not evaluated for compliance with MM-2.

Access Roads

Same as Alternative 2. Use of the existing TA roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Lightning Creek

Plan type: Placer
Subwatershed: Clear Creek (HUC 170702020204)
Subwatershed size: 20,467 acres
Analysis area: 5 acres
Creek: Lightning Creek (perennial flow and fish bearing)
Stream Order: 2nd
303(d) listed: No
Suction Dredging: Yes
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge into Lightning Creek from mining activity because the area proposed for mining is 150 feet from the creek and the ground has mixed topography with some areas with tailings piles and other areas with flat ground.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because withdrawing water directly from Lightning Creek.

Settling ponds

No potential for a discharge via surface flow from use of the existing ponds into Lightning Creek because the ponds are old dredge ponds and separated from the creek by 50 to 75 feet.
No potential for a discharge subsurface flow from use of the existing ponds because the pond bottoms are vegetated with lush rushes, sedges and brush which are effective at trapping fine sediment and the ponds are at about the same elevation level as the stream.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridges

An existing wooden bridge across Lightning Creek is proposed for use. Bridge would be used for regular vehicle traffic (i.e. ATV, pickup truck). No potential for a discharge of sediment as a result of use because bridge is existing and stable and no bridge modifications planned.

FS NOTE: Heavy equipment would be moved across Lightning Creek via the ford on an open road

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Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use two existing Temporary Access roads (Appendix 6).

TA road 1305-E6a

No potential for a discharge related to use of this road because 1) the road is across flat ground, 2) is at least 50 feet from the creek, and 3) separated from the creek by a low berm of old placer tailings. Therefore any sediment generated as a result of use of this road would be trapped by the berm and the flat ground prior to reaching the creek.

TA road 1305-E6b

No potential for a discharge related to use of this road because 1) it is almost 400 feet from the creek, and 2) separated from the creek by road 1305-E6a, old dredge ponds, the berm and areas of flat ground. Therefore, any sediment generated as a result of use of this road would be effectively trapped prior to reaching the creek.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Lightning Creek is not 303(d) listed.

Suction Dredging

Motorized mining, such as suction dredging, is currently not permitted in Essential Salmon Habitat. A State of Oregon moratorium for suction dredging is currently in effect until 2021, or until the Oregon State legislature changes the law. However, since the Plans approved under the Granite Mining FEIS will extend beyond the 2021 moratorium, activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations. If the moratorium is lifted this effects analysis will be re-evaluated to determine if the proposed activities meet the requirements of the 700PM permit that is in place at that time.

The analysis below assumes that the miners <u>would be in compliance</u> with the 2015 700PM permit (Appendix 4B) and all its requirements.

In evaluating suction dredging on Lightning Creek in the area of the proposed operation, impacts to the following parameters were considered: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability (Appendix 4A, 4B).

<u>Site Characteristics</u>

The channel bed in this area is predominantly cobbles with some gravels and sands and highly stable given the abundance of cobbles. Lightning Creek was historically placer mined and therefore, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.7, 8, 9 and 10).

<u>Water Quality and Channel Morphology analysis</u>

Pool frequency and distribution: Localized changes would occur in pool frequency and locations related to suction dredging as dredging will create pools and loosen the substrate. The

pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited, and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

Habitat complexity: Potential local changes would occur in habitat complexity because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be permanent

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) therefore would remain intact thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures would occur because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local change would occur in water clarity as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged, but under the 700 PM permit, changes in water clarity are not allowed to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed, and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact is limited to the when the miner is suction dredging.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability would occur, even though dredging will create pools because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

Summary of Effects

The analysis found that suction dredging would have no impact on 1) stream temperature or 2) channel bed stability for the reasons stated above. Suction dredging would have a local impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. The changes to pool frequency, habitat complexity and substrate are expected to be permanent but limited to the area worked and therefore would not have a measurable impact on channel complexity or channel stability. Changes in turbidity would impact less than 300 feet of stream and not be permanent but limited to the period of time that the miner is suction dredging.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) existing ponds, 2) proposed ponds, 3) one existing temporary access (TA) road (1305-E6a), and 4) an existing bridge TA road 1305-E6b is outside the RHCA and therefore not evaluated for compliance with MM-2.

Existing Ponds

Source water pond

Use of the existing source water pond would be in compliance with MM-2 because the miner would only be withdrawing water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Use of the existing ponds for settling ponds would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Proposed Pond

Source water pond

No new source water pond.

Settling ponds

Construction and use of the settling pond would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Use of existing TA road 1305-E6a would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Bridges

One existing wooden bridge which spans Lightning Creek is proposed for use. Same as Alternative 2. No potential for a discharge.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: Localized changes would occur in pool frequency and locations related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

No changes would occur to pool frequency related to potential for inputs of fine sediment from use of the ford because inputs would move through the system as suspended load and not settle out in the pools. There would be no changes in pool frequency related to *Large Woody Recruitment* because no trees are proposed for removal.

Water Temperature: No changes would occur in *Water Temperature* because 1) no shade trees would be removed, and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit which would ensure that there would not be increases in stream channel widths or channel depths which would alter water depths and influence stream temperatures (Appendix 4A).

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) the only place where trees might be removed is the testing areas and these are more than 150 feet from the creek, and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit. Schedule C.8, 9 and 10 of the permit limits the amount of instream habitat structures that can be moved or altered (Appendix 4B).

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and

other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

No changes would occur to substrate sediment as a result of potential for inputs of fine sediment related to mining activity because inputs would move through the system as suspended load.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be no change to *Bank Stability* as a result of mining activity or suction dredging because, 1) no mining activity is proposed on the stream banks and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit (Appendix 4B). In addition, the existing channel bed is composed of a mix of cobbles, sands and gravels and highly stable. Therefore, there would be no potential for suction dredging to trigger a headcut and increase channel depth.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

<u>Stream flow and stream temperature alteration related to water withdrawals</u>

The Plan proposes to use withdraw water from Lightning Creek and use as source water for processing placer material. Based on the equipment proposed for use, the pump would withdraw approximately 100 gallons per minute or 0.2 cfs. This is the withdrawal amount that is analyzed below for effects.

Background

The potential effects on stream flow and stream temperatures from withdrawing water from Lightning Creek were assessed using 1) stream temperature data, 2) water depths taken during

the stream flow measurement and at the one of the stream temperature monitors (hobos) sites, 3) a stream flow measurement from July 19, 2013, and 4) examination of several stream gages from the larger area to determine the timing of summer low flows which are the result of only groundwater inputs.

a. Stream Temperatures

There are two stream temperature monitors (hobos) on Lightning Creek. The ODEQ stream temperature standard for Lightning Creek is 53.6*F. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at both sites (**Table 7-6**).

Table 7-6
7-day running average of the maximum daily stream temperature on Lightning Creek. LIGHTApl is located upstream of the Lightning Creek operation

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Clear	170702020204	Lightning	LIGHTACC	2000	64	5240
Clear	170702020204	Lightning	LIGHTACC	2001	65	5240
Clear	170702020204	Lightning	LIGHTACC	2002	65	5240
Clear	170702020204	Lightning	LIGHTACC	2003	66	5240
Clear	170702020204	Lightning	LIGHTACC	2004	63	5240
Clear	170702020204	Lightning	LIGHTACC	2005	63	5240
Clear	170702020204	Lightning	LIGHTACC	2006	63	5240
Clear	170702020204	Lightning	LIGHTAPL	1997	56	5520
Clear	170702020204	Lightning	LIGHTAPL	1998	57	5520
Clear	170702020204	Lightning	LIGHTAPL	2000	56	5520
Clear	170702020204	Lightning	LIGHTAPL	2001	59	5520
Clear	170702020204	Lightning	LIGHTAPL	2002	59	5520
Clear	170702020204	Lightning	LIGHTAPL	2003	60	5520

b. Water Depths

Water depths at the point where the July 19, 2013 stream flow measurement was taken varied from 2 to 13 inches. Water depth at the place where hobo LightApl was located in 2013 was about 12 inches deep that day. The hobo was about 20 feet downstream of the flow measurement (D. Robison, UNF, email comm. 3/13/14).

c. Stream Flow

There are no stream gages on Lightning Creek. Therefore, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 (a low flow year) and 2013 to look for patterns of flow (*project file)*. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles. The stream hydrographs were examined to determine when stream flows were reflecting groundwater inputs only (base flows) and would therefore be at their lowest. While there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would be occurring when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year (References). Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

A point-in-time (instantaneous) stream flow measurement was made on July 19, 2013 by Umatilla National Forest personnel just above the Lightning operation. The stream flow was 6.8 cfs with water depths ranging from 2 to 13 inches across the stream. At this flow volume, the amount proposed for removal by the miner (0.2 cfs) would be three percent of the flow. In a drought year or with extended drought, summer low flows are expected to be less making the amount withdrawn (0.2 cfs) a greater percentage of the total flow.

Conclusions

The available data show that currently stream depths are low in the summer and stream temperatures on Lightning Creek exceed the ODEQ temperature standard. Stream flow on July 19, 2013 was 6.8 cfs with water being contributed from several tributaries. At 6.8 cfs flow level, no measurable increase in stream temperatures or reductions in flow would be expected if the miner withdrew up to 0.2 cfs during the summer. However, the predicted changes in climate could create site conditions in which the withdrawal would 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge.

Ponds

Same as Alternative 2. No potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridges

Same as Alternative 2. No potential for a discharge.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Lightning Creek is not 303(d) listed.

Suction Dredging

Same as Alternative 2. The analysis found that suction dredging would have no impact on stream temperature or channel bed stability for the same reasons stated under Alternative 2. Suction dredging would have localized and permanent impacts related to pool frequency and distribution, habitat complexity and substrate and localized but short-term impacts to turbidity for the same reasons stated under Alternative 2.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) existing ponds, 2) proposed ponds, 3) one existing temporary access (TA) road (1305-E6a) and 4) one existing bridge. TA road 1305-E6b is outside the RHCA and therefore not evaluated for compliance with MM-2.

Existing Ponds

Source water pond

Same as Alternative 2. Use of the existing source water pond would be in compliance with MM-2 because would only be withdrawing water. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use of the ponds would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Proposed Pond

Source water pond

No new source water pond.

Settling ponds

Same as Alternative 2. Construction and use of the settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Bridges

Same as Alternative 2. Use of the existing wooden bridge would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of existing TA road 1305-E6a would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. Only *Pool Frequency* and *Substrate Sediment* have the potential to be affected as a result of suction dredging. The changes would be permanent but localized to the area dredged and there would be no measurable changes to these inchannel characteristics even within the Plan analysis area.

Wetlands and Floodplains

Same as Alternative 2. No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

Different than Alternative 2. There is a reduction in the time frame of potential effects related to water withdrawals as a result of the addition of two Forest Service Fish Protection Measures (Fish PMs) which listed under the Forest Service WRPMs (Appendix 11). Under these Fish PMs, water can only be withdrawn from Lightning Creek 1) prior to August 15 and 2) if there is stream flow below the area being worked prior to and after water is withdrawn. Therefore, potential effects to stream temperatures and stream flow would occur for a shorter period (early-mid July through August 14) rather than early-mid July through September 30). However, withdrawals would still occur during the period when stream temperatures are the highest (Appendix 5x) and water depths and stream flows are the lowest. Therefore, water withdrawals, under certain flow condition, prior to August 14 would have the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation, just for a shorter period of time than in Alternative 2.

Little Cross

Plan type: Placer
Subwatershed: Lower Granite (HUC 170702020206)
Subwatershed size: 20,282 acres
Analysis area: 1 acre but area worked is less than ¼ acre
Creek: Granite Creek (perennial flow and fish bearing)
Stream Order: 5th
303(d) listed: No
Suction Dredging: Yes
Essential Salmon Habitat: Yes

ALTERNATIVE 2

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)
Mining Activity

Potential for a discharge of sediment via surface and subsurface flow because the mining hole (also processing pond) would be in a road that slopes into Granite Creek. The test hole would

be dug into a road which slopes directly into the creek, and the hole would be 15 to 20 feet at most from the creek. In addition, the permeability of the sediments is expected to be high as the site is in old placer mining tailings. Therefore, water in the test hole (processing pond) has the potential to create a seepage zone in the road, and in the process remobilize the fine sediment on the surface of the road which could then enter Granite Creek.

Ponds

The test hole would also be the source water pond and the settling pond. Hole would be located on the existing ford approach to Granite Creek.

Construction: Potential for a discharge via surface flow into the creek because the test hole/pond would be dug into a slope which feeds directly into the creek.

Use as Source Water Pond: No potential for a discharge related to use of the pond as a source water pond once constructed because the miner would only be withdrawing water.

Use as Settling Pond: Potential for a discharge via subsurface flow as a result of use of the pond as a settling pond because the hole is dug into old tailings and the permeability of the sediments is likely high. As a result, there would be the possibility that water in the hole could create a seepage zone in the road, and in the process remobilize fine sediment on the surface of the road. Because the hole is on a ford approach, sediment could move downslope into the creek.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use one existing Temporary Access road (Appendix 6). Road 1000-E3a is 0.03 miles and composed of old placer tailings. The road is across flat ground and is within 50 feet of the creek at its closest point. The road is along flat ground and is separated from the creek by a berm composed of old placer tailings. The berm and the flat ground provide effective sediment traps, and therefore any sediment generated as a result of road that might erode off the road would be trapped prior to reaching the creek. Therefore, no potential for a discharge related to use of this road.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

Motorized mining, such as suction dredging, is currently not permitted in Essential Salmon Habitat. A State of Oregon moratorium for suction dredging is currently in effect until 2021, or until the Oregon State legislature changes the law. However, since the Plans approved under the Granite Mining FEIS will extend beyond the 2021 moratorium, activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations. If the moratorium is lifted this effects analysis will be re-evaluated to determine if the proposed activities meet the requirements of the 700PM permit that is in place at that time.

The analysis below assumes that the miners would be in compliance with the 2015 700PM permit (Appendix 4B) and all its requirements.

In evaluating suction dredging on Granite Creek in the area of the proposed operation, impacts to the following parameters were considered: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability (Appendix 4A, 4B).

Site Characteristics

The channel bed in this area is predominantly cobbles with some gravels and sands and highly stable given the abundance of cobbles. Granite Creek was historically placer mined and therefore, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.7, 8, 9 and 10).

Water Quality and Channel Morphology analysis

Pool frequency and distribution: Localized changes would occur in pool frequency and locations related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

Habitat complexity: Potential local changes in habitat complexity would occur because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur, but would be limited to small areas. The changes would be permanent

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream

banks (beaver dams, undercuts, root wads etc.) therefore would remain intact, thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures would occur because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Potential local changes in water clarity would occur as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the 700 PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact is limited to the when the miner is suction dredging.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability would occur, even though dredging will create pools because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

Summary of Effects

The analysis found that suction dredging would have no impact on 1) stream temperature or 2) channel bed stability for the reasons stated above. Suction dredging would have a local impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. The changes to pool frequency, habitat complexity and substrate are expected to be permanent but limited to the area worked and therefore would not have a measurable impact on channel complexity or channel stability. Changes in turbidity would impact less than 300 feet of stream and not be permanent but limited to the period of time that the miner is suction dredging.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one proposed ponds and 2) one existing temporary access road.

Ponds

Construction and use of the proposed pond would NOT be in compliance with MM-2 because of potential impacts to water quality. No other impacts would occur. See Appendix 3 for detailed discussion.

Access Roads

Under Alternative 2, use of the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: Localized changes would occur in pool frequency and locations related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

No changes would occur to pool frequency related to potential for inputs of fine sediment from mining activity because inputs would move through the system as suspended load and not settle out in the pools. There would be no changes in pool frequency related to *Large Woody Recruitment* because no trees are proposed for removal.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be only very limited removal of trees, none of which would be shade trees, and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit which would ensure that there would not be increases in stream channel widths or channel depths which would alter water depths and influence stream temperatures (Appendix 4A).

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees are proposed for removal and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit. Schedule C.8, 9 and 10 of the permit limits the amount of instream habitat structures that can be moved or altered (Appendix 4B).

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction

hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

No changes would occur to substrate sediment as a result of potential for inputs of fine sediment related to mining activity because inputs would move through the system as suspended load.

Bank Stability: No changes would occur in *Bank Stability* because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes would occur in *Lower Bank Angle* for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and thus channel width and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit (Appendix 4B). Currently channel bed composition is a mix of cobbles, sands and gravels and highly stable. Therefore, there would be no potential for suction dredging to trigger a headcut and alter channel depths.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because the placement of two straw bale berms would effectively trap any sediment generated by the activity. Also, the staged removal of the berms eliminate the potential for sediment trapped by the berms from reaching the stream.

Ponds

The test hole would also be the source water pond and the settling pond. The hole would be located on the ford approach to Granite Creek.

Construction: Different than Alternative 2. Under Alternative 3, the discharge potential during digging of the test hole **would be eliminated** as a result of the addition of a Forest Service WRPM (Appendix 11). This WRPM requires that straw bales be placed between the creek and the hole to trap any sediment that moves downslope prior to it reaching the creek.

Use as Source Water Pond: Same as Alternative 2. No potential for a discharge when used as a source water pond because the miner would only be withdrawing water.

Use as Settling Pond: Different than Alternative 2. Under Alternative 3, the discharge potential via surface or subsurface flow as a result of using as a settling pond **would be eliminated** as a result of the addition of a Forest Service WRPM (Appendix 11). This WRPM would require the use of straw bales to ensure that any sediment that might be generated as a result of ground water seeping through the road sediments that make up the mining hole would be trapped before reaching Granite Creek.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is not 303(d) listed in this section of stream.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one proposed pond and 2) one existing temporary access road.

Pond

Different than Alternative 2. Under Alternative 3, construction and use of the proposed test hole/pond would be in compliance with MM-2 as a result of the addition of a Forest Service WRPM (Appendix 11). This WRPM would eliminate potential impacts to water quality by requiring the straw bales be placed between the creek and the hole to trap any sediment that moved downslope prior to its reaching the creek. See Appendix 3 for detailed discussion.

Access Road

Same as Alternative 2. Use of the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. Only *Pool Frequency* and *Substrate Sediment* have the potential to be affected as a result of suction dredging. The changes would be permanent but localized to the area dredged and there would be no measurable changes to these inchannel characteristics even within the Plan analysis area.

Wetlands and Floodplains

Same as Alternative 2. No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Lucky Strike

Plan type: Placer and Lode
Subwatershed: Clear Creek (HUC 170702020204)
Subwatershed size: 20,467 acres
Analysis area: 2 acres
Creek: N/A. Lightning Creek drainage but more than 300 feet from creek.
Stream Order: N/A. On a ridge

303(d) listed: N/A
Suction Dredging: No
Essential Salmon Habitat: No

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Placer portion:

No potential for a discharge because the site is on a ridge and more than 300 feet from any streams. Ground cover is 100% and composed of needles, grasses, forbs and downed wood.

Lode portion:

No potential for a discharge because the site is on a ridge and more than 300 feet from any streams. Ground cover is 100% and composed of needles, grasses, forbs and downed wood.

Ponds

No ponds proposed.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

None. Miner would only use open Forest Service roads that are also used by the general public or private roads.

Clean Water Act, Section 303(d) (antidegradation)

Does not apply. No streams in the area proposed for activity.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

There are no structures inside the RHCA as the site is located on a ridge. Therefore, the question of compliance with MM-2 does not apply.

PACFISH: Riparian Management Objectives (RMOs)

The RMOs do not apply because the site is distant from any streams.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge.

Ponds

No ponds proposed.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Use and/or Creation of Temporary Access Roads

Same as Alternative 2. Only open roads would be used.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Does not apply. No streams in the area proposed for activity.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Same as Alternative 2. There are no structures inside the RHCA as the site is located on a ridge. Therefore, the question of compliance with MM-2 does not apply.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. The RMOs do not apply because the site is distant from any streams.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Make It

Plan type: Placer
Subwatershed: Upper Granite (HUC 170702020201)
Subwatershed size: 9,312 acres
Analysis area: 2 acres
Creek: Granite Creek (perennial flow and fish bearing)
Stream Order: 3rd
303(d) listed: Yes for sedimentation
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge because the two hillslope sites proposed for mining are more than 80 feet from Granite Creek, and separated from the creek by 80 feet of flat ground and a road that is along the base of the hillslope. The other two sites are located on flat ground on the other side of this road.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because the miner would only be withdrawing water from an existing pond.

Settling ponds

No potential for a discharge via surface flow from the settling ponds into Granite Creek because the ponds are dry depressions in old dredge tailings. They have been dug into flat ground, bermed, and are separated from the creek by about 80 feet of flat ground.

No potential for a discharge via subsurface flow from the ponds to the creek because the ponds are at least 80 feet from the creek, at a similar elevation as the stream, and the flattening of the placer tailings across the valley bottom has likely decreased the permeability of the old tailings.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Use and/or Creation of Temporary Access Roads

Miner proposes to use one existing temporary access (TA) road (Appendix 6).

No potential for a discharge related to use of this road because the road is separated from creek by 80 feet of flat ground and a forested strip that has developed on the road's fill slope. The

intervening ground and forested strip are effective sediment traps and would capture any sediment that left the road prior to it reaching the creek.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is 303(d) listed for sedimentation by ODEQ. Sedimentation is defined by ODEQ as: "The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry…."

The activities proposed in this Plan would not alter the existing water quality condition for which this stream is listed because no new sediment would be added to the stream from the proposed activities.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) existing depressions to be used as settling ponds, and 3) one existing temporary access road.

Ponds

Source water pond

Use of the source water pond would be in compliance with MM-2 because the miner would only be withdrawing water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Use of the depressions as settling ponds would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Use of the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities because 1) there are no potential inputs of fine sediment, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) no shade trees would be removed.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) the only place where trees would be cut is on the closed road used to access the site and the areas on the hillslope to be mined and 2) there would be no activity in the channel to alter existing amounts and distributions. This road and mining area are 80 feet from the creek and the road has trees on its fill slope which will not be cut.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) no potential for a discharge of sediment from mining activities on land.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and channel width and 2) no instream activity which could trigger a headcut and alter channel depth.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

<u>Stream flow and stream temperature alteration related to water withdrawals</u>

The miner proposes to use a pond that has a direct connection to Granite Creek via a side channel, as source water for processing material. Based on the equipment, the pump would

withdraw up to 100 gpm or 0.2 cfs. This is the amount that is assumed would be withdrawn from Granite Creek and what is analyzed below for effects.

Background

The potential effects of withdrawing water from Granite Creek on stream flow and stream temperatures were assessed using 1) stream temperature data, 2) water depths, and 3) examination of several stream gages from the larger area to determine the timing of summer low flows. No stream flow data exist for Granite Creek.

a. Stream Temperatures

There are five stream temperature monitors (hobos) on Granite Creek. The closest stream temperature data for this operation are Granite.93C.3 and 93C.4 and their values are shown in **Table 7-7**. The operation is located between the two hobos. The ODEQ stream temperature standard for Granite Creek is 53.6*F. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at both sites most years.

Table 7-7
7-day running average of the maximum daily stream temperature on Granite Creek in the vicinity of Make It.

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1996	61.7	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1997	62.2	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	1998	65.5	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2002	63.8	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2003	63.97	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.3	2005	61.26	4670
Upper Granite Creek	170702020201	Granite	Granite.93C.4	1997	57.85	5006

b. Water Depths

The only water depth data available for Granite Creek in the area of Make-It are at the hobo locations. Only the years with depth data are provided (**Table 7-8**). Water depths varied some each year between installation and removal indicating some reduction in flow.

Table 7-8
Water depths at hobo sites with at installation and removal of stream temperature hobos in the vicinity of Make It.

Hobo number	Survey Yr	Elevation (ft)	water depth at installation (inches)	water depth at removal (inches)	Installation Date	Removal Date
Granite.93C.3	1998	4670	1.4	1.2	July 6	Oct 1
Granite.93C.3	1999	4670	1.4	0.9	June 28	Sept 21
Granite.93C.3	2002	4670	1.2	0.9	July 2	Oct 8
Granite.93C.3	2003	4670	1.1	1.0	June 24	Oct 21
Granite.93C.3	2005	4670	1.0	0.7	July 1	Oct 13

c. Stream Flow

There are no stream gages on Granite Creek. Therefore, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 and 2013 to determine when stream flows were reflecting groundwater inputs only (base flows) and would therefore be at their lowest (*project file)*. These years were selected because 2007 was a low flow year on some streams in the area and 2013 was selected because there was some point-in-time stream flow measurements made on other streams in the analysis area. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles.

While there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would be occurring when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year. Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

Conclusions

No impact to stream temperatures or flow related to withdrawing water from the pond that is connected to Granite Creek via a side channel despite the stream temperatures exceeding ODEQ standard of 53.6*F because the pond holds abundant water and the amount diverted from Granite Creek into the pond is small. There is a return flow channel from the pond into Granite Creek. Amount of water flowing down Granite Creek is much greater than 0.2 cfs even during dry years. Therefore, no change in downstream temperature is expected. The stream is not expected to go dry downstream.

ALTERNATIVE 3
Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge.

Ponds

Same as Alternative 2. No potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is listed for sedimentation and the activities proposed in this Plan would not alter the existing water quality condition for which this stream is listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) existing source water pond, 2) existing depressions to be used as settling ponds, and 3) one existing temporary access road.

Ponds

Source water pond

Same as Alternative 2. Use of the pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use of the ponds would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMOs.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

Same as Alternative 2. The impact of withdrawing water from Granite Creek would not be measureable on stream flow or stream temperatures given the scale of the stream flow compared to the amount proposed to be withdrawn.

Muffin

Plan type: Placer
Subwatershed: Upper Granite (HUC 170702020201)
Subwatershed size: 9,312 acres
Analysis area: 2.5 acres
Creek: Last Chance Creek (perennial flow BUT non fish-bearing). Creek is now a series of ponds.
Stream Order: N/A. This drainage is largely a series of ponds, wetlands and lush meadows due to past mining activity which built berms across the creek and possibly dredged the valley bottom. In places there are small channels that carry flow.
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: No

ALTERNATIVE 2

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Sites 1, 2, and 3

No potential for a discharge because area to be mined is a hillslope and any sediment that left the site would be immediately trapped in the meadow area of Last Chance Creek which has lush grasses. The closest channel in the gulch is 20 feet away from the base of the hillslope. No mining is proposed in Last Chance Creek meadow area.

Site 4

No potential for a discharge because site is more than 300 feet from Last Chance Creek and has abundant ground cover in the intervening area and a road.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because the miner would only be withdrawing water from an existing pond.

Settling ponds

There are two settling ponds. Settling pond #1, the primary settling pond, is up out of the gulch on flat ground and separated from the gulch by the source water pond, and settling pond #2. The area where material is stored prior to processing is in this area of flat ground near settling pond #1.

Settling pond #2 is the over flow pond. It is located below settling pond #1 on the edge of the meadow. Water in the pond was at least 2 feet below their top. Abundant vegetation occurs on the pond rims and in Last Chance Creek.

No potential for a discharge via surface or subsurface flow into Last Chance Creek from use of the existing setting ponds because the ponds are well sealed, dug into the ground, surrounded by a low berm, and their combined size is more than large enough to hold the processing water.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use on Forest Service closed road and one existing Temporary Access road (Appendix 6). Both roads are native surface roads.

Forest Service closed road 7355-012

No potential for a discharge from using Forest Service closed road 7355-012 because the ends in the camp site and does not reach the creek.

TA road 7355-M1a

No potential for a discharge as a result of using this road because 1) it is more than 60 feet from the edge of the creek on this side, 2) the intervening ground is well forested and has 80 to 100% ground cover, 3) the creek is located within a meadow composed of very lush grasses and forbs and 4) the creek is 20 feet from the meadow/hillslope edge. The forested ground, the meadow vegetation and the distance from the creek indicate that any sediment that leave the road would be trapped prior to reaching the creek.

Clean Water Act, Section 303(d) (antidegradation)

Last Chance Creek is not listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one existing source water pond, 2) two existing settling ponds, 2) one Forest Service closed road and 3) one existing temporary access road.

Ponds

Source water pond

Use of the existing source water pond would be in compliance with MM-2 because the miner would only be withdrawing water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Use of the existing settling ponds would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Forest Service closed road 7355-012

Use of the FS closed road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA road 7355-M1a

Use of the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur because 1) there would be no inputs of sediment into the creek, 2) no trees are proposed for removal in areas that would influence inputs of woody material, and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) no shade trees are proposed for removal.

Large Woody Debris: No changes in *LWD* would occur because the stream flows through a meadow.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) no potential for a discharge of sediment from mining activities on land.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability,* and therefore no change to channel widths and 2) no instream activity which could trigger a headcut and alter channel depths.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

<u>Flow reversal from wetland into test holes</u>

There is the potential for some reversal of groundwater flow from the wetland into the test holes proposed along the edge of the wetland at sites 1, 2, and 3. The impact on the wetland is expected to be local because the test hole at each site will be small (20x 25x 6-10 feet deep) and filled in prior to excavating the next hole.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Sites, 1, 2, 3, and 4

Same as Alternative 2. No potential for a discharge

Ponds

Same as Alternative 2. No potential for a discharge

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge

Clean Water Act, Section 303(d) (antidegradation)

Last Chance Creek is not listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one existing source water pond, 2) two existing settling ponds, 2) one Forest Service closed road and 3) one existing temporary access road.

Ponds

Source water pond

Same as Alternative 2. Use of the source water pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use of the settling ponds would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Forest Service closed road 7355-012

Same as Alternative 2. Road use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

TA road 7355-M1a

Same as Alternative 2. Road use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMOs.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Flow reversal from wetland into test holes

SIMILAR to Alternative 2. The potential for some reversal of groundwater flow from the wetland into the test holes proposed along the edge of the wetland at sites 1, 2, and 3 remains but is less as a result of the addition of Forest Service WRPM (Appendix 11). These WRPMs decreases the size of the hole at each site at any one time to either 10 feet or less or would start the hole 5 to 10 feet back from where the hillslope has a break in slope just before it reaches the wetland meadow area. As a result the flow reversal would be less.

Old Eric 1 & 2

Plan type: Placer
Subwatershed: Upper Granite (HUC 170702020201)
Subwatershed size: 9,312 acres
Analysis area: 1 acre
Creek: Granite Creek (perennial flow and fish bearing)
Stream Order: 4th
303(d) listed: No
Suction Dredging: Yes
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for discharge via surface or subsurface flow of sediment because the mining activity is at least 100 feet from Granite Creek and the intervening ground is flat and lush with grasses and forbs. There is a ditch that is 50 feet from the mining area but the intervening ground also has lush grasses and forbs. The flat topography and abundant ground cover would effectively trap any sediment that moved off site before it reached either the ditch or the creek.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because the miner would only be withdrawing water from an existing pond.

Settling ponds

No potential for a discharge via surface flow of any pollutant into Granite Creek from using the pond because the pond is well sealed, dug into the ground and surrounded by a low berm.

No potential for a discharge via subsurface flow of sediment because the pond bottom and sides are well vegetated with lush grasses and rushes which are effective at trapping sediment.

However, there would be a potential for a discharge via subsurface flow of **elevated water temperatures** because the pond is 80 feet long and parallels the creek, is within 15 feet of Granite Creek and elevationally above the creek, and largely unshaded. Therefore, if the amount of water in the pond was such that it remained in the pond for multiple days, there is the potential for it to heat up. As the pond is elevationally above the creek and within 15 feet of the creek, the result could be the influx of warmer water entering Granite Creek.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridges

Existing bridge

No potential for a discharge of sediment as a result of use because it is stable and no modifications are planned.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use one existing temporary access road to access his campsite (Appendix 6). No potential for a discharge of sediment into Granite Creek as a result of using the road because the road is composed of old tailings, on flat ground, and does not cross the creek.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is not 303(d) listed for sedimentation in this section of stream.

Suction Dredging

Motorized mining, such as suction dredging, is currently not permitted in Essential Salmon Habitat. A State of Oregon moratorium for suction dredging is currently in effect until 2021, or until the Oregon State legislature changes the law. However, since the Plans approved under the Granite Mining FEIS will extend beyond the 2021 moratorium, activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations. If the moratorium is lifted this effects analysis will be re-evaluated to determine if the proposed activities meet the requirements of the 700PM permit that is in place at that time.

The analysis below assumes that the miners would be in compliance with the 2015 700PM permit (Appendix 4B) and all its requirements.

In evaluating suction dredging on Granite Creek in the area of the proposed operation, impacts to the following parameters were considered: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability (Appendix 4A). The miner has clearly stated that they will be following the requirements of the 700PM permit (Appendix 4B).

Site Characteristics

The channel bed in this area is predominantly cobbles with some gravels and sands and highly stable given the abundance of cobbles. Granite Creek was historically placer mined and therefore, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.7, 8, 9 and 10).

Water Quality and Channel Morphology analysis

Pool frequency and distribution: Localized changes would occur in pool frequency and locations related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

Habitat complexity: Local change on habitat complexity because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be permanent.

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) therefore would remain intact thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures would occur because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local changes to water clarity would occur as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the 700 PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited

in the channel bed and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact is limited to the when the miner is suction dredging.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability would occur even though dredging will create pools, because the channel bed is composed of cobbles, sand and gravel and is highly stable. Therefore, no headcutting and bed destabilization is expected to occur.

Summary of Effects

The analysis found that suction dredging would have no impact on 1) stream temperature or 2) channel bed stability for the reasons stated above. Suction dredging would have a local impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. The changes to pool frequency, habitat complexity and substrate are expected to be permanent but limited to the area worked and therefore would not have a measurable impact on channel complexity or channel stability. Changes in turbidity would impact less than 300 feet of stream and not be permanent but limited to the period of time that the miner is suction dredging.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one existing source water pond, 2) one existing settling pond, 3) one existing temporary access road, and 4) one existing bridge.

Ponds

Source water pond

Use of the existing source water pond would be in compliance with MM-2 because the miner would only be withdrawing water. Therefore, no impacts would occur to water quality, inchannel

complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Use of the settling pond would NOT be in compliance with MM-2 because of the potential impact to stream temperature as a result of warm pond water entering Granite Creek via subsurface flow. See Appendix 3 for detailed discussion.

Access Roads

Use of the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Bridges

Use of the existing wooden bridge across the creek would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: Localized changes would occur in pool frequency and locations related to suction dredging, as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

No changes would occur to pool frequency related to *Large Woody Recruitment* because no trees are proposed for removal.

Water Temperature: Potential localized effects to water temperature would occur as a result of the influx of warmer water from the settling pond via subsurface flow. The settling pond is 80 feet long, parallels the creek, is within 15 feet of Granite Creek, elevationally above the creek, and largely unshaded.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees are proposed for removal and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit. Schedule C.8, 9, and 10 of the permit limits the amount of instream habitat structures that can be moved or altered (Appendix 4B).

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore no changes in channel width and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit (Appendix 4B). Currently channel bed composition is a mix of cobbles, sands and gravels and is highly stable. Therefore, there are no concerns related to the potential for suction dredging to trigger a headcut and increase channel depths.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No discharge potential.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Same as Alternative 2 with respect to sediment. No potential for a discharge with respect to sediment.

Different than Alternative 2 with respect to temperature. Under Alternative 3, the discharge potential for discharge via subsurface flow, related to temperature, **would be eliminated** as a result of the addition of a Forest Service WRPM (Appendix 11) that limits the amount of water that enters the settling pond to the amount that will infiltrate in a day. This prevents the development and subsequent input of a continuous flow of warmer water into the creek.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridges

Existing bridge

Same as Alternative 2. No potential for a discharge of sediment.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No discharge potential.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is not 303(d) listed for sedimentation in this section of stream.

Suction Dredging

Same as Alternative 2. The analysis found that suction dredging would have no impact on stream temperature or channel bed stability for the same reasons stated under Alternative 2. Suction dredging would have localized and permanent impacts related to pool frequency and distribution, habitat complexity and substrate and localized but short-term impacts to turbidity for the same reasons stated under Alternative 2.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one existing source water pond, 2) one existing settling pond, 3) one existing temporary access road, and 4) one existing bridge.

Ponds

Source water pond

Same as Alternative 2. Use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Different than Alternative 2. Under Alternative 3, use of the settling pond would be in compliance with MM-2 as a result of the addition of a Forest Service WRPM (Appendix 11) that limits the amount of time there can be standing water in the pond. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Bridges

Same as Alternative 2. Use of the existing wooden bridge across the creek would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Different than Alternative 2. Under Alternative 3, the potential effect to water temperatures would no longer occur as a result of a Forest Service WRPM (Appendix 11). This WRPM limits the length of time there can be standing water in the pond.

However, *Pool Frequency* and *Substrate Sediment* still have the potential to be affected by suction dredging. The changes would be permanent but localized to the area dredged and there would be no measurable changes to these inchannel characteristics even within the Plan analysis area.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Olive Tone

Plan type: Placer
Subwatershed: Beaver Creek (HUC 170702020203)
Subwatershed size: 13,075 acres
Analysis area: 2 acres
Creek: Olive Creek (perennial flow and fish-bearing)
Stream Order: 1st
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge as a result of mining activity because the area to be mine is the base of the hillslope which is 60 to 80 feet from the creek. The intervening ground is flat and vegetation is minimal. The flat ground is composed of old placer tailings and infiltration rates are likely high. Therefore any sediment generated by the activity would be trapped on the flat ground prior to reaching the creek.

Ponds

Source water pond

Pond construction: No potential for a discharge from source water pond construction because the pond would be dug into the ground and separated from the creek by 50 feet of flat ground.

Pond Use: No potential for a discharge from use of the source water pond because the water would be withdrawn from Olive Creek, and therefore clean water.

Settling ponds

Pond construction: No potential for a discharge from settling pond construction because the ponds would be dug into the ground and are separated from the creek by 50 feet of flat ground.

Pond Use: No potential for a discharge via surface flow from the proposed ponds because the ponds would be dug into the ground and are separated from the creek by 50 feet of flat ground.

Potential for a discharge of sediment via subsurface flow into Olive Creek because the proposed ponds 1) would be in old placer tailings, 2) would be elevationally above the creek with subsurface flow towards the creek, and 3) the old tailings may have a high permeability and large pores that could allow both water and sediment to move through the subsurface. In addition, water moving towards Olive Creek via subsurface flow could mobilize the bank sediments when the water reemerged at the stream bank face.

Ford

One existing ford proposed for use via temporary acess road1305-E4b. No potential for a discharge because the existing ford approaches are already rocked and sloped and stable.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use two existing Temporary Access roads (Appendix 6). Both are native surface roads.

TA Road 1305-E4a (existing)

No potential for a discharge from using this existing road because the road is elevationally above the creek and about 30 feet from it. The ground between the creek and the road is forested on the fillslope side of the road. The ground cover would trap any sediment prior to it reaching the creek should any sediment generated by use of the road leave the road.

TA Road 1305-E4b (existing)

No potential for a discharge from using this existing road because the road is about 20 feet from the creek and on flat ground. While the ground cover is limited, the topography and distance would be effective at trapping any sediment from the road before it reached the creek.

Clean Water Act, Section 303(d) (antidegradation)

Olive Creek is not 303d listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) two proposed settling ponds and 2) two existing temporary access roads.

Ponds

Source water pond

Construction and use of the source water pond would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. Construction would occur in old tailings and water would be withdrawn from Olive Creek. See Appendix 3 for detailed discussion.

Settling ponds (proposed)

Construction of the settling ponds would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. Construction would occur in old tailings. See Appendix 3 for detailed discussion.

Use of the ponds would NOT be in compliance with MM-2 because of the potential input of sediment into the creek via groundwater flow through the tailings, resulting in a reduction in water quality. See Appendix 3 for detailed discussion.

Access Roads

Use of the existing TA roads would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment under would be small and move through the systems as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because there would be 1) no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) no removal of stream-side shade trees (Appendix 8).

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) only a few trees would be removed (Appendix 8) and 2) there would be no activity in the channel to alter existing amounts and distributions.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment via subsurface flow from the settling pond would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* because 1) no activity would occur on the stream banks and 2) there would be no removal of the stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore no increase in channel width and 2) no instream activity which could trigger a headcut and increase channel depths.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

The Olive Tone miner proposes to withdraw water from a spring and from Olive Creek to use as source water for processing material. Based on the pump size (10 HP 3" pump), the pump would withdraw approximately 100 gallons per minute or 0.2 cfs. This is the amount that is assumed would be withdrawn from Olive Creek if all the water came from Olive Creek, and is what is analyzed below for effects.

Background

The potential effects of withdrawing water from Olive Creek on stream flow and stream temperatures were assessed using 1) stream temperature data, 2) water depths taken when installing and retrieving stream temperature monitors (hobos), 3) a stream flow measurement from July 19, 2013, and 4) examination of several stream gages from the larger area to determine the timing of summer low flows which are the result of only groundwater inputs.

a. Stream Temperatures

There are two stream temperature monitors (hobos) on Olive Creek. Hobo Olive.93L.1 is downstream of the confluence of McWillis Gulch and Olive Creek and hobo Olive.93L.2 is upstream of the confluence of Quartz Gulch and Olive Creek. McWillis Gulch does not contribute flow during the summer to Olive Creek but Quartz Gulch, upstream of McWillis Gulch, does contribute flow to Olive Creek.

Hobo Olive.93L.2 is located downstream of the Olive Tone operation and upstream of the Belvadear operation. The ODEQ stream temperature standard for Olive Creek is 53.6*F. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at both sites most years (**Table 7-9**).

Table 7-9
7-day running average of the maximum daily stream temperature of Olive Creek in the vicinity of Olive Tone

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Beaver Creek	170702020203	Olive	Olive.93L.1	1995	56.42	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	1996	57.1	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	2006	55.77	5181
Beaver Creek	170702020203	Olive	Olive.93L.1	2008	56.3	5181

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Year	District Av. 7 day	Elevation (ft)
Beaver Creek	170702020203	Olive	Olive.93L.2	1996	55.9	5266
Beaver Creek	170702020203	Olive	Olive.93L.2	2006	53.09	5266
Beaver Creek	170702020203	Olive	Olive.93L.2	2008	55.7	5266

b. Water Depths

Hobo Olive.93L.2 is located between the Belvadear and Olive Tone operations. Water at the time of installation and removal at the site were 12.4 inches or less and in most cases 6 inches or less (**Table 7-10**). The stream reach located upstream of this hobo, but downstream of the Olive Tone operation, has been observed to go dry (C. Helberg, UNF Minerals Administrator, pers. com. 2014).

Maximum water depths were measured at hobo Olive.93L.1, located downstream of McWillis Gulch, on October 13, 2006. The water depth was measured every 10 feet for 100 feet, starting at the hobo site and heading upstream. Values ranged from 3.5 to 4 inches deep.

Table 7-10
Water depths at hobo site Olive.93L.2 at installation and removal.
Hobo is located downstream of Olive Tone

Year	Water depth at installation (inches)	Water depth at removal (inches)	Installation Date	Removal Date
1999	6	3	June 2	Sept 7
2000	5	2	May 15	Sept 14
2006	12	4	July 11	Oct 13
2008	12.4	11.4	Jul 4	Oct 16

c. Stream Flow

There are no stream gages on Olive Creek. Therefore, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 and 2013 to look for patterns of flow (*project file)*. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles.

Year 2007 was selected because flows were very low on the NFBR, which is the closest stream gage to Olive Creek and therefore expected to reflect the similar climate conditions, and 2013 because this was the year that the point-in-time stream flow measurement was made on Olive Creek. The stream hydrographs were examined to determine when stream flows were reflecting groundwater inputs only (base flows) and would therefore be at their lowest. While

there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would be occurring when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year. Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

A point-in-time (instantaneous) stream flow measurement was made on July 19, 2013 by Umatilla Forest personnel about 1.5 miles downstream of the proposed activity area. The stream flow was 1.414 cfs with water depths ranging from 2 to 9.5 inches. This flow measurement included water from Quartz Gulch and Buck Gulch and therefore would be larger than the flow at the Olive Tone site which is located upstream of Quartz Gulch and the Belvadear operation. However, using the discharge of 1.414 cfs, the amount proposed for removal by the miner (0.2 cfs) would be 14 percent of the flow. In a drought year or with extended drought, summer low flows are expected to be less making the amount withdrawn (0.2 cfs) a greater percentage of the total flow.

Conclusions

The available data show that currently stream depths and flows are low in the summer and stream temperatures exceed the ODEQ standard. Therefore, the miner's proposal to withdraw up to 0.2 cfs during the summer has the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Same as Alternative 2. No potential for a discharge.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Surface flow: Same as Alternative 2. No potential for a discharge.

Subsurface flow: Different than Alternative 2. Under Alternative 3, the discharge potential via subsurface flow **would be eliminated** with the addition of a Forest Service WRPM (Appendix 11) which would create a buried barrier between the pond and the creek. The barrier would decrease the permeability of the settling ponds and prevent the sediment from leaving the pond and moving through the subsurface to the creek.

Ford

Same as Alternative 2. No potential for a discharge.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Olive Creek is not listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) two proposed settling ponds and 2) two existing temporary access roads.

Ponds

Source water pond

Construction and use: Same as Alternative 2. Construction and use of the source water pond would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds (proposed)

Construction: Same as Alternative 2. Construction of the ponds would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Use: Different than Alternative 2. Under Alternative 3, use of the ponds would be in compliance with MM-2 as a result of the addition of a Forest Service WRPM (Appendix 11 and 1B). This WRPM would create a buried barrier between the pond and the creek. The barrier would decrease the permeability of the settling ponds and prevent the sediment from leaving the pond and moving through the subsurface to the creek. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of the two existing TA roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

Same as Alternative 2. The available data show that currently stream depths and flows are low in the summer and stream temperatures exceed the ODEQ standard. Therefore, the miner's proposal to withdraw up to 0.2 cfs during the summer has the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation.

Rosebud

Plan type: Placer
Subwatershed: Lower Granite (HUC 170702020206)
Subwatershed size: 20,282 acres
Analysis area: 5 acres
Creek: Granite Creek (perennial flow and fish-bearing)
Stream Order: 5th
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge of sediment into Granite Creek because the mining areas are more than 300 feet from the creek and are separated from the creek by1) processing ponds, 2) the powerline road (1000-E1a), 3) old dredge ponds now surrounded by abundant riparian vegetation, and 4) County Road 24. The depressions are in fine-grained material with a low permeability. The distance and features between the depressions and the creek and the composition of the depression sediments are effective sediment trapping mechanisms.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because the miner would only be withdrawing water from an existing pond.

Settling ponds

No potential for discharge of sediment via surface or subsurface flow into Granite Creek because the settling ponds are actually dry depressions located against the hillslope. They are more than 300 feet from Granite Creek and separated from the creek by 1) the powerline road (1000-E1a), 2) old dredge ponds now surrounded by abundant riparian vegetation, and 3) County Road 24. The depressions are in fine-grained material with a low permeability. The

distance and features between the depressions and the creek and the composition of the depression sediments are effective sediment trapping mechanisms.

However, there is the potential for water to overtop some of the shallow depressions and flow down the road and move road and settling pond sediments into the old dredge ponds.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use one existing temporary access road (TA 1000-E1a). Road 1000-E1a is also referred to as the powerline road (Appendix 6). The road is a native surface road.

No potential for a discharge of sediment into Granite Creek from use of this road because the road is more than 300 feet from Granite Creek and is separated from the creek by County Road 24 and old dredge ponds. Any sediment, generated as a result of use related to mining activity and transported off the road, would be trapped by the riparian vegetation that has become established around the old dredge ponds.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) two ponds (a source water pond and a settling pond) and 2) one existing TA road.

Ponds

Source water pond

Use would be in compliance with MM-2 because only water would be withdrawn. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Use of the dry depressions would be in compliance with MM-2 because there would be no impacts to water quality in Granite Creek or inchannel complexity, channel morphology, soils or riparian vegetation.

Access Roads

Use of the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

The RMOs do not apply because the site is more than 300 feet from Granite Creek.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Same as Alternative 2. No potential for a discharge into Granite Creek. Also, the addition of a Forest Service WRPM (Appendix 11) which would ensure that the depressions were sufficiently bermed to prevent spillover onto the road and transport of sediment from the ponds or from the road into the old dredge ponds.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) two ponds (a source water pond and a settling pond) and 2) one existing TA road.

Ponds

Source water pond

Same as Alternative 2. Use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Same as Alternative 2. Use of the existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. The RMOs do not apply because the site is more than 300 feet from Granite Creek.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Royal White

Plan type: Lode
Subwatershed: Beaver Creek (HUC 170702020203)
Subwatershed size: 13,075 acre
Analysis area: 3 acres
Creek: N/A. In the Irish Gulch drainage but on a ridge and more than 300 feet from any stream channel.
Stream Order: N/A. On a ridge.
303(d) listed: N/A
Suction Dredging: No
Essential Salmon Habitat: No

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge as a result of lode mining because the adits are on a ridge and there are no streams or stream channels or wetlands in the area.

Ponds

No potential for a discharge because Royal White ponds are located on a ridge and more than 300 feet from any drainage.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use three existing Temporary Access roads (Appendix 6). All are native surface roads.

No potential for a discharge as a result of use of these roads for mining because the roads are on a ridge, and there are no streams or stream channels or wetlands in the area.

Clean Water Act, Section 303(d) (antidegradation)

N/A. The operation is on a ridge and there are no streams in the area.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

N/A. There are no structures located inside any RHCA because the ponds, roads and site are located on a ridge.

PACFISH: Riparian Management Objectives (RMOs)

The RMOs do not apply because the site is on a ridge and more than 300 feet from any creek.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge.

Ponds

Same as Alternative 2. No potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

N/A. The operation is on a ridge and there are no streams in the area.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

N/A. There are no structures located inside any RHCA because the ponds, roads and site are located on a ridge.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. The RMOs do not apply because the site is on a ridge and more than 300 feet from any creek.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Ruby

Plan type: Placer
Subwatershed: Clear Creek (HUC 17070202024)
Subwatershed size: 20,467 acres
Analysis size: 2.5 acres
Creek: Clear Creek (perennial flow and fish-bearing); Ruby Creek (intermittent flow and fish-bearing)
Stream Order: Clear = 4th; Ruby = 3rd
303(d) listed: No for Clear Creek, No for Ruby Creek
Suction Dredging: No
Essential Salmon Habitat: Clear Creek = Yes. Ruby Creek = No

ALTERNATIVE 2

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Sites 1, 2, and 3

Potential for a discharge because the description of the miner-proposed buffer zone is not specific enough to determine its effectiveness in preventing a discharge of sediment into Ruby Creek. Depending on the starting point the miner intended to use when measuring “10 feet from the creek”, there “may” or “may not” be a potential for a discharge. If the buffer is measured from the low flow channel, they would be mining right on the edge of the valley floor next to the channel. As a result of this uncertainty, the worst-case scenario was used is assessing potential

water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In point A scenario, there would be the potential for a discharge of sediment into Clear Creek.

Site 4 (has two areas evaluated)

1. *Valley Floor area:* Potential for a discharge because the description of the miner-proposed buffer zone is not specific enough to determine its effectiveness in preventing a discharge of sediment into Clear Creek. Depending on the starting point the miner intended to use when measuring "10 feet from the creek", there may or may not be a potential for a discharge because 1) the Clear Creek stream bank is actively eroding, 2) the side channel is connected to Clear Creek at high flow, and 3) measuring the 10 feet buffer from the low flow channel of Clear Creek would put mining activity on an active gravel bar. In addition, the area to be mined is an old road that ends at the stream bank.

As a result of this uncertainty, the worst-case scenario was used is assessing potential water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In point A scenario, there would be the potential for a discharge of sediment into Clear Creek.

2. *Mining in the spur road*: There is a spur road off of 1310-E1a that is part of Site 4 and is proposed for mining. The spur road 1) ends at the stream bank, 2) is on a slight incline, and 3) there is very limited ground cover. Therefore, <u>potential for a discharge</u> of sediment into Clear Creek because site conditions are such that sediment from the road would reach the creek, because there are no sediment traps to prevent this from occurring.

Site 5

Potential for a discharge because the description of the miner-proposed buffer zone is not specific enough to determine its effectiveness in preventing a discharge of sediment into Clear Creek. Depending on the starting point the miner intended to use when measuring 10 feet from the creek, there "may" or "may not" be a potential for a discharge. If the 10 feet were measured from the Clear Creek low flow channel, then the activity would occur on an active cobble bar. As a result of this uncertainty, the worst-case scenario was used when assessing potential water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In point A scenario, there would be the potential for a discharge of sediment into Clear Creek.

Site 6

Same site characteristics as Site 5. As a result there would be the potential for a discharge of sediment into Clear Creek.

Site 7

No potential for a discharge into Clear Creek because the site is 1) more than 100 feet from Clear Creek, 2) is behind a low ridge, and 3) would not disturb the wetland area created by the old dredge pond.

Site 8

Same site characteristics as Site 4. Potential for a discharge depends on the starting point the miner intended to use when measuring “10 feet from the creek”. There may or may not be a potential for a discharge because 1) the Clear Creek stream bank is actively eroding, 2) there is a side channel that is connected to Clear Creek at high flow, and 3) measuring the 10 feet buffer from the low flow channel of Clear Creek would put mining activity on an active gravel bar.

As a result of this uncertainty, the worst-case scenario was used is assessing potential water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In point A scenario, there would be the potential for a discharge of sediment into Clear Creek.

Ponds

No ponds proposed. Miner will be using a self-contained unit.

Fords

Two existing fords proposed for use via temporary mine access road 1310-E1a .

Clear Creek ford

Potential for a discharge of sediment from use of the existing Clear Creek ford because the southwest approach is composed of fines, is steeply sloped, and the northeast approach is composed of fines.

Ruby Creek ford

Potential for a discharge of sediment from use of the existing Ruby Creek ford when the access road and ford was used when wet because 1) Ruby Creek flows down the road at high flow and 2) the road and ford approaches are all composed of fine sediment. Ford used to access mining sites 1, 2, and 3.

Proposed Temporary ATV bridge

Potential for a discharge of sediment into Clear Creek from the placement and removal of the ATV bridge at the Clear Creek ford location because the southwest approach is composed of fines, is steeply sloped, and the northeast approach is composed of fines.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use six existing temporary access (TA) roads to access the various sites (Appendix 6). All are native surface roads.

TA Road 1310-E1a (used to access sites 1, 2, and 3)

Potential for a discharge into Ruby Creek as a result of using this road because 1) it is a native surface road composed of fine sediment and 2) the road becomes part of the creek during the spring high flows. Use of the road by vehicles would break up any armoring that has developed on the road bed and generate fines (Burroughs and King, 1989; Luce and Black 1999; Luce and Black 2001; Swift 1984). The sediment would then be transported down the road and into Ruby Creek at the ford when the creek overtopped it banks and flows down the road.

TA Road 1310-E1b (used to access site 2)

No potential for a discharge because 1) the distance between the road and Ruby Creek is at least 25 feet, 2) the ground is flat, and 3) the ground between the road and the creek is lush grasses. Therefore, any sediment that leaves the road would be trapped before it could reach Ruby Creek.

TA Road 1310-E3a (used to access sites 4 and 5)

No potential for a discharge because this road is separated from Clear Creek by 85 to 100 feet of vegetated ground. The topography is flat. Therefore, any sediment that exits the road would be trapped prior to reaching Clear Creek.

TA Road 1310-E3b (used to access site 6)

No potential for a discharge because 1) the road used to access site 6 is 150 feet from Clear Creek and 2) the intervening ground is well-vegetated and flat. Therefore, any sediment that leaves the road would be trapped prior to its reaching Clear Creek.

TA Road 1310-E3c (used to access site 7)

No potential for a discharge of sediment into Clear Creek because the area is completely disconnected from Clear Creek by the low ridge and sediment would be trapped behind the ridge.

TA Road 1310-E4a (used to access site 8)

No potential for a discharge of sediment into Clear Creek, generated from use of the road to access Site 8, because the road is more than 200 feet from the creek, the ground cover between the creek and the road is lush grasses and forbs, and the road is on flat ground.

Clean Water Act, Section 303(d) (antidegradation)

Clear Creek and Ruby Creek are not listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) six existing temporary access (TA) roads and 2) a temporary ATV bridge. There are no ponds as the miner would be using a self-contained processing unit.

Ponds

None. Using a self-contained unit.

Access Roads

TA roads except TA 1310-E1a

Use of these existing TA roads would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA road 1310-E1a (used to access sites 1, 2, and 3)

Use of this TA road would NOT be in compliance with MM-2 because of potential impacts to water quality because Ruby Creek flows down this road during high flows. See Appendix 3 for detailed discussion.

Proposed Temporary ATV bridge

Installation of this bridge at the ford location would NOT be in compliance with MM-2 because there is the potential for impacts to water quality and inchannel complexity. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment under Alternative 2 would be small and move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width, and therefore change flow depths for a given discharge, and 2) no removal of trees is proposed.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no removal of trees is proposed and 2) there would be no activity in the channel to alter existing amounts.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of the stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability,* and therefore no increase in channel width and 2) no instream activity which could trigger a headcut and therefore increase channel depths.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Site 1, 2, and 3

Different than Alternative 2. Under Alternative 3, discharge potential **would be eliminated** because the Forest Service WRPM (Appendix 11) clarifies the buffer location. This WRPM, which clarifies the Plan-specific buffer, ensures that the activity takes place on the valley floor terrace. The ground is flat in this area and lush with grasses and forbs. The flat ground and vegetation are effective sediment traps and would prevent any sediment that might leave the mining area from reaching the creek.

Site 4 (has two areas evaluated)

1. *Valley floor area:* Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because the Forest Service WRPM (Appendix 11) clarifies the buffer location. This WRPM, which clarifies the Plan-specific buffer, ensures that the activity takes place on the valley floor terrace. The ground is flat in this area and has large tailings piles in places that separate the area to be tested from the creek, or 2) there is a slight rise at the edge of the side channel bank, which in combination with the straw bales or waddles, would prevent sediment from entering either the side channel or Clear Creek.

2. *Mining in the spur road*: Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because the Forest Service WRPM (Appendix 11) would require placement of straw bales 10 feet from the edge of the Valley Floor-Channel Break in Slope (Appendix 1A, Figures 1 and 2). The straw bales would effectively trap any sediment that might move down the road and would prevent it from reaching Clear Creek.

Site 5

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because the Forest Service WRPMs (Appendix 11) clarify the buffer location. This WRPM, which clarifies the Plan-specific buffer, ensures that the activity takes place on the valley floor

terrace. The ground is flat, there is riparian vegetation on the stream bank slopes, and straw bales or waddles would be placed between the mining activity and the creek. The combination of these are an effective sediment trap. In addition, the requirement to fill in each hole before digging another hole in the area eliminates a key sediment source that could enter Clear Creek.

Site 6

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** for the reasons noted for Site 5.

Site 7

Same as Alternative 2. No discharge potential

Site 8

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** for the reasons noted for Site 5.

<u>Ponds</u>

No ponds. Using a self-contained unit.

<u>Fords</u>

Two existing fords proposed for use via temporary mine access road 1310-E1a.

Clear Creek ford

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because a Forest Service WRPM (Appendix 11) requires that the ford approaches be rocked and sloped. This Forest Service WRPM would remove the source of the fines that could enter into Clear Creek as a result of using the ford.

Ruby Creek ford

Different than Alternative 2. Under Alternative 3, discharge potential **would be eliminated** as a result of the addition of Forest Service WRPM (Appendix 11). These protection measures would remove the source of the fines that could enter into Ruby Creek and the potential for Ruby Creek to flow down the road during high flows.

Proposed Temporary ATV bridge

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** from placement and removal of the ATV bridge because the Forest Service WRPM (Appendix 11) for the Clear Creek ford would protect the banks from eroding and contributing sediment into Clear Creek.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use six existing Temporary Access roads to access the various sites (Appendix 6). All are native surface roads.

TA Road 1310-E1a (used to access sites 1, 2, and 3)

Different than Alternative 2. Under Alternative 3, discharge potential **would be eliminated** because the Forest Service site-specific WRPMs (Appendix 11) would 1) prevent the stream from flowing onto the road and transporting sediment generated by use into the creek at the ford, 2) require that sections of the road be rocked, and 3) require that the ford approaches be rocked. These protection measures would eliminate the sources of sediment that could enter into Ruby Creek as a result of road use related to mining activity.

TA Road 1310-E1b (used to access site 2)

Same as Alternative 2. No potential for a discharge.

TA Road 1310-E3a (used to access sites 4 and 5)

Same as Alternative 2. No potential for discharge.

TA Road 1310-E3b (used to access site 6)

Same as Alternative 2. No potential for a discharge.

TA Road 1310-E3c (used to access site 7)

Same as Alternative 2. No potential for a discharge.

TA Road 1310-E4a (used to access site 8)

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Clear Creek and Ruby Creek are not listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) six existing temporary access roads and 2) a temporary ATV bridge. There are no ponds as the miner would be using a self-contained processing unit.

Ponds

N/A. No ponds. Using a self-contained unit.

Access Roads

Existing TA roads except TA 1310-E1a

Same as Alternative 2. Use of these existing TA roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Existing TA road 1310-E1a (used to access sites 1, 2, and 3)

Different than Alternative 2. Under Alternative 3, use of this road would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs (Appendix 11). These WRPMs 1) create a straw bale berm that prevents the creek from flowing down the road at high flows, 2) require that select sections of the road be rocked and 3) that the ford approaches be rocked. See Appendix 3 for detailed discussion.

Proposed temporary ATV bridge

Different than Alternative 2. Under Alternative 3, installation of this bridge would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs (Appendix 11). These WRPMs require 1) that the bridge be seasonally removed to prevent wood buildup behind it and 2) that the ford approaches to Clear Creek be rocked. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Sunshine McWillis

Plan type: Placer
Subwatershed: Beaver Creek (HUC 170702020203)
Subwatershed size: 13,075 acres
Analysis area: 2.5 acres
Creek: McWillis Gulch (intermittent flow and non fish-bearing)
Stream Order: 2nd
303(d) listed: No
Suction Dredging: Yes
Essential Salmon Habitat: No

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Site 1

No potential for a discharge because the mining site is into the hillslope and there is a berm at the base of the work area that prevents any sediment from reaching the gulch.

Site 2

Potential for discharge because mining site #2 is on a forested hillslope that borders McWillis Gulch. Removal of vegetation and movement of materials to the processing sites would likely result in some sediment entering the gulch.

Ponds

Processing site 1

Source water pond

Pond 1: No potential for a discharge via surface or subsurface flow because the miner would only be withdrawing water from an existing pond.

Settling ponds

Pond 2: Potential for a discharge because Pond 2 has a pipe that connects the pond to Pond 3 and a low spot that could serve as an outlet of muddy water into the gulch if the pond overtopped.

Pond 3: No potential for a discharge because the pond is not in the drainage and is sufficiently bermed to prevent any overflow.

Processing site 2

One proposed pond. Potential for a discharge because the proposed pond at this site would be in the drainage of the gulch which seasonally carries water. Therefore any sediment that is put into the pond would be mobilized during the spring flows and transported downstream into Olive Creek.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridges

One existing wooden bridge across McWillis Gulch Creek is proposed for use. Bridge would be used for regular vehicle traffic and heavy equipment. No potential for a discharge of sediment as a result of use because bridge is existing and stable and no bridge modifications planned.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use one Forest Service closed road, one Forest Service decommissioned road and one existing Temporary Access roads to access the various sites (Appendices 3 and 7). All are native surface roads.

FS closed road 1305-054

No potential for a discharge related to use of this road because the closed Forest Service road is more than 100 feet from the gulch, and the intervening ground is well vegetated with grasses, forbs, needles, and downed wood. The ground cover and distances are effective sediment trapping mechanisms and would capture any sediment that leaves the roads prior to it reaching the gulch.

FS decommissioned road 1305-130

No potential for a discharge because related to use of this road because the decommissioned road leaves the closed road and is used to access the cabin area. Distance between the road and the gulch varies but is more than 50 feet from the gulch at its closest. The intervening ground cover is 100 % and composed of grasses, forbs, needles, and downed wood. The ground cover and distances are effective sediment trapping mechanisms and would capture any sediment that leaves the roads prior to it reaching the gulch.

TA Road 1305-M1a

No potential for a discharge related to use of this road because the existing access road is on flat ground, parallels the gulch, and crosses the gulch at a bridge. The intervening ground cover is a mix of riparian shrubs, grass, forbs, and needles. The ground cover and distances are effective sediment trapping mechanisms and would capture any sediment that leaves the roads prior to it reaching the gulch.

Clean Water Act, Section 303(d) (antidegradation)

McWillis Gulch is not listed.

Suction Dredging

Suction dredging is currently permitted under the 2015 ODEQ 700PM permit because it is not located in Essential Salmon Habitat (Appendix 4A, 4B).

In evaluating suction dredging on McWillis Gulch in the area of the proposed operation impacts to the following parameters were considered: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and substrate, and channel bed stability (Appendix 4A). The analysis assumes that the miner <u>would be in compliance</u> with the 2015 700PM permit (Appendix 4B) and all its requirements.

<u>Site Characteristics</u>

The channel bed in this area is predominantly cobbles with some gravels and sands and highly stable given the abundance of cobbles. McWillis Gulch was historically placer mined and therefore, the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.8, 9 and 10).

Water Quality and Channel Morphology analysis

Pool frequency and distribution: Localized changes would occur in pool locations and frequency related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

Habitat complexity: Local change to habitat complexity would occur because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be permanent

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) therefore would remain intact thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures would occur because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local change would occur to water clarity as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the 700 PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact is limited to the when the miner is suction dredging.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and

other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability would occur even through dredging will create pools because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

Summary of Effects

The analysis found that suction dredging would have no impact on 1) stream temperature or 2) channel bed stability for the reasons stated above. Suction dredging would have a local impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. The changes to pool frequency, habitat complexity and substrate are expected to be permanent but limited to the area worked and therefore would not have a measurable impact on channel complexity or channel stability. Changes in turbidity would impact less than 300 feet of stream and not be permanent but limited to the period of time that the miner is suction dredging.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) existing ponds at Processing site 1, 2) proposed pond at Processing site 2, 3) one FS decommissioned road, 4) one existing temporary access road, and 5) existing bridge. The miner also proposes to use a FS closed road but this road is outside the RHCA. Therefore, it is not discussed in this section.

Ponds (Processing site 1)

Source water pond

Pond 1 is the source water pond. It would be in compliance with MM-2 because the miner would only be withdrawing water. Therefore, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Pond 2 would NOT be in compliance with MM-2 because of potential impact to water quality. See Appendix 3 for detailed discussion.

Pond 3 would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Ponds (Processing site 2)

Construction and use of the proposed pond would NOT be in compliance with MM-2 because of potential impacts to water quality. See Appendix 3 for detailed discussion.

Access Roads

FS decommissioned road 1305-130

Use of this road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA road 1305-M1a

Use of this road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Bridges

Use of the existing wooden bridge across McWillis Gulch Creek would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: Localized changes would occur in pool locations and frequency related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

No changes would occur to pool frequency related to potential for inputs of fine sediment from mining activity because inputs would move through the system as suspended load and not settle out in the pools. There would be no changes in pool frequency related to *Large Woody Recruitment* because no trees are proposed for removal.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees, none of which would be shade trees.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) the only place where trees would be cut is in a small area proposed for mining. This area is adjacent to McWillis Gulch, which has intermittent flow and abundant in-channel riparian woody vegetation. 2) There would be no activity in the channel to alter existing amounts and distributions.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

No changes would occur to substrate sediment as a result of potential for inputs of fine sediment related to mining activity because inputs would move through the system as suspended load.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of the stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore no increase in channel width and 2) no instream activity which could trigger a headcut and increase channel depths.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Site 1
Same as Alternative 2. No potential for a discharge.

Site 2

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** as a result of the additional Forest Service WRPM (Appendix 11) that adds straw bales 10 feet from the edge of the hillslope to ensure that there is an effective sediment trap in place that prevents sediment from reaching McWillis Gulch.

Ponds

Processing site 1

Source water pond

Pond 1: Same as Alternative 2. No potential for a discharge via surface or subsurface flow because only withdrawing water from an existing pond.

Settling ponds

Pond 2: Different then Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** as a result of the Forest Service WRPM (Appendix 11) that berms the low spots on Pond 2. This ensures that sediment entering into the pond would not enter the gulch.

Pond 3: Same as Alternative 2. No potential for a discharge.

Processing site 2

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** as a result of the Forest Service WRPM (Appendix 11) that restricts processing activity to Processing site 1.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Bridges

Same as Alternative 2. Use of the existing wooden bridge would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use one Forest Service closed road, one Forest Service decommissioned road and one existing Temporary Access roads to access the various sites (Appendices 3 and 7). All are native surface roads.

FS closed road 1305-054

Same as Alternative 2. No potential for a discharge.

FS decommissioned road 1305-130

Same as Alternative 2. No potential for a discharge.

TA Road 1305-M1a

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

McWillis Gulch is not listed.

Suction Dredging

Same as Alternative 2. The analysis found that suction dredging would have no impact on stream temperature or channel bed stability for the same reasons stated under Alternative 2.

Suction dredging would have localized and permanent impacts related to pool frequency and distribution, habitat complexity and substrate and localized but short-term impacts to turbidity for the same reasons stated under Alternative 2.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) existing ponds at processing site 1, 2) proposed pond at processing site 2, 3) one FS decommissioned road, 4) one existing temporary access road, and 5) one existing bridge. The miner also proposes to use a FS closed road but this road is outside the RHCA. Therefore, it is not discussed in this section.

Ponds (Processing site 1)

Source water pond

Pond 1: Same as Alternative 2. Use of the pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Pond 2: Different than Alternative 2. Under Alternative 3, use of this pond would be in compliance with MM-2 as a result of the addition of a Forest Service WRPM that requires a berm in the low spot in the pond. This eliminates the potential for a discharge. See Appendix 3 for detailed discussion.

Pond 3: Same as Alternative 2. Use of the pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Ponds (Processing site 2)

Different than Alternative 2. Under Alternative 3, this site is dropped as the result of the addition of a Forest Service WRPM that restricts processing activity to Site #1. See Appendix 3 for detailed discussion.

Access Roads

FS decommissioned road 1305-130

Same as Alternative 2. Use of this road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

TA road 1305-M1a

Same as Alternative 2. Use of this road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Bridges

Same as Alternative 2. Use of the existing wooden bridge across would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. Only *Pool Frequency* and *Substrate Sediment* have the potential to be affected as a result of suction dredging. The changes would be permanent but localized to the area dredged and there would be no measurable changes to these inchannel characteristics even within the Plan analysis area.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Tetra Alpha Placer

Plan type: Placer
Subwatershed: Upper Granite (HUC 170702020201)
Subwatershed size: 9,312 acres
Analysis area: 8 acres
Creek: Boulder Creek (perennial flow and fish bearing)
Stream Order: 2nd or 3rd depending on mining site
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2

Water Resources

Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining activity

Stage 1 mining site (downstream site)

Potential for a discharge because the description of the miner-proposed buffer zone is not specific enough to determine effectiveness. The proposal is to mine both sides of the existing mine access road that runs along the base of the south hillslope. Depending on the starting point the miner intended to use to measure the 25 -foot buffer and what they identify as the "Boulder Creek high water mark", there "may" or "may not" be a potential for a discharge as a result of mining on the north side of the road.

If the 25-foot miner-proposed buffer is measured from the top of the channel bank, then portions of the activity would occur at the edge of the wet meadow, BUT if measured from the back edge of the wet meadow, the activity would be behind the tailings that line the edge of the meadow. In the first case, there would be the potential for a discharge of sediment into Boulder Creek. In the second case (behind the tailings) there would not be a potential for a discharge.

As a result of this uncertainty, the worst-case scenario was used is assessing potential water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In point A scenario, there would be the potential for a discharge of sediment into Clear Creek.

Stage 2 mining site (upstream site)

Potential for a discharge because the description of the miner-proposed buffer zone is not specific enough to determine effectiveness. Depending on the starting point the miner intended to use to measure the 25 -foot buffer and what they identify as the "Boulder Creek high water mark", there "may" or "may not" be a potential for a discharge as a result of mining on the north side of the road.

If the 25-foot miner-proposed buffer is measured from the top of the channel bank, then portions of the activity would occur at the edge of the wet meadow or in the meadow, BUT if measured from the back edge of the wet meadow, the activity would occur up on the hillslope and there would be 25 feet of hillslope vegetation and the lush meadow vegetation that separates the activity area from the creek. In the first case, there would be the potential for a discharge of sediment into Boulder Creek. In the second case (on the hillslope) there would not be a potential for a discharge.

As a result of this uncertainty, the worst-case scenario was used is assessing potential water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In scenario 1, there would be the potential for a discharge of sediment into Clear Creek.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because only withdrawing water from an existing pond in Last Chance Creek.

Settling ponds

No potential for discharge via surface flow into Boulder Creek from the existing settling pond because the pond has a large capacity, is dug into the ground, is in a stable location, is well bermed, and is more than 150 feet from Boulder Creek.

No potential for a discharge via subsurface flow into the creek because the pond is dug into fine sediments and the pond is separated from the creek by a wet meadow that has lush vegetation.

Fords

Three fords proposed for use via closed Forest Service road 7355-011. One is an existing ford and two are proposed fords.

Lower existing ford (west ford)

Used to access Stage 1 area. Potential for a discharge of sediment into Boulder Creek as a result of the use of the ford because the ford approaches are composed of fine-grained sediments.

Middle proposed ford

Used to access Stage 2 site. Potential for a discharge into Boulder Creek because the north approach is very steep and the approaches on both sides are composed of fines.

Upper proposed ford (east ford)

Used to access Stage 2 site as well. Potential for a discharge into Boulder Creek because the stream banks are vertical, 1 to 2 feet high, and fine grained.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads:

The miner proposes to use one Forest Service closed road, one existing Temporary Access road and four proposed Temporary Access roads (Appendix 6). All are native surface roads.

Forest Service closed road 7355-011

This road is used to access the placer processing site and serves as the starting point for the roads that access the two mining areas.

No potential for a discharge related to use of this road because the road is within 50 feet of the creek in places, and once it reaches the processing site, the distance to the creek increased to more than 200 feet. The intervening ground is composed of lush grasses and forbs. This ground cover type would effectively trap any sediment that exits the road would prevent it from reaching the creek.

TA Road 7355-M3a (existing)

This road would be used to access a portion of the Stage 1 mining area.

No potential for a discharge into Boulder Creek because this existing road is separated from the creek by tailings piles.

TA Road 7355-M3b (proposed)

This road would be used to access the upper portion of the Stage 1 mining area.

No potential for a discharge into Boulder Creek as a result of creation and use of this two-track road because the road would be separated from the creek by about 50 feet of vegetated ground that is a mix of downed wood, grasses, needles and forbs. This ground cover would be effective at trapping any sediment that might exit the road prior to reaching the creek.

TA Roads 7355-M3c and most of M3d (except meadow portion) (proposed)

Proposed two-track roads 7355-M3c and M3d would be used to access the Stage 2 area. M3d has about 350 feet that crosses a lush meadow. This segment is discussed separately.

No potential for a discharge as a result of creation and use because these roads would occur about 25 feet from the edge of the meadow on the hillslope. The ground cover in the meadow is lush grasses, forbs and sedges and the ground cover on the hillslope is needles, grasses, forbs,

and downed wood. The ground cover would prevent any sediment generated by construction and use of these two roads from reaching Boulder Creek.

TA Road 7355-M3d (meadow segment) (proposed)

Potential for a discharge as a result of the creation and use of this segment of two-track which would cross the meadow. The meadow has lush grasses, forbs and sedges. The road would cross Boulder Creek and there would be the potential that sediment generated by creation and use of this road could travel into Boulder Creek.

Clean Water Act, Section 303(d) (antidegradation)

Boulder Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing pond (used as source water and settling pond), 2) one FS closed road, 3) one existing temporary access road and 4) four proposed TA roads.

Ponds

Source water pond

Use would be in compliance with MM-2 when the existing pond used as a source water pond because the miner would only be withdrawing water. Therefore, no impacts to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Use would also be in compliance with MM-2 when using the existing pond as a settling pond because no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Forest Service closed road 7355-011

Use of this road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA Road 7355-M3a (existing)

Use of the existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA Roads 7355-M3b, M3c, and most of M3d (except meadow portion) (proposed)

Creation and use of the proposed TA roads would NOT be in compliance with MM-2 because 1) there would be new soil disturbance inside the RHCA and 2) there are not sufficient protection measures to ensure that disturbance is minimal and that appropriate reclamation would be done. See Appendix 3 for detailed discussion.

TA Road 7355-M3d (meadow segment) (proposed)

Creation and use of this portion of M3d would NOT be in compliance with MM-2. In addition to new soil disturbance, this portion of the road would 1) impact water quality, 2) locally impact to stream banks and thus channel morphology, and 3) locally impact riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes would occur in *Pool Frequency* related to the potential inputs of fine sediment under Alternative 2 because the inputs would be small and move through the system as suspended load and 2) there would be no changes in pool frequency related to *Large Woody Recruitment* because the area on the south side of Boulder Creek, which is proposed for mining, is more than 50 feet from the creek and trees would remain in the intervening ground.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) there would be only very limited removal of trees and none would be shade trees.

Large Woody Debris: This RMO does not apply as this is a meadow system.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore no increase in channel width and 2) no instream activity which could trigger a headcut and therefore increase channel depths.

Wetlands and Floodplains

The miner proposes to create a two-track temporary access road 7355-M3d across a wet meadow area which is combination of wetland and active floodplain to access the Stage 2 mining area. Length of section across the meadow is about 350 feet and would cross Boulder Creek.

The Plan would NOT be in compliance with Executive Order 11988 (Protection of Floodplains) and Executive Order 11990 (Protection of Wetlands) because the miner has not ensured that two-track road would not lead to the development of a channel related to road erosion. A new channel would alter groundwater flows and potentially trigger gully development in the meadow.

Other Potential Water Resource Impacts

<u>Stream flow and stream temperature alteration related to water withdrawals</u>

The miner proposes to use water from an existing off-channel pond for processing placer material. The pond is 110 feet from the creek and elevationally above the creek. In addition, the miner proposes to withdraw water from Boulder Creek, if necessary, to supplement the water in the pond water (i.e. make up water). Based on the pump size (10 HP 3" pump), the pump would withdraw approximately 100 gallons per minute or 0.2 cfs. This is the amount that is assumed would be withdrawn from Boulder Creek if the pond needed make up water and is the amount analyzed below.

Background

The potential effects of withdrawing water from Boulder Creek on stream flow and stream temperatures were assessed using 1) stream temperature data, 2) water depths taken during the installation and removal of the stream temperature monitors (hobos), and 3) examination of several stream gages from the larger area to determine the timing of summer low flows which are the result of groundwater inputs only.

a. Stream Temperatures

The ODEQ stream temperature standard for Boulder Creek is 53.6*F. There are five stream temperature monitors (hobos) on Boulder Creek. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at all sites (**Table 7-11**). The pond currently proposed for use as the processing site is located up on a terrace away from the stream and between hobos Boulder.93C.2 and Boulder.93C.3.

Table 7-11
7-day running average of the maximum daily stream temperature on Boulder Creek for years with temperature data in the vicinity of Tetra Alpha

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Boulder	Boulder.93C.1	1996	70.65	4671
Upper Granite Creek	170702020201	Boulder	Boulder.93C.2	1996	67.5	4700
Upper Granite Creek	170702020201	Boulder	Boulder.93C.2	1997	69.01	4700
Upper Granite Creek	170702020201	Boulder	Boulder.93C.3	1997	67.1	4731
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1996	56.9	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1997	59.26	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1998	61.22	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	2002	61.91	4769

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	2005	61.13	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	1998	56.54	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2002	57.37	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2003	57.53	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2005	55.22	5094

b. Water Depths

The only water depth data available is at the hobo locations (**Table 7-12**). Only the years with depth data are provided. Several of these sites do not show up in Table 1 above because the hobos failed that year and temperature data was not collected Boulder.93C.1, Boulder.93C.2 and Boulder.93C.3 do not show up in Table 2 because no water depth data were collected for those years with temperature data.

Table 7-12
Water depths at hobo sites on Boulder Creek at installation and removal in the vicinity of Tetra Alpha

Hobo number	Survey Yr	Elevation (ft)	water depth at installation (inches)	water depth at removal (inches)	Installation Date	Removal Date
Boulder.93C.4	1998	4769	14.4	9.6	July 6	Oct 1
Boulder.93C.4	1999	4769	18	6	June 17	Sept 21
Boulder.93C.4	2002	4769	12	7.2	July 2	Oct 8
Boulder.93C.4	2003	4769	14.4	6	June 24	Oct 21
Boulder.93C.4	2005	4769	12	7.2	June 29	Oct 13
Boulder.93C.5	1998	5094	20.4	7.2	July 7	Oct 1
Boulder.93C.5	1999	5094	26.4	4.8	June 17	Sept 21
Boulder.93C.5	2002	5094	12	7.2	July 2	Oct 8
Boulder.93C.5	2003	5094	14.4	6	June 24	Oct 21
Boulder.93C.5	2005	5094	10.8	6	July 1	Oct 13

Water depths decreased in all cases between the time when the hobos were installed and removed indicating a reduction in stream flow. Water depths were as low as about 5 inches at these sites. Because hobos are located in pools, water depths here are likely some of the deepest along the stream.

c. Stream Flow

There are no stream gages on Boulder Creek. Therefore, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 (a low flow year) and 2013 to look for patterns of flow (*project file)*. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles. The stream hydrographs were examined to determine when stream flows were reflecting groundwater inputs only (base flows) and would therefore be at their lowest. While there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would be occurring when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year. Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

No stream flow data exists for this stream. However, **Table 7-12** above suggests a reduction in stream flow during the summer as water depths at hobo locations decrease. As noted above in the water depth section, hobos are located in pools and therefore those depths often represent some of the deeper places along the stream, at least in those areas.

Conclusions

The available data show that currently stream depths are low in the summer and stream temperatures on Boulder Creek exceed the ODEQ temperature standard. While stream flow data is absent the reduction in water depths at hobo location over the course of the summer document decreasing flows and the low water depths suggest low flow. Therefore, the miner's proposal to withdraw up to 0.2 cfs during the summer has the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation. The magnitude of the impact would vary as a function of climate and flow conditions that year and prior years.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Stage 1 site (downstream site):

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** with the addition of a Forest Service WRPM (Appendix 11) that clarifies where the 25 foot buffer measurement begins. This WRPM, which clarifies the Plan-specific buffer, places the mining activity behind the tailings that line the meadow edge and effectively prevents sediment from entering the meadow and creek.

Stage 2 site (upstream site):

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** as a result of the addition of Forest Service WRPMs (Appendix 11). One WRPM clarifies the Plan-specific buffer and places it up on the hillslope with 25 feet between the meadow and the activity. The other WRPM requires placement of a straw bale berm at the base of the hillslope. Both the intervening ground cover and the straw bales would ensure that no sediment generated by the activity would reach the creek or wet meadow.

Ponds: Same as Alternative 2. No potential for a discharge.

Fords

Lower existing ford

Different than Alternative 2. Under Alternative 3, the discharge potential of the LOWER ford **would be eliminated** because of the addition of Forest Service WRPMs (Appendix 11) that would require that the ford approaches be rocked to prevent the fine sediment from entering Boulder Creek.

Middle proposed ford

Different than Alternative 2. Under Alternative 3, the discharge potential related to the construction and use of the MIDDLE ford **would be eliminated** with the addition of the Forest

Service WRPM (Appendix 11) which would limit access to the Stage 2 area via the upper ford site.

Upper proposed ford

Different than Alternative 2. Under Alternative 3, the discharge potential related to the construction and use of the UPPER ford **would be eliminated** because of the addition of Forest Service WRPMs (Appendix 11) which specific how the ford will be constructed and rocked to prevent sediment from reaching the stream.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Forest Service closed road 7355-011.

Same as Alternative 2. No potential for a discharge.

Proposed TA roads 7355-M3a, M3b, M3c, M3d (except meadow portion):

Same as Alternative 2. No potential for a discharge.

Proposed TA road M3d (meadow portion):

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** related to the construction and use of the miner access road that crosses the meadow by the addition of a Forest Service WRPM (Appendix 11) that would require that the portion of the road that is within 25 feet of the creek be rocked. Rocking would eliminate the sediment source.

Clean Water Act, Section 303(d) (antidegradation)

Boulder Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing pond, 2) one FS closed road, 3) one existing temporary access road and 4) four proposed TA roads.

Ponds

Source water pond

Same as Alternative 2. Use of the pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Same as Alternative 2. Use of the pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Access Roads

Forest Service closed road 7355-011

Same as Alternative 2. Use of this road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

TA Road 7355-M3a (existing)

Same as Alternative 2. Use of this road would be in compliance. See Appendix 3 for detailed discussion.

TA Roads 7355-M3b, M3c, and most of M3d (except meadow portion) (proposed)

Different than Alternative 2. Under Alternative 3, creation and use of the proposed TA roads would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs (Appendix 11) and General Requirements Z1-14 and R13 (Appendix 2). See Appendix 3 for detailed discussion.

TA Road 7355-M3d (meadow segment) (proposed)

Different than Alternative 2. Under Alternative 3, creation and use of the proposed TA roads would be in compliance with MM-2 as a result of the addition of Forest Service WRPMs (Appendix 11) and General Requirements Z1-14 and R13 (Appendix 2). See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Different than Alternative 2. Under Alternative 3, the Plan would be in compliance with Executive Order 11988 (Protection of Floodplains) and Executive Order 11990 (Protection of Wetlands) as a result of the addition of Forest Service WRPMs and General Requirements (Z1 through Z14). These requirements eliminate the potential for road erosion by rocking portions of the road, locating the rock with input from Forest Service personnel, and ensuring appropriate reclamation when no longer needed.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

Different than Alternative 2. There would be a reduction in the time frame of potential effects related to water withdrawals from Boulder Creek as a result of the addition of two Forest Service Fish Protection Measures (Fish PMs) which are listed under the Forest Service WRPMs (Appendix 11). Under these Fish PMs, water can only be withdrawn from Boulder Creek 1) prior to August 15 and 2) if there was stream flow below the area being worked prior to and after water was withdrawn. Therefore, potential effects to stream temperatures and stream flow would occur for a shorter period (early-mid July through August 14) rather than early-mid July through September 30). However, withdrawals would still occur during the period when stream temperatures are the highest (Appendix 5x) and water depths and stream flows are the lowest. Therefore, water withdrawals prior to August 14 still have the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation, just for a shorter period of time.

Tetra Alpha Mill and Lode

Plan type: Lode
Subwatershed: Upper Granite (HUC 170702020201)
Subwatershed size: 9,312 acres
Analysis area: 2 acres
Creek: Boulder Creek (perennial flow and fish-bearing)
Stream Order: 3rd
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2

Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge because 1) the adit to be mined is upslope of Forest Service road 7355-020 which is an effective sediment trap, 2) the road is more than 100 feet from the creek, and 3) the adit is dry. Lode rock will be moved to the Tetra Alpha mill site for processing.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because only withdrawing water from an existing pond.

Settling ponds

No potential for discharge via surface flow into Boulder Creek from the existing Tetra Alpha Mill ponds because the ponds has a large capacity, are dug into the ground and separated from the creek by the mine access road.

However, there would be a potential for a discharge via subsurface flow of **heavy metals** into Boulder Creek as a result of use of the settling ponds for the following reasons: 1) The ponds are separated from Boulder Creek by road fill and a floodplain. However, water in the settling ponds has the potential to seep through the road fill sediments adjacent to the creek and move heavy metals in solution into the active floodplain. During the spring high flow, these heavy metals would then be moved into the creek.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use 1) one Forest Service closed road to the mill site, 2) two existing TA roads in the mill site area, and 3) one existing TA road to access the lode site (Appendix 6). All are native surface roads.

Forest Service road 7355-011 (Mill site area)

No potential for a discharge related to use of this existing road because the road is separated from the creek by 50 feet. The intervening ground is composed of lush grasses and forbs. This ground cover type would effectively trap any sediment that exits the road would prevent it from reaching the creek.

TA Road 7355-M4a (Mill site area)

No potential for a discharge related to use of this existing road because this is separated from the creek by 140 feet. In addition, FS 7355-011 is between this road and the creek and 56 feet of vegetated ground exists between the two roads. The distance from the creek, the presence of FS 7355-011 and the ground cover would effectively trap any sediment that exits the road would prevent it from reaching the creek.

TA Road 7355-M4b (Mill site area)

No potential for a discharge related to use of this existing road because this is separated from the creek by 50 to 140 feet. It connects FS 7355-011 and TA road 7355-M4a. The distance from the creek and the intervening ground cover would effectively trap any sediment that exits the road would prevent it from reaching the creek.

TA Road 7355-E1a (Lode adit access)

No potential for a discharge related to use of this existing road because this road is more than 300 feet from Boulder Creek and there is a FS open road and ground cover between the TA road and the creek.

Clean Water Act, Section 303(d) (antidegradation)

Boulder Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mill site that were evaluated for compliance with MM-2 are 1) existing source water pond, 2) existing settling ponds (dry depressions), 3) one FS closed road, and 4) two existing temporary access roads (TA roads 7355-M4a and M4b).

TA road 7355-E1a which is used to access the Lode adit is outside the RHCA and not discussed further with respect to compliance with MM-2.

Ponds

Source water pond

Use would be in compliance with MM-2 because only water would be withdrawn. Therefore, no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds (dry depressions)

Use of the ponds would NOT be in compliance with MM-2 because there are potential impact to impacts water quality as a result of heavy metals in solution going into Boulder Creek. No impacts to inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access roads

Forest Service road 7355-011 (Mill site area)

Use of this road would be in compliance with MM-2 because no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA Road 7355-M4a and M4b (Mill site area)

Use of these TA roads would be in compliance with MM-2 because no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) The potential inputs of fine sediment under Alternative 2 would be small and would move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) no trees are proposed for removal.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees are proposed for removal and 2) there would be no activity in the channel to alter existing amounts.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore no increase in channel width and 2) no instream activity which could trigger a headcut and therefore increase channel depths.

Wetlands and Floodplains

No activity is proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

<u>Stream flow and stream temperature alteration related to water withdrawals</u>

The miner proposes to use water from an existing pond in Last Chance Creek for processing placer material. The pond is the result of past mining which created a berm across the stream. In addition, the miner proposes to withdraw water from Boulder Creek, if necessary, to supplement the water in the pond water (i.e. make up water). Based on the pump size (10 HP 3" pump), the pump would withdraw approximately 100 gallons per minute or 0.2 cfs. This is the amount that is assumed would be withdrawn from Boulder Creek if the pond needed make up water and is what is analyzed below for effects.

Background

The potential effects of withdrawing water from Boulder Creek on stream flow and stream temperatures were assessed using 1) stream temperature data, 2) water depths taken during the installation and removal of the stream temperature monitors (hobos), and 3) examination of

several stream gages from the larger area to determine the timing of summer low flows which are the result of groundwater inputs only.

a. Stream Temperatures

The ODEQ stream temperature standard for Boulder Creek is 53.6*F. There are five stream temperature monitors (hobos) on Boulder Creek. The 7-day running average of the maximum daily stream temperatures for the years with data exceed ODEQ standard at all sites (**Table 7-13**). The Last Chance pond currently proposed for use as the processing pond and for source water is located between hobos Boulder.93C.1 and Boulder.93C.2.

Table 7-13
7-day running average of the maximum daily stream temperature of Boulder Creek for years with temperature data in the vicinity of Tetra Group

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Boulder	Boulder.93C.1	1996	70.65	4671
Upper Granite Creek	170702020201	Boulder	Boulder.93C.2	1996	67.5	4700
Upper Granite Creek	170702020201	Boulder	Boulder.93C.2	1997	69.01	4700
Upper Granite Creek	170702020201	Boulder	Boulder.93C.3	1997	67.1	4731
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1996	56.9	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1997	59.26	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	1998	61.22	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	2002	61.91	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.4	2005	61.13	4769
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	1998	56.54	5094

2010 NHD HUC 12 name	2010 NHD HUC 12	Creek	Hobo number	Survey Yr	District Av. 7 day	Elevation (ft)
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2002	57.37	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2003	57.53	5094
Upper Granite Creek	170702020201	Boulder	Boulder.93C.5	2005	55.22	5094

b. Water Depths

The only water depth data available is at the hobo locations (**Table 7-14**). Only the years with depth data are provided. Several of these sites do not show up in Table 1 above because the hobos failed that year and temperature data was not collected. Boulder.93C.1, Boulder.93C.2 and Boulder.93C.3 do not show up in **Table 7-14** because no water depth data were collected for those years with temperature data.

Table 7-14
Water depths at hobo sites on Boulder Creek at installation and removal in the vicinity of Tetra Group

Hobo number	Survey Yr	Elevation (ft)	water depth at installation (inches)	water depth at removal (inches)	Installation Date	Removal Date
Boulder.93C.4	1998	4769	14.4	9.6	July 6	Oct 1
Boulder.93C.4	1999	4769	18	6	June 17	Sept 21
Boulder.93C.4	2002	4769	12	7.2	July 2	Oct 8
Boulder.93C.4	2003	4769	14.4	6	June 24	Oct 21
Boulder.93C.4	2005	4769	12	7.2	June 29	Oct 13
Boulder.93C.5	1998	5094	20.4	7.2	July 7	Oct 1
Boulder.93C.5	1999	5094	26.4	4.8	June 17	Sept 21
Boulder.93C.5	2002	5094	12	7.2	July 2	Oct 8
Boulder.93C.5	2003	5094	14.4	6	June 24	Oct 21
Boulder.93C.5	2005	5094	10.8	6	July 1	Oct 13

Water depths decreased in all cases between the time when the hobos were installed and removed indicating a reduction in stream flow. Water depths were as low as about 5 inches at these sites. Because hobos are located in pools, water depths here are likely some of the deepest along the stream.

c. Stream Flow

There are no stream gages on Boulder Creek. Therefore, stream hydrographs from six stream gages around the area were examined for the period of June 10 through Sept 30 for 2007 (a low flow year) and 2013 to look for patterns of flow (*project file)*. Drainage areas for these stream gages ranged from 7 sq. miles up to 121 sq. miles. The stream hydrographs were examined to determine when stream flows were reflecting groundwater inputs only (base flows) and would therefore be at their lowest. While there was some variability between years and stations, stream low flows tend to occur between early to mid-July through early to late September. Therefore, any water withdrawals during this time would be occurring when the flows would be at their lowest.

Predictions regarding climate change for the Blue Mountains are for increased periods of drought, reductions in snowpacks, and a shift in the timing of peak flows to earlier in the year (References). Under these conditions, stream flows are expected to decrease during the summer months, the initiation of summer low flows may occur sooner (i.e. from early-mid July to sometime in June), and stream temperatures may increase. An additional impact is that some streams may change from perennial to intermittent flow.

No stream flow data exists for this stream. However, Table 3 above captures a reduction in stream flow during the summer as water depths at hobo locations decrease. As noted above in the water depth section, hobos are located in pools and therefore those depths often represent some of the deeper places along the stream, at least in those areas.

Conclusions

The available data show that currently stream depths are low in the summer and stream temperatures on Boulder Creek exceed the ODEQ temperature standard. While stream flow data is absent the reduction in water depths at hobo location over the course of the summer document decreasing flows and the low water depths suggest low flow. Therefore, the miner's proposal to withdraw up to 0.2 cfs during the summer has the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation. The magnitude of the impact would vary as a function of climate and flow conditions that year and prior years.

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No potential for a discharge

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Surface flow*:* Same as Alternative 2. No potential for a discharge.

Subsurface flow*:* Different from Alternative 2. Under Alternative 3, the discharge potential via subsurface flow **would be eliminated** for two reasons: 1) Forest Service General Requirement L5 (Appendix 2) requires that the first run of any lode material be tested for heavy metals. 2) If the lode material from the first run or subsequent material found that the ore has the potential to release acidity or other contaminates into the ground and into Boulder Creek, then a Forest Service WRPM (Appendix 11) would apply in which the miner would cease activity until he had submitted a supplement to their plan that detailed how they would prevent heavy metals from entering Boulder Creek. This supplement would then be evaluated and additional Forest Service WRPMs put into place to ensure that there would not be a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use 1) one Forest Service closed road to the mill site, 2) two existing TA roads in the mill site area, and 3) one existing TA road to access the lode site (Appendix 6). All are native surface roads.

Forest Service road 7355-011 (Mill site area)

Same as Alternative 2. No discharge potential

TA Road 7355-M4a (Mill site area)

Same as Alternative 2. No discharge potential

TA Road 7355-M4b (Mill site area)

Same as Alternative 2. No discharge potential

TA Road 7355-E1a (Lode adit access)

Same as Alternative 2. No discharge potential

Clean Water Act, Section 303(d) (antidegradation)

Boulder Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mill site that were evaluated for compliance with MM-2 are 1) existing source water pond, 2) existing settling ponds (dry depressions), 3) one FS closed road, and 4) two existing temporary access roads (TA roads 7355-M4a and M4b).

TA road 7355-E1a which is used to access the Lode adit is outside the RHCA and not discussed further with respect to compliance with MM-2.

<u>Ponds</u>

Source water pond

Same as Alternative 2. Use <u>would be in compliance</u> with MM-2. See Appendix 3 for detailed discussion.

Settling ponds (dry depressions)

Different than Alternative 2. Under Alternative 3, use of the ponds <u>would be in compliance</u> with MM-2 because the potential for a discharge of heavy metals in solution a **would be eliminated** as a result of the addition of Forest Service General Requirements (Appendix 2) which address lode mining and testing lode material for heavy metals and WRPMs (Appendix 11) which ensures that sediment containing heavy metals is not placed in the settling ponds. See Appendix 3 for detailed discussion.

<u>Access roads</u>

Forest Service road 7355-011 (Mill site area)

Same as Alternative 2. Use of this road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

TA Road 7355-M4a and M4b (Mill site area)

Same as Alternative 2. Use of these two roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

Stream flow and stream temperature alteration related to water withdrawals

Different than Alternative 2. There is a reduction in the time frame of potential effects related to water withdrawals from Boulder Creek as a result of the addition of two Forest Service Fish Protection Measures (Fish PMs) which are listed under the Forest Service WRPMs (Appendix 11). Under these Fish PMs, water can only be withdrawn from Boulder Creek 1) prior to August 15 and 2) if there was stream flow below the area being worked prior to and after water was withdrawn. Therefore, potential effects to stream temperatures and stream flow would occur for a shorter period (early-mid July through August 14) rather than early-mid July through September 30). However, withdrawals would still occur during the period when stream temperatures are the highest (Appendix 5x) and water depths and stream flows are the lowest. Therefore, water withdrawals prior to August 14 still have the potential to 1) increase stream temperatures downstream, 2) decrease water depths downstream, and/or 3) dry up the stream below the operation, just for a shorter period of time.

Troy D

Plan type: Placer
Subwatershed: Lower Granite (HUC 170702020206)

Subwatershed size: 20,282 acres
Analysis area: 8 acres
Creek: Granite Creek (perennial flow and fish-bearing)
Stream Order: 5th
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: Yes

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge because the mining area is separated from the creek by an old placer tailings berm along the terrace edge. The distance between the back edge of the berm and the mining area is at least 136 feet (paced) of flat ground. Both the flat ground and the tailings berm would effectively prevent any sediment related to the mining from reaching the creek via a surface flow.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow related to use of the large pond as a source pond because only withdrawing water. However, the pond would also be used as the settling pond and there are potential impacts related to use as a settling pond.

Settling ponds

Surface flow*:* No potential for a discharge via surface flow from use of the large pond into Granite Creek because the ponds are dug into the ground and are behind an old tailings berm that lines the terrace edge. The distance between the back edge of the berm and the ponds is at least 136 feet (paced).

Subsurface flow*:* Potential for a discharge via subsurface flow from the ponds into the creek, even though they are at least 136 feet (paced) away from the back edge of the old placer tailings berm that lines the terrace located above the creek, because 1) the ponds are in old placer tailings which are expected to have a high permeability and large pores which would allow both sediment and water to move through the subsurface, 2) ponds are elevationally

above the creek and there is the potential for water and sediment to emerge along the face of the terrace slope that is next to the creek , and 3) the presence of water in the large pond indicates groundwater flow through the ponds, and towards the creek.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use two existing temporary access roads (Appendix 6). They are composed of old placer tailings.

No potential for a discharge from use of these roads because they are more than 136 feet (paced) behind the old placer tailings berm that lines the terrace that borders the creek, on flat ground, , and have very limited fines.

Clean Water Act, Section 303(d) (antidegradation)

Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one pond which would be used as both a source water pond and a settling pond, 2) two existing temporary access (TA) roads.

Ponds

Source water pond

Use of the large pond as a source water pond would be in compliance with MM-2 because the miner would only be withdrawing water from the pond. Therefore, there would be no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion,

Settling pond

The large pond would also be used as the settling pond. Use of this pond as a settling pond would NOT be in compliance with MM-2 because there is the potential for impacts to water quality as a result of sediment moving into Granite Creek via subsurface flow. See Appendix 3 for detailed discussion.

Access Roads

Use of the existing TA roads would be in compliance with MM-2 because no impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: No changes in *Pool Frequency* would occur as a result of the proposed activities for the following reasons: 1) the potential inputs of fine sediment under Alternative 2 would be small and move through the system as suspended load, 2) no changes to large woody recruitment are expected (see below), and 3) no suction dredging is proposed.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be no activity in the channel or on the stream banks which would alter channel width and therefore change flow depths for a given discharge, and 2) no stream-side trees would be cut.

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees are proposed to be cut, and 2) there would be no activity in the channel to alter existing amounts and distributions.

Substrate Sediment: No changes in *Substrate Sediment* because 1) no suction dredging is proposed, 2) no other inchannel activity is proposed, and 3) the potential inputs of fine sediment would be small and would move through the system as suspended load and not alter the substrate.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and therefore no increase in channel width and 2) no instream activity which could trigger a headcut and therefore increase channel depths.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

Same as Alternative 2. No discharge potential.

Ponds

Source water pond

Same as Alternative 2. No potential for a discharge.

Settling ponds

Surface flow: Same as Alternative 2. No potential for a discharge.

Subsurface flow: Different than Alternative 2. Discharge potential via subsurface flow **would be eliminated** as a result of the addition of Forest Service WRPMs (Appendix 11). One WRPM would require that 1) Pond A be used only as a source water pond and 2) Pond B be used as the settling pond. The other WRPM would create a buried barrier between the pond and the creek. The barrier would decrease the permeability of the settling ponds and prevent the sediment from leaving the pond and moving through the subsurface to the creek (Appendix 11 and 1C).

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Same as Alternative 2. Granite Creek is not 303(d) listed in this section of stream.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) one pond which would be used as both a source water pond and a settling pond, 2) two existing temporary access (TA) roads.

Ponds

Source water pond

Same as Alternative 2. Use of the large pond as a source water pond would be in compliance with MM-2. See Appendix 3 for detailed discussion,

Settling pond

Different than Alternative 2. Under Alternative 3, Pond A would only be used as a source water pond and Pond B (the smaller pond) would be used as the settling pond. In this new settling pond, a Forest Service WRPM would be added to eliminate the potential for a water quality impact by creating a localized buried barrier to subsurface groundwater and sediment movement. As a result the new settling pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

If Pond B needed to be enlarged, this construction would also be in compliance with MM-2 because the Forest Service WRPM would apply.

Access Roads

Same as Alternative 2. Use of the existing TA roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. No changes in the RMO parameters.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Yellow Gold

Plan type: Placer
Subwatershed: Upper Granite (HUC 170702020201)
Subwatershed size: 9,312 acres
Analysis area: 9 acres
Creek: Last Chance Creek (perennial flow and non fish-bearing). Now a series of ponds.
Stream Order: N/A. This drainage is now a series of ponds due to past mining activity which built berms across the creek and valley bottom and possibly dredged the valley bottom.
303(d) listed: No
Suction Dredging: No
Essential Salmon Habitat: No

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

FS NOTE: Last Chance Creek in this area is NOT a creek but has converted to a pond and wetland complex as the result of the presence of an earthen dam that was built during past historic mining.

Mining Activity

West Site

No potential for a discharge related to mining activity at this site because 1) activity is at least 160 feet from Last Chance Creek, 2) located on flat ground, and 3) has Forest Service road 7355-020 between the activity and the creek. Ground cover is limited to some needles and downed wood. The fillslope of the road slopes directly into the Last Chance Creek/pond. However, the combination of the mining distance from the creek, the flat topography in the area to be mined and the road would effectively trap any sediment that exited the mining area prior to the sediment reaching the fillslope and the creek.

East Site

Portion 1

Potential for a discharge into the creek/pond and wetland area located between the two-track road (road 7355-E2a) and the creek because the description of the miner-proposed 25-foot buffer zone is not specific enough to determine effectiveness. in preventing a discharge of sediment into the creek. Depending on the starting point the miner intended to use when measuring 25 feet from the creek, there may or may not be a potential for a discharge. As a result of this uncertainty, the worst-case scenario was used is assessing potential water quality impacts (**Appendix 1A, Figure 1A-3, Point A**). In scenario 1, there would be a discharge potential.

Portion 2

No discharge potential as a result of mining in the portion 2 area. The remaining portions of the East site to be mined are on the east side of 7355-E2a and the combination of ground cover and the two-track road and the distance from the creek (35 feet) would effectively trap any sediment that exited the mining area prior to the sediment reaching the creek.

Ponds

Source water pond

No potential for a discharge via surface or subsurface flow because only withdrawing water from an existing pond.

Settling ponds

Potential for a discharge **could not be determined** under Alternative 2 because the locations of the proposed ponds on the Plan map were not specific enough to determine how the close the ponds would be to the stream and the type of material that the ponds would be constructed in (e.g. permeable old placer tailings vs. sediments with a lot of fines).

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Miner proposes to use five Forest Service closed roads and one existing Temporary Access road (Appendix 6). They are all native surface roads.

Forest Service closed roads

No potential for a discharge related to use of any of these Forest Service closed roads because the roads are separated from the creek by well-vegetated ground composed of needles, grasses, forbs and downed wood. This ground cover would effectively trap any sediment that exits these roads prior to reaching the creek/pond. See Appendix 3 for detailed discussion.

Existing TA road 7355-E2a

No potential for a discharge related to use of this TA road because 1) this road is a two-track road that makes its way down to Last Chance Creek and part of the area to be mined, 2) is separated from Last Chance Creek by 35 feet at its closest, and 3) the intervening ground cover is a mix of grasses, forbs, and downed wood. The distance, combined with the limited disturbance and ground cover, are sufficient to effectively trap any sediment that might leave the two-track prior to it reaching the creek. See Appendix 3 for detailed discussion.

Bridges

No potential for a discharge related to installation, removal or use of the foot bridge because 1) the bridge is just going to be planks of wood placed across the creek so that the miners can walk across the creek to the processing site and 2) no disturbance of the ground cover is anticipated. Therefore, no soil would be exposed. See Appendix 3 for detailed discussion.

Clean Water Act, Section 303(d) (antidegradation)

Last Chance Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) proposed settling ponds, 3) five Forest Service closed roads, 4) one existing temporary access (TA) road, and 5) a proposed foot bridge.

Ponds

Source water pond

Use of the source water pond would be in compliance with MM-2 because water is only going to be withdrawn. Therefore, no would occur to impacts water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Settling ponds

Compliance with MM-2 could NOT be evaluated under Alternative 2 because the miner has not located the ponds. Compliance is evaluated only under Alternative 3.

Access Roads

Forest Service closed roads

Use of these five existing roads (Appendix 6) would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Existing TA road 7355-E2a

Use of this existing TA road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Bridges

Seasonal installation, removal and use of the proposed foot bridge would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

The RMOs do not apply to this site because Last Chance Creek has an earthen dam in place from past mining and has converted to a pond and wetland complex in this area.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

West Site

Same as Alternative 2. No potential for a discharge.

East Site

Portion 1:

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** because of the addition of Forest Service WRPMs (Appendix 11). One WRPM clarifies the buffer location and ensures that the activity takes place out of the wetland area. The other

WRPM requires that a straw bale berm be installed between the creek and the portion of the mining area between the creek/pond and road 7355-E2a. These two WRPMs ensure that any sediment leaving this area would be trapped prior to reaching the creek and wetland.

Portion 2:

Same as Alternative 2. No discharge potential.

Ponds

West processing site ponds

Same as Alternative 2. No potential for a discharge.

East processing site ponds

Different than Alternative 2. Under Alternative 3, the discharge potential **would be eliminated** as a result of the addition of the Forest Service WRPM (Appendix 11). This WRPM requires that the ponds be located with input from the Forest Service and protection measures identified and implemented prior to construction and use. This WRPM would be sufficient as there are places in the area identified for ponds which could be used for processing that would not result in a potential for a discharge.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Forest Service closed roads

Same as Alternative 2. No potential for a discharge.

Existing TA road 7355-E2a

Same as Alternative 2. No potential for a discharge.

Clean Water Act, Section 303(d) (antidegradation)

Last Chance Creek is not 303(d) listed.

Suction Dredging

None proposed.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are 1) an existing source water pond, 2) proposed settling ponds, 3) five Forest Service closed roads, 4) one existing temporary access (TA) road, and 5) a proposed foot bridge.

Ponds

Source water pond

Same as Alternative 2. Use of the source water pond would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Settling ponds

Different than Alternative 2. Under Alternative 3, construction and use of the proposed settling ponds would be in compliance with MM-2 because of the addition of a Forest Service WRPM (Appendix 11) and General Requirement R15 (Appendix 2). As a result of these additions, no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

Access Roads

Forest Service closed roads

Same as Alternative 2. Use of these existing five roads would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Existing TA road 7355-E2a

Same as Alternative 2. Use of this existing TA road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

Foot Bridge

Same as Alternative 2. Seasonal installation, removal and use of this proposed foot bridge would be in compliance with MM-2. See Appendix 3 for detailed discussion.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. RMOs do not apply.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Yellow Jacket

Plan type: Placer
Subwatershed: Beaver Creek (HUC 170702020203)
Subwatershed size: 13,075 acres
Analysis area: 7.5 acres
Creek: Orofino Gulch (intermittent flow, non-fish-bearing)
Stream Order: 1st
303(d) listed: No
Suction Dredging: Yes
Essential Salmon Habitat: No

ALTERNATIVE 2
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

Mining Activity

No potential for a discharge as a result of mining activity because there would be a 20-foot no disturbance buffer between mining activity and the gulch because portions of the gulch are lined with old placer tailings. Even given the worst-case scenario in where the miner would measure

the 20-foot buffer from, the activity would still be behind the tailings which would effectively trap any sediment generated by the activity.

Ponds

Impacts are not analyzed under direct and indirect effects because the ponds would be on private land. They are discussed under Cumulative Effects in Chapter 3.

Fords

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use. Existing Temporary Access road crosses Orofino Gulch on private land via a culvert.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

The miner proposes to use two existing Temporary Access road (Appendix 6). They are a mix of native surface and tailings.

TA road 1305-E1a

No potential for a discharge because the road is more than 300 feet from any stream channel and occurs through the old tailings.

TA road 1305-E1b

Road occurs on private land. Discussed under Cumulative Effects in Chapter 3.

Clean Water Act, Section 303(d) (antidegradation)

Orofino Gulch is not 303(d) listed.

Suction Dredging

Suction dredging is currently permitted under the 2015 ODEQ 700PM permit because it is not located in Essential Salmon Habitat (Appendix 4B).

In evaluating suction dredging on Orofino Gulch in the area of the proposed operation impacts to the following parameters were considered: pool frequency and distribution, habitat complexity (e.g. log jams, instream wood, beaver dams), stream temperatures, turbidity, and

substrate, and channel bed stability (Appendix 4A, 4B). The analysis assumes that the Plan would be in compliance with the 2015 700PM permit and all its requirements.

Site Characteristics

The channel bed in this area is predominantly cobbles with some gravels and sands and highly stable given the abundance of cobbles. Orofino Gulch was historically placer mined, therefore the percentage of the silts and clays in the channel bed is expected to be limited. The only source of abundant fine-grained material would be the stream banks. However, no mining or destabilizing of the stream banks is permitted under the 700PM permit (Schedule C.7, 8, 9 and 10).

Water Quality and Channel Morphology analysis

Pool frequency and distribution: Localized changes would occur in pool locations and frequency related to suction dredging as dredging will create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

Habitat complexity: Potential local change to habitat would occur because boulders and habitat structures may be moved around in the stream but not removed. Therefore, the impacts of suction dredging on in-channel habitat complexity may occur but should be limited to small areas. The changes would be permanent

Schedule C.8 prohibits removing or disturbing boulders, rooted vegetation, or embedded woody plants and other habitat structures from the stream banks. Habitat connected to the stream banks (beaver dams, undercuts, root wads etc.) therefore would remain intact thereby ensuring that some key habitat types would not be modified.

Stream temperatures: No changes to stream temperatures would occur because suction dredging would not alter stream channel widths, channel depths, remove stream side shade or alter groundwater flows.

Turbidity: Local change on water clarity would occur as represented by changes in turbidity. Turbidity could extend beyond the immediate area that is dredged but changes in water clarity are not allowed under the 700 PM permit to extend beyond 300 feet downstream. However, given the past history of placer mining in this stream, fines are expected to be limited in the channel bed and therefore the turbidity plume is expected to dissipate much sooner than 300 feet downstream. In addition, the turbidity plume would only occur when dredging is occurring. Therefore, the temporal impact is limited to the when the miner is suction dredging.

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction

hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

Channel bed stability: No changes to channel bed stability would occur even though dredging will create pools because the channel bed is composed of cobbles, sand and gravel. Therefore, no headcutting and bed destabilization is expected to occur.

Summary of Effects

The analysis found that suction dredging would have no impact on 1) stream temperature or 2) channel bed stability for the reasons stated above. Suction dredging would have a local impact on 1) pool frequency and distribution, 2) habitat complexity, 3) turbidity and 4) substrate for the reasons stated above. The changes to pool frequency, habitat complexity and substrate are expected to be permanent but limited to the area worked and therefore would not have a measurable impact on channel complexity or channel stability. Changes in turbidity would impact less than 300 feet of stream and not be permanent but limited to the period of time that the miner is suction dredging.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are an existing temporary access road only. The ponds and TA road 1305-E1b are on private land.

Ponds

N/A. The ponds would be on private land and therefore the question of compliance with MM-2 does not apply.

Access Roads

TA road 1305-E1a

Use of this road would be in compliance with MM-2 because no impacts would occur to water quality, inchannel complexity, channel morphology, soils or riparian vegetation. See Appendix 3 for detailed discussion.

TA road 1305-E1b

N/A. The road is on private land and therefore the question of compliance with MM-2 does not apply.

PACFISH: Riparian Management Objective (RMO) Parameters

Pool Frequency: Localized changes would occur in pool locations and frequency related to suction dredging because dredging would create pools and loosen the substrate. The pool created by suction dredging is likely to be permanent because the amount of bedload moving through the stream is limited and the sediment disturbed by suction dredging would be redistributed downstream during high flow events.

No changes would occur to pool frequency related to potential for inputs of fine sediment from mining activity because inputs would move through the system as suspended load and not settle out in the pools. There would be no changes in pool frequency related to *Large Woody Recruitment* because no trees are proposed for removal.

Water Temperature: No changes in *Water Temperature* would occur because 1) there would be only very limited removal of trees and none would be shade trees and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit which would ensure that there would not be increased in stream channel widths or channel depths which would alter water depths and influence stream temperatures (Appendix 4A).

Large Woody Debris: No changes would occur in *Large Woody Debris* recruitment or existing wood in the stream because 1) no trees are proposed for removal and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit. Schedule C.8, 9 and 10 of the permit limits the amount of instream habitat structures that can be moved or altered (Appendix 4B).

Substrate: Local changes in channel bed substrate are expected as a result of suction dredging. Dredging would pull sediment from the channel bed, pass it up through a suction hose, and run it across a recovery system (sluice box) floating at the surface. The gravel and other material, which washes through the recovery system, would then be washed back into the stream. Pools would be created where the sediment was pulled from and small dredge tailings piles created where the gravel and other material was deposited. In some cases the gravel and other material would be put back into the pool and in other cases deposited in the channel but not in the pool. These dredge tailings would be mobilized during the spring high flow and redistributed downstream. The changes in substrate at the dredge pool location would be permanent but highly localized.

No changes would occur to substrate sediment as a result of potential for inputs of fine sediment related to mining activity because inputs would move through the system as suspended load.

Bank Stability: No changes in *Bank Stability* would occur because 1) no activity would occur on the stream banks and 2) there would be no removal of stream bank vegetation which provides bank stability and resistance to instream erosion.

Lower Bank Angle: No changes in *Lower Bank Angle* would occur for the same reasons listed under *Bank Stability.*

Width/Depth ratio: No changes in *Width/Depth ratio* would occur because there would be 1) no change to *Bank Stability* and 2) suction dredging would occur under the requirements established in the ODEQ 700 PM permit (Appendix 4B) which prevent dredging of the stream banks and altering stream channel widths. With respect to changes in channel depths, the channel bed composition is a mix of cobbles, sands and gravels and highly stable. Therefore, there would be no potential for suction dredging to trigger a headcut and increase channel depths.

Wetlands and Floodplains

No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

ALTERNATIVE 3
Water Resources
Direct and Indirect Effects

Clean Water Act, Section 401 (potential for a discharge)

<u>Mining Activity</u>

Same as Alternative 2. No potential for a discharge.

<u>Ponds</u>

N/A. Ponds would be on private land. Therefore, the impacts are not analyzed under direct and indirect effects. They are discussed under Cumulative Effects in Chapter 3.

<u>Fords</u>

No fords on closed or decommissioned Forest Service roads or temporary mine access roads proposed for use.

Use of Forest Service Closed and Decommissioned Roads and Creation and/or Use of Temporary Access Roads

Same as Alternative 2. No potential for a discharge from use of road 1305-E1a (on public land). TA road 1305-E1b is on private ground and discussed under Cumulative Effects in Chapter 3.

Clean Water Act, Section 303(d) (antidegradation)

Orofino Gulch is not 303(d) listed.

Suction Dredging

Same as Alternative 2. The analysis found that suction dredging would have no impact on stream temperature or channel bed stability for the same reasons stated under Alternative 2. Suction dredging would have localized and permanent impacts related to pool frequency and distribution, habitat complexity and substrate and localized but short-term impacts to turbidity for the same reasons stated under Alternative 2.

PACFISH: MM-2 (structures inside RHCAs)

Structures related to the mining operation that are evaluated for compliance with MM-2 are an existing temporary access road only. The ponds and TA road 1305-E1b are on private land and discussed under Cumulative Effects in Chapter 3.

Ponds

N/A. Same as Alternative 2. The ponds would be on private land and therefore the question of compliance with MM-2 does not apply.

Access Roads

TA road 1305-E1a

Same as Alternative 2. Use of the road would be in compliance with MM-2. See Appendix 3 for detailed discussion.

TA road 1305-E1b

N/A. The road is on private land and therefore the question of compliance with MM-2 does not apply.

PACFISH: Riparian Management Objectives (RMOs)

Same as Alternative 2. Only *Pool Frequency* and *Substrate Sediment* have the potential to be affected as a result of suction dredging. The changes would be permanent but localized to the area dredged and there would be no measurable changes to these inchannel characteristics even within the Plan analysis area.

Wetlands and Floodplains

Same as Alternative 2. No activity proposed in floodplains or wetlands. Therefore, Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) do not apply.

Other Potential Water Resource Impacts

None

Table 7-15A
Cumulative Effects by Plan
(Sorted by Plan)

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
Altona	Beaver	**Potential for a discharge:** NO cumulative effects to water resources, despite there being potential for a discharge of sediment (direct effect), for the following three reasons. First, the portion of stream potentially impacted by a discharge of sediment would not overlap in time AND space impacts to water quality related to past harvest, mining, grazing, or road building activities. Impacts as a result of these past activities have since stabilized and are no longer contributing new sediment. Second, the portion of stream potentially impacted does not overlap in time AND space impacts from present day activities because there is no current grazing, mining, logging, or road building ongoing in this area. Finally, there are no reasonably foreseeable activities proposed in this area that might alter water quality. The reasonably foreseeable mining operation is Belvadear Placer which is located about 1 mile downstream of Altona Placer. Therefore, there would be no overlap in time AND space because the distance between the areas proposed for activity are much greater (1 mile) than the length of the potential water quality impact (< 300 feet at most).	**Potential for a discharge:** NO cumulative effect but for a different reason than Alternative 2. The addition of FS WRPMs eliminates the potential for a discharge. Therefore, no direct/indirect effects under this alternative.
Belvadear	Beaver	**Potential for a discharge:** POTENTIAL for a cumulative effect if a discharge of silts and clays occurs into Olive Creek due to mining activity because it could overlap in time AND space with the impacts related to potential sediment input from Olive Tone. The two operations are within about 1300 feet of each other and both are on Olive Creek. Given the low summer flows and particle sizes, the inputs of these fines has the potential to reduce water clarity for distances greater than 300 feet and might persist even after activity is completed. **Wetlands/Floodplains:** NO cumulative effect related to wetland impacts because the direct effects, which are localized, would NOT overlap in time AND space any other wetland impacts. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals))**: POTENTIAL for a cumulative effect for the following reasons: 1) potential to increase already elevated stream temperature, 2) potential to alter stream flow and cause the stream to go dry sooner, and 3) Olive Tone, located upstream would also be withdrawing water.	**Potential for a discharge:** Different than Alt. 2. NO cumulative effect because of the addition of FS WRPMs (Appendix 11) BUT to **Olive Tone.** **Olive Tone** located upstream of Belvadear. The addition of FS WRPMs to **Olive Tone** would eliminate the potential for a discharge of fine sediment and reduction in water clarity due to activities at this site. Therefore, while the potential for a discharge of fine sediment remains for Belvadear, the effects would no longer overlap in time AND space with Olive Tone. **Wetlands/Floodplains**: Same as Alt 2. NO cumulative effects

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
		These changes would overlap in time AND space impacts from Olive Tone and the ongoing elevated stream temperatures and alteration of stream flow due to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge, more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: Same as Alt. 2. POTENTIAL cumulative effect to stream temperatures and stream flow remains at the same level as Alternative 2.
Blue Sky Bull Run	Bull Run	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment due to mining activities, Swamp Creek ford use and placement of temporary bridge because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future and therefore NO overlap in time and space of direct effects. Any inputs of sediment related to replacement of culverts would be limited to less than 6 days with most of the inputs through the system in hours (See Appendix 5 turbidity table) that there still is not considered to have a potential overlap in time and space with future projects. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Bull Run Creek.	**Potential for a discharge**: Same as Alt 2. NO cumulative effects. **Suction Dredging**: Same as Alt 2. NO cumulative effects
Blue Smoke	Lower Granite	**Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Granite Creek.	**Suction Dredging**: Same as Alt 2. NO cumulative effects.
Bunch Bucket	Clear	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment due to activity in the small creek and close proximity of Ruby Placer which also has a discharge potential for the following reason. 1) Stream flows on Clear Creek are large relative to the potential input of fines and the effect on water clarity would be diluted. Therefore, there would be no measureable overlap in time and space of direct effects of the operations.	**Potential for a discharge:** Same as Alt 2. NO cumulative effects.
City Limits	Upper Granite	NO cumulative effects because no direct/indirect effects to water resources	Same as Alt. 2. NO cumulative effects
East 10 Cent	Lower Granite	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future and therefore NO overlap in time and space of direct effects.	**Potential for a discharge:** Same as Alt 2. NO cumulative effects.
Eddy Shipman	Upper Granite	**Potential for a discharge (sediment):** NO cumulative effects despite the potential for a discharge of fine sediment from use of the ford because the impact would be	**Potential for a discharge (sediment):** Same as Alt 2. NO cumulative effects.

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
		nonmeasurable given the Granite Creek stream flows compared to the inputs. Therefore, NO overlap in time and space of direct effects. **Potential for a discharge (heavy metals):** POTENTIAL for a cumulative effect related a discharge of heavy metals into Granite Creek, because the old lode tailings which make up the soils in the area have tested high for heavy metals. As groundwater enters these old lode tailings and moves into Granite Creek, it carries with it heavy metals in solution. Therefore, additional heavy metals would overlap in time AND space with heavy metals currently entering Granite Creek from past mining activities. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals))**: NO cumulative effect related to water withdrawals from Chipman Gulch because the stream flows compared to flows on Granite Creek. The direct effects of withdrawing water would not result in a measureable reduction in stream flows or increase in stream temperatures on Granite Creek. Therefore, there would not be an overlap in time AND space of effects with other withdrawals that could occur on Granite Creek from Make Up, located upstream, or Hopeful 1, located downstream..	**Potential for a discharge (heavy metals):** Different than Alt. 2. NO cumulative effect as a result of the addition of FS General Requirement L5 (Appendix 2). This requirement would eliminate the potential for a discharge of heavy metals and therefore no direct/indirect effects related to this potential impact. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt. 2. NO cumulative effects.
Grubsteak	Clear Creek	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future. Therefore, NO overlap in time and space of direct effects. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to groundwater flow reversal)**: POTENTIAL for a cumulative effect related to groundwater reversing its direct of flow from towards Clear Creek to towards the test hole at Site B. Stream temperatures are already elevated as a result of past activities (See Belvadear for discussion) and flows are low in Clear Creek. Therefore, there could be a local increase in stream temperature that would add to the already elevated stream temperatures. If a portion of the stream went dry, there would NOT be a cumulative effect because the portion that would go dry would NOT overlap in time and space any other activity that might cause another portion to go dry in the present or reasonably foreseeable future.	**Potential for a discharge**: Same as Alt 2. NO cumulative effect . **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to groundwater flow reversal):** Different than Alt. 2. NO cumulative effects because of the addition of FS WRPMs which would prevent activity at Site B from drying up the stream in that area and potentially contribute to increased stream temperatures..
Hopeful 1	Lower Granite	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: NO cumulative effects on stream flow or temperature because the Granite Creek stream flows are much greater than the	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt 2. NO cumulative effect

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
		amount of water that would be withdrawn from the creek. Therefore, there would be no measurable change in temperature or flow related to the withdrawal.	
Hopeful 2&3	Lower Granite	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment related to the ford, TA 1035-E1d or construction and use of the ponds on the north side of Granite Creek because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future and therefore NO overlap in time and space of direct/indirect effects.	**Potential for a discharge:** Same as Alternative 2. NO cumulative effects.
L&H	Beaver	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of heavy metals in solution because there are no other activities in the area that are discharging heavy metals now or in the reasonably foreseeable future. Therefore NO overlap in time and space of direct effects.	**Potential for a discharge**: Same as Alt. 2. NO cumulative effects.
Lightning	Clear	**Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Lightning Creek. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: POTENTIAL for a cumulative effect related to withdrawing water from Lightning Creek for the following reasons: 1) There is the potential to increase already elevated stream temperature and 2) cause the stream to go dry. These changes would overlap in time AND space the increase in stream temperatures and alteration of stream flow due to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge, more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Suction Dredging**: Same as Alt 2. NO cumulative effects **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Similar to Alt. 2. POTENTIAL cumulative effect to stream temperatures and flow remains BUT cumulative effect is now restricted to period of time between July 1 and August 14 as a result of the addition of FS Fish Protection Measures (Appendix 11).
Little Cross	Lower Granite	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of silts and sands because the closest Plan on Granite Creek which also has the potential for a discharge of sediment is Troy D, which is located about 1/2 mile downstream. The potential alteration of water clarity would not be visible this far downstream because of the large amount of flow in Granite Creek and that the sands would settle out. Therefore, NO overlap in time and space of direct effects. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of	**Potential for a discharge**: Same as Alt. 2. NO cumulative effects. **Suction Dredging**: Same as Alt 2. NO cumulative effects

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
		suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Granite Creek.	
Lucky Strike	Clear	NO cumulative effects because no direct/indirect effects to water resources.	Same as Alt. 2. NO cumulative effects because no direct/indirect effects to water resources.
Make It	Upper Granite	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: NO cumulative effects on either stream flow or temperature because the Granite Creek stream flows are much greater than the amount of water that would be withdrawn from the creek. Therefore, there would be no measurable change in either temperature or flow related to the withdrawal.	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt. 2. NO cumulative effects
Muffin	Upper Granite	**Other Water Resource Potential Impacts (Drying up wet meadow)**: NO cumulative effect because there are no other activities in the area that could dry up a small portion of this meadow. Therefore, there would no overlap of time AND space of effects.	**Other Water Resource Potential Impacts (Drying up wet meadow)**: Same as Alt 2. NO cumulative effect
Old Eric 1 and 2	Upper Granite	**Potential for a discharge**: POTENTIAL for a cumulative effect related to a discharge of warm water from the settling pond into Granite Creek because 1) there is the potential to increase already elevated stream temperature and 2) that increase would overlap in time AND space stream temperatures increases related to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge and more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Granite Creek.	**Potential for a discharge**: Different than Alt 2. Under Alt 3 there would be NO cumulative effects to stream temperatures because the addition of FS WRPMs would eliminate the potential for a discharge of warm water. **Suction Dredging**: Same as Alt 2. NO cumulative effects
Olive Tone	Beaver	**Potential for a discharge**: POTENTIAL for a cumulative effect if a discharge of silts and clays occurs into Olive Creek due to use of the settling ponds activity because it could overlap in time AND space with the impacts related to potential sediment input from Belvadear Tone. The two operations are within about 1300 feet of each other and both are on Olive Creek. Given the low summer flows and particle sizes, the inputs of these fines has the potential to reduce water clarity for distances greater than 300 feet and might persist even after activity is completed.	**Potential for a discharge**: Different than Alt 2. Under Alt 3 there would be NO cumulative effects to turbidity because the addition of FS WRPMs would eliminate the potential for a discharge of sediment and therefore eliminate potential overlap in turbidity plumes between Olive Tone and Belvadear.

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
		Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals): POTENTIAL for a cumulative effect for the following reasons: 1) potential to increase already elevated stream temperature, 2) decrease stream flow such that the stream goes dry sooner, and 3) is in close proximity to another site (Belvadear) that also proposes to withdraw water. These changes would overlap in time AND space impacts from Olive Tone and the ongoing elevated stream temperatures and alteration of stream flow due to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge, more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt. 2. POTENTIAL for cumulative effect to stream temperatures and stream flow remains at the same level.
Rosebud 1-4	Lower Granite	NO cumulative effects because no direct/indirect effects to water resources	Same as Alt. 2. No cumulative effects
Royal White	Beaver	NO cumulative effects because no direct/indirect effects to water resources	Same as Alt. 2. No cumulative effects
Ruby Group	Clear	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment related to mining activity, ford use and road use because the closest Plan on Clear Creek which also has the potential for a discharge of sediment is Bunch Bucket, which is located about ¼ to ½ mile upstream. The potential alteration of water clarity from a discharge of sediment from Bunch Bucket Cross would not be visible at Ruby given the volume of water in Clear Creek and the distance between the two sites. Therefore, there would be NO overlap in time and space of direct effects.	**Potential for a discharge:** Same as Alt 2. NO cumulative effects
Sunshine McWillis	Beaver	**Potential for a discharge**: Varies depending on if McWillis Gulch has flow. IF McWillis Gulch is dry then NO cumulative effect because any discharge from the ponds or mining site #2 would infiltrate and keep the sediment in the gulch IF McWillis Gulch has flow then POTENTIAL cumulative effect because the sediment would be transported downstream into Olive Creek and there are two other operations upstream (Belvadear and Olive Tone) that also have the potential for a discharge of fine sediment. Therefore, there could be a reduction in water clarity that overlaps in time AND space with these two operations. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in McWillis Gulch.	**Potential for a discharge**: Same as Alt 2. NO cumulative effects **Suction Dredging**: Same as Alt 2. NO cumulative effects **Wetland/Floodplains**: Same as Alt 2. NO cumulative effects

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
		Wetland/Floodplains: NO cumulative effect related to impacts in the McWillis Gulch floodplain because the direct effects would be localized and therefore NOT overlap in time AND space any other floodplain impacts.	
Tetra Alpha Placer	Upper Granite	**Potential for a discharge**: NO cumulative effect related to the potential discharge of sediment from road construction and use of TA 7355-M3d and fords because the closest Plan on Boulder Creek is Tetra Alpha Mill and Lode, located ¼ miles downstream. Tetra Alpha Mill and Lode only has the potential to discharge heavy metals, not sediment, and there are no other Plans on Boulder Creek. Therefore, the effects on water clarity from activity on Tetra Alpha would not overlap in time AND space with other activity in the drainage.. **Wetland/Floodplain activity**: NO cumulative effect related to impacts in the wetlands because the direct effects to the wetland meadow would be localized in space and therefore NOT overlap in time AND space any other wetland-related impacts. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: POTENTIAL cumulative effect on stream temperatures IF water were withdrawn from Boulder Creek because there is the potential to increase already elevated stream temperature and that increase would overlap in time AND space the increase in stream temperatures related to past activities and a reasonably foreseeable future activity (water withdrawal from Boulder Creek by Tetra Group). These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge and more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Potential for a discharge**: Same as Alt 2. NO cumulative effects **Wetlands/Floodplains**: Same as Alt 2. NO cumulative effects **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Similar to Alt. 2. POTENTIAL cumulative effect to stream temperature and flow remains BUT cumulative effect is now restricted to period of time between July 1 and August 14 as a result of the addition of FS Fish Protection Measures (Appendix 11).
Tetra Alpha Mill and Lode	Upper Granite	**Potential for a discharge (heavy metals):** POTENTIAL cumulative effect related to a discharge of heavy metals because Boulder Creek flows into Granite Creek which already has elevated levels of heavy metals from past mining activities. **Other Water Resource Potential Impacts (Water Withdrawal)**: POTENTIAL cumulative effect on stream temperatures IF water were withdrawn from Boulder Creek because there is the potential to increase already elevated stream temperature and that increase would overlap in time AND space the increase in stream temperatures related to past activities and a reasonably foreseeable future activity (water withdrawal from Boulder Creek by Tetra Alpha). These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge and more of the water	**Potential for a discharge (heavy metals)**: Different than Alt 2. Under Alt 3 there would be NO cumulative effects related to heavy metals because the addition of FS General Requirements L1-L12 would eliminate the potential discharge of heavy metals into Boulder Creek and increase heavy metal concentrations in Granite Creek. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):**

Plan	SWS Name	Cumulative Effects	
		Alternative 2	**Alternative 3**
		column is warmed and there is a loss of groundwater inputs because the water table has dropped.	Similar to Alt. 2. POTENTIAL cumulative effect to stream temperature and flow remains BUT cumulative effect is now restricted to period of time between July 1 and August 14 as a result of the addition of FS Fish Protection Measures (Appendix 11).
Troy D	Lower Granite	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment from use of the settling pond because the closest Plan on Granite Creek which also has the potential for a discharge of sediment is Little Cross, which is located about 1/2 mile downstream. The potential alteration of water clarity from a discharge of sediment from Troy D would not be visible this far downstream given the small amount of sediment discharged and the volume of flow in Granite Creek. Therefore, NO overlap in time and space of direct effects.	**Potential for a discharge**: Same as Alt 2. NO cumulative effects.
Yellow Gold	Upper Granite	**Potential for a discharge**: NO cumulative effect despite the potential input of sediment because the sediment would be trapped in the in-channel pond in Last Chance Creek and therefore there would be no overlap in time AND space of the direct/indirect effects from any other activities occurring in the area. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: NO cumulative effect on stream flows or water temperatures because 1) Last Chance Creek is now a series of ponds and 2) the amount of water proposed for withdrawal is much less than the amount in the ponds. Therefore, there would be no measureable decrease in pond volume.	**Potential for a discharge:** Same as Alt 2. NO cumulative effects. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt 2. NO cumulative effects
Yellow Jacket	Beaver	**Suction Dredging:** NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Orofino Gulch.	**Suction Dredging**: Same as Alt 2. NO cumulative effects

Table 7-15B
Cumulative Effects by Plan
(Sorted by Subwatershed)

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
Beaver Creek SWS			
	Altona	**Potential for a discharge:** NO cumulative effects to water resources, despite there being potential for a discharge of sediment (direct effect), for the following three reasons. First, the portion of stream potentially impacted by a discharge of sediment would not overlap in time AND space impacts to water quality related to past harvest, mining, grazing, or road building activities. Impacts as a result of these past activities have since stabilized and are no longer contributing new sediment. Second, the portion of stream potentially impacted does not overlap in time AND space impacts from present day activities because there is no current grazing, mining, logging, or road building ongoing in this area. Finally, there are no reasonably foreseeable activities proposed in this area that might alter water quality. The reasonably foreseeable mining operation is Belvadear Placer which is located about 1 mile downstream of Altona Placer. Therefore, there would be no overlap in time AND space because the distance between the areas proposed for activity are much greater (1 mile) than the length of the potential water quality impact (< 300 feet at most).	**Potential for a discharge:** NO cumulative effect but for a different reason than Alternative 2. The addition of FS WRPMs eliminates the potential for a discharge. Therefore, no direct/indirect effects under this alternative.
	Belvadear	**Potential for a discharge:** POTENTIAL for a cumulative effect if a discharge of silts and clays occurs into Olive Creek due to mining activity because it could overlap in time AND space with the impacts related to potential sediment input from Olive Tone. The two operations are within about 1300 feet of each other and both are on Olive Creek. Given the low summer flows and particle sizes, the inputs of these fines has the potential to reduce water clarity for distances greater than 300 feet and might persist even after activity is completed. **Wetlands/Floodplains:** NO cumulative effect related to wetland impacts because the direct effects, which are localized, would NOT overlap in time AND space any other wetland impacts. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals))**: POTENTIAL for a cumulative effect for	**Potential for a discharge:** Different than Alt. 2. NO cumulative effect because of the addition of FS WRPMs (Appendix 11) BUT to **Olive Tone. Olive Tone** located upstream of Belvadear. The addition of FS WRPMs to **Olive Tone** would eliminate the potential for a discharge of fine sediment and reduction in water clarity due to activities at this site. Therefore, while the potential for a discharge of fine sediment remains for Belvadear, the effects would no longer overlap in time AND space with Olive Tone.

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
		the following reasons: 1) potential to increase already elevated stream temperature, 2) potential to alter stream flow and cause the stream to go dry sooner, and 3) Olive Tone, located upstream would also be withdrawing water. These changes would overlap in time AND space impacts from Olive Tone and the ongoing elevated stream temperatures and alteration of stream flow due to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge, more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Wetlands/Floodplains**: Same as Alt 2. NO cumulative effects **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: Same as Alt. 2. POTENTIAL cumulative effect to stream temperatures and stream flow remains at the same level as Alternative 2.
	L&H	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of heavy metals in solution because there are no other activities in the area that are discharging heavy metals now or in the reasonably foreseeable future. Therefore NO overlap in time and space of direct effects.	**Potential for a discharge**: Same as Alt. 2. NO cumulative effects.
	Olive Tone	**Potential for a discharge**: POTENTIAL for a cumulative effect if a discharge of silts and clays occurs into Olive Creek due to use of the settling ponds activity because it could overlap in time AND space with the impacts related to potential sediment input from Belvadear Tone. The two operations are within about 1300 feet of each other and both are on Olive Creek. Given the low summer flows and particle sizes, the inputs of these fines has the potential to reduce water clarity for distances greater than 300 feet and might persist even after activity is completed. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: POTENTIAL for a cumulative effect for the following reasons: 1) potential to increase already elevated stream temperature, 2) decrease stream flow such that the stream goes dry sooner, and 3) is in close proximity to another site (Belvadear) that also proposes to withdraw water. These changes would overlap in time AND space impacts from Olive Tone and the ongoing elevated stream temperatures and alteration of stream flow due to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge, more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Potential for a discharge**: Different than Alt 2. Under Alt 3 there would be NO cumulative effects to turbidity because the addition of FS WRPMs would eliminate the potential for a discharge of sediment and therefore eliminate potential overlap in turbidity plumes between Olive Tone and Belvadear. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt. 2. POTENTIAL for cumulative effect to stream temperatures and stream flow remains at the same level.
	Royal White	NO cumulative effects because no direct/indirect effects to water resources	Same as Alt. 2. No cumulative effects
	Sunshine McWillis	**Potential for a discharge**: Varies depending on if McWillis Gulch has flow.	**Potential for a discharge**: Same as Alt 2. NO cumulative effects

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
		IF McWillis Gulch is dry then NO cumulative effect because any discharge from the ponds or mining site #2 would infiltrate and keep the sediment in the gulch IF McWillis Gulch has flow then POTENTIAL cumulative effect because the sediment would be transported downstream into Olive Creek and there are two other operations upstream (Belvadear and Olive Tone) that also have the potential for a discharge of fine sediment. Therefore, there could be a reduction in water clarity that overlaps in time AND space with these two operations. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in McWillis Gulch. **Wetland/Floodplains**: NO cumulative effect related to impacts in the McWillis Gulch floodplain because the direct effects would be localized and therefore NOT overlap in time AND space any other floodplain impacts.	**Suction Dredging**: Same as Alt 2. NO cumulative effects **Wetland/Floodplains**: Same as Alt 2. NO cumulative effects
	Yellow Jacket	**Suction Dredging:** NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Orofino Gulch.	**Suction Dredging**: Same as Alt 2. NO cumulative effects
Bull Run Creek SWS			
	Blue Sky Bull Run	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment due to mining activities, Swamp Creek ford use and placement of temporary bridge because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future and therefore NO overlap in time and space of direct effects. Any inputs of sediment related to replacement of culverts would be limited to less than 6 days with most of the inputs through the system in hours (See Appendix 5 turbidity table) that there still is not considered to have a potential overlap in time and space with future projects. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Bull Run Creek.	**Potential for a discharge**: Same as Alt 2. NO cumulative effects. **Suction Dredging**: Same as Alt 2. NO cumulative effects
Clear Creek SWS			
	Bunch Bucket	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment due to activity in the small creek and close proximity of Ruby Placer which also has a discharge potential for the following reason. 1) Stream flows on Clear Creek are large relative to the potential input of fines and the	**Potential for a discharge:** Same as Alt 2. NO cumulative effects.

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
		effect on water clarity would be diluted. Therefore, there would be no measureable overlap in time and space of direct effects of the operations.	
	Grubsteak	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future. Therefore, NO overlap in time and space of direct effects. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to groundwater flow reversal)**: POTENTIAL for a cumulative effect related to groundwater reversing its direct of flow from towards Clear Creek to towards the test hole at Site B. Stream temperatures are already elevated as a result of past activities (See Belvadear for discussion) and flows are low in Clear Creek. Therefore, there could be a local increase in stream temperature that would add to the already elevated stream temperatures. If a portion of the stream went dry, there would NOT be a cumulative effect because the portion that would go dry would NOT overlap in time and space any other activity that might cause another portion to go dry in the present or reasonably foreseeable future.	**Potential for a discharge**: Same as Alt 2. NO cumulative effect . **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to groundwater flow reversal):** Different than Alt. 2. NO cumulative effects because of the addition of FS WRPMs which would prevent activity at Site B from drying up the stream in that area and potentially contribute to increased stream temperatures..
	Lightning	**Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Lightning Creek. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: POTENTIAL for a cumulative effect related to withdrawing water from Lightning Creek for the following reasons: 1) There is the potential to increase already elevated stream temperature and 2) cause the stream to go dry. These changes would overlap in time AND space the increase in stream temperatures and alteration of stream flow due to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge, more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Suction Dredging**: Same as Alt 2. NO cumulative effects **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Similar to Alt. 2. POTENTIAL cumulative effect to stream temperatures and flow remains BUT cumulative effect is now restricted to period of time between July 1 and August 14 as a result of the addition of FS Fish Protection Measures (Appendix 11).
	Lucky Strike	NO cumulative effects because no direct/indirect effects to water resources.	Same as Alt. 2. NO cumulative effects because no direct/indirect effects to water resources.

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
	Ruby Group	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment related to mining activity, ford use and road use because the closest Plan on Clear Creek which also has the potential for a discharge of sediment is Bunch Bucket, which is located about ¼ to ½ mile upstream. The potential alteration of water clarity from a discharge of sediment from Bunch Bucket Cross would not be visible at Ruby given the volume of water in Clear Creek and the distance between the two sites. Therefore, there would be NO overlap in time and space of direct effects.	**Potential for a discharge:** Same as Alt 2. NO cumulative effects
Lower Granite SWS			
	Blue Smoke	**Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Granite Creek.	**Suction Dredging**: Same as Alt 2. NO cumulative effects.
	East 10 Cent	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future and therefore NO overlap in time and space of direct effects.	**Potential for a discharge:** Same as Alt 2. NO cumulative effects.
	Hopeful 1	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: NO cumulative effects on stream flow or temperature because the Granite Creek stream flows are much greater than the amount of water that would be withdrawn from the creek. Therefore, there would be no measurable change in temperature or flow related to the withdrawal.	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt 2. NO cumulative effect
	Hopeful 2&3	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment related to the ford, TA 1035-E1d or construction and use of the ponds on the north side of Granite Creek because there are no other activities in the area that are discharging sediment now or in the reasonably foreseeable future and therefore NO overlap in time and space of direct/indirect effects.	**Potential for a discharge:** Same as Alternative 2. NO cumulative effects.
	Little Cross	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of silts and sands because the closest Plan on Granite Creek which also has the potential for a discharge of sediment is Troy D, which is located about 1/2 mile downstream. The potential alteration of water clarity would not be visible this far downstream because of the large amount of flow in Granite Creek and that the sands would settle out. Therefore, NO overlap in time and space of direct effects. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of	**Potential for a discharge**: Same as Alt. 2. NO cumulative effects. **Suction Dredging**: Same as Alt 2. NO cumulative effects

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
		suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Granite Creek.	
	Rosebud 1-4	NO cumulative effects because no direct/indirect effects to water resources	Same as Alt. 2. No cumulative effects
	Troy D	**Potential for a discharge**: NO cumulative effects despite the potential for a discharge of fine sediment from use of the settling pond because the closest Plan on Granite Creek which also has the potential for a discharge of sediment is Little Cross, which is located about 1/2 mile downstream. The potential alteration of water clarity from a discharge of sediment from Troy D would not be visible this far downstream given the small amount of sediment discharged and the volume of flow in Granite Creek. Therefore, NO overlap in time and space of direct effects.	**Potential for a discharge**: Same as Alt 2. NO cumulative effects.
Upper Granite SWS			
	City Limits	NO cumulative effects because no direct/indirect effects to water resources	Same as Alt. 2. NO cumulative effects
	Eddy Shipman	**Potential for a discharge (sediment):** NO cumulative effects despite the potential for a discharge of fine sediment from use of the ford because the impact would be nonmeasurable given the Granite Creek stream flows compared to the inputs. Therefore, NO overlap in time and space of direct effects. **Potential for a discharge (heavy metals):** POTENTIAL for a cumulative effect related a discharge of heavy metals into Granite Creek, because the old lode tailings which make up the soils in the area have tested high for heavy metals. As groundwater enters these old lode tailings and moves into Granite Creek, it carries with it heavy metals in solution. Therefore, additional heavy metals would overlap in time AND space with heavy metals currently entering Granite Creek from past mining activities. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals))**: NO cumulative effect related to water withdrawals from Chipman Gulch because the stream flows compared to flows on Granite Creek. The direct effects of withdrawing water would not result in a measureable reduction in stream flows or increase in stream temperatures on Granite Creek. Therefore, there would not be an overlap in time AND space of effects with other withdrawals that could occur on Granite Creek from Make Up, located upstream, or Hopeful 1, located downstream..	**Potential for a discharge (sediment):** Same as Alt 2. NO cumulative effects. **Potential for a discharge (heavy metals):** Different than Alt. 2. NO cumulative effect as a result of the addition of FS General Requirement L5 (Appendix 2). This requirement would eliminate the potential for a discharge of heavy metals and therefore no direct/indirect effects related to this potential impact. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt. 2. NO cumulative effects.
	Make It	**Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: NO cumulative effects on either stream flow or temperature because the Granite Creek stream flows are much greater than	**Other Water Resource Potential Impacts (Stream temperature and stream flow**

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
		the amount of water that would be withdrawn from the creek. Therefore, there would be no measurable change in either temperature or flow related to the withdrawal.	**alteration related to water withdrawals):** Same as Alt. 2. NO cumulative effects
	Muffin	**Other Water Resource Potential Impacts (Drying up wet meadow)**: NO cumulative effect because there are no other activities in the area that could dry up a small portion of this meadow. Therefore, there would no overlap of time AND space of effects.	**Other Water Resource Potential Impacts (Drying up wet meadow)**: Same as Alt 2. NO cumulative effect
	Old Eric 1 and 2	**Potential for a discharge**: POTENTIAL for a cumulative effect related to a discharge of warm water from the settling pond into Granite Creek because 1) there is the potential to increase already elevated stream temperature and 2) that increase would overlap in time AND space stream temperatures increases related to past activities. These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge and more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped. **Suction Dredging**: NO cumulative effects to water resources despite local changes in pool frequency and channel substrate because the direct effects of suction dredging would not overlap in time and space changes in pool frequency and channel substrate elsewhere in Granite Creek.	**Potential for a discharge**: Different than Alt 2. Under Alt 3 there would be NO cumulative effects to stream temperatures because the addition of FS WRPMs would eliminate the potential for a discharge of warm water. **Suction Dredging**: Same as Alt 2. NO cumulative effects
	Tetra Alpha Placer	**Potential for a discharge**: NO cumulative effect related to the potential discharge of sediment from road construction and use of TA 7355-M3d and fords because the closest Plan on Boulder Creek is Tetra Alpha Mill and Lode, located ¼ miles downstream. Tetra Alpha Mill and Lode only has the potential to discharge heavy metals, not sediment, and there are no other Plans on Boulder Creek. Therefore, the effects on water clarity from activity on Tetra Alpha would not overlap in time AND space with other activity in the drainage.. **Wetland/Floodplain activity**: NO cumulative effect related to impacts in the wetlands because the direct effects to the wetland meadow would be localized in space and therefore NOT overlap in time AND space any other wetland-related impacts. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: POTENTIAL cumulative effect on stream temperatures IF water were withdrawn from Boulder Creek because there is the potential to increase already elevated stream temperature and that increase would overlap in time AND space the increase in stream temperatures related to	**Potential for a discharge**: Same as Alt 2. NO cumulative effects **Wetlands/Floodplains**: Same as Alt 2. NO cumulative effects **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Similar to Alt. 2. POTENTIAL cumulative effect to stream temperature and flow remains BUT cumulative effect is now restricted to period of time between July 1 and August 14 as a result of the addition of FS Fish Protection Measures (Appendix 11).

SWS Name	Plan	Cumulative Effects	
		Alternative 2	**Alternative 3**
		past activities and a reasonably foreseeable future activity (water withdrawal from Boulder Creek by Tetra Group). These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge and more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	
	Tetra Alpha Mill and Lode	**Potential for a discharge (heavy metals):** POTENTIAL cumulative effect related to a discharge of heavy metals because Boulder Creek flows into Granite Creek which already has elevated levels of heavy metals from past mining activities. **Other Water Resource Potential Impacts (Water Withdrawal)**: POTENTIAL cumulative effect on stream temperatures IF water were withdrawn from Boulder Creek because there is the potential to increase already elevated stream temperature and that increase would overlap in time AND space the increase in stream temperatures related to past activities and a reasonably foreseeable future activity (water withdrawal from Boulder Creek by Tetra Alpha). These past activities (logging, mining, grazing, road building) have increased channel widths and depths and disconnected the stream-valley floor hydrologic connectivity. Result is that stream flow water depths are shallower for a given discharge and more of the water column is warmed and there is a loss of groundwater inputs because the water table has dropped.	**Potential for a discharge (heavy metals)**: Different than Alt 2. Under Alt 3 there would be NO cumulative effects related to heavy metals because the addition of FS General Requirements L1-L12 would eliminate the potential discharge of heavy metals into Boulder Creek and increase heavy metal concentrations in Granite Creek. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Similar to Alt. 2. POTENTIAL cumulative effect to stream temperature and flow remains BUT cumulative effect is now restricted to period of time between July 1 and August 14 as a result of the addition of FS Fish Protection Measures (Appendix 11).
	Yellow Gold	**Potential for a discharge**: NO cumulative effect despite the potential input of sediment because the sediment would be trapped in the in-channel pond in Last Chance Creek and therefore there would be no overlap in time AND space of the direct/indirect effects from any other activities occurring in the area. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals)**: NO cumulative effect on stream flows or water temperatures because 1) Last Chance Creek is now a series of ponds and 2) the amount of water proposed for withdrawal is much less than the amount in the ponds. Therefore, there would be no measureable decrease in pond volume.	**Potential for a discharge:** Same as Alt 2. NO cumulative effects. **Other Water Resource Potential Impacts (Stream temperature and stream flow alteration related to water withdrawals):** Same as Alt 2. NO cumulative effects

Appendix 8
Plan Summaries and Maps

(Note: the complete Plans of Operations are found in the project file)

Altona

Claim Description

The Altona plan consists of only one placer claim. It is located in Quartz Gulch approximately one mile west of its confluence with Olive Creek. Access is from the west by the unimproved forest road 1042-970. The legal description for the claim is T.10 S., R.35 E., Section 03, W.M.

Existing Condition

In the past, the area was hydraulically mined along Quartz Gulch and up a draw leading to the 970 road. Both sides of the creek are lined with old tailings and overgrown with willows and small trees. The stream and most of the riparian area is located on private land. The hydro-mined draw to the north of the creek, lacks the brush but is covered with 20 foot tall Douglas Fir and Ponderosa pine. The Pete Man Ditch crosses the western edge of the claim, and private land (owned by the claimant) abuts the south and east end of the claim.

Looking across passed hydro mined area

The National Forest boundary is well marked along the creek and the adjacent private land. Access to the claim is by the 1042 -970 road, which is classified as a level one road and is not maintained. A two track (old skid trail) takes off from the 970 road and ends at a 30 ft drop off on the edge of the previously hydro-mined draw. East of the site one can still find an unauthorized atv trail which supposable connects the site with the 1305-080 road and may be the road 1305-099,092, and/or 086 mentioned in the proposed plan. The claimant and I were unable to locate the adit during our field review (it may have collapsed and grown over).

Recent Mining Activity

According to past inspections there has been no recent activity on this claim in the last 15 years.

Proposed Plan of Operations [(1)]

The miner is proposing to placer mine the area along the north side of Quartz Gulch. Existing Forest System, decommissioned roads and temporary roads are proposed by the miner to access the claim from the 1305 road. Only one test hole (20’ x 20’ x 10’deep) will be open at a time in a 3-4 acre work. A miner-designated 20-foot undisturbed buffer will be maintained between the creek and the mining activity. Soil/material will be hauled to the processing site with a pickup. Water from the collapsed adit will be piped into two constructed ponds (10’x20’x10’deep) which will then be recycled during the gravity processing.

Equipment to be operated on the claims includes a backhoe, wash plant, trommel, pickup (to haul soil), travel trailer, water pump and hand tools.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers and out of the flood plain.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

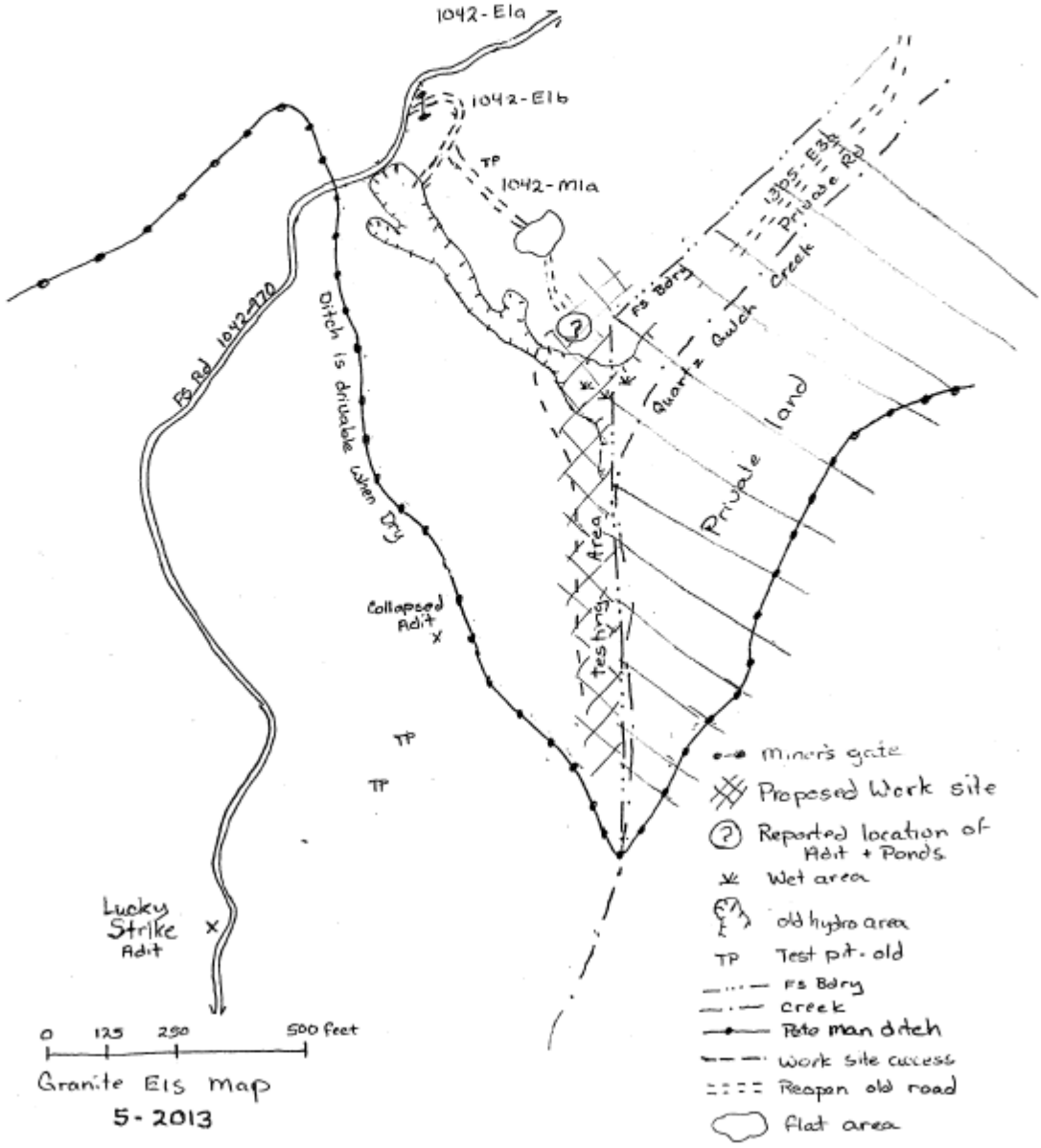
Test holes will be filled in and ponds will be left dry during the winter. Road maintenance will include water barring and grass seeding. Final reclamation will remove equipment, re-slope and re-plant the area to the current densities and species.

Looking down Quartz Gulch

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks -120 days) for the next 10 years to complete the project. It is expected that the operation will only be able to work a few holes a year. It is estimated that the miner will need to work/disturb approximately ½ acre per year in order to complete the project as planned.

<u>Mitigation Measures identified by the miner in the Plan [(1)]</u>

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).


ALTON A
T10S R35E Sec 3
N
1042-E1a
1042-E1b
TP
1042-M1a
T10S-E3b Private Rd
Fs Bdry
Quartz Gulch Creek
Private land
Ditch is drivable when Dry
Fs Rd 1042-270
Collapsed Adit
Tes hrg Area
TP
TP
Lucky Strike Adit
Miner's gate
Proposed Work site
Reported location of Adit + Ponds
Wet area
old hydro area
TP Test pit. old
Fs Bdry
creek
Pete man ditch
work site access
Reopen old road
flat area
0 125 250 500 feet
Granite EIS map
5-2013

BELVADEAR

Claim Description

The Belvadear plan consist of 4 placer claims located along Olive Creek, about 3 miles south of it confluence with Clear Creek. The legal location is T.9S, R.35E, Section 35 WM

Ponds and processing area

Existing Condition

Forest road 1305-080 access the claim from the east side of Olive Creek. Historical placer mining activities appear to have involved dredging the creek bottom which has left dredge tailings for more than 100' along both side of the creek.

There is a small outhouse on the north end of the claim. The active work is on the south end of the claim were the road and the creek cross. This is also were the spring feed pond is located. The proposed work area is located just north of the current work area and consists of old dredge tailings, small ponds of water, brush and a few, 15 to 20 foot tall lodgepole pines.

Recent Activity

The claimant has been workings material which was stockpiled at the processing site throughout the summers under a Notice of Intent.

Proposed Plan of Operations [(1)]

The owners will continue to work the ten acre project area along Olive Creek. Excavations will be 4-10 feet deep. A miner designated 20 ft no disturbance buffer will be maintained between the test holes and the stream. Topsoil will be stockpiled and used later for reclamation. The processing site will be at the junction of Olive Creek and the 1300-080 road on the east side of the creek. Wash water for the trommel will be pumped from the spring and Olive Creek (under an old water right). The water will be re-circulated through a shallow pond (20' x 30' 5' deep) excavated in dredge tailings gravels. Mineral processing will be done by gravity and no chemicals will be used. The tailings will be returned to the hole once it is mined and excess tailings could be used on the road.

Old tailing area below pond

Equipment to be used will include a small backhoe, trommel, dump truck, high-banker, gold spinner, and hand tools.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers

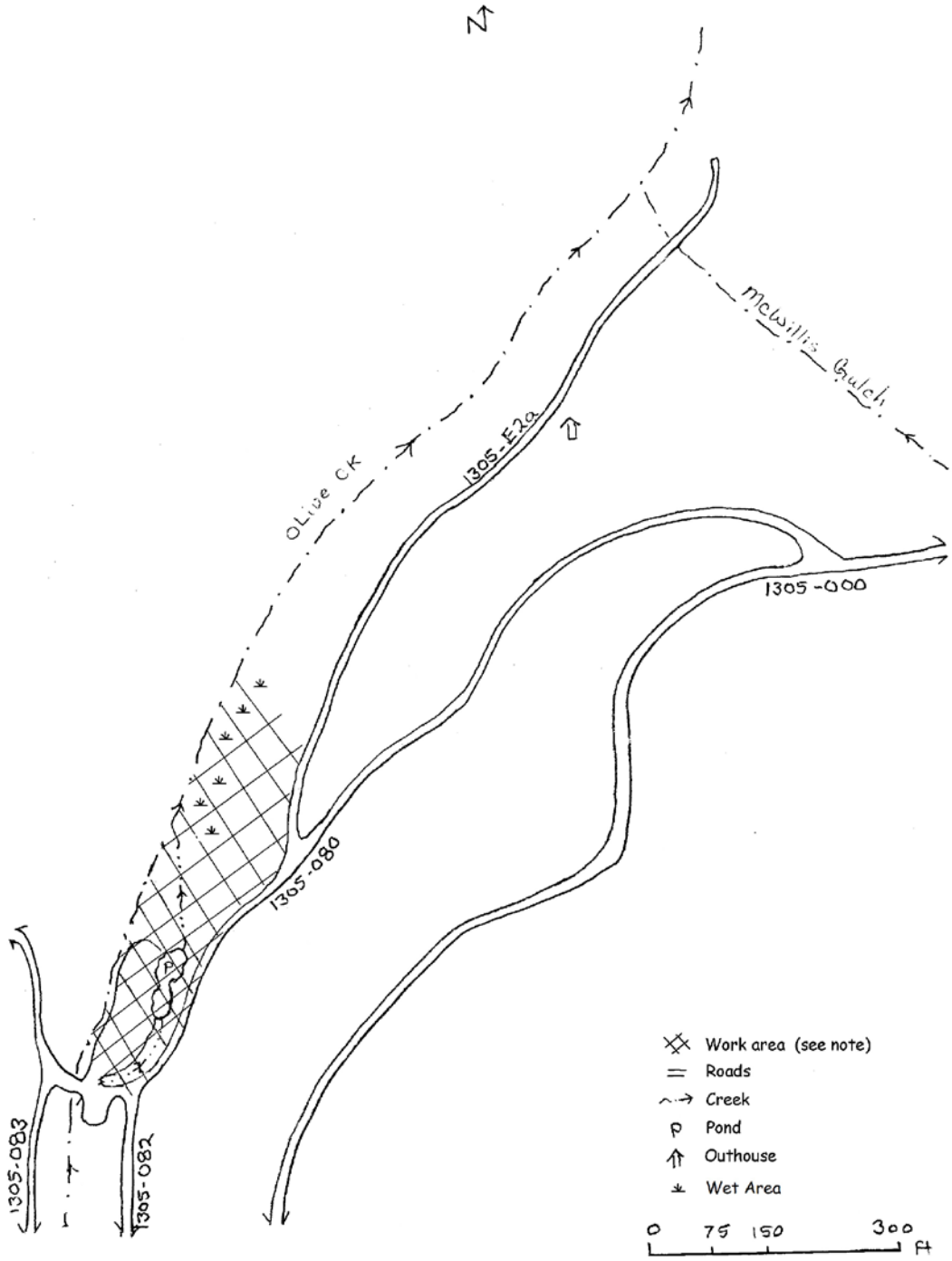
Reclamation will be done on a continuing basis and the site stabilized annually before close out and re-contouring the worked sites to match the surrounding area. Grass seeding and fertilization will be done as needed. On final reclamation the temporary access road will be water barred and closed. All machinery and mining related debris will be removed.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. The pond and associated processing area takes up about ½ acre leaving about 2 ½ acres to be worked. It is estimated that the miner will need to work/disturb approximately ¼ acre per year in order to complete the project as planned.

No additional mitigation measures were identified by the miner in the Plan. [(1)]

Belvadear

T 10 S R 35 E sec 2



Note: Plan talks about mining in the 10 acre area but also does not plan to remove trees providing shade to the creek. This leaves the area above.

Granite EIS Map
5 - 2013

BLUE SKY - BULL RUN

Bull Run Site 1

Claim Description

The Blue Sky Bull Run placer claim is located along Bull Run between 3 and 5 miles from the confluence of Bull Run with Granite creek. Access is by the paved Forest System road 7300. The legal locations are T.8S, R.36E, Section 19 and T.9S, R.35½E, Section 18&13 WM.

Existing Condition

The northern portion of the claim is referred to as Blue Sky. The claim is on the west side of the creek and is accessed by crossing Bull Run Creek in various locations. Historically the area placer mined and dredged which has left tailing piles and old ponds along both sides of the creek. The main access to this area fords the creek and uses a highly used dispersed camping area as the main campsite for the claimant.

Swamp creek as well as Bull Run Creek have been channelized and show signs of past dredging.

The southern portion of the Bull Run claim is located up-stream from what was an old dredge dam. The past sediment from the dredging operations appears to have contributed to the development of the meadow just north of the proposed work site. The proposed work area is located on the west side of the creek and can also partially access from Forest Service road 7375.

Blue Sky –Swamp Creek

Recent Activity

The claimants are able to access the claim throughout the summer months. Current mining activities are limited to panning by hand and small motorized equipment at the creek near the dispersed campsite. I would estimate that only a yard or so of material have been processed per year during the last 5 -10 years.

Proposed Plan of Operations [(1)]

The miner plans to conduct placer mining at 6 locations (4-Blue Sky, 2-Bull Run). Test holes will be a max of 11 feet deep. Only one test hole at a time will be open. Test holes will be a max of 12 feet deep.

A processing site will be set up and used at an existing off channel dredge pond will be recycled.

A temporary bridge is proposed over Bull Run Creek in order to access at Bull Run - site 2, while the an existing ford on Bull Run will be used to access Blue Sky – sites 1-3 and the claims only processing site.

A vegetative buffer of 30 feet will be maintained between Bull Run creek and any mining and the processing site will be 50 feet from Bull Run Creek.

Bull Run Site two

Equipment to be used will include a small backhoe, smaller suction dredge, washing plant, highbanker, water pumps, drill, and hand tools (pick and shovel). Structures on site will consist of self-contained travel trailers and a chemical toilet that will be brought in seasonally.

The miner will also operate a small suction dredge under the terms and conditions of a State dredging permit from July 15 to August 15.

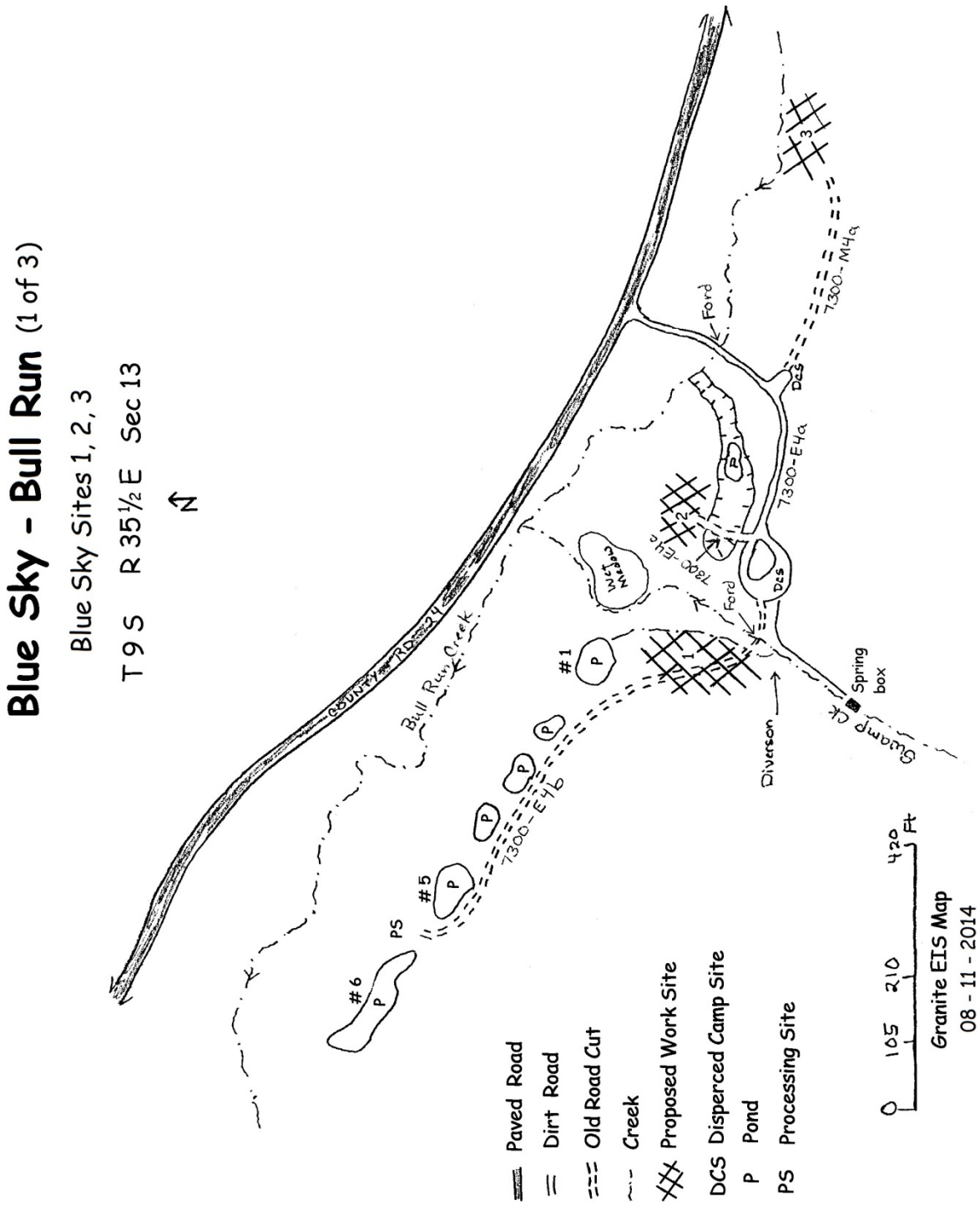
Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

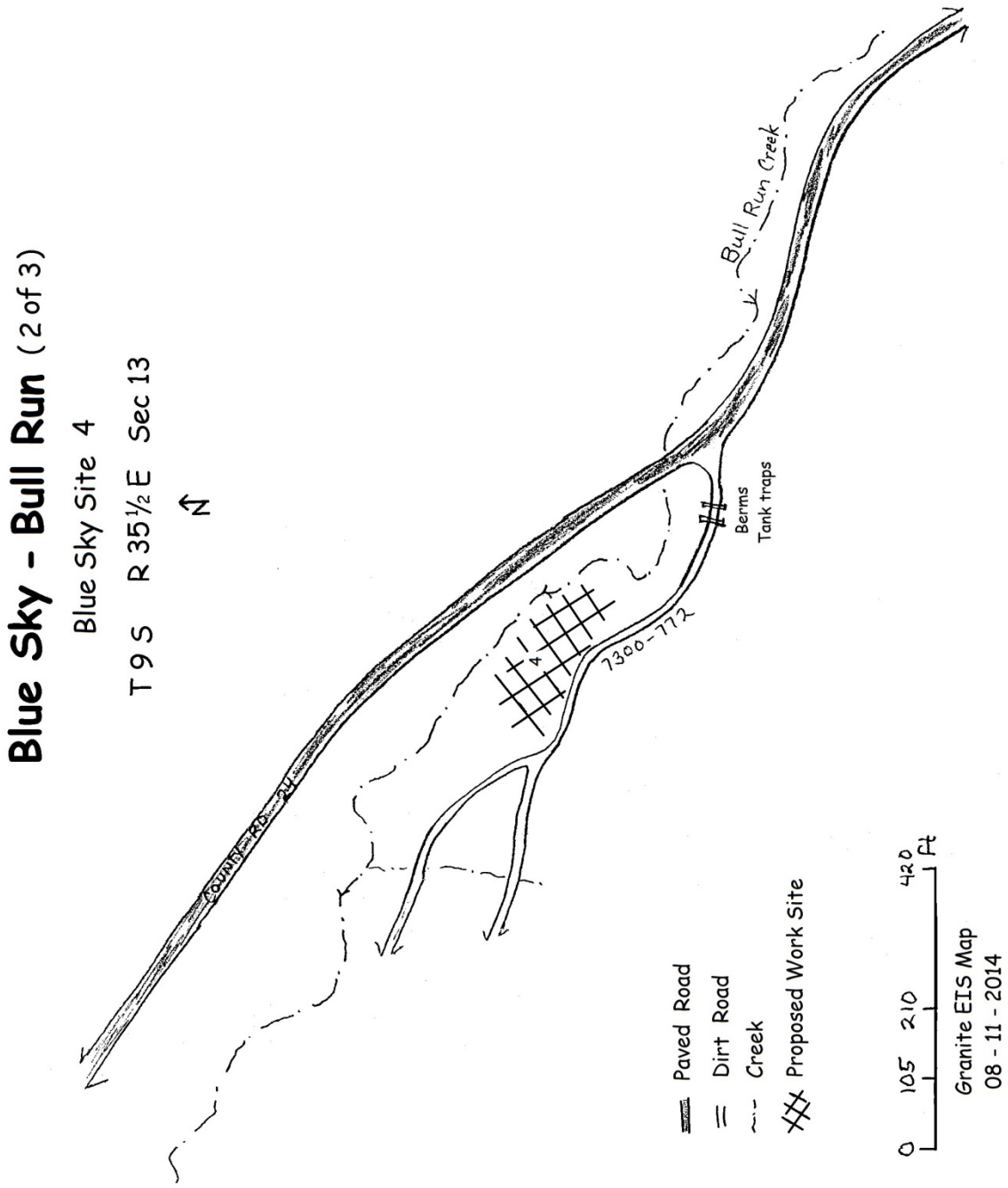
Reclamation will be done on a continuing basis and the site stabilized annually before close out. Topsoil will be stockpiled and used later for reclamation. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. All equipment will be removed from the site at season's end

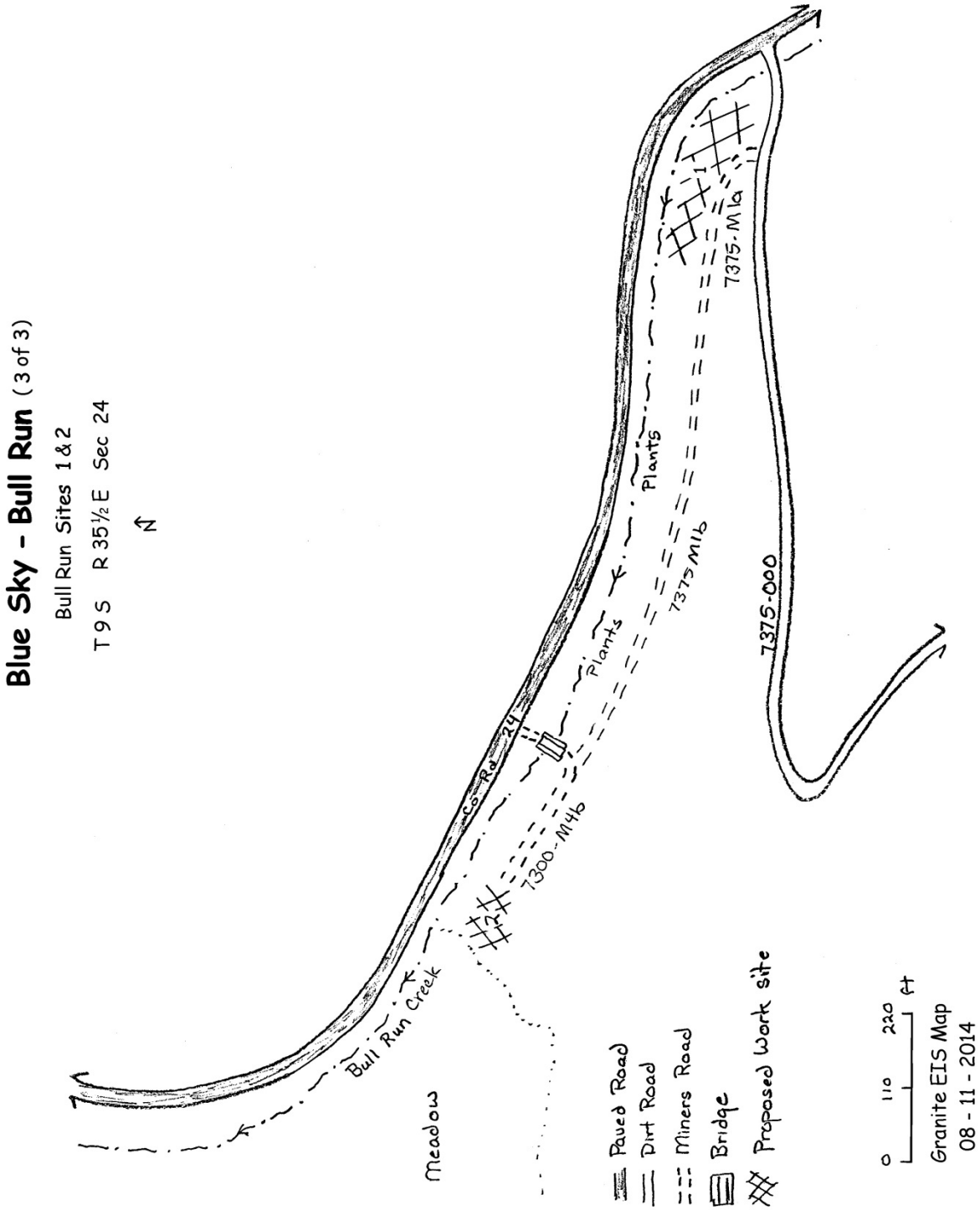
This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. The miner is proposing to haul up to 5 cubic yards (5 trips in a pickup) of material per day for possessing. Based on this, it is estimated that the miner will need to work/disturb approximately 1/10 acre and haul material for 7-10 weeks each year in order to complete the project as planned.

<u>Mitigation Measures identified by the miner in the Plan [(1)]</u>

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).


Blue Sky - Bull Run (1 of 3)
Blue Sky Sites 1, 2, 3
T 9 S R 35½ E Sec 13
N
COUNTY RD 24
Bull Run Creek
#6
P
PS
#5
P
P
P
P
#1
7300-E4b
Wet Meadow
1
2
7300-E4c
Ford
Ford
P
P
DCS
DCS
7300-E4a
7300-M4a
3
Diversion
Spring box
Swamp Cr
Paved Road
Dirt Road
Old Road Cut
Creek
Proposed Work Site
DCS Disperced Camp Site
P Pond
PS Processing Site
0 105 210 420 Ft
Granite EIS Map
08 - 11 - 2014


Blue Sky - Bull Run (2 of 3)
Blue Sky Site 4
T 9 S R 35½ E Sec 13
N
COUNTY RD. 211
Bull Run Creek
7300-772
4
Berms
Tank traps
Paved Road
Dirt Road
Creek
Proposed Work Site
0 105 210 420 Ft
Granite EIS Map
08 - 11 - 2014


Blue Sky - Bull Run (3 of 3)
Bull Run Sites 1 & 2
T 9 S R 35½ E Sec 24
N
Bull Run Creek
Meadow
Co Rd 24
7300-M4b
Plants
Plants
7375 M1b
7375-M1a
7375-000
Paved Road
Dirt Road
Miners Road
Bridge
Proposed Work site
0 110 220 ft
Granite EIS Map
08 - 11 - 2014

Blue Smoke

Claim Description

The Blue Smoke plan consists of only one claim located north of county road 24. Granite Creek flows in a westerly direction on the southern edge of the claim and is approximately ¼ mile west of its confluence with Bull Run Creek. Access is by the paved county road 24 and the powerline access road. The legal description for the claim is T.9 S., R.35 ½ E., Section 04, W.M.

Processing Site

Existing Condition

Mining began in this area in 1861. In the early 1900's the flood plains along Granite Creek were dredged for the first time and was last dredged in the 1940-50's. Placer mining continues today as people continue to search through the rocks and stream bed. The dredge tailings north of the paved road and south of the powerline road contain isolated ponds that may or may not be connected underground to each other and/or Granite Creek.

Short lodge pole pines (15-20 foot tall), scrub willow and native grasses have taken hold on the dredge tailings. The high bank area to the north is undisturbed from past mining and contains larger trees. The ponds are filled with hydrophytic plants such as sedges (*Carex*), cattails (*Typha*), and duckweed (*Lemna*).

Private land lays on the east and north side of the claim and is not well marked. The powerline runs the entire length of the work area, between the access road and the ponds used in the operation.

Recent Activity

The claimant did some testing of the dirt located at the proposed processing site, under a Notice of Intent in 2012 and 2011. There are no buildings or equipment on the claim. The piles of dirt at the processing site were there previous to the claimant's location of the claim.

Proposed Plan of Operations [(1)]

The miner would like to placer mine in 3 sites along the high bank (road cut bank) north of the existing powerline road. Excavations will be 20' x 25' x 10' deep at a time with each one reclaimed before moving on to the next. The dirt road acts as a boundary and buffer between the water and the active mining site, so no buffer was identified by the miner.

Water for processing will be pumped from an existing dredge pond (#2). An existing dry pond will be expanded and used as a settling pond with a grass area and pond (#3) to be used in case of overflow.

Equipment to be operated on the claims includes a backhoe and/or dozer, small trommel, highbanker/sluice, 5 yard dump truck, generator, a pickup truck, water pump, atv, and hand tools.

The miner will also operate a small suction dredge under the terms and conditions of a State dredging permit from July 15 to August 15.

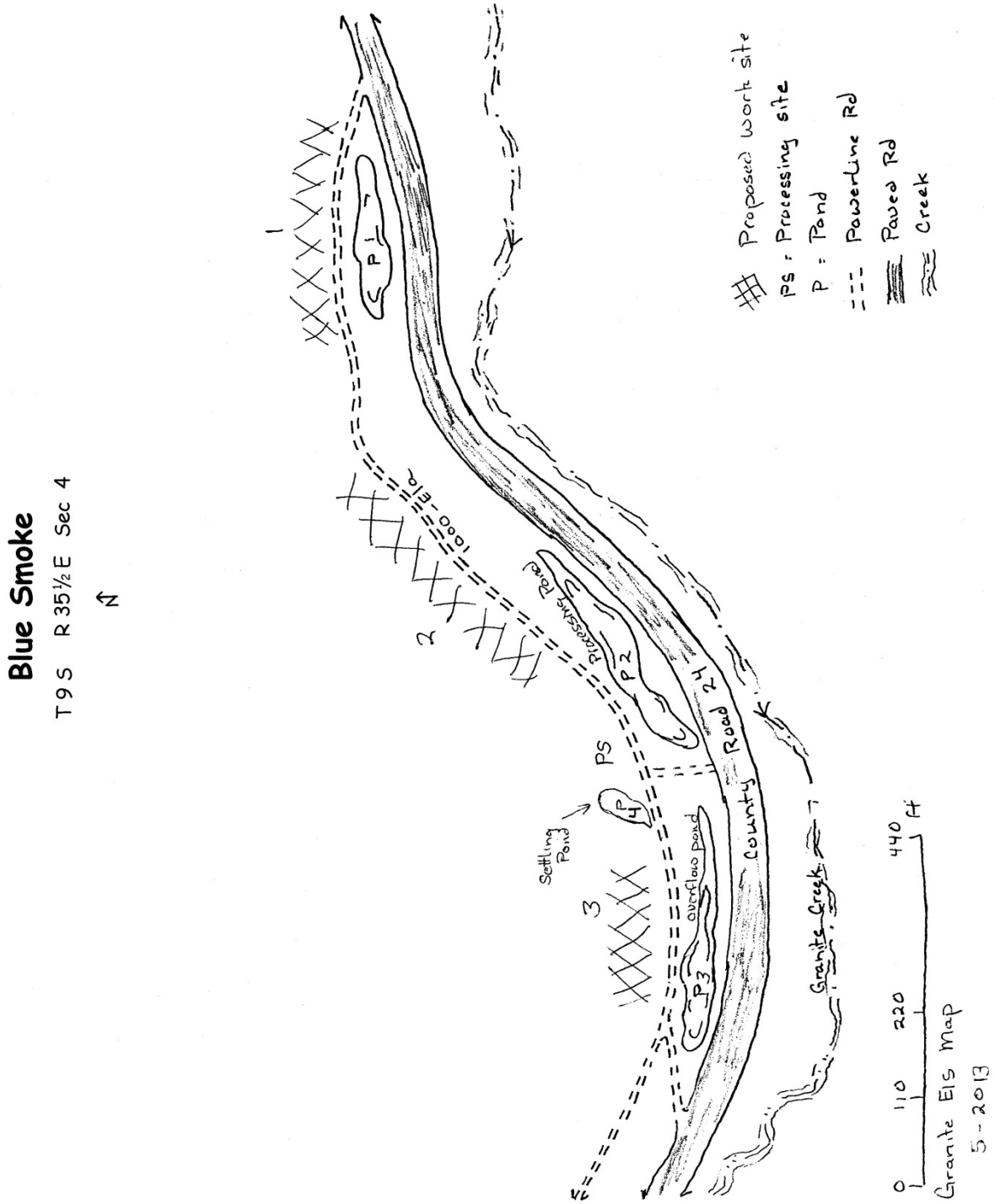
Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

Reclamation will be done on a continuing basis and the site stabilized annually before close out each fall. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

Site 2

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks – 120 days) for the next 10 years to complete the project. Initially one or two holes will be dug in each of the three areas. Should sufficient minerals resources be located then the area will be dug as planned. Base on the hole size (20 x 25 x 10 ft deep) and the area to be mined it is estimated that approximately 9 holes a year will need to be worked in order to complete the project as planned.

No additional mitigation measures were identified by the miner in the Plan. [(1)]


Blue Smoke
T 9 S R 35½ E Sec 4
N
1
2
3
P1
P2
P3
P4
PS
1000-Elev
Processing Pond
Settling Pond
overflow Pond
County Road 24
Granite Creek
Proposed work site
PS : Processing site
P : Pond
Powerline Rd
Paved Rd
Creek
0
110
220
440
Ft
Granite Eis Map
5-2013

BUNCH BUCKET #1 AND #2

Claim Description

The Bunch Bucket plan consist of 2 placer claims located along the north east side of Clear Creek, at either side of its confluence with Ruby Creek and approximately 2 miles east of its confluence Olive Creek. Access is by existing Forest System Road 1310. The legal description for the claim is T.9S., R.35E., Section 22, W.M.

Pond location at site 2

Existing Condition

Site 2 is located between Forest System Road 1310 and Clear Creek. A large portion of the area was cleared in the 1970's but has since grown back with 15' tall lodgepole. Tailing piles from past dredging activities exist along both sides of the creek. An approximately 50 to 80-foot wide zone of native vegetation buffers the cleared area from Clear Creek along with an existing non-system road (1310-E2c). A previously dug pond site is now dry.

Site 1 is located along the east side of Forest System road 1310 and is a flat terrace on which a few trees have been left (15, tall lodgepole pine and occasional larger ponderosa pine or Douglas fir). The site is buffered from the creek by a 50-80 foot vegetative area and the 1310 road.

Recent Activity

According to past inspections there has been no activity on this claim in the last 10 years. An abandon trommel and 3 pickup loads of household trash have been removed since 2010.

Proposed Plan of Operations [(1)]

The miner is proposing to placer mine two sites by excavating 4 trenches at each site. The trenches (2' wide and 8'deep) will be excavated to bedrock using a backhoe, and will be situated in such a manner as to spare the larger trees in the area. Overburden and/or topsoil will be stockpiled along the trenches for later use in reclamation. Excavated materials will be trucked to the trommel, which will be set up on the southeast side of Bunch Bucket #2, approximately 150 to 200 feet south of Clear Creek. A two track road and an 50 foot plus undisturbed area, will buffer the dig site from the creek.

An existing pond will be expanded (30'x60'x10 deep) to secure a dependable water source and all water will be recycled. The claimant proposes to place log dams across a seasonal stream that drains the site to minimize the amount of sediment that might otherwise wash into Clear Creek.

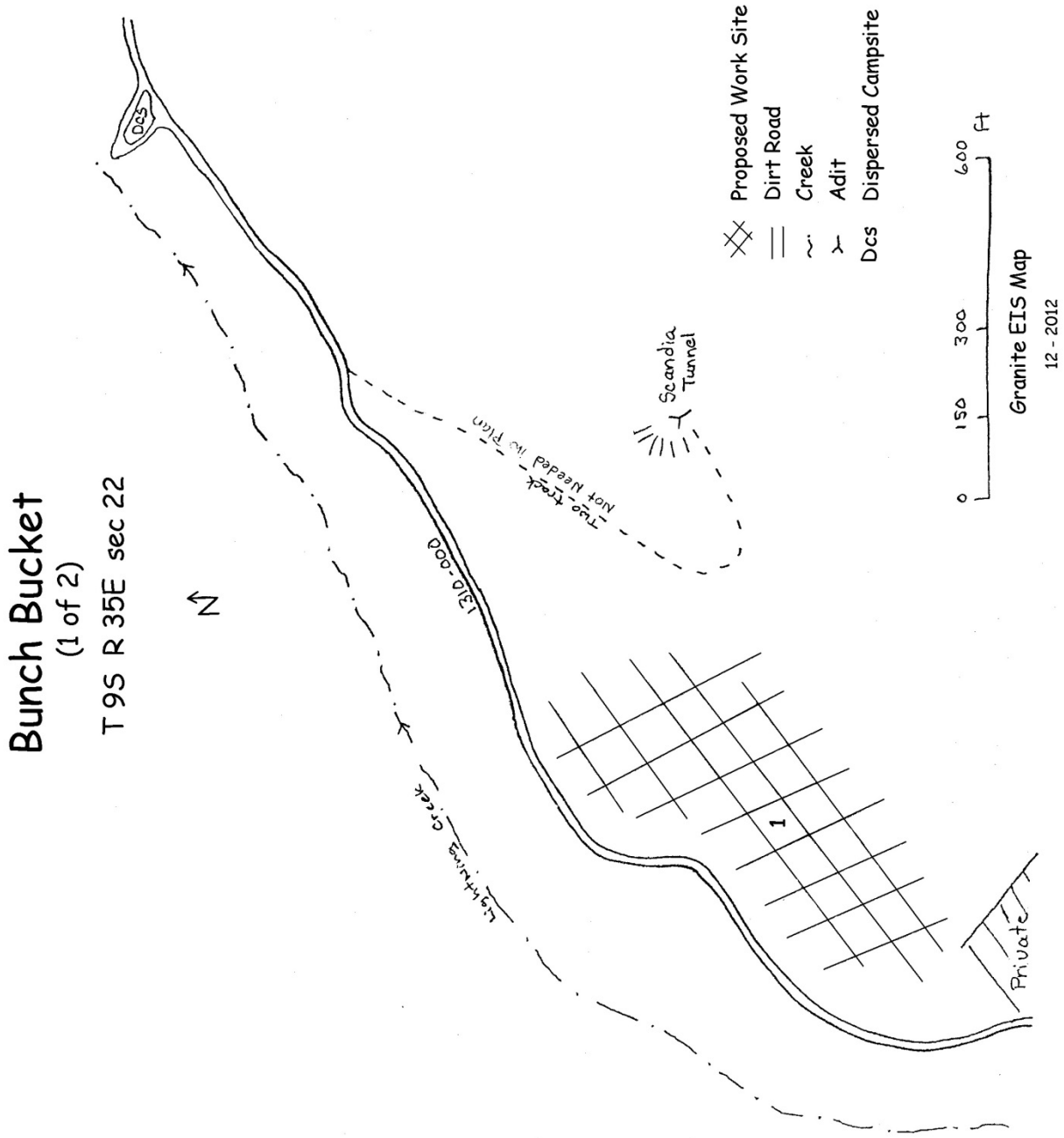
Equipment to be operated on the claim include a medium size backhoe, pickup, atv, water pump and a trommel capable of washing up to 30 cubic yards per hour will be used. No structures are planned.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

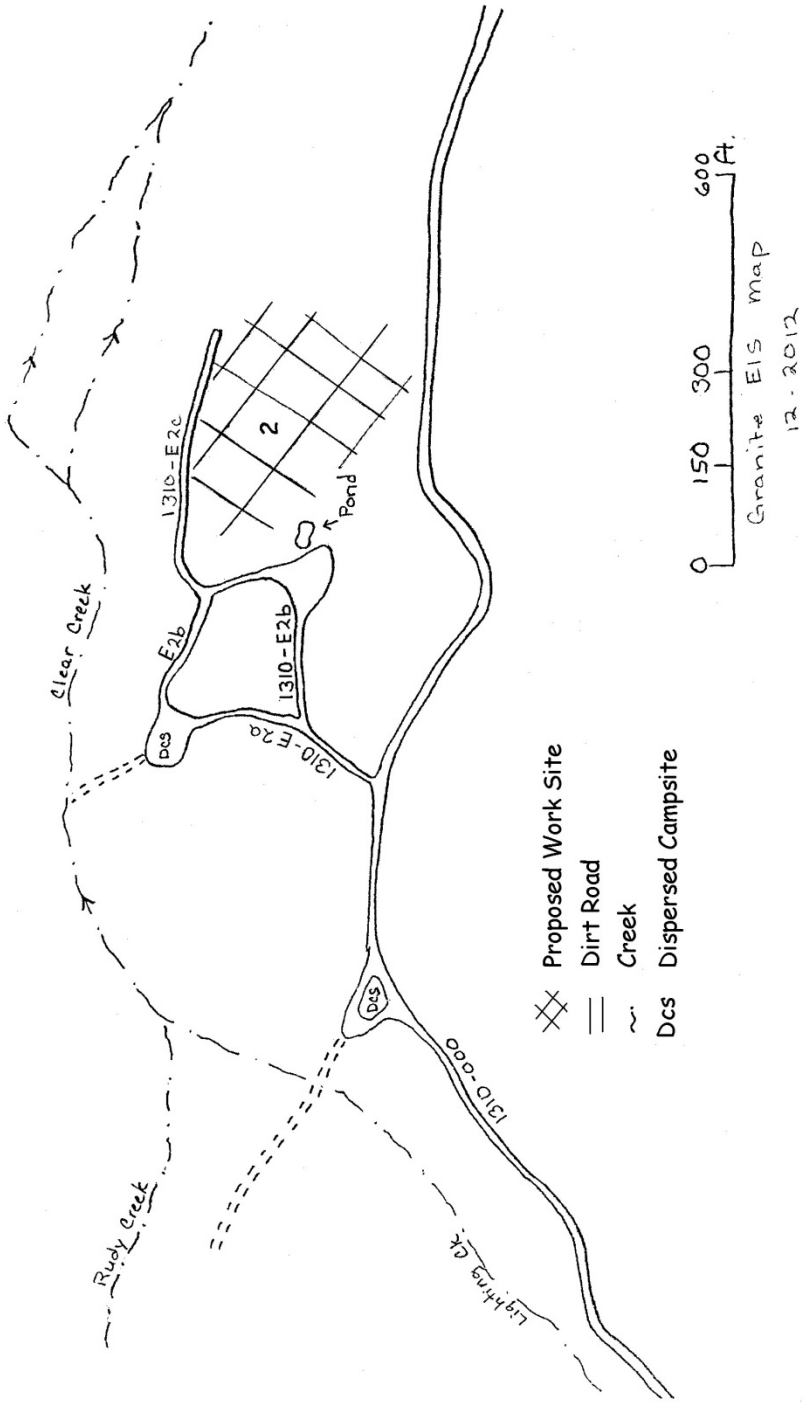
Reclamation will be done on a continuing basis and the site stabilized annually before close out. Washed gravels will be used as backfill in the trenches. Grass seeding will be done as needed and topsoil will be stockpiled for use in final reclamation. All garbage will be hauled off site for disposal.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks - 120 days) for the next 10 years to complete the project. Based on his trench size (2x8x200) it is estimated that the digging of each trench will move 120 cubic yards. While they could complete one trench per year and still finish the project as planned, the plan is to process 600 cubic yards the first year. At that rate, the operation could process all the material in 2 years.

No mitigation measures were identified by the miner in the Plan. [(1)]


Bunch Bucket
(1 of 2)
T 9S R 35E sec 22
N
Dcs
1310-000
Lightning Creek
Trap Rock
Not Needed in Plan
Scandia Tunnel
1
Private
Proposed Work Site
Dirt Road
Creek
Adit
Dcs Dispersed Campsite
0
150
300
600
ft
Granite EIS Map
12 - 2012

Bunch Bucket
(2 of 2)
T 9S R 35E sec 22



City limits

Claim Description

The City Limits plan consists of only one claim. It is located just north of the town of Granite on the east side of paved Forest System road 7300, across the road from Granite creek and approximately ½ mile north of its confluence with Bull Run. Access is from Forest System road 7300. The legal description for the claim is T09 S., R.35½ E., Section 04, W.M.

Side road east of ponds

Existing Condition

Mining began in this area in 1861. In the early 1900's the flood plains along Granite Creek were dredged for the first time and was last dredged in the 1940-50's. Placer mining continues today as people continue to search through the rocks and stream bed. The dredge tailings in this area contain isolated ponds that may or may not be connected underground. The north end of the claim is located over an active gravel pit in which county and city processed gravel has been stored. Non-system gravel roads run between the ponds and the hill side to the east.

Short lodge pole pines (15-20 foot tall), scrub willow and native grasses have taken hold on the dredge tailings. The hill side to the east is undisturbed from past mining and contains larger trees before crossing over into the city limits. The existing ponds are filled with hydrophytic plants such as sedges (*Carex*), cattails (*Typha*), and duckweed (*Lemna*).

The National Forest boundary has been well marked along the private land on the south and east side of the claim and the town of Granite.

Recent Activity

There has been no recent mining activity documented on this claim in the last 10 years.

Proposed Plan of Operations [(1)]

The miner would like to placer mine the old tailings and the high bank (hill side) along the east side of the claim. The proposal is to process approximately 3-5 yards a day from a series of pits (20' x30' x 8' deep) dug along the east side of the claim. There is no stream on the claim so there is no miner-designated stream side buffer.

Processing water (20-80gpm) will come from and be recycled in the old dredge ponds (1200-4800 gallons per hour).

Equipment to be operated on the claims includes a backhoe, bobcat, 5 yard dump truck, Highbanker, washing plant, sluice, water pumps, pickup, and hand tools. Only travel trailers and a chemical outhouse are planned to be used while mining.

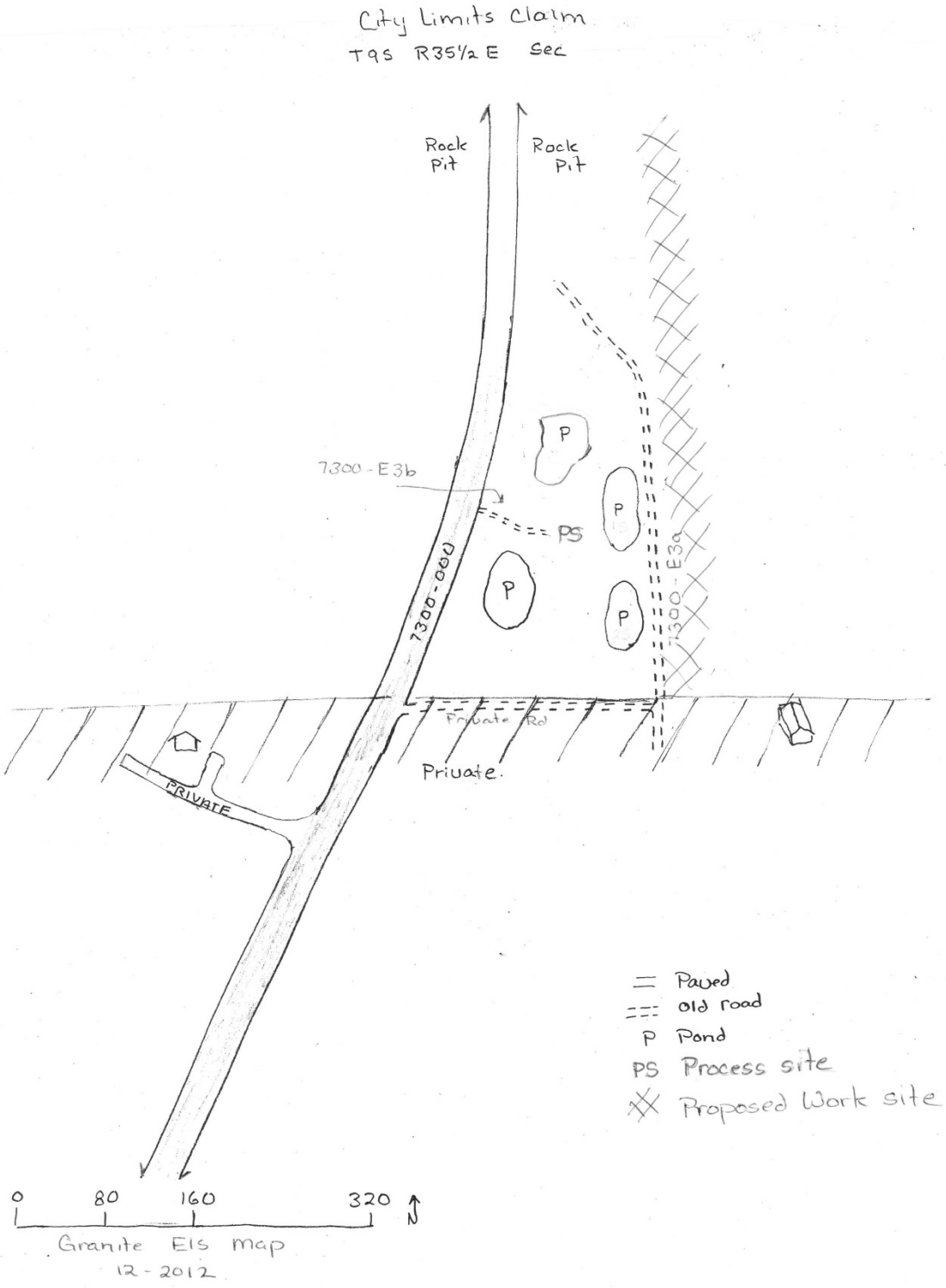
Old dredge pond in dredge tailings

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. Ponds will be left for wildlife use.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks - 120 days) for the next 10 years. As the area is comprised of old dredge tailings, one can expect that most of the material from the hole will be discarded as waste rock. This could leave an estimated 60 cubic years or less per pit to process. At a rate of 2-3 yards per day it would take 20-30 days to work a pit. The area described for mining is approximately ½ to 1 acre in size and could be completely excavated by 36-72 holes. Over a ten year period that would mean the miner would need to excavate 4-7 pits a year in order to complete the project as planned.

No additional mitigation measures were identified by the miner in the Plan. [(1)]


City Limits Claim
T9S R35½E Sec
Rock Pit
Rock Pit
7300-E3b
PS
P
P
P
P
7300-000
7300-E3a
Private Rd
Priuate.
PRIVATE
= Paved
=== old road
P Pond
PS Process site
Proposed Work site
0 80 160 320
Granite EIS map
12-2012

East Ten Cent Claim

Claim Description

The East Ten Cent plan consists of two claims. It is located on East Ten Cent Creek which flows into Granite Creek approximately 2 mile to the west. Access is by Forest Road 7550-050 and a miner created road up the east side of the creek. The legal description for the claim is T.8 S., R.35½ E., Section 28, W.M.

Camp site and shed

Existing Condition

The hydraulically mining began in this area in the late 1800's. Then again in the 1970's the west side of the creek was mined and then reclaimed in the 1980's. The creek and both banks are lined with old tailings from past operations.

The area identified for mining under this plan is located on the west bank of the creek and consist of a cut bank with a few fir and lodge pole trees (10-50 foot tall) and a grassy area resulting from rehabilitation from a previous mining operation. The existing miner's pond (12' diameter) is located on the north end of the west bank and is filled with hydrophytic plants such as sedges (*Carex*), and cattails (*Typha*). The campsite is located on the east side of the creek at the end of the road in an excavated, flat area.

Recent Activity

Throughout the last 10 years the claim has changed hands several times. Mining activity has been limited to panning and occasionally a highbanker. Some cleanup and removal of non-essential mining items has been done.

Creek and pond area

Proposed Plan of Operations [1]

The miner would like to placer mine along the west side of the creek. Test pits (12 ft in diameter) will be opened in the area between the creek and an old access road. An approximately 10 foot undisturbed steam side buffer will be retained between the break in slope at the edge of the work site and the creek below.

An existing pond will be used for processing and settling (12'diameter -6'deep).

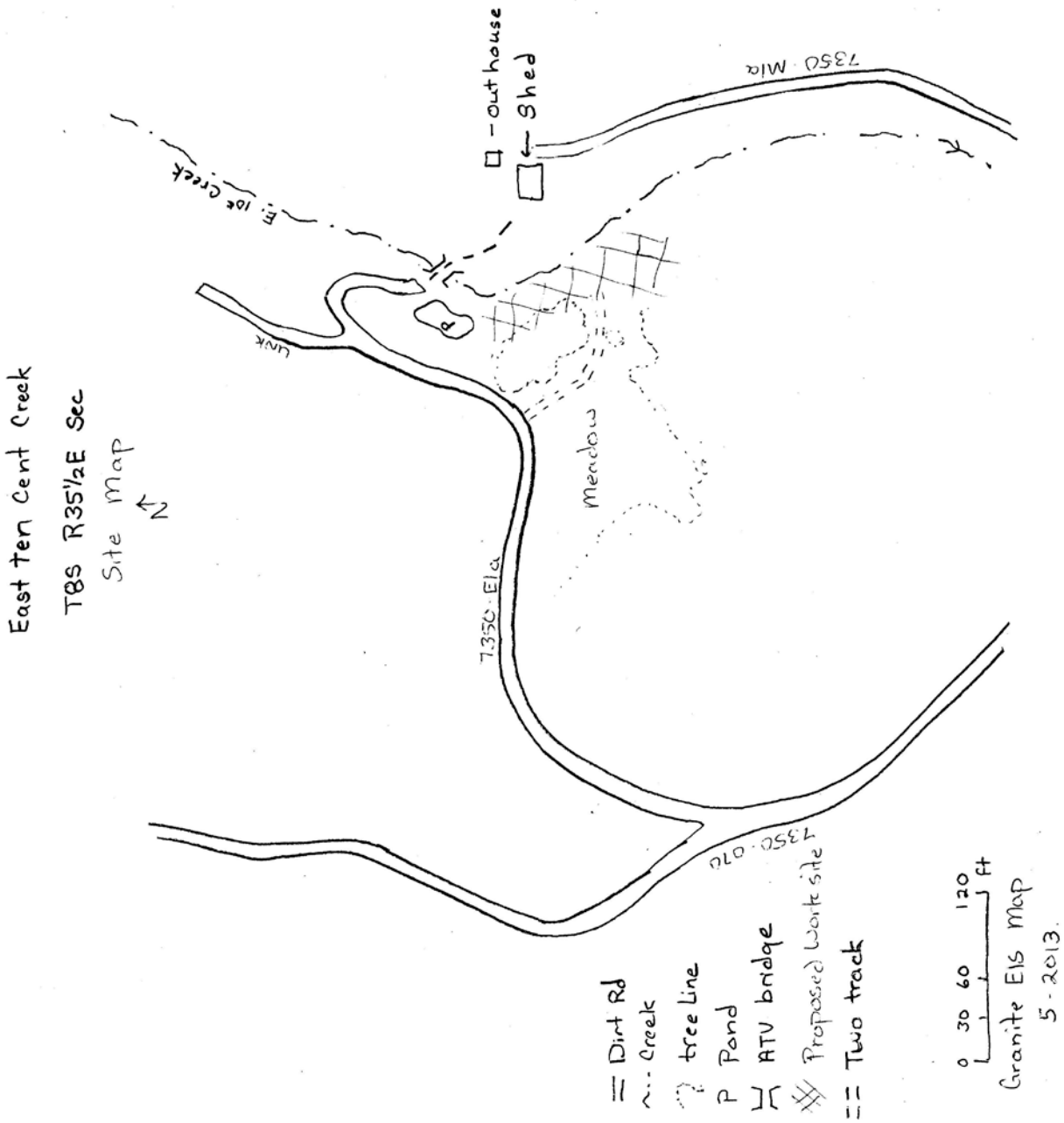
Equipment to be operated on the claims includes a backhoe, trommel, a pickup truck, highbanker, water pumps, ATV and hand tools. During the mining operations a self-contained travel trailer will be used for sleeping quarters. The miner plans to continue using the shed for storage as well as the existing outhouse.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers. Approximately 20 gal will be kept in a locked metal box in the storage shed.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. Road maintenance (water-barred and cleared) will be accomplished annually on the one mile of road needed to access the claim. For final reclamation, the two structures will be removed and the un-named (7350-M1a) access road will be ripped, seeded and covered with adjacent brush.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks – 120 days) for the next 10 years. The excavation area is estimated at 80'x100' (less than ¼ acre) and the miner would need to work 7 (12' diameter) holes a year in order to completely excavate the site. The pond is estimated at 4-5,000 gallons

No mitigation measures were identified by the miner in the Plan. [(1)]


East ten Cent Creek
T8S R35½E Sec
Site Map
N
Ei Ice Creek
Unk
P
7350 · Ela
Meadow
7350 · Mia
7350 · Ola
□ - out house
← Shed
= Dirt Rd
~ Creek
tree line
P Pond
ATV bridge
Proposed work site
= Two track
0 30 60 120 ft
Granite Ela Map
5 - 2013

Eddy Shipman

Claim Description

The Eddy-Shipman plan consists of 3 lode claims. It is located at the junction of Chipman Creek and Granite Creek. Access is by Forest System road 7300 and a closed non-system roads. The legal description for the claim is T7S, R35½ E, Section 23 WM.

Eddy Shipman - Cabin

Existing Condition

Mining began in this area in the late 1800's. The creek appears to have been dredged, but based on the location, it is more likely just the results of intensive hydraulic and hand mining. The surrounding draws are full of adits that were also created in the late 1800's and worked as late as the 1980's. Concerns have been voiced regarding the potential for acid mine drainage and soil contamination based on independent sampling in the area. A non-system road (reportable the old county road) runs along the west side of Granite Creek and is used to access the cabin, placer site and two of the old collapsed adits (B&C). The area is covered with trees in a variety of types and sizes. The relocation of the county road (possible in the 70's) cut through several adits just north of the claim area and used the old tailings and waste rock to fill in the present crossing over Granite Creek which divides the proposal into the east and west portions.

The adits on the west side of the road (B&C) appear to be the old East Eddy adits. While they are both collapsed, adit C portal was replaced with 4 wide culvert and gated when the 7300 road was relocated.

The collapsed adit (A) is on the east side of the 73 road and is part of the old Central mine. It is currently accessed by a foot trail or the 7300-680 road which fords Granite Creek and is also gated. An Engineering Evaluation /Cost Assessment (EE/CA) has been completed for this adit as part of the final evaluation in the CERCLA process. The findings showed that metal concentration were near clean-up level in waste rock, tailings and soil. The recommendation is for on-site containment which would consist of containing, covering and replanting the sites.

Collapsed Adit B

Recent Mining Activity

The claimant currently uses the small cabin an associated shop/garage and outhouse along Granite Creek. Over the last 10 years, the claimant has been rebuilding the portal on adit (A) and conducting small scale prospecting by hand along Chipman Creek. The small amount of prospecting that has been done over the past 10 years is equivalent to natural bank erosion and the portal still remains caved in.

Proposed Plan of Operations [(1)]

This is listed as an ongoing operation. The claimant would like to reopen the existing adits and conduct placer operations.

For the *lode operations*, locally available wood will be used to reconstruct the portals and for mine timbers. Work inside the adit will consist of using a bobcat or mucker and explosives to rehabilitate the adit and continue mining underground. A temporary cement mill base will be brought in and a temporary corral constructed. It is estimated that up to 5 tons per day will be crushed and milled using a potable horse

powered arrastra at a site near the cabin. Chipman creek will be used in this process. During the testing phase, a few dump truck loads may be hauled off site to private land using Forest Service Road 7300.

Tailings will be re-deposited underground.

Placer operations will take place in the draw along Chipman Creek as well as the rock surface where the vein shows through and the old mine dumps. A trammel or small washing plan and backhoe will be used. Process water from Chipman Creek or off-channel ponds will be placed in existing ponds and recycled. Top soil will be stockpiled for later reclamation and the miner will maintain an undisturbed buffer of at least 20 ft between the creek and the mining activity. It is estimated that the placer depth will be no more than 6 feet. If trees need to be removed, these will be placed along the gulch to prevent head-cutting. If the brush is removed, it will be planted back after the mining is completed.

Equipment will be washed before it is taken onto the National Forest and commercial hay pellets and weed free hay will be used to feed the horse.

Collapsed Adit A

At present, petroleum products will be stored in vehicles in approve containers, and removed from the site at season's end. If storage is needed, a lined containment vat sufficient to hold the entire contents of the barrel will be used and stored near the cabin site.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. Portals will be stabilized and safe. Trailers will be removed seasonally. Final reclamation will include re-countering mine dumps, closing shafts and portals, and planting. The old county road will be closed with a rock berm and all buildings and equipment will be removed.

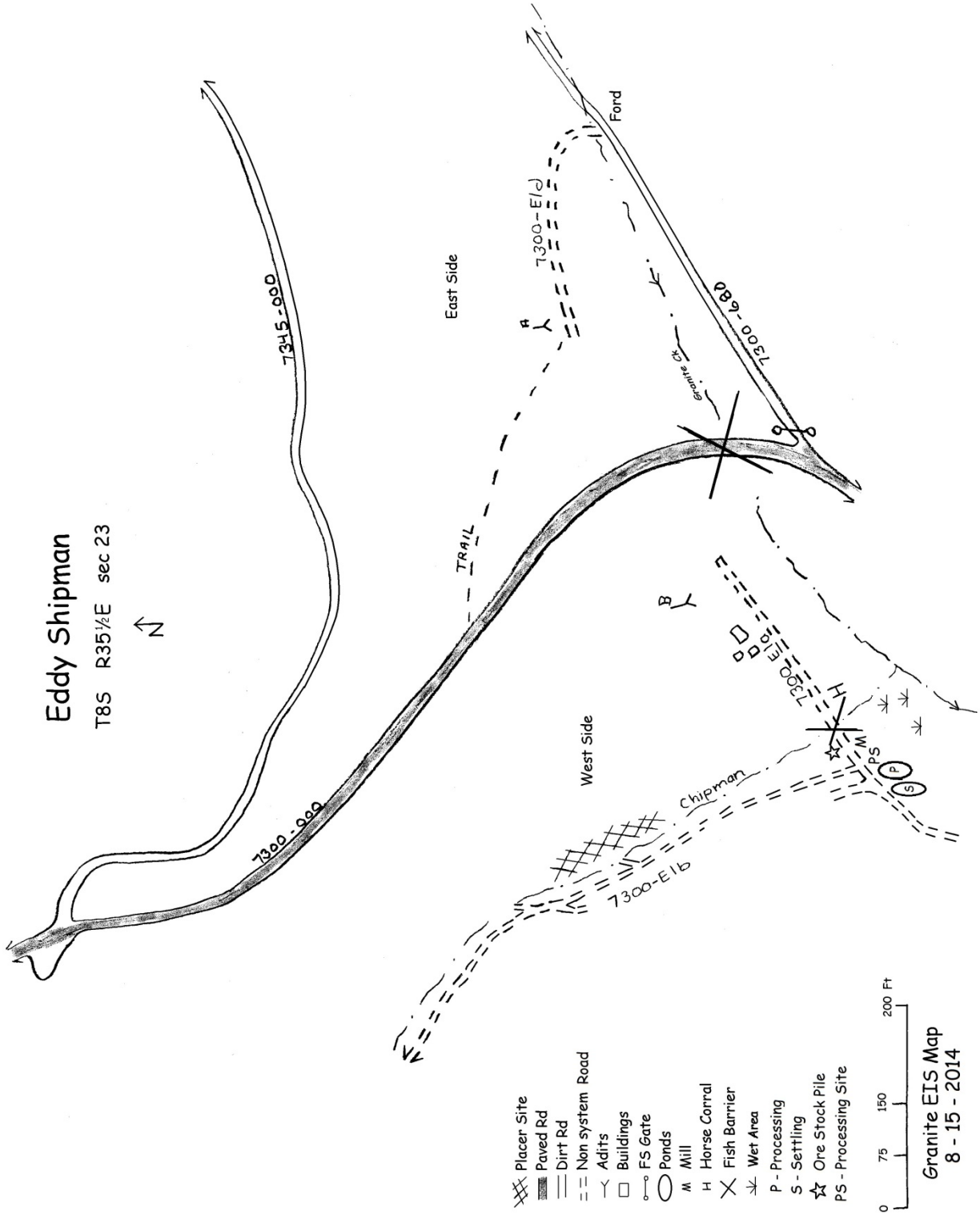
This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work year around in the adit but due to the snow it is expected that most of the outside work will occur from June through October of each year (20weeks -120 days) for the next 10 years to complete the project. The miner has proposed a maximum milling rate of 5 tons (@ 5 cubic yards a day). It is estimated that with the settling pond (50x100x8 feet in depth) would hold 500 cubic yards or 98,100 gallons of water. This would mean that every 100 days, or once a year the settling pond would have to be cleaned and the sludge put back in the mine.

The existing waste rock and tailing piles previously used (Adit A, and across from the pond) are very limited and will only hold a few more loads (10-20 cubic yards).

The actual production rate for the operation will probably be less than what is proposed in the plan due to the need to return the waste rock and tailings to the adit for surface storage, and the fact that the adit had yet to be reopened for testing. Based on the outcome of the lode testing, a modification to the plan (36CFR 228) may be necessary and may require engineer designed for the waste rock disposal sites and address any other concerns that may develop as a result of the testing.

Mitigation Measures identified by the miner in the Plan [(1)]

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).


Eddy Shipman
T8S R35½E sec 23
N
7345-000
7300-000
TRAIL
East Side
West Side
7300-E1d
7300-E1b
7300-E1e
7300-680
Ford
Granite ck
Chipman
A
B
H
M
PS
P
S
Placer Site
Paved Rd
Dirt Rd
Non system Road
Adits
Buildings
FS Gate
Ponds
Mill
Horse Corral
Fish Barrier
Wet Area
P - Processing
S - Settling
Ore Stock Pile
PS - Processing Site
0
75
150
200 Ft
Granite EIS Map
8 - 15 - 2014

Grubsteak

Claim Description

The Grubstake plan consists of only one placer claim. It is located on the west side of Clear Creek at its confluence with Beaver Creek. Access is from a miner created road, ford and bridge that ties back to County Road 24. The legal description for the claim is T.09 S., R.35 E., Section 04, W.M.

Bridge

Existing Condition

The claim is near the historical site of the town of Alamo and the Eureka mine. Over the past 100 years, the area along the creek has been dredged and numerous ditches point to hydraulic mining along the stream banks. . Improvements on the claim include one equipment storage building and a bridge over Clear Creek. An open pit (30x20 deep) is located over 100 feet from the creek an up on the flat. A washing plant, set up near the pit consists of a screen, a trommel, and a sluice box which has not been used in some time. Over the last 10 years the Forest Service in conjunction with Grant Co and other parties, have stated restoration of the bare dredge tailings and the two creeks in the area. Private land abuts the south end of the claim and has been clearly marked with forest boundary signs. The road into the claim is a non-system road and is not suitable for public use due to the miner constructed bridge.

Recent Mining Activity

The claimant began replacing the deck and stringers on his access bridge in 2011. A safety fence has been placed around the existing mining hole (30 ft by 20 ft deep) and a ford crossing over clear creek was improved near the existing shed. There has been no visible mining activity on this claim in at least the last 10 years.

Site B and Camping Site

Proposed Plan of Operations [1]

The miner is proposing to continue mining on the east side of Clear Creek. Two sites have been selected for further testing. Site A is currently open (20'accross x 30' deep) and will also serve as a processing and settling pond. The existing hole may be deepened and a ramp added to the north side. A new excavation (20'accross x 12' deep) is proposed on site B.

The miner will maintain an undisturbed 20 foot buffer between the creek and the mining activities. This buffer will be maintained and defined by a placement of a gravel berm and straw bales. The processing from the excavation at site a (ground water pond) will be recycled as it is also the settling pond. The material from Site B will be processed at site A.

Equipment to be operated on the claims includes a backhoe, Trommel, shaker, water pumps, generator, a pickup truck, atv's, motorcycles, utility trailer and hand tools. A self-contained RV will be used for sleeping

quarters while mining. The ford will only be used from July 15-Aug 15 and the bridge will be used all year round. A small shed on the site is used for storage.

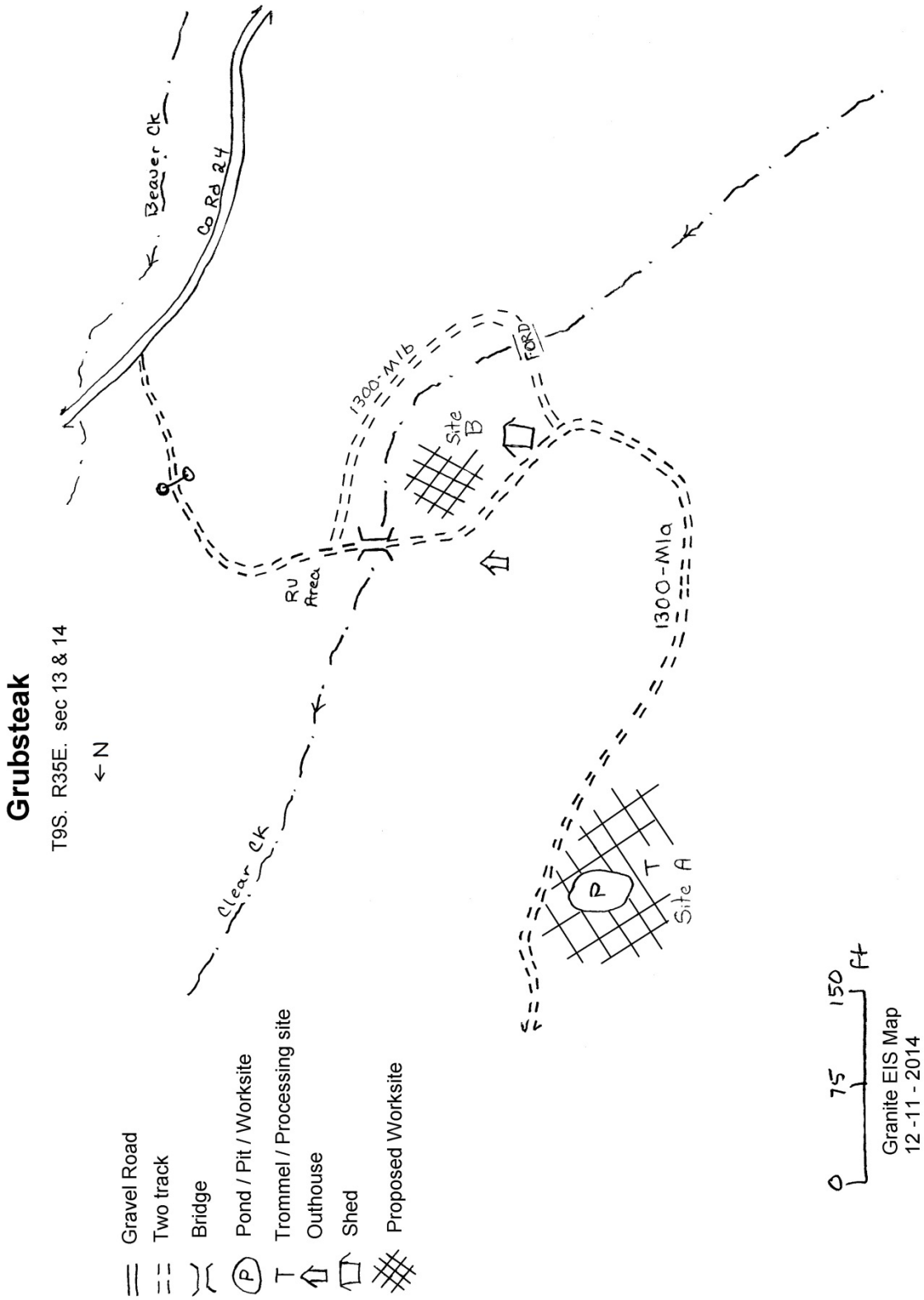
Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers. Fuels are to be stored out of the flood plain.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

Hole at Site A

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20 weeks - 120 days) for the next 10 years to complete the project. While the operator does not give an estimated production for each year he does give two specific work sites. The sides on site A will be re-sloped to meet Forest Service safety measures, and they may need to develop an entrance ramp if they continue beyond the current 20 foot depth. A new site B was identified for mining and will be 12 feet deep and an estimated 20 ft across. As this is within the annual high waterline of the adjacent creek, it will need to be closed prior to winter run off. Based on the information provided in the Plan and collected during the analysis, it is expected that operation could be completed well within the 10 years requested by the operator.

No additional mitigation measures were identified by the miner in the Plan. [(1)]


Grubsteak
T9S. R35E. sec 13 & 14
← N
Beaver Ck
Co Rd 24
1300-M1b
FORD
Site B
RU Area
1300-M1a
Clear Ck
Site A
Gravel Road
Two track
Bridge
Pond / Pit / Worksite
Trommel / Processing site
Outhouse
Shed
Proposed Worksite
0 75 150 ft
Granite EIS Map
12-11-2014

Hopeful 1

Claim Description

The Hopeful 1 is a placer claim located along the northern side of Granite Creek approximately 1 miles upstream of its confluence with the North Fork John Day. Access is by the closed system road 1035-012, which runs along the north side of Granite Creek. The legal description for the claim is T8S, R35E, NW1/4 Section 29 WM.

Cabin and RV

Existing Condition

The valley bottom and creek area was historically placer and hydraulically mined starting in the late 1800's and even up into the 1950's. The mining activities appears to have involved stripping and stockpiling fine-grained topsoils in elongated piles approximately 50 to 100 feet to the north and south of the creek, and then processing the more coarsely grained creek gravels. There is a small cabin and some old dredge ponds on the claim. The active working area consists of a small (15 x 20 foot pit) that is excavating under an old stock pile of soil on the north side of the creek, approximately 30 feet southeast of the cabin and 50 feet north of Granite Creek. This pit was originally started in the late 1980's and due to the old dredge gravels in the area does not hold much vegetation or fine dirt.

Recent Activity

The claimants spend a couple of weeks during the summer months on the site. It is estimated that only 1-3 yards is processed yearly is processed by hand with a small sluice. Inspections of the site have not changed much over the last 10 years.

Mining Site

Proposed Plan of Operations [(1)]

The claimants will continue to work the small pit in the dirt bank that was originally opened in 1989.

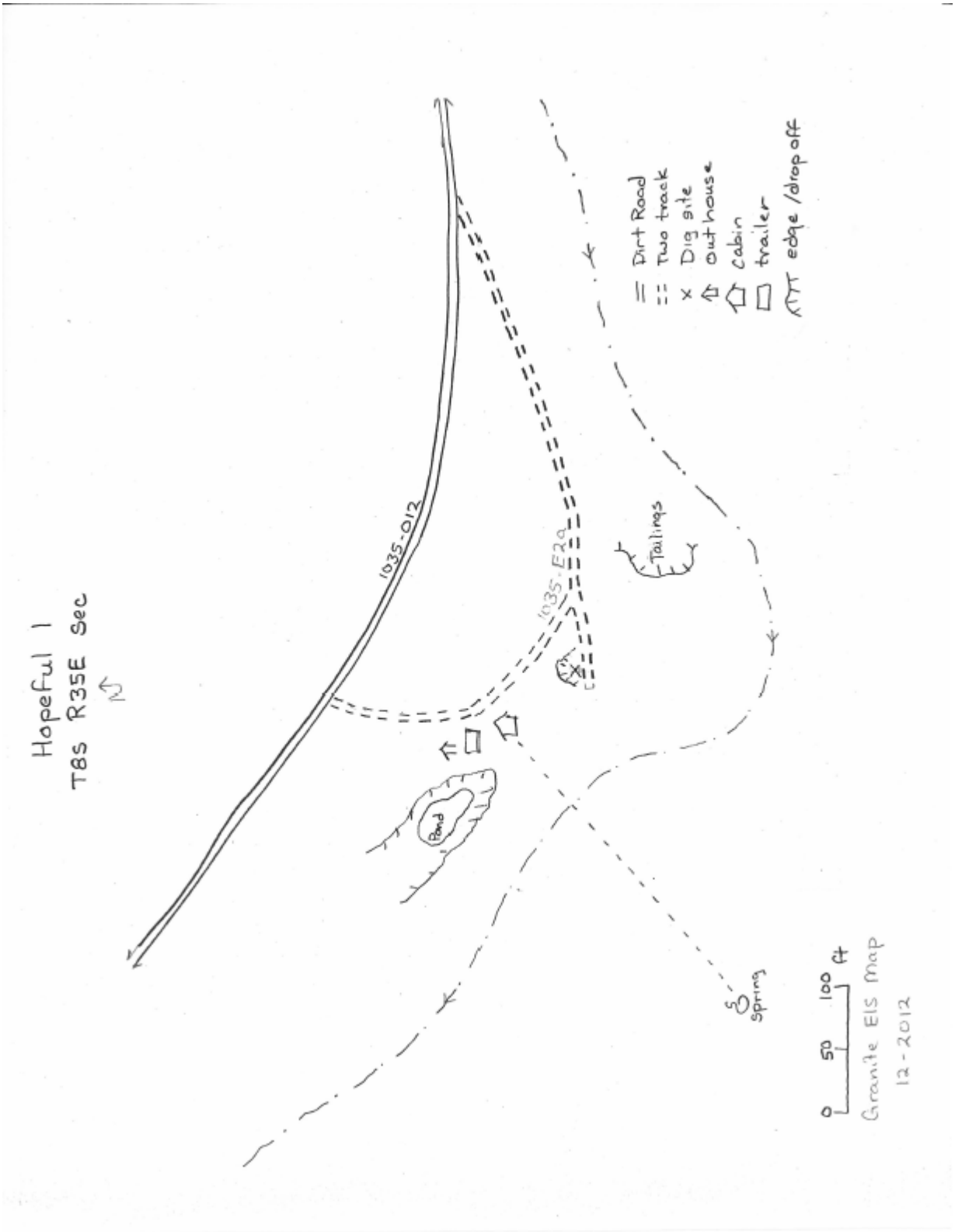
Equipment to be used will include a small backhoe, pick, shovel, pan-o-matic, and a small trommel. Wash water for the plant will be pumped from the creek and re-circulated through a shallow pit excavated in dredge tailings gravels approximately 15 feet north of the creek. The small volume of tailings generated will be disposed of in an old dredge hole 20 to 30 feet north of Granite Creek. Based on the map and a description of the operations, a minimum buffer of 15 feet will remain undisturbed between the creek and any mining activities.

Petroleum products used will be stored in vehicles and be removed from the site at season's end. Topsoil will be stockpiled and used later for reclamation. Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

Due to the overall size of the operation, the hole will be left open until the operation is completed. Once completed, the site will be stabilized and re-contoured. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. The buildings and equipment will be removed, and the entrance road will be blocked with rocks and logs, and allowed to return to a natural state.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks) for the next 10 years to complete the project. According to the plan, a maximum of 3 cubic yards a year will be processed. The amount and timing of the mining activity at the site is expected to remain similar to what has been done in the last 10 years.

No mitigation measures were identified by the miner in the Plan. [(1)]


Hopeful 1
T8S R35E Sec
N
1035-012
1035-E20
Pond
Tailings
Spring
= Dirt Road
:: Two track
x Dig site
out house
cabin
trailer
edge /drop off
0 50 100 ft
Granite EIS Map
12-2012

Hopeful 2&3

Cabin

Claim Description

The Hopeful 2&3 placer claims are on the north and south sides of Granite Creek about 2 miles upstream from the North Fork John Day. Access to the claim is via Forest System road 1035, and then a closed non-system and a miner constructed roads. The legal description for the claim is T.8S, R.35E, Section 28 & 29, W.M.

Existing Condition

The claim was located in 1965 and segregated from mineral entry on March 24, 1966 and later withdrawn on July 9th 1968. The southern portion (300ft south of the river's edge) was declared wilderness on June 26, 1984. The creek area was historically mined at the turn of the century and dredged again in the 1950's. The previous claimant mined the south side of the claim in the 1980's. A mineral exam was last done on the claim in 1989 and showed mixed results. The miner has no plans to mine in the wilderness.

A cabin, shed and outhouse exist on the north side of the river at the end of the access road. Water filtration plant exists on the northwest side of the claim. A harden ford exist on both the east and west end of the claim. A cable cart is allows people to cross the creek throughout the year. Water from the un-named creek on the south side of Granite is piped over to the cabin area. An additional pipeline was once used to feed the filtration plant and south side dig/pond area, but is not presently running.

Recent Activity

In 2009 a new claimant took over the claim and has been in the process of cleaning up the site and removing non-essential mining items. Current mining actives consist of hand work for annual assessment work.

Proposed Plan of Operations [(1)]

The miner is proposing to placer mine in selected areas on both sides of Granite Creek (outside of the Wilderness). Mining will be done by first digging a test holes 6x3x10 ft deep then expanding to ¼ acre parcels. Work on the claims would include hand digging, and processing gravels through a small wash plant. All mining activity will take place at least 20ft from the creek edge and processing will be at least 50 feet from the creeks edge. Material for processing will not be hauled across Granite Creek as there is a processing site on both sides. Equipment will cross on the east ford.

Process water will be recycled within the ponds. An existing pond (20' x 30' x 4'deep) lies on the south side of the creek and two ponds ((10' x 10' x' 10'deep and 10' x 15' by 4' deep) would be created on the north side for processing and settling.

Equipment to be used on the claims includes a backhoe, cat, dump truck, Trommel, highbanker, washing plant, pickup, water pumps and hand tools. The cabins will continue to be used while mining, for sleeping quarters and storage. A gate would be placed on the 1035-E1b road into the mine site.

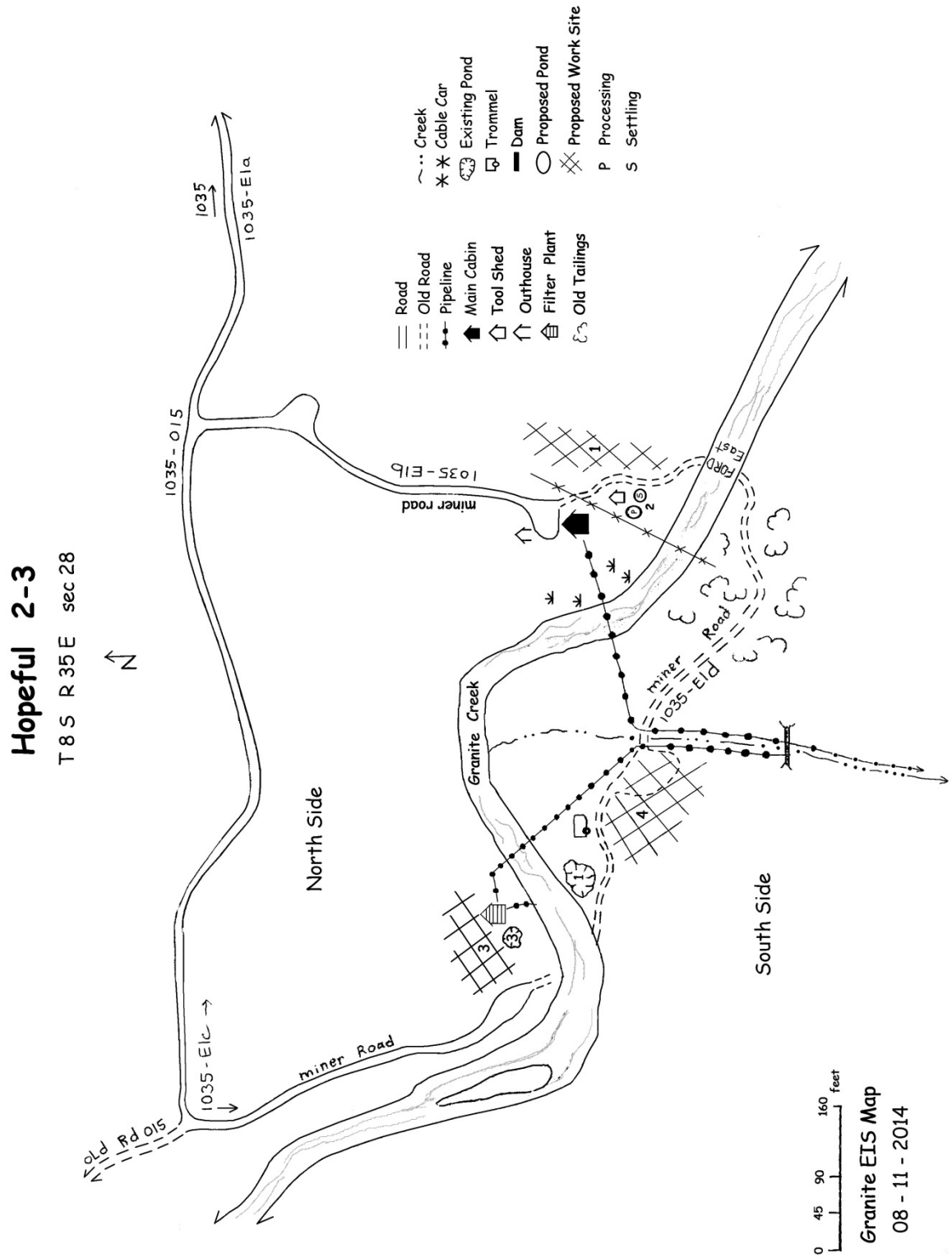
Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding will be done as needed and topsoil will be stockpiled for use in final reclamation. During final reclamation, all building will be removed and the miner created access road will be closed with piled rocks.

East ford and south bank

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks – 120 days) for the next 10 years to complete the project. According to the plan, an estimated 15 cubic yards of material will be processed each year. Test holes will be 6’ x3’ x 10’ deep. Given the low production rate, it would take more than 10 years to dig and process the project as proposed. Based on the production rates of the proposed equipment, the 15 cubic yards of material could be processed in as little as one week each year.

No additional mitigation measures were identified by the miner in the Plan. [(1)]


Hopeful 2-3
T 8 S R 35 E sec 28
N
Road
Old Road
Pipeline
Main Cabin
Tool Shed
Outhouse
Filter Plant
Old Tailings
Creek
Cable Car
Existing Pond
Trommel
Dam
Proposed Pond
Proposed Work Site
P Processing
S Settling
1035
1035-E1a
1035-015
1035-E1b
miner road
Ford East
miner Road
1035-E1d
Granite Creek
North Side
South Side
1035-E1c
miner Road
old Rd 015
0 45 90 160 feet
Granite EIS Map
08 - 11 - 2014

L & H

Claim Description

The L&H plan consists of only one placer claim. It is located at the head of Olive Creek about 4 miles from it confluence with Clear Creek. Access is by Forest System road 1305-200 which also provides access to private land in the area. A non-system road partially identified as the 950 road runs the length of the claim and is adjacent to Olive Creek. The legal description for the claim is T.10 S., R.35 E., Section 11, W.M.

Campsite

Existing Condition

The banks along the creek consist of rock tailings most likely from the hydraulically mined conducted during the early 1900's. Additional mining activities have continued in the area on and off thought out the century. Vegetation is sparse in several areas especially along the west end of the claim near the Pete Man Ditch. Signs of several collapsed adits exist along the 950. A well-used campsite and small storage shed exist near the junction of the 200 road and Olive Creek. The claim runs below the Pete Mann ditch which goes along the west and south side of the claim.

Recent Activity

An updated plan was submitted in 2010 when the new owners took over the claim. For the past several years the claimants have done some prospecting with hand tools and dredging to collect samples and assess the claims value. It is estimated that less than 1 cubic yard of material has been moved/worked a year.

Proposed Plan of Operations [(1)]

The miner would like to continue placer mine along the access road adjacent to Olive Creek and reopen the existing 3 adits for testing. For the adit, a backhoe will be used to clear away the debris from the portal and internal work would be done by hand. For the placer sites a backhoe will be used to dig test holes (20' x30' x 10' deep) will be dug and an undisturbed miner identified buffer of 10 feet will be maintained between the active mining and the creek. Processing will take place at the existing pond site where the water will be recycled from off channel ponds.

Equipment to be operated on the claims includes a backhoe, small cat, one-yard loader, air compressor, a pickup truck, and hand tools. Fuels are to be stored out of the flood plain.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding will be done as needed and topsoil will be stockpiled for use in final reclamation. The trailers will be removed at the end of each season. Final reclamation will include closure of the adits and refilling the settling pond.

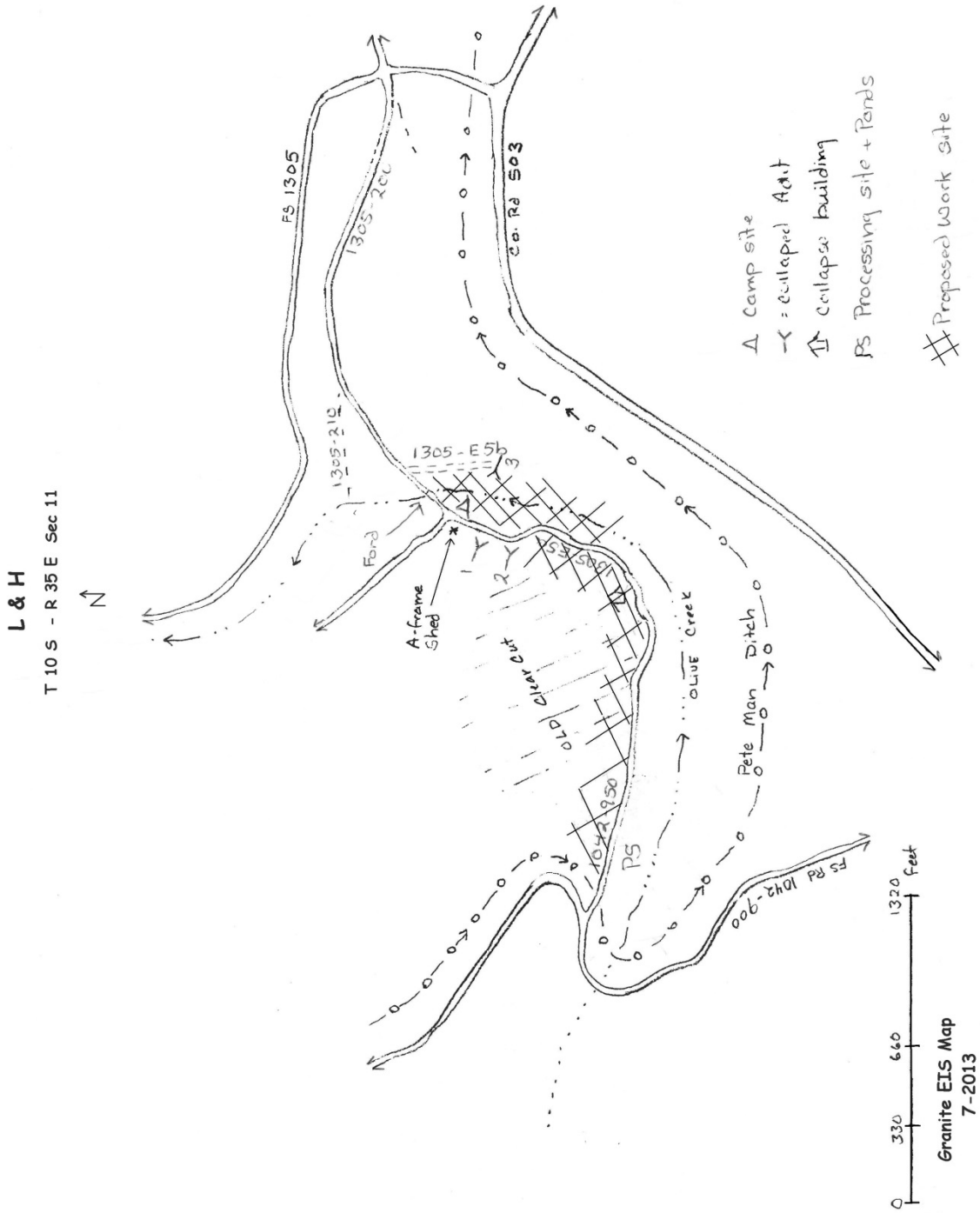
This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks – 120 days) for the next 10 years to complete the project.

For the placer portion of the claim, based on the expected hole size of 20'x 30' by 10 ft deep, it will take approximately 532 holes to completely mine the estimated 8 acres identified in the plan. As no estimated excavation rate was given, the production rate could be based on the lack of water and the current size of the ponds (approximately 10'x15'x5' deep) it would easily take more than 10 years to process all 8 acres should it prove productive.

The 3 adits will be open for testing purposes only. This would involve remove of the debris currently in the portal and material removed for testing purposes. No plan was presented to process material beyond this point.

Collapsed Adit

No additional mitigation measures were identified by the miner in the Plan. (1)


L & H
T 10 S - R 35 E Sec 11
N
FS 1305
1305-200
Co. Rd 503
1305-210
1305-E5b
3
Ford
A-frame Shed
1
2
Clear Cut
Olive Creek
Pete Man Ditch
PS
FS Rd 1042-900
Camp site
= collapsed Adit
collapse building
PS Processing site + Ponds
Proposed Work Site
0
330
660
1320
feet
Granite EIS Map
7-2013

Lightning Creek

Claim Description

The Lightning Creek plan consists of an association placer claim located along Lightning Creek about ½ miles from its confluence with Clear Creek. . Access to the claim is via Forest System Road 1310 and secondary open roads in the area. The claimant would like to placer mine in the old tailing and along the high-bank. The legal description for the claim is T.9S. R.35E., Sections 28, 33 W.M.

Settling ponds

Existing Condition

Mining activities at this site dates back to the late 1800's when the area was hydraulically mined and continues throughout the century at various levels. The result is several acres of washed tailing rocks along the east side of Lighting Creek. The east side of the creek is accessed by a claimant constructed bridge. The claim has a series of settling ponds developed down thru the middle of the tailings and a current dig site along the eastern edge of the tailings. Some areas of the tailings are starting to grow 10 foot tall lodge poles and willows are becoming established along the creek. The area east of the tailings is covered with mixed conifers.

The claim has two usable cabins, but the blacksmith's shop, and the garage/storage shed are in poor (unusable) condition. There is a miner constructed bridge on the 1305-100 road that access the previously existing settling ponds and mining area.

Recent Activity

The claimants have been known to works the claim for a couple of weeks a year and especially major holidays. A couple of yards a year have been moved and a trammel was used to process the material. About 5 years ago the deck on the access bridge (1305-100 road) was replaced and signed for mining use only.

Dig site

Proposed Plan of Operations [(1)]

The miner would like to placer mine three sites along the high bank area on the south side of the creek. A miner constructed bridge and parallel hardened ford (used twice a year for heavy equipment during the in-stream work period) will be used by the miner to access existing Forest Service roads. Water for processing will be pumped from Lightning Creek under a 1921 water right into existing ponds where it will be re-circulated. Each site will be reclaimed before moving on to the next. Past mining disturbances will also be reclaimed. Mining activities

are separated from lighting creek by old dredge tailings, a Forest service road, and a series of old dredge ponds.

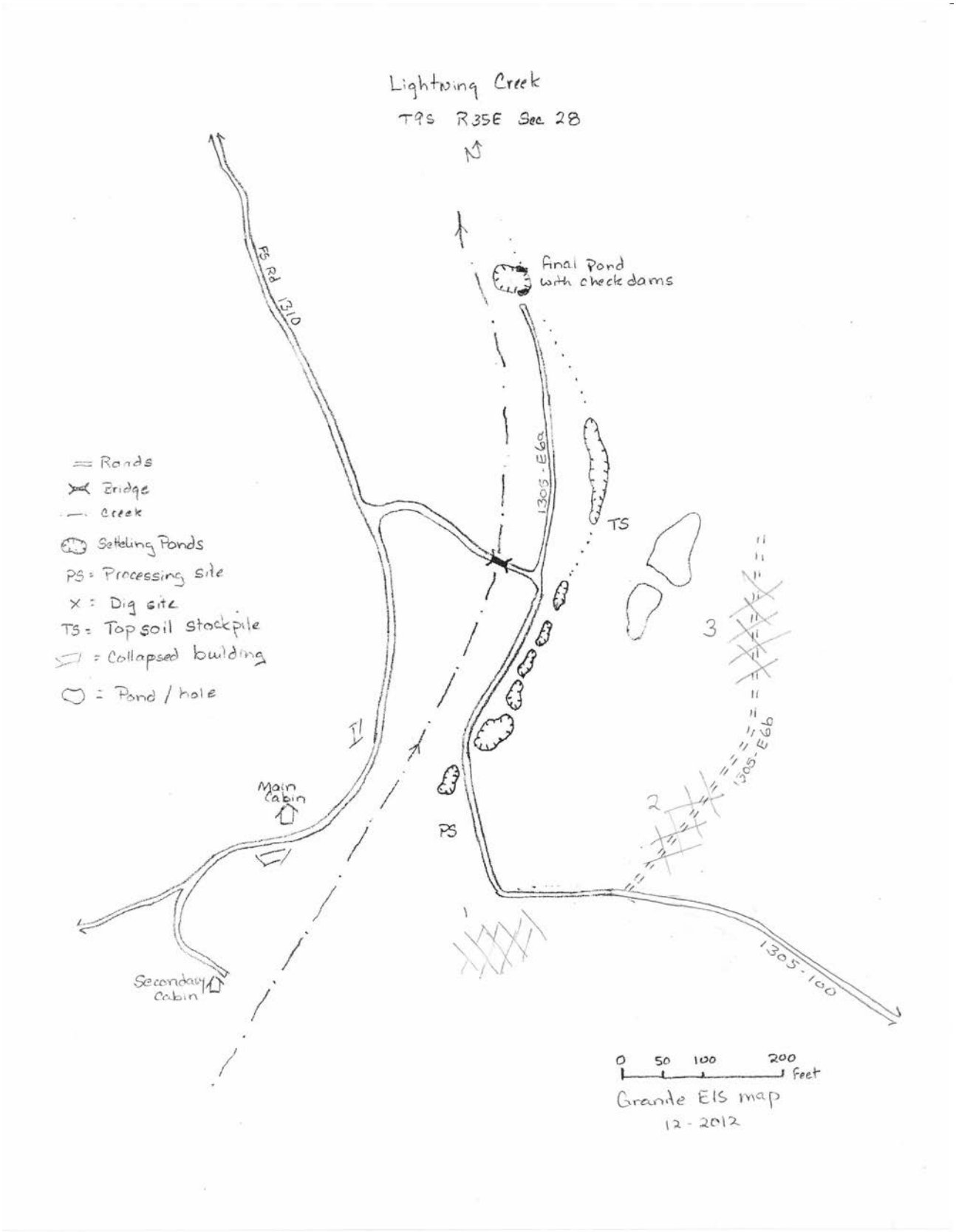
Equipment used on the claim will include a backhoe, excavator, D4 cat, one or two 5-yard dump trucks, 4-wheel drive pickups, washing plant, generator, pumps and hand tools. All buildings will be used and maintained while mining is taking place. Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding will be done as needed and topsoil will be stockpiled for use in final reclamation. Final reclamation will consist of re-contouring the access routes along the hillside, reclaimed areas will be mulched and dry ponds will be re-contoured. The bridge will be dismantled and the ford closed. All equipment and associated material will be removed from the National Forest System lands.

The miner will also operate a small suction dredge under the terms and conditions of a State dredging permit from July 15 to August 15.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks – 120 days) for the next 10 years to complete the project. The plan calls for processing a maximum of 50 cubic yards per day. Each hole will be approximately 50’x100’x15’deep which means the miner will move about 2800 cubic yards from each of the 3 proposed holes. Based on the maximum production rate and size of the hole, it would be possible to complete one hole per year. Based on a lower production rate of 20 cubic yards per day, it’s most likely each hole will remain open for 2 years.

No mitigation measures were identified by the miner in the Plan. [(1)]


Lightning Creek
T9S R35E Sec 28
N
FS Rd 1310
Final Pond
with check dams
1305-E6a
TS
3
2
1305-E6b
PS
Main Cabin
Secondary Cabin
1305-100
= Ponds
Bridge
Creek
Settling Ponds
PS = Processing site
X = Dig site
TS = Top soil stockpile
= Collapsed building
= Pond / hole
0 50 100 200 feet
Granite EIS map
12-2012

Little Cross 1

Claim Description

The Little Cross I plan consists of only one claim. It is located along Granite Creek, south of county road 24. It is approximately ¼ mile west its confluence with Bull Run Creek. Access is by the paved county road 24 and a well-used unnumbered camping road. The legal description for the claim is T.9 S., R.35 E., Section 01 and, T.9 S., R.35½ E., Section 04 W.M.

Existing Condition

Mining began in this area in 1861. In the early 1900's the flood plains along Granite Creek were dredged for the first time and was last dredged in the 1940-50's. Placer mining continues even today as people continue to search through the rocks and stream bed. The dredge tailings have a scattering of short 15-20 foot tall lodge pole and occasional brush.

Dispersed camp site

Recent Activity

The recent activity on this claim has consisted of hand panning, dredging and the use of small sluice boxes. The road into the claim is used for dispersed camping.

Proposed Plan of Operations [1]

The claimant would like to placer mine a pit at the end of the road (dispersed campsite road) that is about 50 feet of Granite Creek. Ground water collected in the pit will be used and recycled for the operation. Processing will be done at the dispersed camping site directly east of the pit.

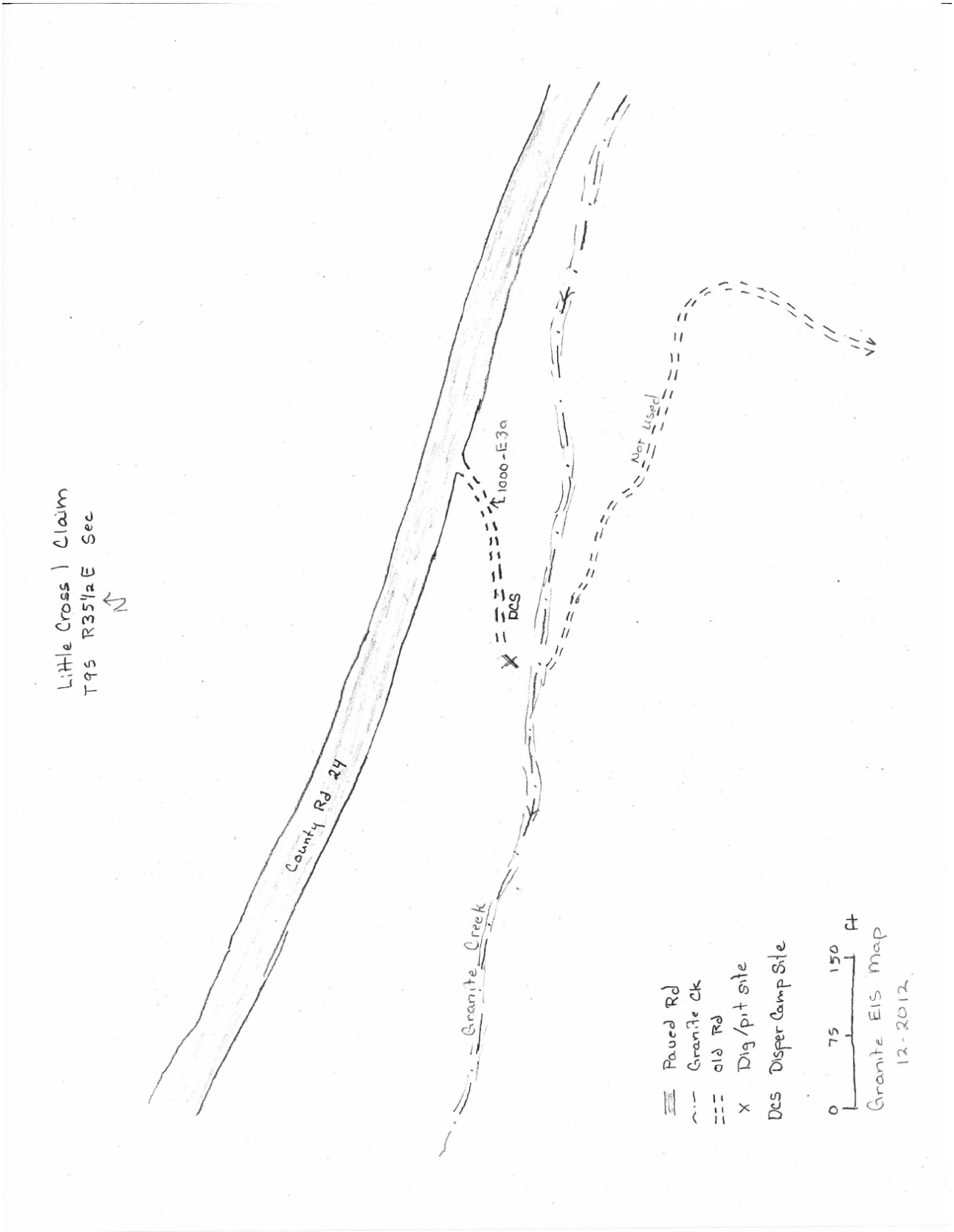
Equipment to be operated on the claims includes a backhoe, highbanker, dredge, atv, a pickup truck, and hand tools.

The miner will also operate a small suction dredge under the terms and conditions of a State dredging permit from July 15 to August 15.

Reclamation plans for the pit are to return the area to its previous state, an old rocky dredge pile. Reclamation plans for the dredging will follow the rules as listed in the state permit.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks -120 days) for the next year to complete the project and dredging for the next 10 years. The excavation of the hole with a back hoe could easily be completed in one year. As gold continually travels through the stream system it is expected that a new supply for dredging will be available each year. The project as proposed can easily be completed in 10 years.

No additional mitigation measures were identified by the miner in the Plan. [1]


Little Cross 1 Claim
T9S R35½E Sec
N
County Rd 24
Granite Creek
1000-E3a
DCS
Not Used
Paved Rd
Granite Ck
old Rd
Dig/pit site
DCS Disper Camp Site
0 75 150 ft
Granite EIS map
12-2012

LUCKY STRIKE

Claim Description

The lucky strike plan consist of 2 lode claims located ½ mile south of Lightning Creek and about 2 ½ miles from its confluence with Clear Creek. The legal description for the claim is T.10S., R.35E., Section 3, W.M.

Old Mill

Existing Condition

The western portion of the claim contains a cabin, developed spring, shed, and a 2-stamp ore mill which have been maintained in their original condition.

The eastern portion of the claim is referred to as the old Belcher mine on Forest Service maps. Several years ago the 100 foot access shaft was filled in for safety reasons. To the east of the shaft is a collapsed adit but one can still see the outer 150 feet of the light gauge track. A small head frame over the shaft has collapsed. According to a state survey, the presence of sulfides has been reported in conjunction with this dry adit.

The Pete Man Ditch crosses below the claim along the northern and eastern edge of the claim.

Recent Mining Activity

During the past 5 years the building that houses a two stamp ore mill has been maintained, however the stamp mill is not operable. A plan was approved in 1993, but as of this date, the adit is still closed. Only placer samples have been hand collected from the area near the tower and processed during the past 15 years

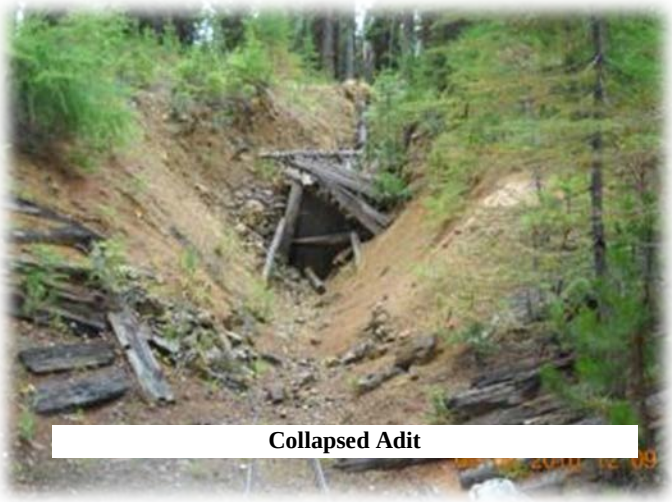
Proposed Plan of Operations [(1)]

The claimant proposes to re-open the existing tunnel system, and backfill exploratory placer holes which were excavated by the original claimant. A tunnel would be extended through an existing "vertical tunnel" (shaft) along the vein. The stamp mill and cabin will be restored to original condition. 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. Any "viable" material will be hauled offsite for processing, or may be processed in the mill onsite depending on quality. Ongoing tunnel extension, including exploratory testing in an adjacent tunnel, is anticipated. Once inside the adit, the work will be done by hand, and the volume of waste rock generated will be small. The waste rock will be placed near the excavation, and cribbed with cut timbers to minimize erosion. Ore will be removed for commercial processing as the decision to use the mill has not been made yet.

Equipment to be used on site will include a rubber-tired backhoe, pick, shovel, ore car, chainsaw, electric roto-hammer, and 4000-watt generator. Small volumes of fuel will be kept on site during the summer, under lock and key.

The existing structures will be used in conjunction with mining operations and the spring well be used for domestic use at the main cabin.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. Final reclimation will be to remove all equipment and buildings.

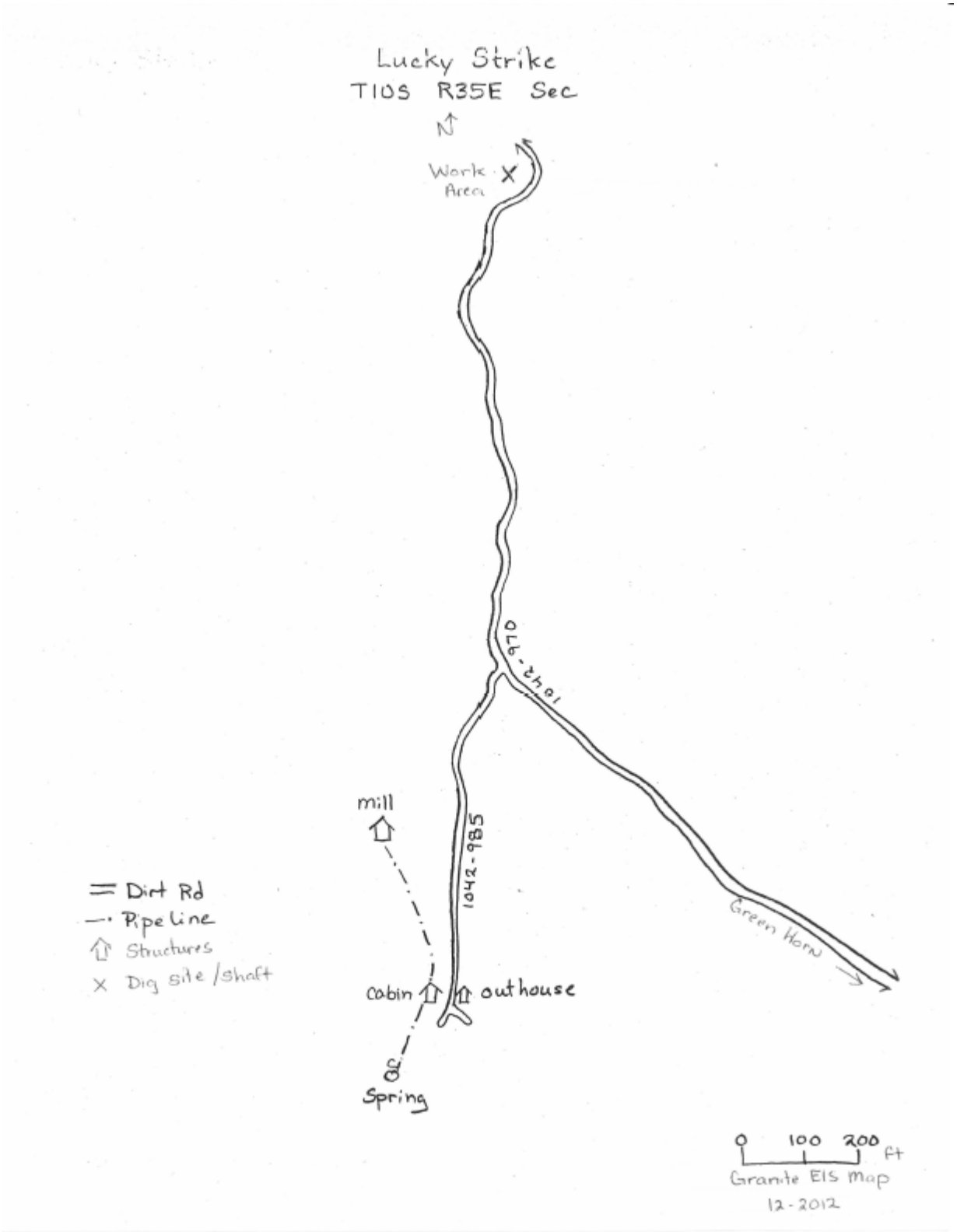


Collapsed Adit

This proposal is for a small scale, intermittent, family based mining operation. The minor plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. Estimated production is 25 cubic yards of tailings, annually.

Based on the outcome of the lode testing, once the adit is opened, a modification to the plan (36 CFR 228) may be necessary to address any concerns that develop or require a change in the operation.

No Additional mitigation measures were identified by the miner in the Plan. [(1)]


Lucky Strike
T10S R35E Sec
N
Work Area
1042-970
mill
1042-985
Green Horn
cabin
outhouse
Spring
= Dirt Rd
Pipeline
Structures
Dig site /Shaft
0 100 200 ft
Granite EIS Map
12-2012

Make It

Claim Description

The Make It plan consists of only one placer claim. It is located along Granite Creek approximately 6 mile north of its confluence with Granite Creek. Access is by Forest System road 7300, and 7300-700. The legal description for the claim is T.08 S., R.35½ E., Section 27, W.M.

Existing Condition

The make it claim was historically mined in the early 1900's. The northern portion of the claim was at one time a large reservoir while the southern portion of the claim consists of old dredge pilings from the hydraulically mined along Granite Creek. The old reservoir bottom is sparsely vegetated and has the occasional 15' tall lodge pole. The surrounding area is a more typical conifer forest. The creek banks and the edges of the pond are covered with various shrubs and willows.

At the north end of the claim, a pond (about 30' across by 6' deep) is located adjacent to the east bank of Granite creek. South of this pond, the draw flattens out into the old reservoir bottom with an undisturbed highbank that runs along the east side of the flat. A non-system road (7300-E2a) runs up the east side of the claim to the old cabin and is used for mining access. The collapsed cabins on the claim are not usable and have been signed as Forest System property. Several collapsed adits exist in the area but there are no large mine dumps associated with them. The claim is bounded by Forest System road 73 on the west, 7300-720 on the east and 7300-700 on the south.

Processing site

Recent Mining Activity

They have been using hand equipment to work the highbank along the east side of the claim. Work is usually done over the holidays and occasional weekends. They typically work less than 1 yard a year and usually camp along the 73 road.

Proposed Plan of Operations [(1)]

The miner is looking to test 3 sites along the cut bank (east edge of flat valley bed). For the first couple of years of operation will be done with a pick, shovel and a small highbanker. Water will be obtained from the existing pond. Later a backhoe will be brought in to dig holes 15' to 20 'feet by 8'deep for testing with a small trommel. The miner will maintain an undisturbed 50 foot buffer between the creek and the activity mining site.

Equipment to be operated on the claims includes a backhoe, Trommel, a pickup truck, and hand tools. A self-contained travel trailer will be used for sleeping quarters during mining operations.

Road maintenance will be accomplished annually on the access road to the claim and the existing gate will be maintained.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers, and out of the flood plain.

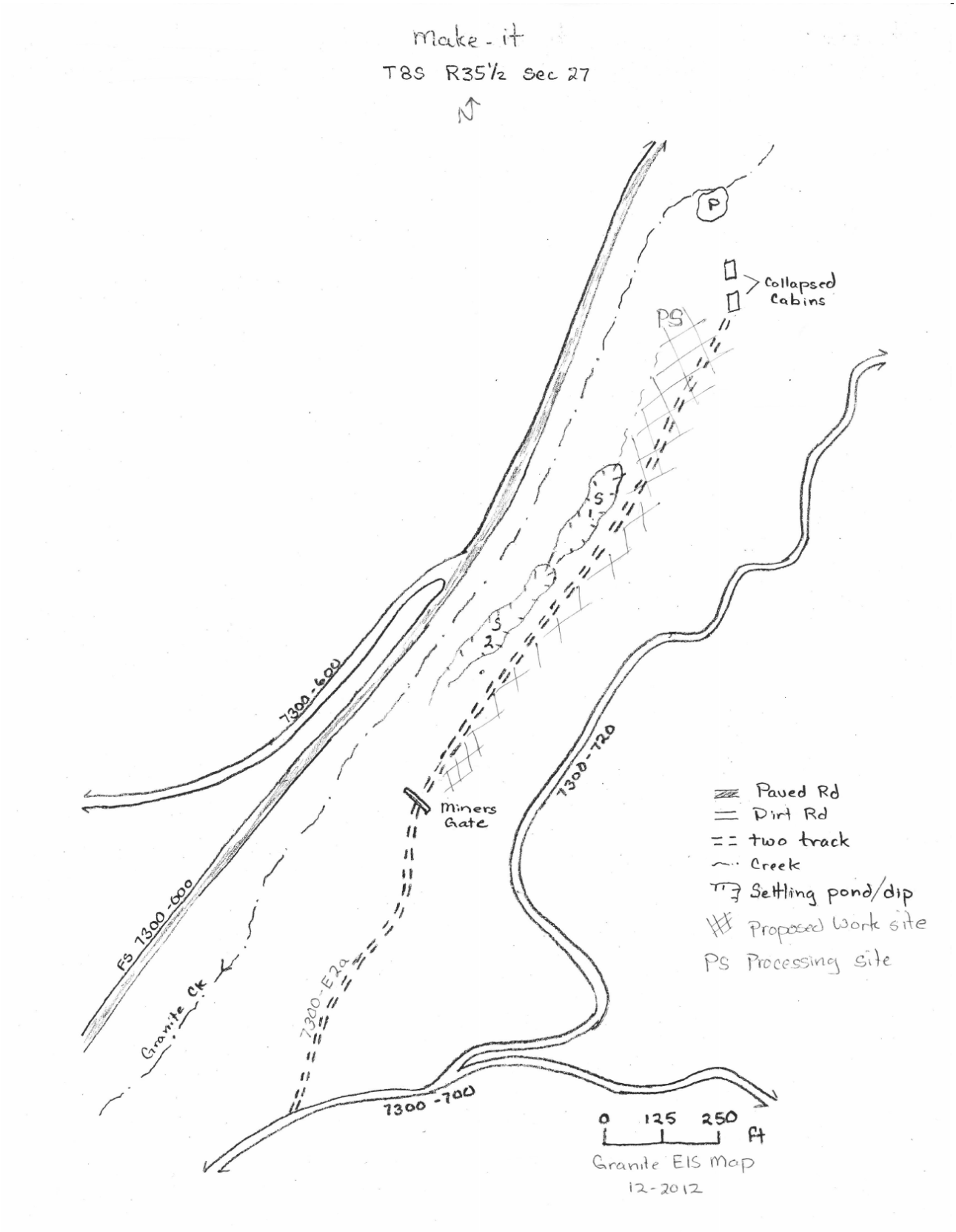
Reclamation will be on going. Test holes will be refilled, contoured and seeded. The site will be

Old settling pond area – Valley floor

stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. On final reclamation the gate will be removed and the road closed with an earth berm.

This proposal is for a small scale, intermittent, family based mining operation. The minor plans to typically work from June through October of each year (20weeks) for the next 10 years to complete the project. A maximum excavation rate of 20 cubic yards per year over 10 years would result in the processing of a maximum 200 yards. This would result in about 1 test pit every other year.

No additional mitigation measures were identified by the miner in the Plan. (1)


Make-it
T8S R35½ Sec 27
N
P
Collapsed Cabins
PS
S
S
2
7300-600
7300-720
Miners Gate
Paved Rd
Dirt Rd
two track
Creek
Settling pond/dip
Proposed Work site
PS Processing site
FS 7300-600
Granite Ck
7300-E2a
7300-700
0 125 250 ft
Granite EIS Map
12-2012

Muffin

Claim Description

The Muffin plan consists of three placer claims. It is located on Last Chance Gulch Creek a tributary to Boulder Creek that joins with Granite Creek approximately 1 mile south of the claim. Access is by Forest System road 7355-012. The legal description for the claim is T.18 S., R.35½ E., Section 34, W.M.

Existing Condition

This area is characterized by an open valley meadow covered with grasses, a few shrubs along the creek and clumps of 20 -30 foot tall lodegepole. The area shows little signs of past mining. According to the records, the present mining site was established in the late to 70's or early 80's when the dam and settling ponds were constructed. It is possible that some mining existed in the area prior to that based on an old house site and the history of the area. The soils along the creek resemble fine ash sediments and show little signs of past disturbance in the area proposed for placer mining.

Processing site

The Muffin claim has a well-developed dispersed campsite along the 012 road on the west side of the creek. The O12 road continues across the creek to the processing site on the east side which consists of 3 existing settling ponds (@ 10'x 40' x 6'deep). An earthen dam (@ 6' tall and 100' across) creates a reservoir in the creek. The processing site covers about a ½ acre of ground with the reservoir covering around another ½ acre.

Recent Activity

In 2012 the new claimant did some processing of existing material that was stored on site under a Notice of Intent. The previous claimant extended the 012 road into the claim and the first half was graveled by the previous claimant.

Pond & Earth Dam

Proposed Plan of Operations [(1)]

The miner is proposing to continue mining along Last Chance Gulch Creek using the existing ponds and roads. Four sites have been selected for further testing and in which holes 20' x25' x 10' deep will be excavated with a backhoe. Approximately 4-10 yards of material will be removed for processing from each test site during the operating season. There is one processing sites which initially uses the water from an existing reservoir to fill 3 existing ponds and then recycle for processing. According to the map and site measurements, the miner has an undisturbed buffer of 20 feet between the creek and the activity mining site.

Equipment to be operated on the claims includes a backhoe, 3-5 yard dump truck, ATV, pickup, sluice boxes, highbanker, Trommel, generator, Self-contained travel trailer, pickup truck, and hand tools.

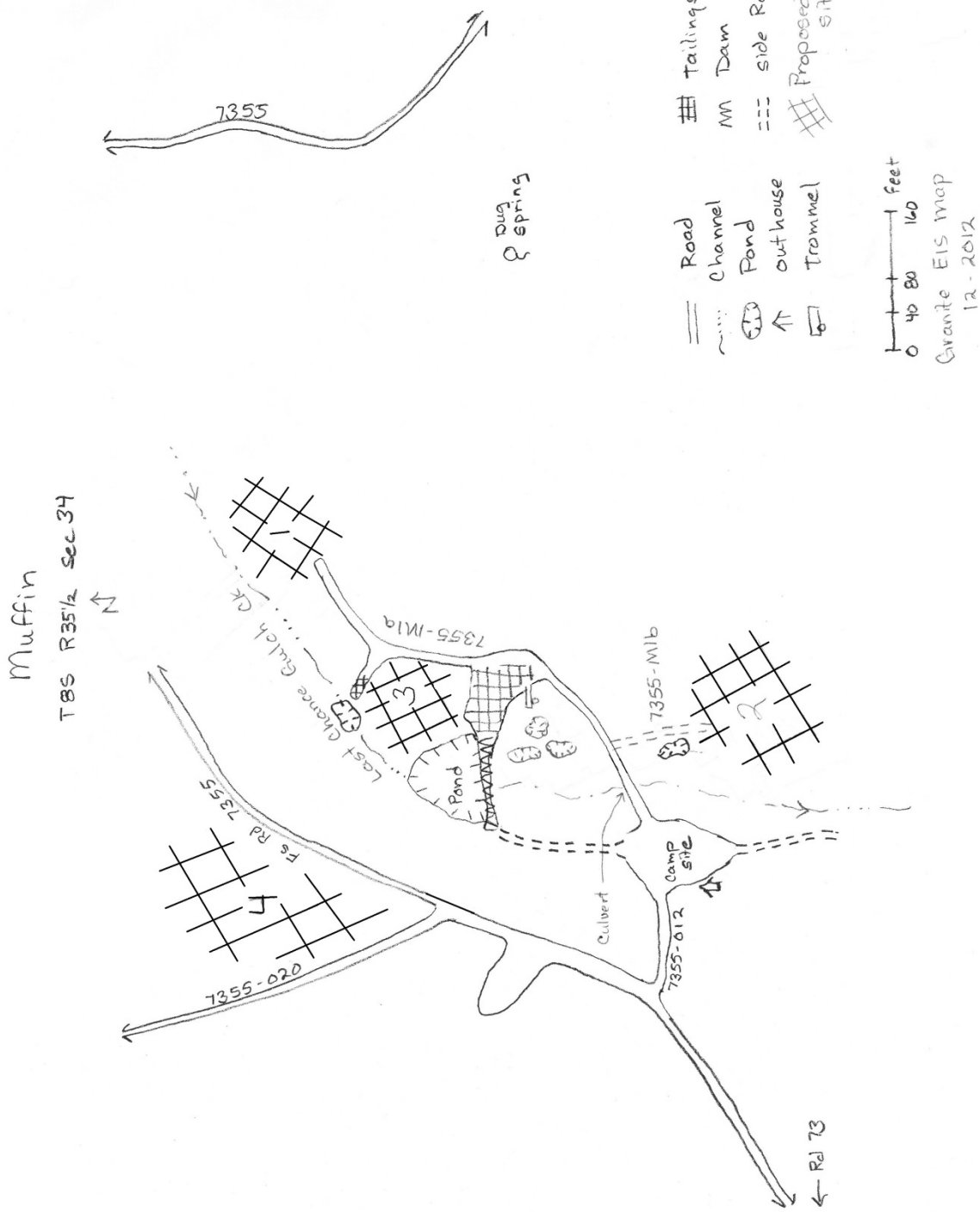
Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers and stored out of the flood plain.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

This proposal is for a small scale, intermittent, family based mining operation designed to test the area for further ore values. The minor plans to work from June through October of each year (20weeks) for the next 10 years to complete the project. At one to two sites a year, this would be about right. It is estimated that the work proposed in this operation will affect @ 3 acres.

Mitigation & Monitoring identified by the miner in the Plan [(1)]

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).


Muffin
T8S R35½ Sec 34
N
7355
Dug spring
Road
Channel
Pond
outhouse
Trommel
Tailings
Dam
side Rd
Proposed work site
0 40 80 160 feet
Granite EIS map
12-2012
7355-020
FS Rd 7355
J
Lost Chance Gulch Ck
Pond
3
1
7355-M1a
7355-M1b
2
Culvert
Camp site
7355-012
Rd 73

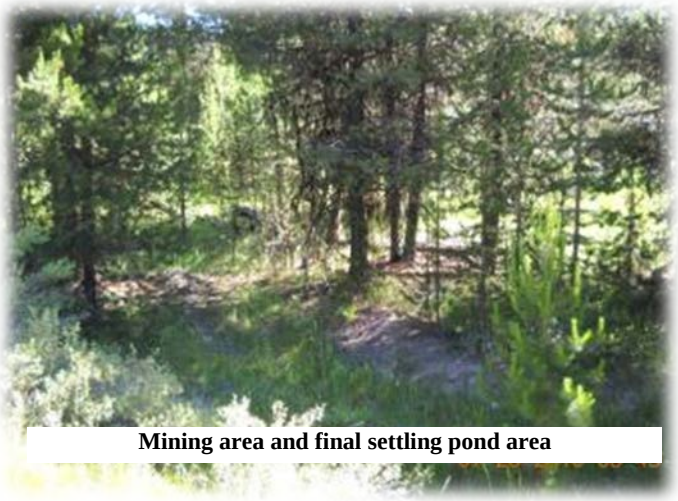
Old Eric 1&2

Claim Description

The proposed Old Eric plan consists of two placer claims. It is located along Granite Creek just north (upstream) of its junction with Bull Run Creek. Access is from county road 24. The legal description for the claim is T.9 S., R.35½ E., Section 04, W.M.

Existing Condition

The claims and surrounding area were dredged over 50 years ago, and the dredge spoils are now covered with small 20 foot tall lodgepole pine. It appears that Granite creek itself was at one point placed into the well-defined and channelized creek bed. The majority of the claim is primarily within the historic Granite Creek floodplain, although portions of the claim impinge upon an andesitic bedrock knoll on the west near the private land boundary. The creek bed consists of sand, gravel, and boulders to 12 inches, and the creek is locally confined to an 8 foot wide section and channeled by old dredge tailings



Mining area and final settling pond area

The Old Eric area consists of a well-used dispersed campsite @20 feet on the east side of the creek. A wooden plank is used as a foot bridge to access over to the west side of the creek. The creek has been channelized and is rather narrow in this location, due to historic mining activities. A thick growth of grasses and small shrubs covers the banks of the creek and a well vegetated dirt berm (@ 2 foot tall) runs south along the west bank of the creek and west (@ 50 feet) to the existing mining site. This dirt berm creates the outer walls of an old settling pond which is overgrown with native grasses and an occasional lodgepole pine. At the base of the short rock outcroppings, a series of 3 pits exist (the water source pit, the active mining pit, and an alternate settling pond). There are no buildings on the claims, although a small mobile trailer is moved onto the site during operations. The area of disturbance is less than 0.5 acre.

Recent Mining Activity

For the last 10 years, the miner has intermittently mined the area during the summer from Memorial Day through October. Much of the existing work was established under a previously approved Plan of Operations. Since 2000 the prospecting work (hand work) has been done under 36 CFR 228.4.and annually amounts to stays of 0-28 days and less than 1/2 yard a year.

Proposed Plan of Operations [(1)]

Work on the claims would include hand digging, and processing gravels through a small wash plant which will recirculate the water until it is to dirty to reuse at which time it will be drained into the final settling pond. A backhoe may be used to loosen/deepen the prospect hole and clean the settling/holding pond of sediment as needed. Other equipment to be used on the claims includes a pickup, and a small trailer that is removed from the claims in the fall. The miner activities area is limited to those shown on the map. The settling pond is adjacent to granite creek but is separated with a dirt berm. The active digging site is will

over 50 feet from the edge of the creek. While the miner did not define an undisturbed buffer between the creek and the activity mining site, the level of mining is low and there is no expectation that the area outside of the activity mining area identified on the map will be disturbed.

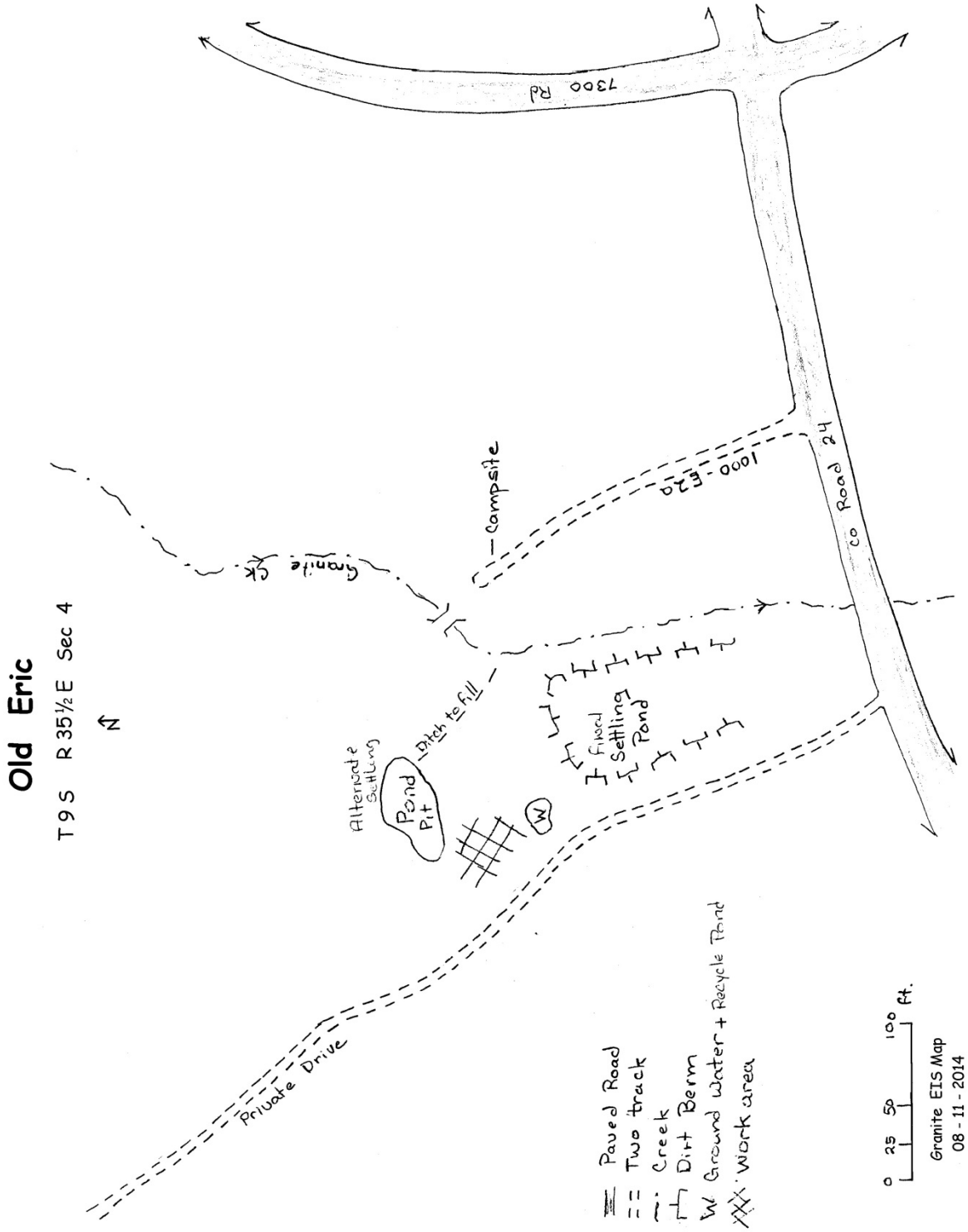
The miner will also operate a small suction dredge under the terms and conditions of a State dredging permit from July 15 to August 15

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers. A travel trailer will be used for camping while the claim is being operated.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

This proposal is for a small scale, intermittent, family based recreational mining operation. The minor plans to work from June through October of each year (20weeks) for the next 10 years to complete the project. A maximum excavation rate of 5 cubic yards per year and a limited water source are not expected to change the operation or its effect beyond that which has been done in the last 10 years. The current duration of this plan is proposed for 5-10 years which could result in the excavation of 50 cubic yards or a hole 15’ x 15’x 6’.

No mitigation measures were identified by the miner in the Plan. (1)


Old Eric
T 9 S R 35½ E Sec 4
N
7300 Rd
Co Road 24
1000 - E20
Granite Crk.
Campsite
Alternate Settling Pond
Pit
Ditch to fill
Fixed Settling Pond
W
Private Drive
Paved Road
Two track
Creek
Dirt Berm
Ground Water + Recycle Pond
Work area
0 25 50 100 ft.
Granite EIS Map
08 - 11 - 2014

Olive Tone

Claim Description

The Olive Tone plan consists of two placer claims that are located along the banks of Olive Creek. It is located about 3 ½ miles south of its confluence with Clear Creek. Access is by the unimproved forest road 1305-082. The legal description for the claim is T.10S., R.35E., Section 02, W.M.

Ford crossing

Existing Condition

According to the map this site was once known as the Eureka mine. Lode mining, hydraulic mining and dredging in the early 1900's have disturbed the valley bottom gravels resulting in stacks/piles of rock along Olive Creek and Three Cent gulch

A non-system road along the east side of the draw fords Olive Creek in order to provide access to the west side of the claim and an old landing area which has a collapsed adit of unknown depth on its northern edge. The existing roads into the claim are often used by ATV's.

There are several abandon mining ditches throughout the area. The collapsed buildings on the claim are no longer useable and have been signed as Forest Service Property.

Recent Mining Activity

While a previous plan was approved in 1995, inspections do not record any mining activity on this site since that time.

Proposed Plan of Operations [(1)]

The claimant is proposing to dig a series of 30'x 30'x10'deep test pits with a backhoe along the west side of Olive Creek. Two off channel ponds will be created @ 40 ft from the creek and 20' x 10'x10' deep. Process water will come from the spring. With small runs water will be allowed to sink into the ground. With larger runs water will be recycled and settled in the ponds. The miner will maintain an undisturbed 40 foot buffer between the creek and the activity mining site.

Equipment to be used will include a backhoe, tractor with a front loader, 2 self-contained travel trailers, personal vehicles, highbanker, trommel/wash plant, gold panning equipment, pumps, and hand tools.

Any petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers and removed from the site at season's end. Final reclamation will remove all equipment,

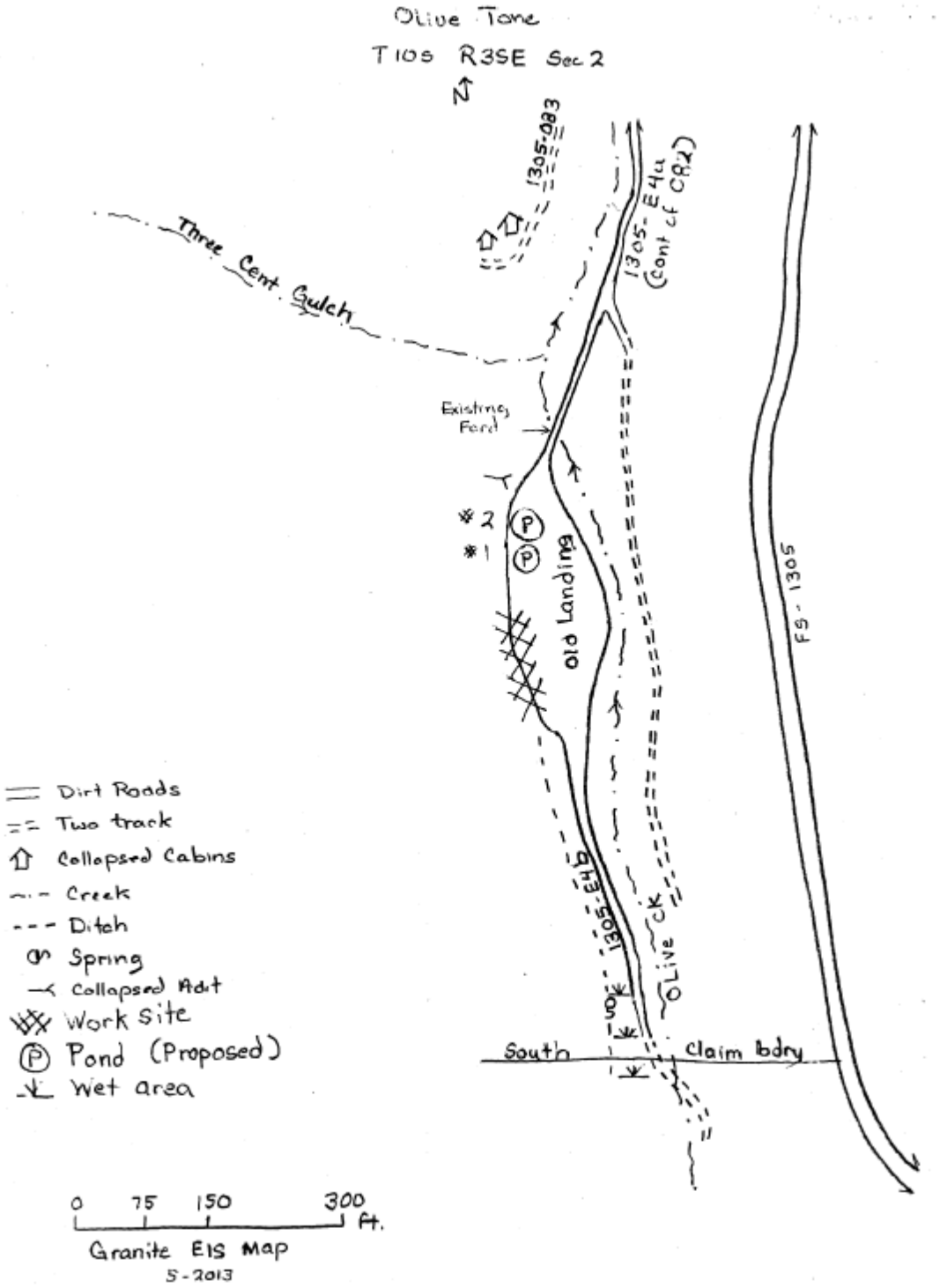
stabilize the ponds for wildlife, close the access roads, and replant the area so it is similar to the surrounding area.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

Proposed work and pond site (lone person)

This proposal is for a small scale, intermittent, family based mining operation. The minor plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. It is estimated that approximately ½ acre is proposed for mining. Given an excavation surface area of 900 square feet, it is estimated that the area would be mined in 3 pits. At one pit a year, the mining could take 5 years to complete, or 10 years if smaller pits are dug or left open for more than one year.

No additional mitigation measures were identified by the miner in the Plan. (1)


Olive Tone
T10S R3SE Sec 2
N
1305-083
1305-E4u (Cont of CR2)
Three Cent. Gulch
Existing Ford
#2
#1
P
P
Old Landing
FS-1305
1305-E4b
Olive Ck
South Claim bdry
Dirt Roads
Two track
Collapsed Cabins
Creek
Ditch
Spring
Collapsed Adit
Work Site
Pond (Proposed)
Wet area
0 75 150 300 ft.
Granite EIS Map
5-2013

ROSEBUD #1,- #4

Claim Description

The Rosebud plan consists of four placer claims which are located on the north side of County Road 24. Granite Creek flows in a westerly direction approximately 500 to 600 feet to the south of the claims and on the opposite side of the 24 road. The west edge of the claim aligns with the confluence of Clear Creek and Granite Creek and the north edge of the claim runs along private land. The legal description for the claim is T.9S., R.35E., Section 1, and T.9S., R35 ½ E., Section 4, W.M.

Power line road (ponds on left)

Existing Condition

Mining began in this area in 1861. In the early 1900's the flood plains along Granite Creek were dredged for the first time and was last dredged in the 1940-50's. Placer mining continues today as people continue to search through the rocks and stream bed. The dredge tailings north of the paved road and south of the powerline road contain isolated ponds that may or may not be connected underground to each other and/or Granite Creek.

Short lodge pole pines (15-20 foot tall), scrub willow and native grasses have taken hold on the dredge tailings. The high bank area to the north is undisturbed from past mining and contains larger trees. The ponds are filled with hydrophytic plants such as sedges (*Carex*), cattails (*Typha*), and duckweed (*Lemna*). There are no buildings or equipment on the claims

Pond

Recent Activity

The claims show little evidence of recent work due in large part to the coarse, sparsely vegetated nature of the spoil piles, which does not readily record recent disturbances. Non authorized people have occasionally been found placer mining on the claim due to its location. It is estimated that only 1-2 yards of material have been disturbed over the last 10 years.

Proposed Plan of Operations [(1)]

The miner would like to placer mine the area along the high bank (road cut bank) north of the existing powerline road. Yearly processing will start at 2 to 10 cubic yards of material. Pits will be dug by hand or backhoe on the level areas along the high bank north of the powerline road. Equipment to be used on the claims includes a pickup truck, small backhoe, trommel, water pump, gold spinner, and 3 cubic yard dump truck. No structures are planned for this operation. The mining activities area is about 300 feet from Granite Creek. As the powerline road, county road 24 and dredge tailing separated the activities Granite Creek and the old dredge ponds, there was no buffer identified by the miner.

Excavated material will be processed through a small trommel and gold spinner located near the test holes. Process water will be pumped from water-filled depressions in historic placer tailings, and be discharged to natural depressions where it will soak into the ground. No process water will directly enter Granite Creek.

Tailings will be stockpiled and returned to excavations at the end of the season. Topsoil will be stockpiled for later use in reclamation

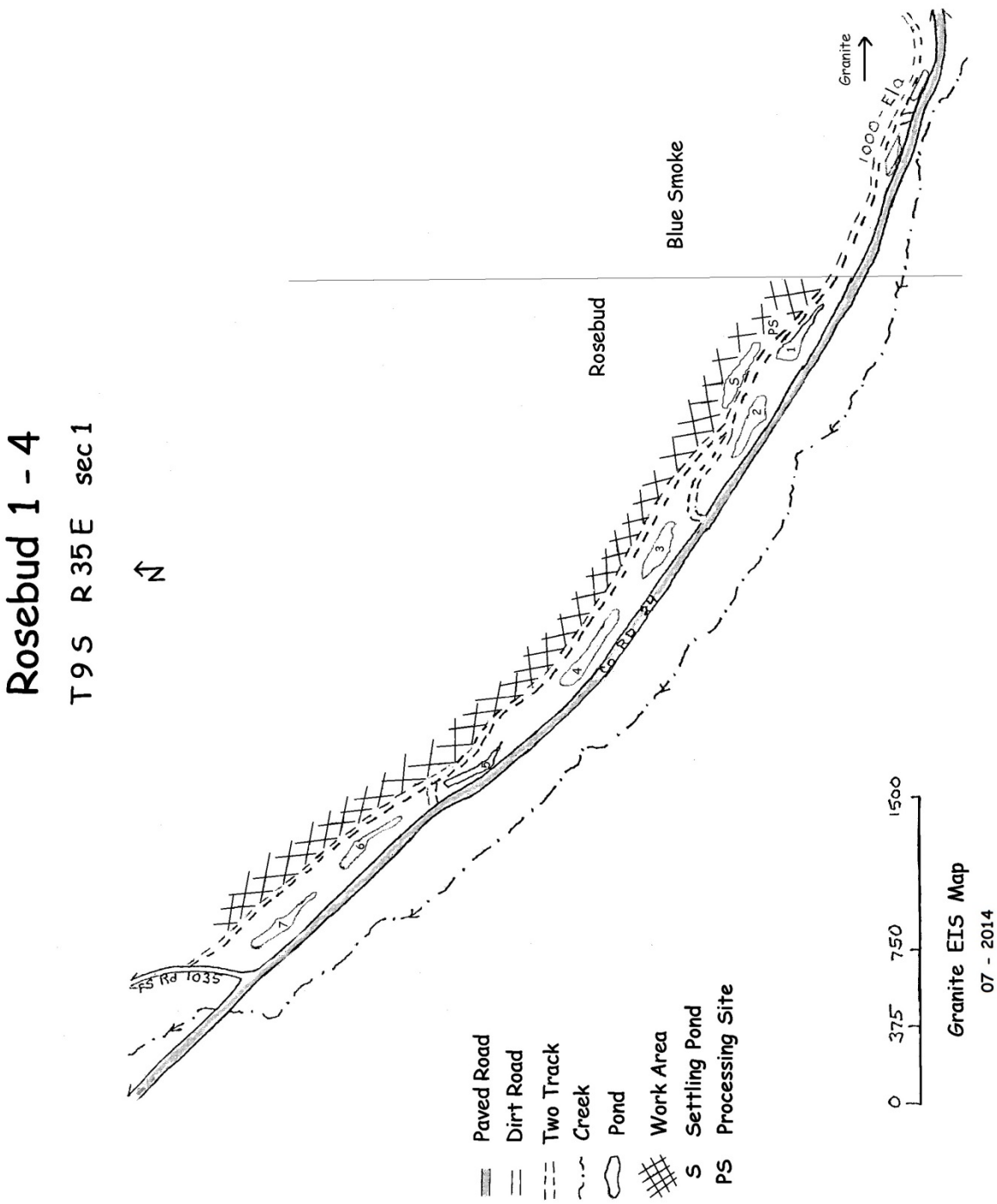
Example mining area

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers. No fuel is stored on the site

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. Reclaimed areas will be seeded with a Forest Service approved seed mix. All garbage will be hauled offsite for disposal and fuel will be stored in the pickup in approved containers.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks) for the next 10 years to complete the project. The plan proposes to mine an estimated 5 acres. Should all 5 acres prove productive, the miner will work approximately ½ acre per year.

No additional mitigation measures were identified by the miner in the Plan. [(1)]


Rosebud 1 - 4
T 9 S R 35 E sec 1
N
Rosebud
Blue Smoke
Granite
1000 - El a
Co Rd 241
FS Rd 1035
PS
Paved Road
Dirt Road
Two Track
Creek
Pond
Work Area
S Settling Pond
PS Processing Site
0 375 750 1500
Granite EIS Map
07 - 2014

Royal White Group

Claim Description

The Royal White plan consists of four claims. It is located at the head of Irish Gulch approximately ¾ of a mile west of its confluence with Olive Creek. Access is by the unimproved forest road 1042-970. The legal description for the claim is T.10 S., R.35 E., Section 03, W.M.

Royal White –Adit 1 Upper Adit

Existing Condition

The Royal White group is located on a serpentine ridge and was originally developed in the late 1800's. Today the underground workings are known as the Royal White and Blackhawk mines The National Forest boundary has been well marked where it abuts the private land along the north end of the project area.

The Pete Man Ditch crosses on east the east side of the claims and well below the proposed work area.

Recent Activity

According to inspections, there has been no recent mining activity on this claim in the last 10 or more years. In 2012 a gate was placed on private land on the 1042-982 road and the Royal White 1 portal was repaired and re-gated in 2013.

Proposed Plan of Operations [(1)]

The claimant would start by reopen the Royal White 1 adit (one of 3 adits and 2 shafts on the claim). Material would be processed without chemicals (milled) at the Royal white 1 and/or the Blackhawk adit depending on the availability of the water. It is estimated that up to five tons of ore will be crushed and milled per day. As there are no creeks in the area there was no work buffer defined for this proposal.

Water for milling will obtained from the Royal White 2 and the Blackhawk adit. Thru the use of on-site storage tanks, it will be recycled until it is to dirty to re-used, then it will be placed in an existing pond (20'x 30'x 6' deep) to evaporate.

Equipment used in the operation will includes a backhoe, small cat, five yard dump truck, portable mill, portable saw mill, mucker, air compressor, a pickup truck, and hand tools. The existing buildings on site will be used for storage and sleeping quarters along with travel trailers when additional help is needed.

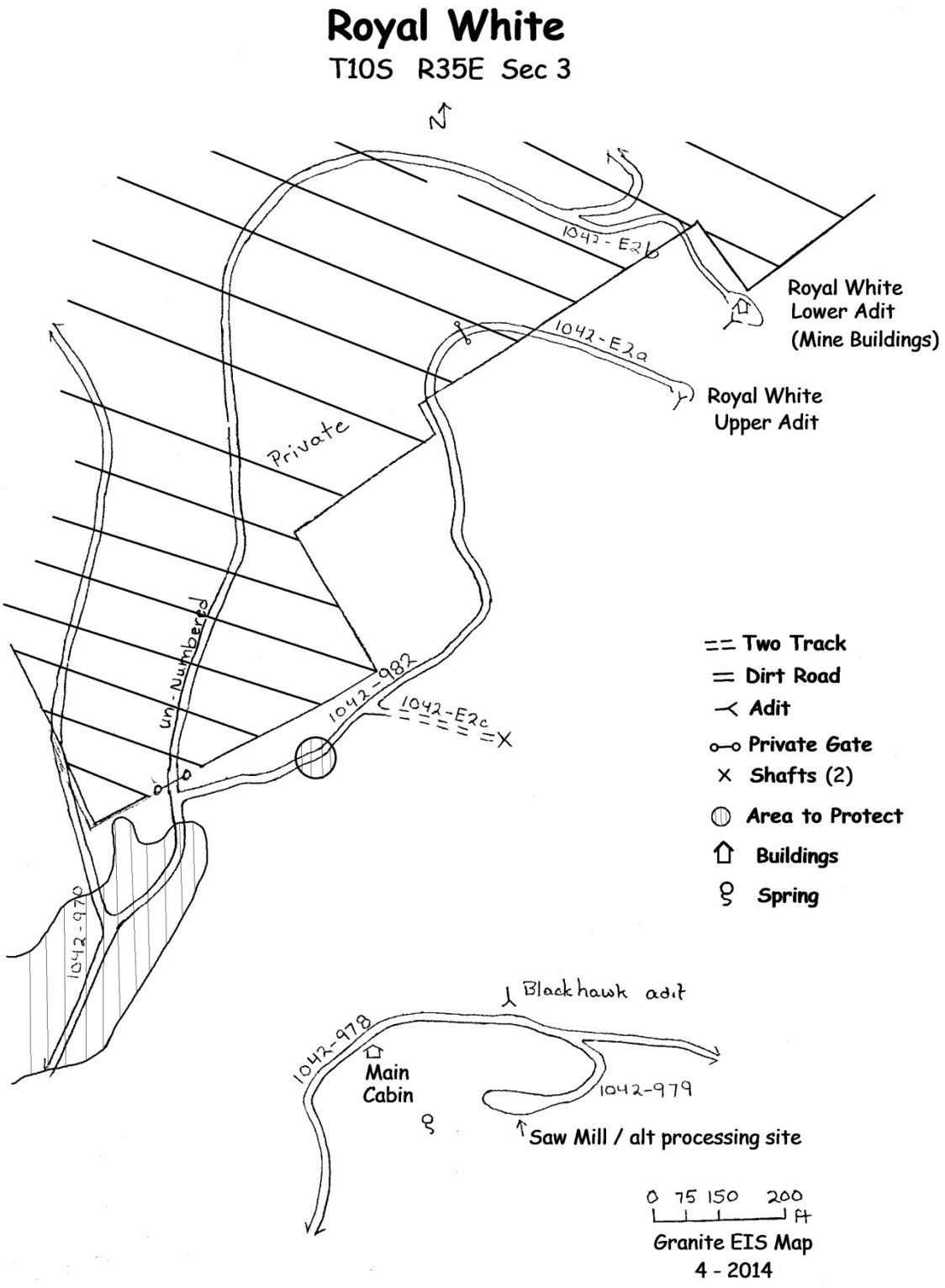
Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers. Dynamite will be used underground and sorted according to MSHA.

Annual reclamation will consist of grass seeding bare areas of soil and soil stabilization for winter. Final reclamation will consist of gating the portals, milled tailings will be mixed with cement and pumped back underground, and all buildings and structures will be removed.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks) for the next 10 years or longer to work on this project. The miner has estimated that they will work 8 weeks a year. This work is expected to produce and approximately 35 cubic yards to mill and 57 cubic yards of waste rock. At full capacity the mill is expected to crush 5 tons (6-7 cubic yards) per week. The life of the mine will be based on the ore that is found and the request to continue working will be reviewed in 10 years.

Mitigation Measures identified by the miner in the Plan [(1)]

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and development of Alternative 3).


Royal White
T10S R35E Sec 3
N
1042-E2b
Royal White
Lower Adit
(Mine Buildings)
1042-E2a
Royal White
Upper Adit
Private
Un-Numbered
1042-982
1042-E2c
1042-970
== Two Track
= Dirt Road
Adit
Private Gate
× Shafts (2)
Area to Protect
Buildings
Spring
Blackhawk adit
1042-978
Main
Cabin
1042-979
Saw Mill / alt processing site
0 75 150 200
ft
Granite EIS Map
4 - 2014

Ruby Group

Claim Description

The Ruby plan consists of 1 placer and 4 lode claims. It is located along Ruby Creek and Clear Creek approximately 2 mile west of its confluence with Olive Creek. Access is by the 1310 road, and several existing non-system side roads which provide access to the proposed dig sites and cabin. The legal description for the claim is T.9 S., R.35 E., Section 22, W.M.

Existing Condition

Mining began on Ruby creek in the late 1800's with both placer mining and the historic Ruby Creek lode mine as well as several other lode mines in the surrounding area. Both Clear creek and lighting creek were placer mined and dredged during this time. The surrounding area is covered with vegetation from lodgepole pine, spruce and Douglas fir which are all about the same age and date back to the early mining. Creek banks have grown in with grass and other brush.

The wilderness boundary is well marked along the south side of Ruby Creek. .

Cabin

Recent Activity

The miner removed the heavy equipment that had been left there since 2000. The cabin has been used for several months at a time during the summer, but there has been no documentation or sign of any mining beyond prospecting in the last 10 years.

Proposed Plan of Operations [(1)]

The miner would like to placer mine 8 proposed sites along Ruby and Clear Creek. Operations would consist of digging, 5 to 20 holes at each site and removing 1-2 yards per hole for processing. A temporary atv bridge is proposed for crossing Clear Creek. The miner will maintain an undisturbed 10 foot buffer between the creek and the activity mining site.

Clear Creek Crossing

Equipment to be operated on the claims includes a backhoe, self-contained /portable, wash plant. Trommel, water pumps atv's and hand tools.

The existing cabin will be used for sleeping quarters during mining operations.

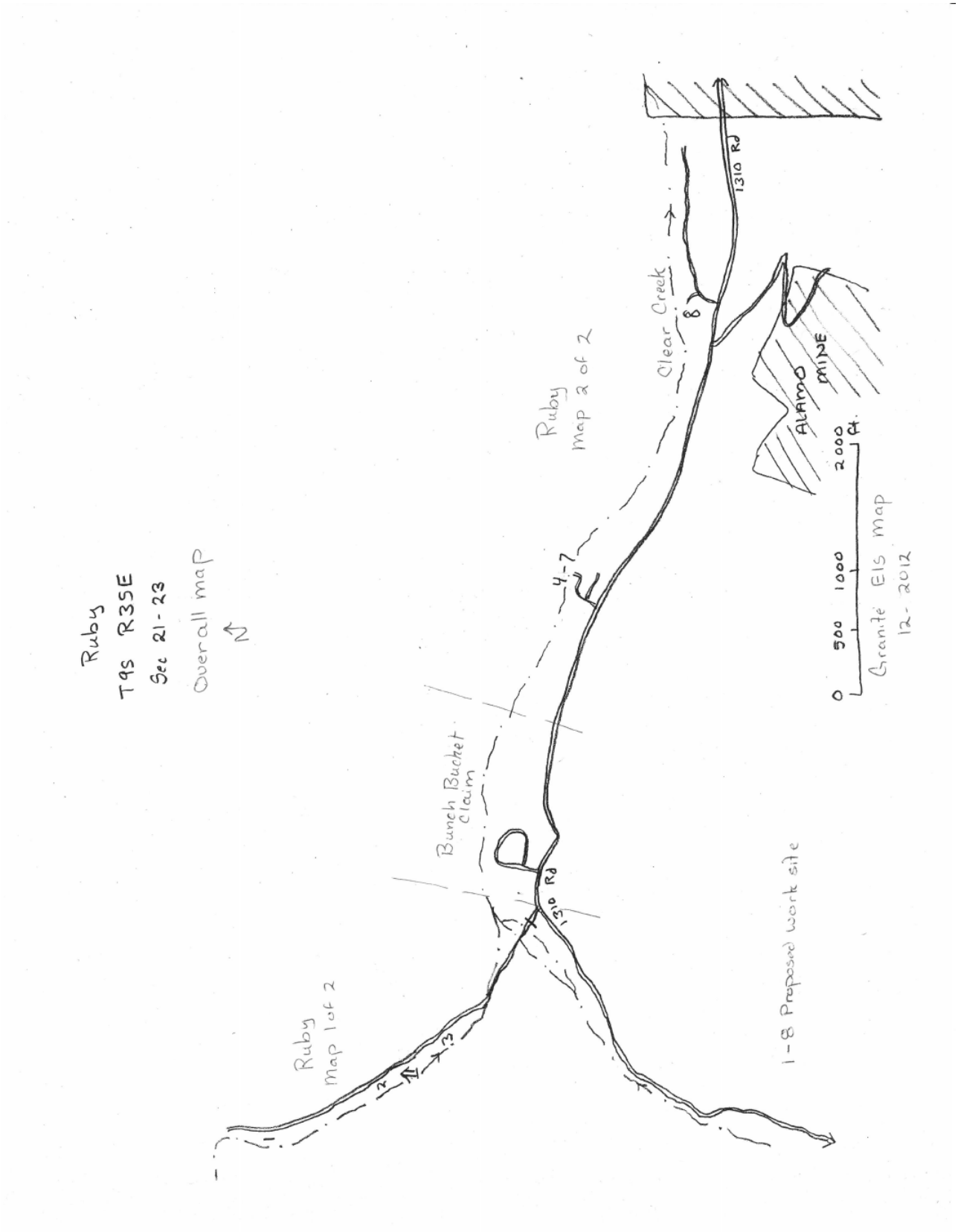
Road maintenance (filling pot holes, water bars and removal of dead trees from the road way) will be accomplished annually on the one mile of road needed to access the claim.

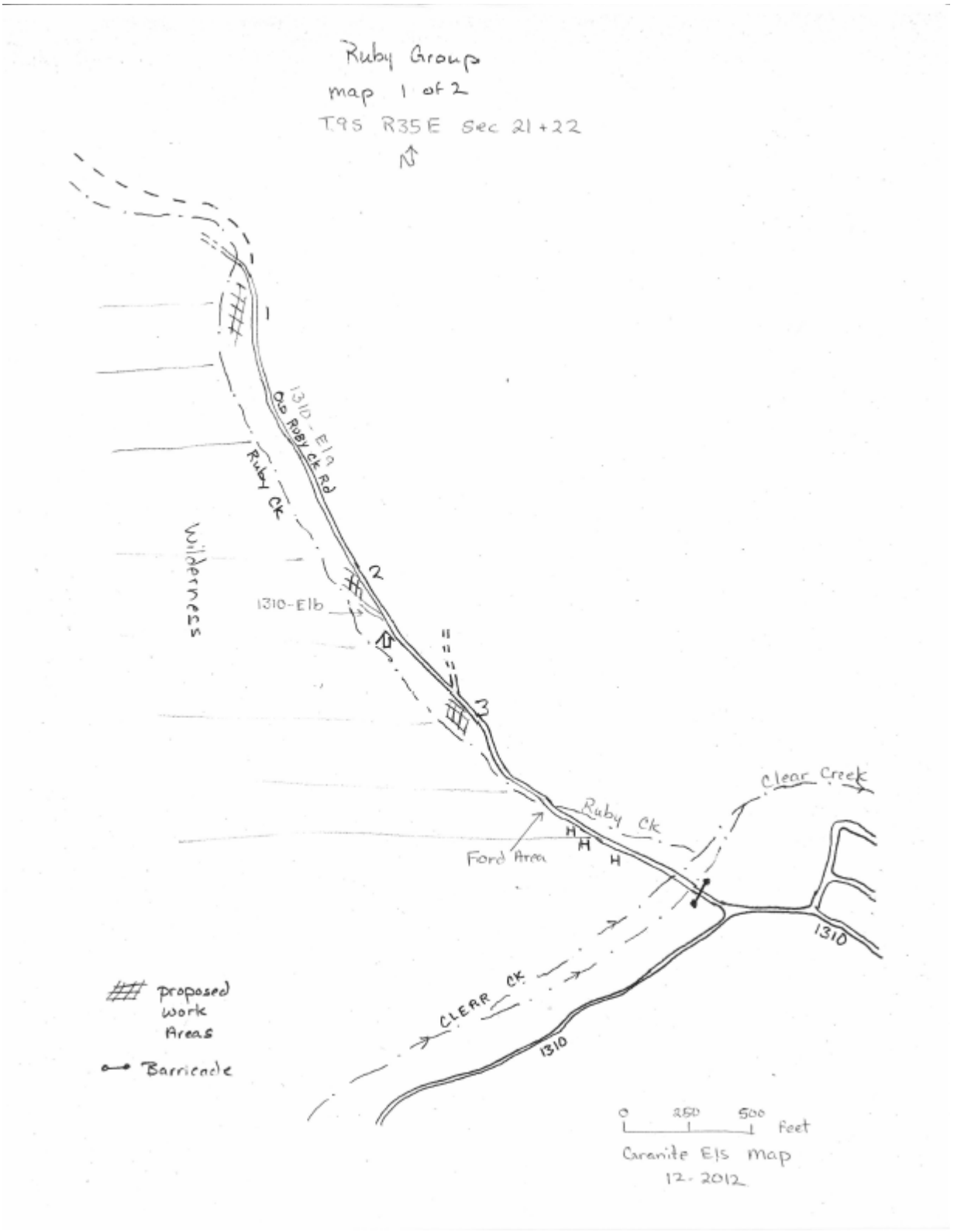
Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers and spill clean will be kept on site.

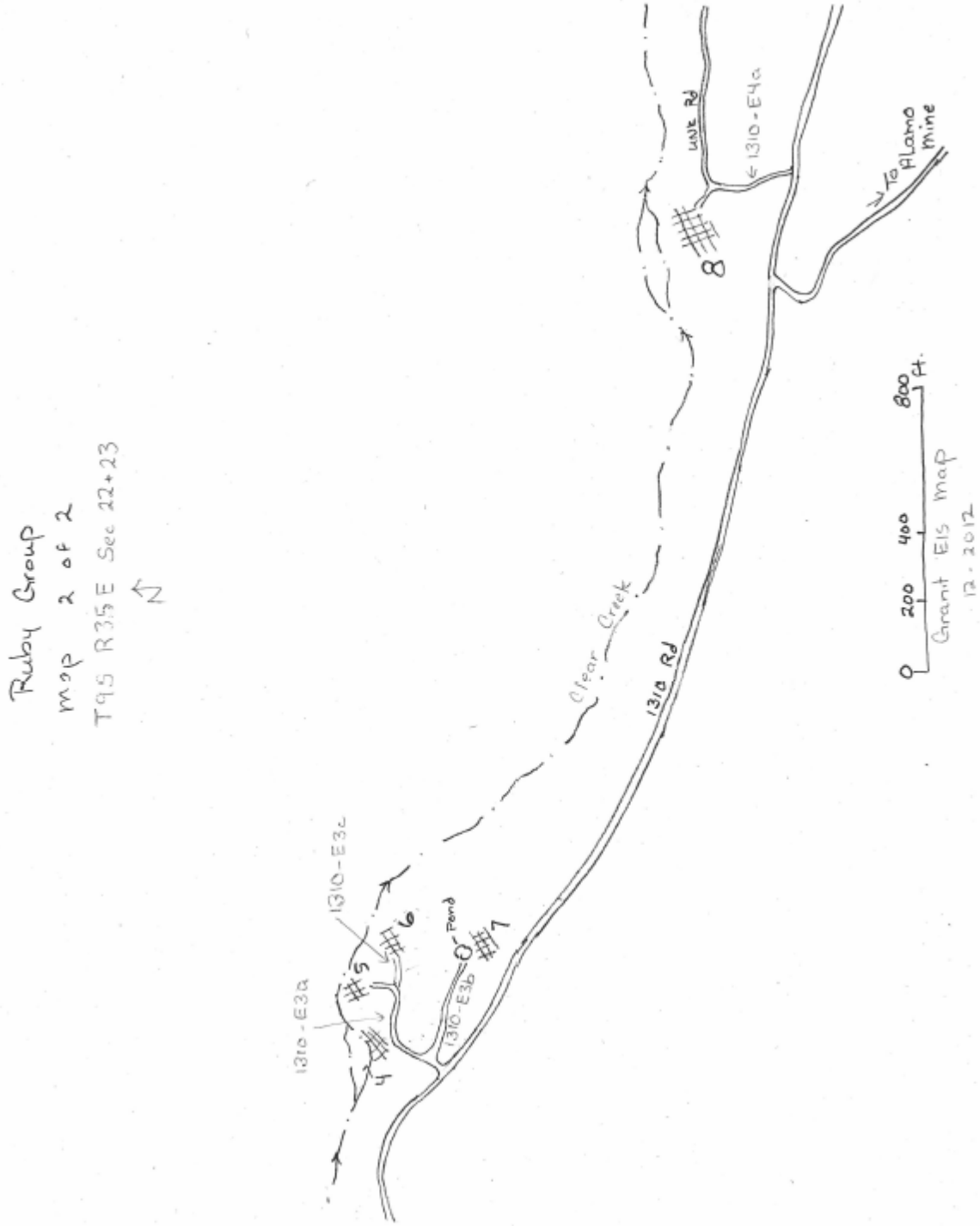
Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. Once the area has been mined out or the claim closed, the pre-existing structures and road will be left in place unless the Forest service request otherwise.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. Production rate is estimated at 2-5 yards per year which would only relate to 1-2 holes per year. With the estimated size of the hole and the ability to dig with the back hoe, it would be possible to complete the proposed work load in 1 week each year. A longer stay would result in a higher work load (say one site per year) and result in a completion of the work proposal in less than 10 years.

No additional mitigation measures were identified by the miner in the Plan. [(1)]


Ruby
T9S R35E
Sec 21-23
Overall map
N
Ruby
map 1 of 2
1-3
2
1
Bunch Bucket
claim
1310 Rd
4-7
Ruby
map 2 of 2
Clear Creek
8
1310 Rd
ALAMO
MINE
1-8 Proposed work site
0 500 1000 2000 ft.
Granite EIS map
12-2012


Ruby Group
map 1 of 2
T9S R35E Sec 21+22
N
1310-E1a
Old Ruby Ck Rd
Ruby Ck
Wilderness
1310-E1b
1
2
3
Clear Creek
Ruby Ck
Ford Area
H
H
H
1310
CLERR Ck.
1310
proposed work Areas
Barricade
0 250 500 Feet
Granite E1s map
12-2012


Ruby Group
map 2 of 2
T9S R35E Sec 22+23
N
1310-E3a
1310-E3c
#5
#6
#4
1310-E3b
Pond
#7
Clear Creek
1310 Rd
1310-E4a
Waste Rd
8
To Alamo Mine
0
200
400
800 ft.
Grant EIS map
12-2012

Sunshine/McWillis

Claim Description

The Sunshine/McWilllis plan consists of three claims. It is located at the Sunshine Cabin, along McWillis Creek approximately ½ mile north of its confluence with Olive Creek. Access is by forest service road 1305-050, 1305-054 and a miner created road. The legal description for the claim is T.09 S., R.35 E., Section 02, W.M.

Cabin

Existing Condition

Mining may have started in McWillis Gulch creek about 1900's based on the establishment date of the adjacent Pyx mine (south/uphill). The creek flows from the south and bends to the west as it hits the toe slope below the 1305-050 road and continues on down the draw. The creek banks are lined with old tailing piles covered with alder and a few lodge pole trees. A collapsed added exist on the northeast side of the creek along a intermittent tributary which separates it from the cabin site. Excavations were conducted on the southwest side of the creek in the 1980's along with explorations on the adit. In the early 1990's the claimants relocated the non-system road into the cabin and proposed work area, placed a log bridge over the creek and gated Forest Service road 1305-054. A reported road or trail from the 1305-050 down to the creek was not found and would nbe rather steep if it did exist.

An old trommel is located at one proposed processing site along with 3 existing ponds. Ponds 1 and 3 are connected with a pipe while pond 2 is connected to a seasonal tributary of the main stem. No ponds could be found west of the bridge and may have been washed out by the creek.

Structures on the site consist of a cabin, work shed, outhouse and cold storage building.

Recent Activity

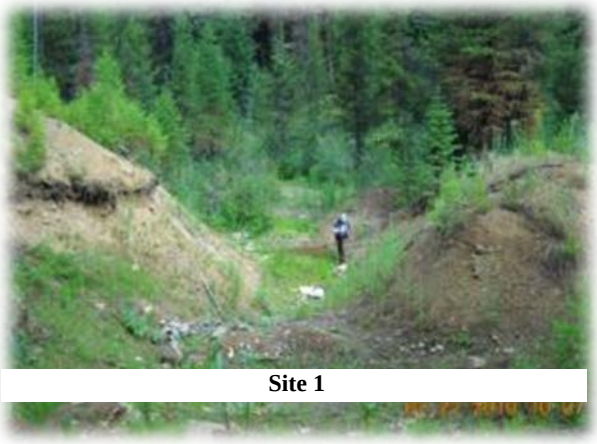
The proposed plan of operation was updated in the spring of 2011; in order to remove the references to work that had already been completed in the late 80's and early 90's. It is estimated that less than 1 yard of material has been moved in the last ten years. In 2012 the gate was broken and an unauthorized dredge site was conducted without the claimant's knowledge.

Proposed Plan of Operations [(1)]

The miner is proposing to continue placer mining at along McWillis Gulch using the existing ponds, roads and structures. Two sites have been selected for further testing on the south side of the creek and south of the previous work. The main process will be done at the existing pond site east of the creek and additional process with a highbanker will be done at the end of the road (ponds were non-existence during inspection). The miner will maintain an undisturbed 30 foot buffer between the creek and the activity mining site.

Processing water is obtained via a pipe which extends from a cement dam on McWillis Gulch Creek.

Equipment to be operated on the claims includes a backhoe, small cat, 5yd dump truck, tormmel and wash plant, highbanker, 4 wheel drive pickups, ATV's and hand tools. A small shed on the site well be used for storage and the cabin will be used for sleeping quarters when mining. Petroleum products used to operate machinery will be kept in the bed of a pickup in approved container and stored out of the flood plain. The miner will also operate a small suction dredge under the terms and conditions of a State dredging permit from July 15 to August 15.

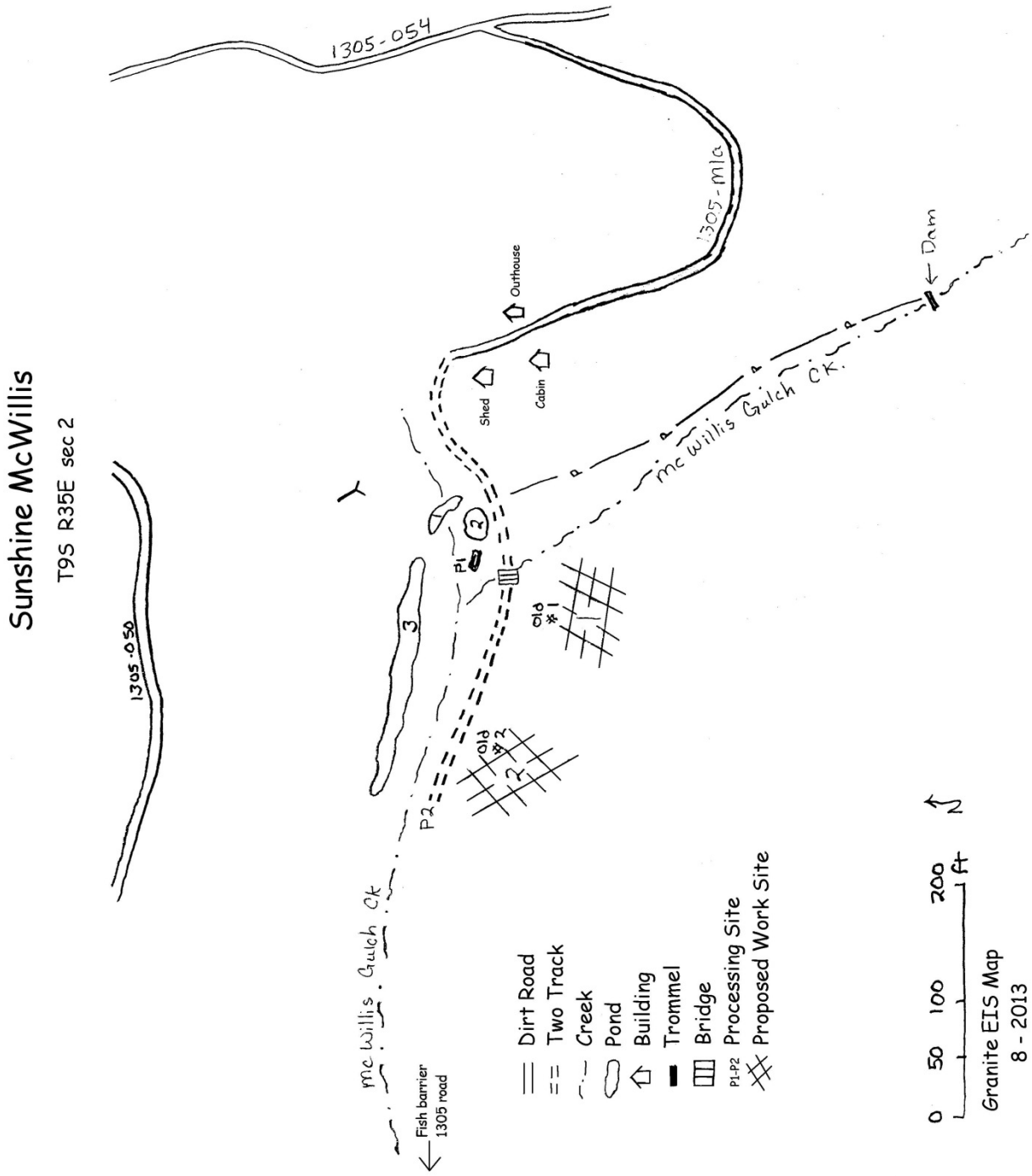


Site 1

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation. Once mining is has been completed equipment and structures will be removed from the site.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. In order to work the area identified in the plan, the operator would have to work through a little over 1/20 of an acre a year (50x20ft). However the operator plans to process 1000 cubic yards a year which would result in an estimated 8-10 cubic yards of material being processed each day during the operating season. Based on this production rate and allowing for some breaks, it is estimated that the area proposed in the plan (approximately ½ acre) could be totally processed within the 10 years requested.

No additional mitigation measures were identified by the miner in the Plan. [(1)]


Sunshine McWillis
T9S R35E sec 2
1305-050
1305-054
1305-mla
Outhouse
Shed
Cabin
Dam
mc Willis Gulch Ck.
mc Willis Gulch Ck
Fish barrier
1305 road
P1
P2
Old #1
Old #2
1
2
3
Dirt Road
Two Track
Creek
Pond
Building
Trommel
Bridge
P1-P2 Processing Site
Proposed Work Site
0 50 100 200 ft
N
Granite EIS Map
8 - 2013

TETRA ALPHA MILL AND LODE

Claim Description

The Tetra Alpha Mill and lode plan consist of several lode & placer claims.

The mill site is located at the junction of Boulder Creek and Last Chance Gulch. Access is by Forest system roads 7355-xxx and is gated by the miner. The legal description for the mill site is T.8S, R35½ E, Section 34 of the WM

The lode site is located on the ridge above the headwaters of Boulder Creek. Access if by Forest System road 7355-020 and miner constructed temporary roads. The legal description for the lode site is T.8S, R35½ E, Section 25 of the WM

Mill Site

Existing Condition

The access road to the mill site is gated. The road runs along Granite creek before turning up Boulder creek and crosses the pipe line that carries last Chance creek at the existing mill site. This is the same road that is also used to access the placer site. The sheds, equipment, and settling ponds are present at the mill site and have been in place, but un-used for the last 10 years.

The lode site is located above the 7300-020 road and the top soil has been excavated but the portal for the adit has not been started.

Recent Activity

Over the last 10 year the family has been reorganizing and refurbishing the equipment after taking over the operations from their father. While the district did issue a Notice of Intent to work on the adit and placer site, the only activity has been the yearly assessment and maintenance work that is done during vacations and holidays.

Proposed Plan of Operations [(1)]

The miner is proposing to continue to run the mill by using the materials from the lode operations. The plan is to re-open/expose the vein in the adit located above the road. A test run consisting of 10 yards will be brought to the mill for processing. The plant will be set up to crush 10-20 Tons per day (TPD). During the test run the existing settling ponds will be allowed to fill with sediment and then a supplement will need to be filled before the operations can continue. There is no creek within a ¼ mile of the lodes site, but the miner will maintain an undisturbed 50 foot buffer between boulder creek and the activity mill site, and designated a 25 foot buffer between the work area the bog around Last Change Gulch pond.

Wash water for the mill will be pulled from the reservoir on Last Chance Gulch creek and/or Boulder Creek.

Equipment to be used will include an excavator, front end loader, dump truck, and miscellaneous pumps, compressors and other mining related equipment. The mill, sheds and settling ponds are currently existing on site.

Collapsed Adit

For the lode portion of the operation, all fueling associated with the mining will be contained and hauled in 55 gallon drums. For the milling portion of the operation, petroleum products will be stored at least 100 ft from water and in a lined containment vault and will be placed in approved containers. All equipment will be checked daily for leaks and fueling will be done at least 50 feet from water.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

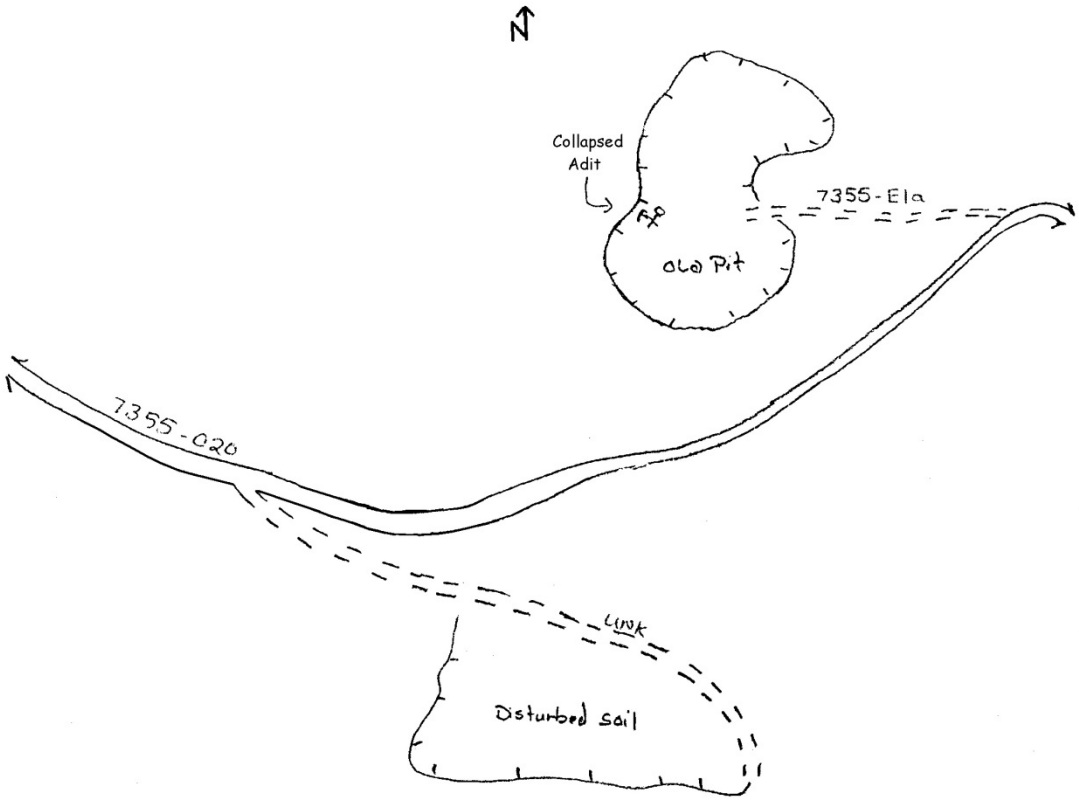
This proposal is for an intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks- 120 days) for the next 10 years to complete the project. It is anticipated that around 30 cubic yards of waste rock will be removed from the lode site in order to get the proposed max of 10 yards for processing. Processing this material is expected to fill the existing settling ponds due to their small size and at a process rate of 10-20 tons per day this operation could easily be completed in on year. Should additional work be requested, it will be addressed in a supplement to the plan.

Mitigation Measures identified by the miner in the Plan [(1)]

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).

Tetra Alpha Lode

T 8 S R 35½ E Sec 25



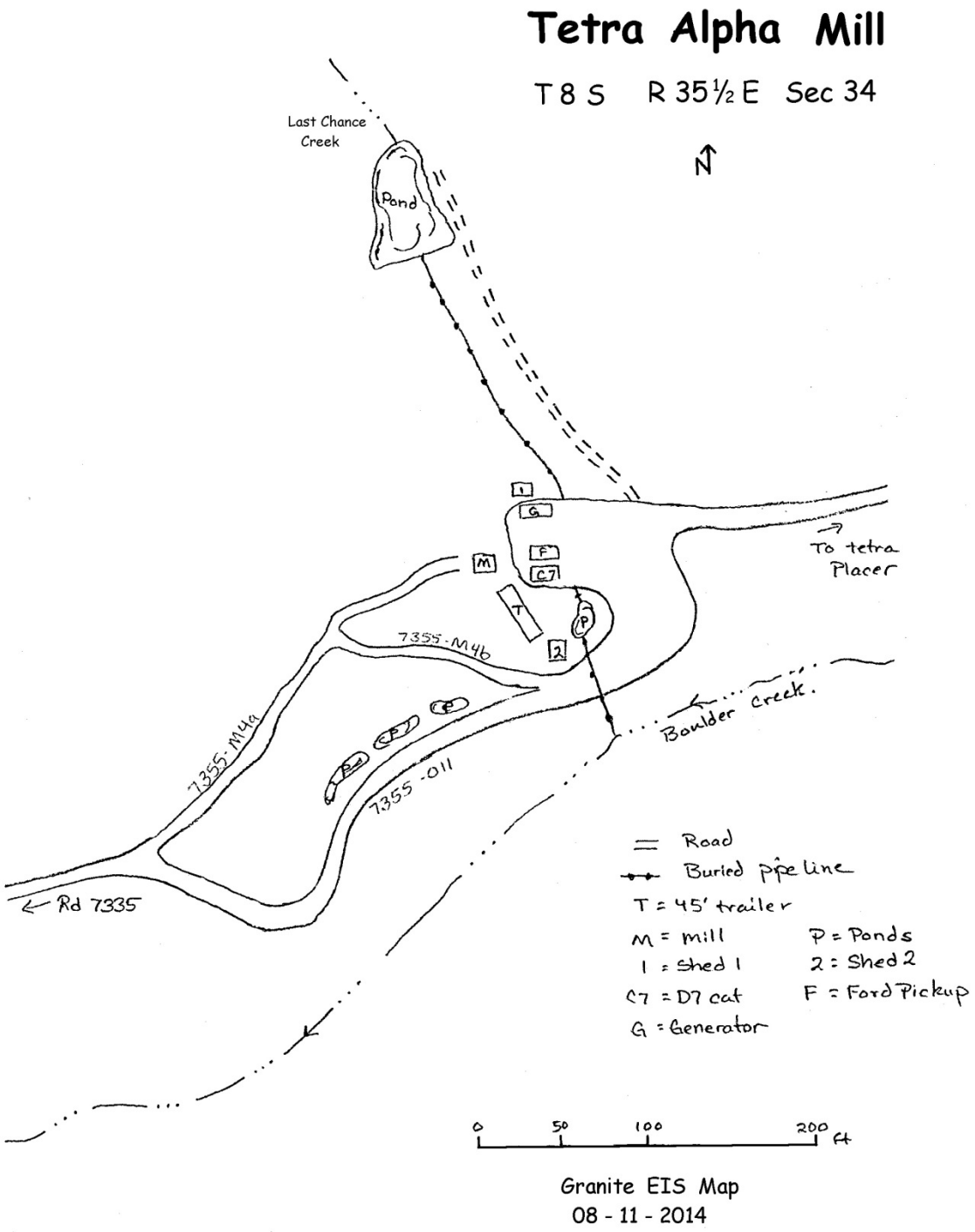
Dirt Road

Mining Road

Collapsed Adit (proposed work site)

0 50 100 200 feet

Granite EIS Map
08 - 11 - 2014



Granite EIS Map
08 - 11 - 2014

TETRA ALPHA PLACER

Claim Description

The Tetra Alpha placer plan consist of several placer claim located along Boulder Creek just upstream and west of it confluence with Granite Creek. Access is by Forest system roads 7355-011 and is gated by the miner. The legal location is T.8S, R35½ E, Section 34 of the WM.

Existing Condition

The north side of Boulder Creek was mined in the mid 1900's and has been reclaimed. The south side of the valley had some testing that was done, but the previous logging or other clearing has left the area covered in overstocked 20 foot tall lodge pole pine.

The access road into the claim is gated by the claimant and runs along Granite creek before turning up Boulder Creek in to the Mill area. At the Mill site the road crosses the pipe line (Last Chance Creek) and continues along the north side of Boulder Creek to the placer site.

There is a small shed and various pieces of large mining equipment scattered around the pond (main processing site).

Recent Activity

Over the last 10 year the family has been reorganizing and refurbishing the equipment after taking over the operations from their father. While the district did issue a Notice of Intent to work on the adit and placer site, the only activity has been the yearly assessment and maintenance work that is done during vacations and holidays.

Plan of Operations [1]

The miner plans to continue previous placer mining operations on the south side of Boulder Creek. The proposed excavation area is approximately 100 feet in width, extends from the mill site east past the placer processing site and is estimated to be approximately 8 acres in size. The plan is to start testing on the south side of Boulder creek using the 2 proposed and 1 existing ford to haul the material back to the existing processing site and pond on the north side of the creek. The south fork of Boulder creek and the wet meadow areas will be avoided by leaving a miner designated 25-foot buffer between the average high water mark and mining excavations. If values are found then mining will begin at ½ acre at a time and test holes will be enlarged to 200' x 100' x 30' deep. The miner will maintain an undisturbed 25 foot buffer between the creek/meadow and the activity mining site.

Wash water for the trommel and wash plant will pulled from the off channel pond and will be recycled on site.

Equipment to be used will include an excavator, front end loader, dump truck, and miscellaneous pumps, compressors and other mining related equipment.

Any petroleum products used will be stored in a lined vault at least 100 feet from any creeks or bogs as designated by the Forest Service. Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

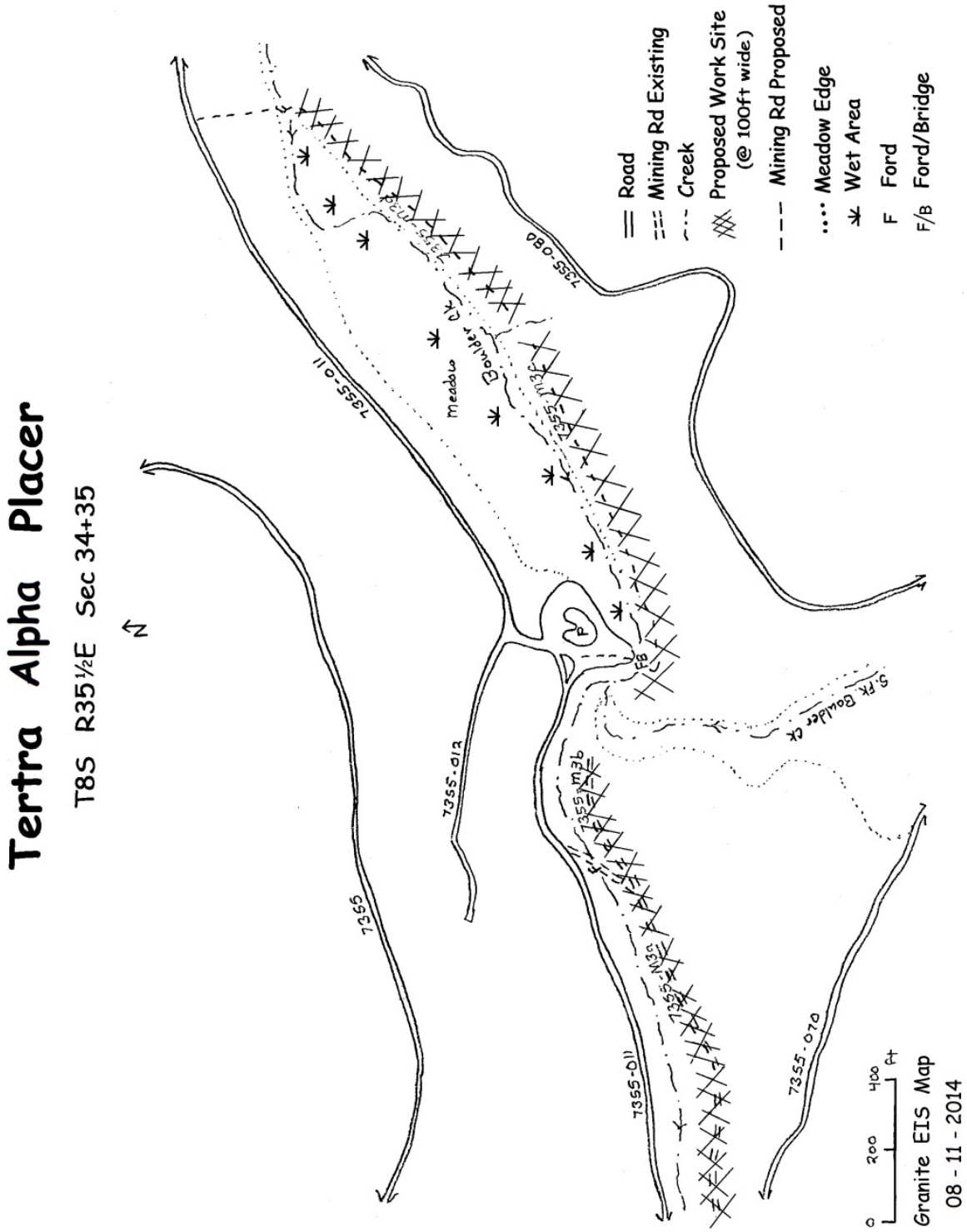
Trommel

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

This proposal is for a mid-scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project and plans to process 100 yards per day during the summer. Approximately 100 yards are planned to be processed each day and not more than 1 acre per year disturbed per year. With an estimated 8 acres to mine, this can be done in 10 years if the work is done full time during the summer. Fire season delays, lack of water and equipment problems, could easily push this time line out for another 2-3 years. The expected size of the operation will also require a DOGAMI permit.

Mitigation Measures identified by the miner in the Plan [(1)]

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).


Tertra Alpha Placer
T8S R35½E Sec 34+35
N
7355
7355-011
7355-012
7355-080
7355-070
7355-011
Boulder ck
Meadow
S. Fk. Boulder ck
F/B
Road
Mining Rd Existing
Creek
Proposed Work Site
(@ 100ft wide)
Mining Rd Proposed
Meadow Edge
Wet Area
F Ford
F/B Ford/Bridge
0 200 400 ft
Granite EIS Map
08 - 11 - 2014

TROY D

Claim Description

The Troy D plan consists of only one placer claim. It is located about 1½ miles east of the town of Granite and between the paved County Road 24 (which provides access) and Granite Creek. The legal description for the claim is T.9S, R.35E, Section 1, and T.9S, R.35 ½ E., Section 4, W.M.

Existing Pond

Existing Condition

Mining began here in the mid 1800's and the last dredge went through the area in the mid 1900's The valley floor and stream banks consist of old dredge tailings The two existing ponds listed in the proposed plan are located just south of the paved road. Ten foot tall lodgepole pines, scrub willow, and native grasses exist on about 50% of the area and along the 8' berm of rocks that separates the mining area from Granite Creek. A portion of the claim was used for gravel storage during reconstruction of Forest System Road 13 and is still a flat gravel area suitable for parking**.**

Recent Activity

The claimant had an NOI to do some mining on the site in 2012 and 2011 but nothing was done. Equipment currently on site includes 2-45ft semi-trailers and a dozer. The two semi-trailers have been used to filter the gold and other locatable minerals out of the water.

Proposed Plan of Operations [(1)]

The miner would like to continue with placer operations on the 10 acre area on the north side of Granite Creek. They would also like to set up a year around water filter operation on the claims mining ponds. A wash plant will be placed in the east end of the claim and the existing ponds will be used to store and re-circulate water. Test holes will be excavated to bedrock (@ 10') and should they prove productive; mining will begin throughout the claim. An undisturbed buffer of at least 25 feet will be maintained by the miner between the mining activity and Granite Creek. It is estimated that up to 50 cubic yards of material will be processed daily. Black sand concentrates will be collected and shipped off site for processing.

Granite Creek

Water from the existing processing pond will filtered through the carbon columns and electroplated in the semi-trailers. The power line will be brought in (@ 600') to run the filtration system and replace the generator.

Equipment operated on the claim will include a backhoe or excavator, small cat, 5 yard dump truck, washing plant, trommel, sluices, generator, 1 filter trailer, pumps pickups truck, and hand tools and a self-contained RV trailer for sleeping.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

Existing Pond and semi-trailers

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding and fertilization will be done as needed and topsoil will be stockpiled for use in final reclamation.

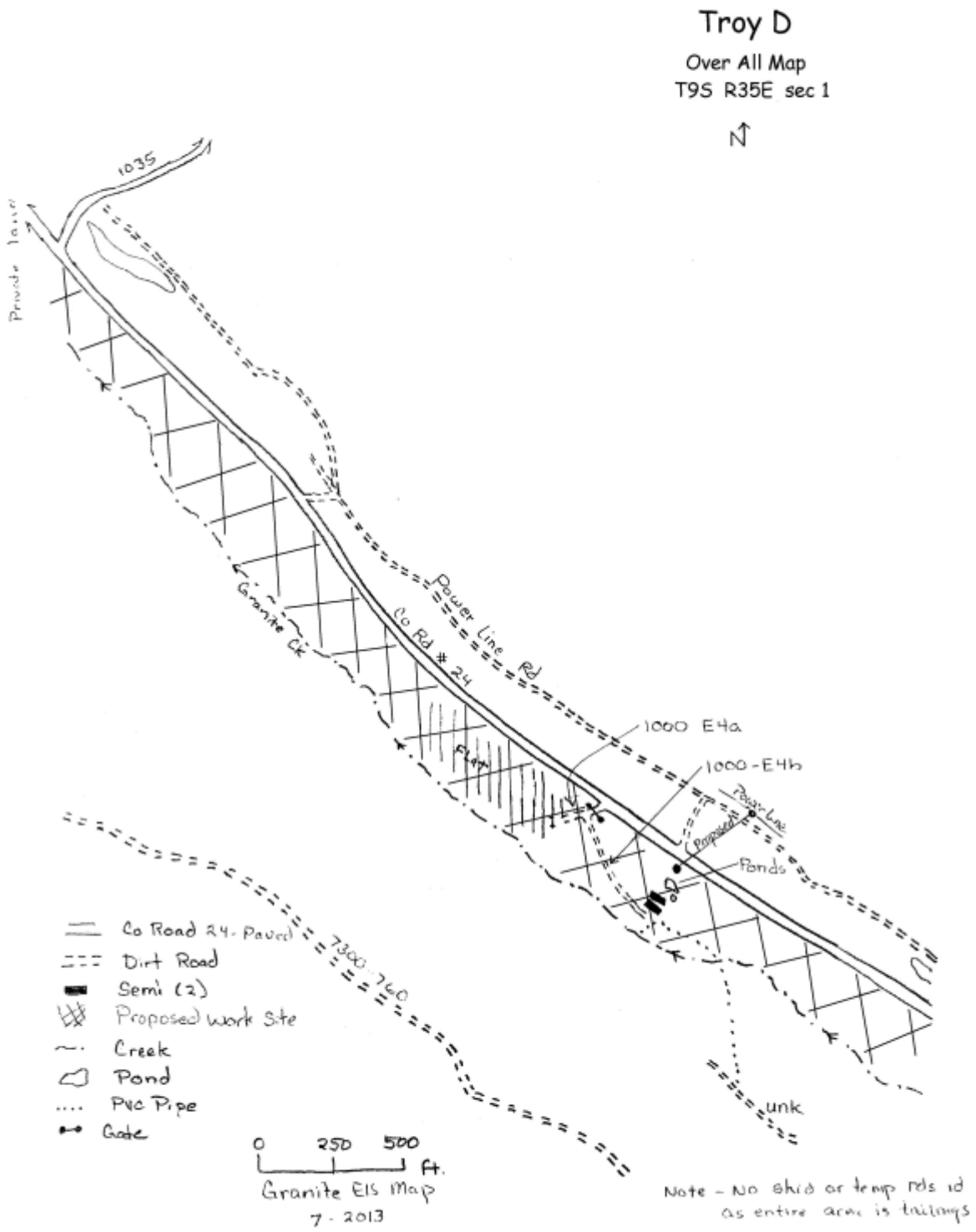
Semi-Trailers from processing pond

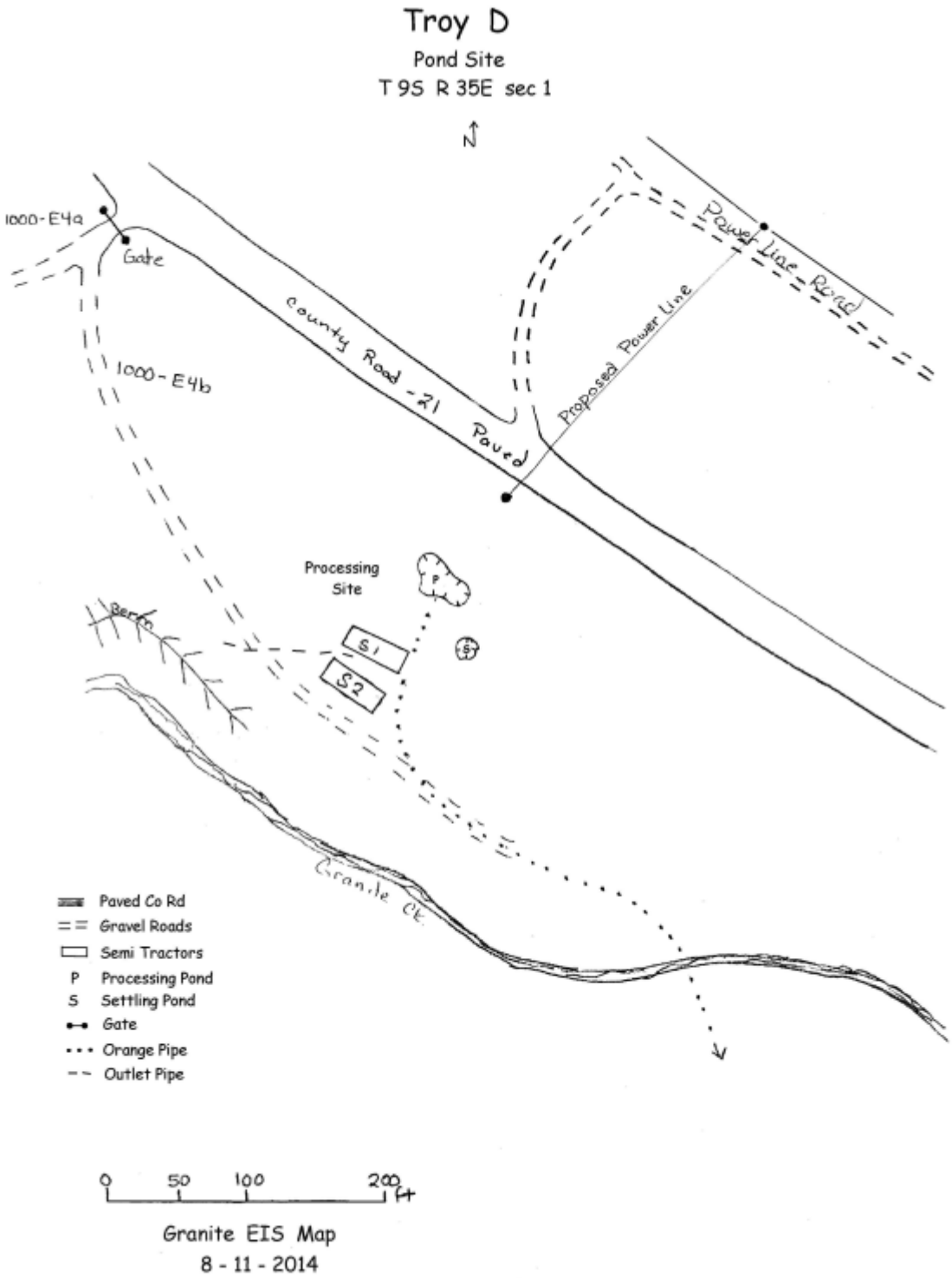
This proposal is for a small scale, intermittent, family based mining operation. The miner plans to placer mine from June through October of each year (20weeks -120 days) for the next 10 years. A ¼ acre mining sites would be 100x 100 ft. Previous mining in this area has resulted in rocky dredge tailings devoid of any fines or sediments. This means that most excavations will result in little material for processing. The miner would need to work through at least one acre per year in order to complete the project as planned. This can be done if processing rates reference the fine materials to be processed and not the cubic yards of material removed from each hole. The limited availability of water and seasonal fire restrictions may increase the production time. The expected size of the operation will also require a DOGAMI permit.

The water filter operation (in the semi-trailers) is proposing to work year around and the operation plans to continue for 10 years.

<u>Mitigation Measures identified by the miner in the Plan [(1)]</u>

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and development of Alternative 3).


Troy D
Over All Map
T9S R35E sec 1
N
1035
Private Land
Power Line Rd
Co Rd # 24
Granite Ck
Flat
1000 E4a
1000-E4b
Power Line
(Proposed)
Ponds
Co Road 24 - Paved
Dirt Road
Semi (2)
Proposed work Site
Creek
Pond
PVC Pipe
Gate
7300-760
unk
0 250 500 ft.
Granite EIS Map
7 - 2013
Note - No shid or temp rds id
as entire area is tailings


Troy D
Pond Site
T 9S R 35E sec 1
N
1000-E4a
Gate
1000-E4b
County Road -21 Paved
Power Line Road
Proposed Power Line
Processing Site
P
S1
S2
S
Berm
Granite Ck
Paved Co Rd
Gravel Roads
Semi Tractors
P Processing Pond
S Settling Pond
Gate
Orange Pipe
Outlet Pipe
0 50 100 200 ft
Granite EIS Map
8 - 11 - 2014

Yellow Gold

Claim Description

The Yellow Gold plan consists of only one placer claim. It is located along Last Chance Gulch Creek, approximately one mile north of its confluence with Boulder Creek. Access is by Forest System road 7355-020. The legal description for the claim is T.08 S., R.35½ E., Section 27 & 34, W.M.

Earth Dam on Last Chance Gulch

Existing Condition

Historically the Yellow Gold claim was hydraulically placer mined. Old tailings and several earthen dams still exist along Last Chance Gulch Creek. The area is covered with timber and lot of grass and shrubs exist along the creek. A seldom used dispersed campsite known as Bear Camp is located on the main road at the north end of the claim and shows no sign of development or an outhouse. Dirt berms exist on the 025, 055 and 050. The 055 is grown in with 20ft tall lodgepole.

Recent Activity

There was a previously approved plan for this operation which was extended until 2012. According to inspections, there has been no mining activity recorded on this claim in the last 10 years.

Pond from west side road

Proposed Plan of Operations [1]

The miner would like to continue placer mining along Last Chance Gulch Creek. The proposal is to provide mining opportunities for small groups. A backhoe will be used to open a hole (50’ x 30’ x 12’deep) on each side of the gulch. This will provide two holes at all times for the group to work. Water from the creek (dammed reservoir) will be used to fill the ponds and recycled to process the placer materials. A 25 foot stream buffer will be maintained along both side of the creek.

Equipment to be operated on the claims includes a backhoe, small cat, 5 yard dump truck, washing plant, trommel, sluices, highbankers, pumps pickups truck, and hand tools and self-contained RV trailer. Miners will camp near Bear Camp and a portable outhouse may be brought in.

Petroleum products used to operate machinery will be kept in the bed of a pickup in approved containers.

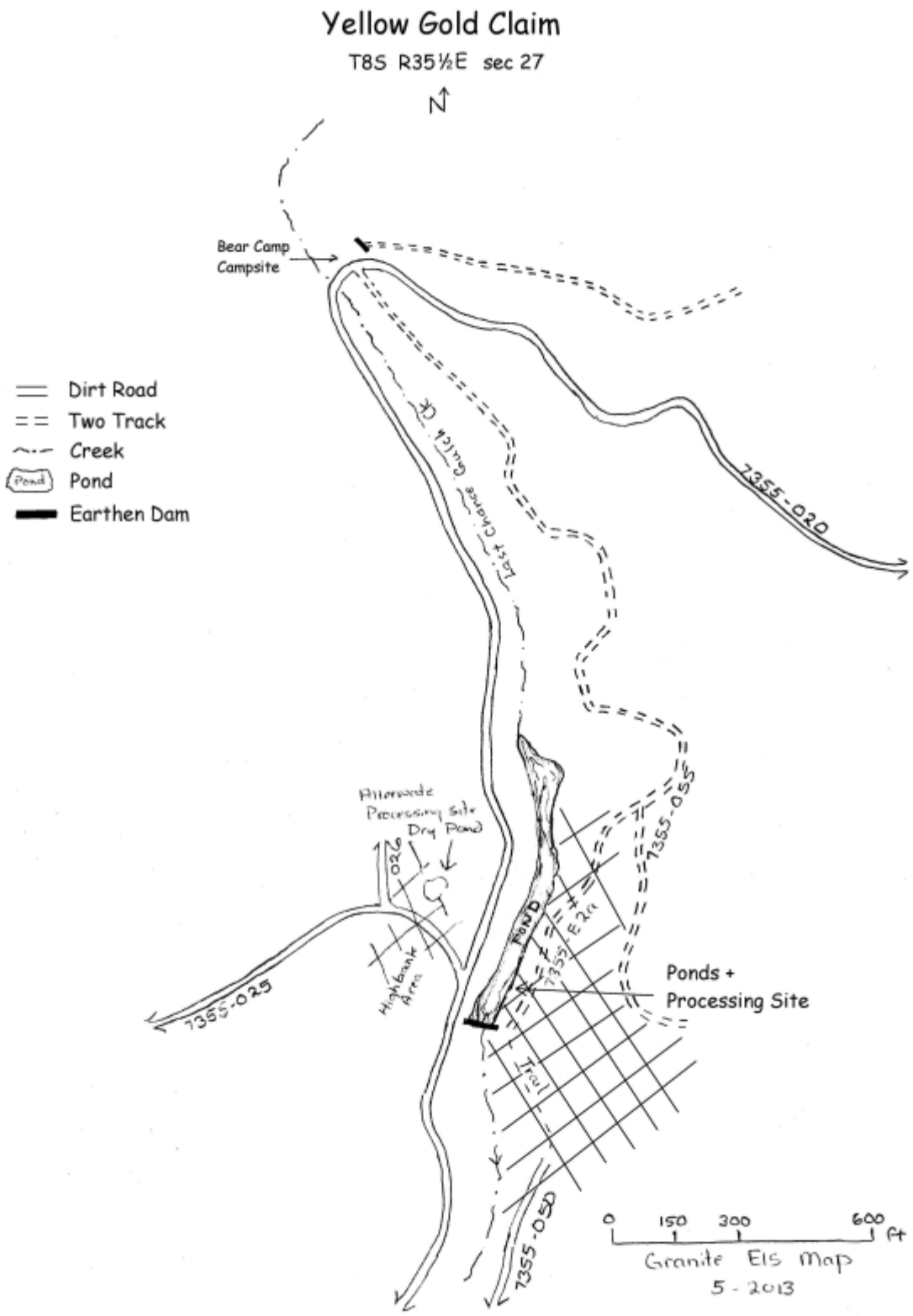
Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding will be done as needed and topsoil will be stockpiled for use in final reclamation. The miner will maintain waterbars and spot rock the existing access roads. Final reclamation will include closing the 025,026 and 055 road at Bear camp with a dirt berm and ponds will be left in place for wildlife or future mining.

This proposal is for a small scale, intermittent, group based mining operation. The miner plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. Based on the size of the holes, only having 2 holes open each year, and the intermittent nature of the proposed operation, it is estimated that it could take considerably more than 10 years to complete this operation. Based on the given hole size, it is estimated that the miner would have to work 16 holes per year in order to completely mine the estimated 10 acres in 10 years.

Road and flat east of pond

<u>Mitigation Measures identified by the miner in the Plan [(1)]</u>

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).


Yellow Gold Claim
T8S R35½E sec 27
N
Bear Camp Campsite
Dirt Road
Two Track
Creek
Pond
Earthen Dam
7355-020
Left Chance Gulch Cr
Alternate Processing Site
Dry Pond
020
Highbank Area
7355-025
7355-055
7355-E2a
POND
Ponds + Processing Site
Trail
7355-050
0 150 300 600 ft
Granite EIS Map
5 - 2013

Yellow Jacket

Claim Description

The Yellow Jacket plan consists of placer mining two lode claims. These are located in Orofino Gulch approximately 1½ mile east of its confluence with Olive Creek. Access is through by a private road on the adjacent private land of the claim owner. The legal description for the claim is T.09 S., R.35 E., Section 27&34, W.M.

Previously Mined Tailings

Existing Condition

The Yellow Jacket claim was hydraulically mined during the early 1900's. Most likely about the time the adjacent Orofino Adit was worked and patented. The side drainages as well as Orofino Gulch Creek itself are made up of those mine tailings. The Lodge pole (30' tall) and occasionally larger have grown in through the rocks. Some ground vegetation is located through-out the old tailings but it is sparse.

Recent Mining Activity

According to the inspections, the only activity in the last 10 years was the removal of the cabin to private land, and improvements to a spring (water source for the cabin). Recent inspections have shown no signs of recent mining activities.

Proposed Plan of Operations [(1)]

The miner has proposed to placer mine within a 10 acre area along the South Fork of Orofino Gulch. Phase one would use mechanical equipment to dig 30'x50'x8'deep holes. Should economical values be found then phase two mining will begin mining (excavating) ¼ acres (100'x100') parcels at a time. Short segments of temporary roads will be created by equipment driving from the excavation site to the existing roads. A miner designated 20 ft buffer consisting of vegetation and a tailings berm will be maintained between the creek and the mining operations.

Processing will take place on private land using the water from the patented Orfino adit and the water will be recycle in the existing private ponds. No chemical will be used in this process.

Equipment to be operated on the claims includes a backhoe, small cat, one-yard loader, air compressor, pump, 5 yard dump truck, 5 yard per hour trommel, a pickup truck, gold spinner/ wheel and hand tools. The existing storage shed will be used to store equipment and a temporary trap structure may be placed over the excavation.

Petroleum products will be stored on private land.

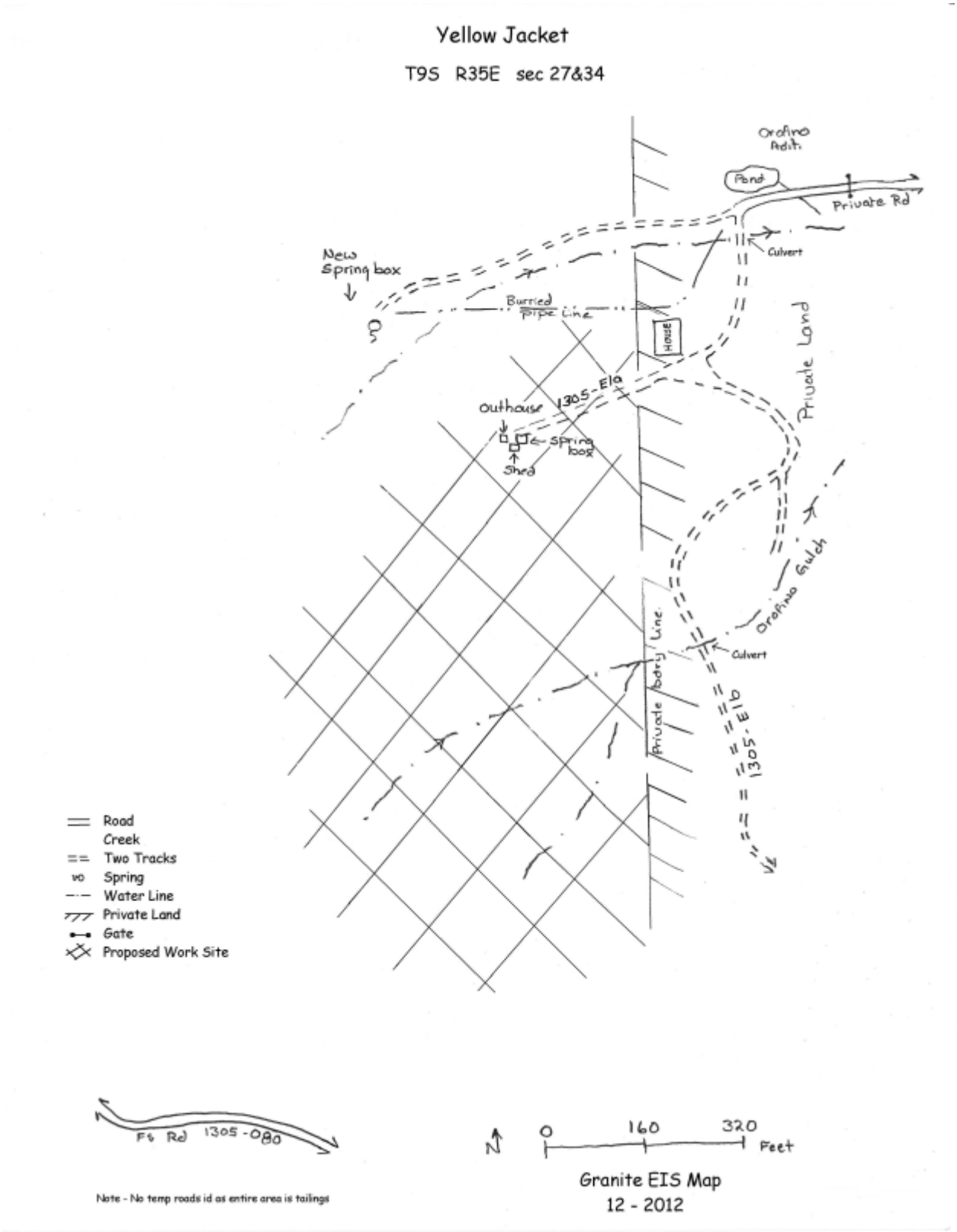
The miner will also operate a small suction dredge under the terms and conditions of a State dredging permit from July 15 to August 15.

Reclamation will be done on a continuing basis and the site stabilized annually before close out. Grass seeding will be done as needed and topsoil will be stockpiled for use in final reclamation. Road maintenance will be accomplished annually on the one mile of the private road needed to access the claim. For final reclamation, access roads/trails will be water barred and closed. Mined areas will be recontoured and seeded. The domestic pipeline will be removed and all machinery, debris or structures related to this operation will be removed.

This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. This would mean that the miner would need to mine approximately 1 acre a year in order to complete the estimated 7.5 acres in 10 years. The expected size of the operation will eventually require a DOGAMI permit.

Mitigation Measures identified by the miner in the Plan [(1)]

- Forest Service mitigation measures from previously approved Plans of Operations were attached to this proposal under the Forest Service Evaluation section. (When applicable to the proposal, these were applied to this analysis and the development of Alternative 3).
- Miner will visually check and monitor the gulch near the mining area for increases in sediment caused by this operation.


Yellow Jacket
T9S R35E sec 27&34
Orofino Adit
Pond
Private Rd
Culvert
New Spring box
Buried Pipe Line
House
Private Land
Outhouse
1305-E10
Spring box
Shed
Orofino Gulch
Private Boundary Line
Culvert
1305-E10
Road
Creek
Two Tracks
Spring
Water Line
Private Land
Gate
Proposed Work Site
Fs Rd 1305-080
N
0
160
320
Feet
Granite EIS Map
12 - 2012
Note - No temp roads id as entire area is tailings

Appendix 9

Forest Plan Compliance – Watershed, Soils and PACFISH

Wallowa-Whitman and Umatilla National Forests Standards and Guidelines

Appendix 9
Forest Plan Standards and Guidelines
Water and Soil Resources and Minerals Management
Umatilla and Wallowa Whitman National Forests

Wallowa-Whitman National Forest (USDA 1990)

WWNF Forest Plan Reference number	Standard and Guideline: WATERSHED (4-22 through 4-26)	Compliance Discussion
1	**Conflicts With Other Uses.** Give management and enhancement of water quality, protection of watercourses and streamside management units, and fish habitat priority over uses described or implied in all other management standards or guidelines.	Met under Alternative 3 to the extent possible (36CRS Part 228, Subpart A). See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. See also Appendix 7 (Analysis of Effects for each Plan) and the Water Resources section of Chapter 3 of the EIS.
2	**Water Quality Standards and BMP's.** Meet Water Quality Standards for waters of the States of Oregon (Oregon Administrative Rules, Chapter 340-41) and Idaho through planning, application, and monitoring of Best Management Practices (BMP's) in conformance with the Clean Water Act, regulations, and federal guidance issued thereto.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. See also Appendix 7 (Analysis of Effects for each Plan) and the Water Resources section of Chapter 3 of the EIS.
3	Use the following process in cooperation with the States of Oregon and Idaho:	See below
3a	Select and design BMP's based on site-specific condition, technical, economic, and institutional feasibility, and the water quality standards for those waters potentially impacted. (See Watershed Management Practices Guide for Achieving Soil and Water Objectives, Wallowa-Whitman NF.)	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. See also Appendix 7 (Analysis of Effects for each Plan) and the Water Resources

WWNF Forest Plan Reference number	Standard and Guideline: WATERSHED (4-22 through 4-26)	Compliance Discussion
3e	Evaluate monitoring results and mitigate where necessary to minimize impacts from activities where BMP's do not perform as expected.	Met under Alternatives 2 and 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. Also see Chapter 2 of the EIS for discussion of the minerals administration annual monitoring and inspections.
3f	Adjust BMP design standards and application when it is found that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluate the appropriateness of water quality criteria for reasonably assuring protection of beneficial uses. Where appropriate, consider recommending adjustment of water quality standards.	Met under Alternatives 2 and 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. Also see Chapter 2 of the EIS for discussion of the minerals administration annual monitoring and inspections.
4	**State Water Quality management Plans.** Implement (Oregon) State Water Quality Management Plans on lands administered by the USDA Forest Service as described in Memoranda of Understanding between: The Oregon Department of Environmental Quality and U. S. Department of Agriculture, Forest Service (2/12/79 and 12/7/82), and "Attachments A and B" referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest 12/78 and Best Management Practices for Range and Grazing Activities on Federal Lands, respectively).	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water quality (i.e. stream temperatures, turbidity).

WWNF Forest Plan Referenc e number	Standard and Guideline: WATERSHED (4-22 through 4-26)	Compliance Discussion
5	**Mitigation.** Mitigate negative impacts causing reduction in water quality to return water quality to previous levels in as short a time as possible. (It is recognized that short-term reductions in water quality may result from some activities. For example, turbidity may increase for several days following bridge or culvert installation.)	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water quality (i.e. stream temperatures, turbidity). See also discussion in the Water Resources section of Chapter 3 of the EIS and Appendix 7 (Effect Analysis for each Plan).
7	**Stream Temperatures.** Prevent measurable temperature increases in Class I Streams (less than a 0.5 degree Fahrenheit change). Temperature increases on SMU Class II (and fish-bearing SMU Class III) streams will be limited to the criteria in State standards. Temperatures on other streams may be increased on to the extent that water quality goals on downstream, fish-bearing streams will still be met. Normally stream shade management on Class III streams will differ little from treatment on Class II streams.	Met under Alternative 3. Miners do not propose to remove any trees that provide stream shade. With respect to water withdrawals and potential stream temperature impacts, a valid water right would be required prior to approving that Plan. WRPMs are in place to prevent an input of warm water from one of the Plans (Old Eric), and a groundwater flow reversal in another Plan (Grubsteak).
8	**Channel Stability.** Maintain natural large woody debris, plus trees needed for a future supply, top protect or enhance stream channel and bank structure, enhance water quality, and provide structural fish habitat within all SMU classes. Quantities and sizes will be determined on a case-by-case basis.	Met under Alternatives 2 and 3. Miners do not propose to remove any trees providing stream side shade or bank stability.

WWNF Forest Plan Referenc e number	Standard and Guideline: WATERSHED (4-22 through 4-26)	Compliance Discussion
11	**Conduct Cumulative Effects Analyses.** When project scoping identifies an issue or concern regarding the cumulative effects of activities on water quality, stream channels, or fish habitat a cumulative effects assessment of these effects will be made. This will include land in all ownerships in the watershed. Activities on National Forest Service lands in these watersheds should be dispersed in the time and space to the extent practicable and at lease to the extent necessary to meet management requirements. On intermingled ownerships, coordinate scheduling efforts to the extent prpracticable.	Met under Alternatives 2 and 3. See the cumulative effects section in the Water Resources section of Chapter 3 of the EIS.
12	Alter watershed conditions only to the extent that aquatic and riparian goals will still be met and other valid water uses, such as irrigation, will not be adversely affected. When planned projects are likely to adversely affect watershed conditions, a hydrologic analysis will be conducted considering past, present, and future activities. If the results of this analysis indicate that the proposed project would adversely affect watershed condition, the project will be altered. This may include such things as deleting or rearranging harvest units in timber sales, selecting different silvicultural prescriptions, or delaying activities for one or more decades.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for measures that protect and enhance aquatic and riparian goals and ensure protection of water quality. See Appendix 3 (Structures inside the RHCAs) and Appendix 7 for effects analysis by Plan.
13	**Groundwater.** All projects or activities (including but not limited to pesticide application, fertilizer application, or storage of potentially hazardous volumes of fuels and other chemicals on Nation Forest System land) with the potential to adversely affect surface or ground waters, will include constraints and/or mitigation measures designed to prevent contamination, and will include a plan for dealing with accidental spills.	Met under Alternative 3. See Appendix 2 (General Requirements H 1 – H12) for protection measures related to chemicals.
14	**Floodplains.** Address in all projects environmental analyses the presence of, and potential impacts, to any floodplain within the project area.	Met under Alternative 3. Impacts to floodplains are avoided or mitigated under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for protection and restoration measures. See also Appendix 7 which discusses compliance with Executive Order 11988 (Protection of Floodplains).

WWNF Forest Plan Referenc e number	Standard and Guideline: WATERSHED (4-22 through 4-26)	Compliance Discussion
16	Permit short-term adverse impacts on floodplains only in conjunction with specific mitigation measures designed to minimize the impacts. Where activities adversely affect natural floodplains, the floodplains will be restored, to the extent practicable, shortly after the activity has ceased.	Met under Alternative 3. Impacts to wetlands are avoided or mitigated under Alternative 3 See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for protection and restoration measures. See also Appendix 7 which discusses compliance with Executive Order 11988 (Protection of Floodplains)
17	**Wetlands.** Address in all project environmental analyses the presence of, and potential impacts to, any wetlands within the project area. Particular attention will be paid to protection of springs during road location, timber sale plans, and range allotment management plans. Adverse impacts to wetlands will be avoided or mitigated.	Met under Alternative 3. Impacts to wetlands are avoided or mitigated under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for protection and restoration measures. See also Appendix 7 which discusses compliance with Executive Order 11990 (Protection of
26	**Mining Activities.** Protect watershed values to the fullest extent possible under existing laws in evaluating and developing mineral operating plans.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for protection and restoration measures. See also discussion in Appendix 7 which evaluates the effects of proposed

WWNF Forest Plan Referenc e number	Standard and Guideline: WATERSHED (4-22 through 4-26)	Compliance Discussion
27	When areas within 100 feet of Class I, II, or III streams or other perennial water bodies are disturbed by mining activities, they shall later be restored by the operator to equal or comparable condition. This restoration will occur whenever the operator is finished with an area that is large enough to logically restore. An inventory of existing conditions should be performed by Forest Service before approval of the operating plan is given. If this is not possible, then the inventory shall be performed before mining operations begin, with an amendment made to the operating plan. This inventory will determine: (a) Densities of trees, riparian brush (alders, willows, etc.), nonriparian brush, and herbaceous vegetation. (b) Fish habitat suitability (expressed as percent of habitat optimum). The inventory method used will be Cow-Fish 1/ or a similar one.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for post-activity restoration requirements. Also see discussion in Appendix 7 which evaluates the effects of proposed activities by Plan under Alternatives 2 and 3. NOTE: References to Class I, II, or III streams has been replaced by Category 1, 2, and 4 streams due to the amendment to the Forest Plan to include PACFISH.
28	Require the mining operator, as part of the restoration process to: (a) Plant trees and riparian brush at spacings that will achieve the original densities of these types. This spacing will at least be equal to what existed originally, except when the original densities were too great for good growth. (b) Plant grass to achieve a density equal to or greater than the total of the original herbaceous plus nonriparian brush types—greater densities may be required if needed for erosion control.	Met under Alternative 3. See Appendix 2 (General Requirements) for reclamation requirements post activity.

WWNF Forest Plan Referenc e number	Standard and Guideline: WATERSHED (4-22 through 4-26)	Compliance Discussion
29	Require the mining operator, as part of the restoration process, to (where appropriate): (a) Construct a temporary fence to exclude livestock from the planted area if needed for protection from livestock grazing. (b) Place whole trees, construct habitat enhancement structures, or perform comparable improvements within the stream channel at a density required to bring the fish habitat suitability index up to the same value that existed before the mining operations began. This is needed if instream work has disrupted the fish habitat suitability index of five or more percentage units. The estimated costs of the above operator requirements shall be incorporated into the value of the operator performance bond.	29 a. n/a. There is no livestock grazing in the project area. 29b. n/a. The miner will not be placing any trees or habitat structures in the stream channels
30	Evaluate and restore all other surface areas impacted by mining as in the previous paragraphs except for those items dealing with fish habitat.	Met under Alternative 3. See discussion in Appendix 7 which evaluates the effects of proposed activities by Plan and alternative. See Appendix 2 (General Requirements) for reclamation requirements.
31	**Water Rights and Instream Flows.** File for water rights in accord with State law and FSM 2500.	Met under Alternative 2 and 3. They must be in compliance with State law and FSM 2500.
32	Protect instream flow on Nation Forest System lands through critical analysis (via NEPA) of proposed water uses, diversions, and transmission applications and renewal of permits. Protections may be achieved through filing protests with States where applications are made that adversely affect National Forest resources, asserting claims for this water under Federal or State laws where applicable, inserting protection measures into special use permits, or reaching formal agreements over use. Purchase of water rights and impoundments are other means for reducing these impacts. (Also see Standards and Guidelines for Livestock Grazing and Wildlife).	NEPA analysis of proposed water withdrawals on stream flow and stream temperatures occurred under Alternatives 2 and 3.

WWNF Forest Plan Reference	General Riparian Area Management	Compliance discussion
RA-2	Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.	Met under Alternative 3. See Appendix 2 (General Requirements)
RA-3	Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on inland native fish.	n/a. None proposed for use under either Alternative. Only mechanical treatment allowed. See Appendix 2 (General Requirements).
RA-4	Prohibit storage of fuels and other toxicants within Riparian habitat Conservation Areas. Prohibit refueling within Riparian Habitat Conservation Areas unless there are no other alternatives. Refueling sites within a Riparian Habitat Conservation Area must be approved by the Forest Service or Bureau of Land Management and have an approved spill containment plan.	Met under Alternative 3. See Appendix 2 (General Requirements).

WWNF Forest Plan Reference number	Watershed and Habitat Restoration	Compliance discussion
WR-1	Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements)

PACFISH (Amended to the WWNF Forest Plan)	Minerals Management	Compliance discussion
MM-2	Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to siting facilities in Riparian Habitat Conservation Areas exists, locate and construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on inland native fish. 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.	Met under Alternative 3. Compliance with PACFISH MM-2 is required. See Appendix 3 (Structures inside an RHCA) and the Water Resources section of Chapter 3 of the EIS.
MM-3	Prohibit solid and sanitary waste facilities in Riparian Habitat Conservation Areas. If no alternative to locating mine waste (waste rose, spent ore, tailings) facilities in Riparian Habitat Conservation Areas exists, and releases can be prevented and stability can be ensured, then:	Met under Alternatives 2 and 3. It is part of minerals administration annual monitoring. See Appendix 2 (General Requirements) and Appendix 11 of the EIS which identifies items to be monitored and inspected.
MM-3a	Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.	Met under Alternative 3. See Appendix 2 for General Requirements related to Lode mining, discharge of adit water, and use of adit water for processing. See Water Quality discussion in the Water Resources section of Chapter 3 of the EIS. See Appendix 7 for effects analysis by Plan of waste material.
MM-3b	Locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Habitat Conservation Areas.	Met under alternative 3. Site specific plans detail proposed actions. Water quality laws insure compliance, Resource Protection Measures and monitoring listed in Appendix 11, describe actions and criteria that will prevent potential problems.

MM-3c	Monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to inland native fish and to attain Riparian Management Objectives.	This is met under Alternative 2 & 3 under 36 CFR 228.4 (e) & (f). Gives the District Ranger the authority to require a proposed modification to the Plan of Operations and when required, the completion of an environmental analysis.
MM-3d	Reclaim and monitor waste facilities to assure chemical and physical stability and revegetation to avoid adverse effects to inland native fish, and to attain the Riparian Management Objectives.	This is met under Alternative 2 & 3 as 36 CFR 228.8(g) requires the operator to reclaim the operation by taking such measures as will prevent or control onsite and off-site damage to the environment and forest surface resources see this regulation for more information.
MM-3e	Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.	This is met under Alternative 2 & 3 as 36 CFR 228.13gives the district ranger the authority to require a reclamation bond prior to the approval of the Plan of Operation.
MM-6	Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to eliminate impacts that prevent attainment of Riparian Management Objectives and avoid adverse effects on inland native fish.	This is met under Alternative 2 & 3 as 36 CFR 228.7 requires inspections, and the FSM 2800 outlines requirements for FS inspections. Additional site specific requirements are listed in Appendix 11.

WWNF Forest Plan Reference number	Standard and Guideline: SOILS (4-21)	Compliance discussion
1	**Conflicts with Other Uses.** Give maintenance of soil productivity and stability priority over uses described or implied in all other management direction, standards, or guidelines. Exceptions may occur for such things as campgrounds or transportation facilities when it is determined, through environmental analysis, to be in the public interest.	Met under Alternative 3. See Soil Resources section in Chapter 3 of the EIS for discussion and Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for soil protection and reclamation measures.

2	**Protection.** Minimize detrimental soil conditions with total acreage detrimentally impacted not to exceed 20 percent of the total acreage within the activity area including landings and system roads. Where detrimental conditions (see glossary) affect 20 percent or more of the activity area, restoration treatments will be considered. Detrimental soil conditions include compaction, puddling, displacement, and severe burning.	Met under Alternative 3. See Soil Resources section in Chapter 3 of the EIS for discussion and Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for soil protection and reclamation measures.
5	Re-establish vegetation following wild fire or management activities where necessary to prevent excessive erosion.	Met under Alternative 3. See Soil Resources section in Chapter 3 of the EIS for discussion and Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for soil protection and reclamation measures.

Umatilla National Forest

Uma NF Plan Reference number	Standard and Guideline: WATER (4-77 through 4-79)	Compliance discussion
	General	
1	Meet (MR) or exceed state requirements in accordance with the Clean Water Act for protection of waters of the State of Oregon (Oregon Administrative Rules, Chapter 340-41), and the State of Washington (Washington Administrative Code, Chapters 173-201 and 202), through planning, application, and monitoring of Best Management Practices (BMP's) in conformance with the Clean Water Act, regulations, and Federal guidance.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. See also Appendix 7 (Analysis of Effects for each Plan) and the Water Resources section of Chapter 3 of the EIS.

Uma NF Plan Reference number	Standard and Guideline: WATER (4-77 through 4-79)	Compliance discussion
	General	
3	In (sub)watersheds where project scoping identifies an issue or concern regarding the cumulative effects of activities on water quality, quantity, or stream channels, a cumulative effects analysis will be performed. The analysis will include land in all ownerships in the (sub)watershed. Activities on national forest lands in the (sub)watersheds should be dispersed over time and space to the extent practicable, and at least to the extent necessary to meet MR's. On intermingled ownerships, coordinate scheduling efforts to the extent practicable.	Met under Alternatives 2 and 3. See the cumulative effects section in the Water Resources section of Chapter 3 of the EIS.
4	Meet the direction and processes for management of wetlands and floodplains in accordance with EO 11990 and EO 11998 and FSM 2527 (MR).	Met under Alternative 3. Impacts to wetlands and floodplains are avoided or mitigated under Alternative 3 See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) for protection and restoration measures. See also Appendix 7 which discusses compliance with Executive Order 11988 (Protection of Floodplains) and Executive Order 11990 (Protection of Wetlands)
	Protection of Water Quality	
1	In cooperation with the States of Oregon and Washington, the Forest will use the following process:	See below
1a	Select and design BMP's based on site-specific conditions, technical, economic, and institutional feasibility, and the water quality standards for potentially impacted waters.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. See also Appendix 7 (Analysis of Effects for each Plan) and the Water Resources section of Chapter 3 of the EIS.

Uma NF Plan Reference number	Standard and Guideline: WATER (4-77 through 4-79)	Compliance discussion
	General	
1b	Implement and enforce BMP's.	Meets Alternative 2 & 3 as this is new direction for the Forest Service to follow on all activities.
1c	Monitor to ensure that practices are correctly applied as designed. Monitor to determine the effectiveness of practices in meeting design expectations and in attaining water quality standards.	Will be partially met in Alt 2 as normal process is to do random monitoring and site inspections on district mining activities? Will meet in Alt 3 as monitoring and site inspections are planned specifically on those sites.
1d	Evaluate monitoring results and mitigate where necessary to minimize impacts from activities where BMP's do not perform as expected.	Met under Alternatives 2 and 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. Also see Chapter 2 of the EIS for discussion of the minerals administration annual monitoring and inspections.
1e	Adjust BMP design standards and application when monitoring shows that beneficial uses are not being protected and water quality standards are not being achieved to the desired level. Evaluate the appropriateness of water quality criteria for reasonably assuring protection of beneficial uses. Consider recommending adjustment of water quality standards.	Met under Alternatives 2 and 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water resources. Also see Chapter 2 of the EIS for discussion of the minerals administration annual monitoring and inspections.
2	Use the existing process agreements to implement state water quality management plans on lands administered by the Forest as described in Memorandum of Understanding between:	See below

Uma NF Plan Reference number	Standard and Guideline: WATER (4-77 through 4-79)	Compliance discussion
	General	
2a	The Oregon Department of Environmental Quality and U.S. Department of Agriculture, Forest Service (2/12/79 and 12/7/82), and "Attachments A and B" referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest Lands in the Pacific Northwest 12/78 and Best Management Practices for Range and Grazing Activities on Federal Lands, respectively).	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water quality (i.e. stream temperatures, turbidity).
2b	The Washington Department of Ecology and U.S. Department of Agriculture Forest Service (7/79), and 'Attachment A' referred to in this MOU (Implementation Plan for Water Quality Planning on National Forest Lands in the Pacific Northwest 12/78). For a more complete explanation of the above, refer to Appendix E in the FEIS, 'Best Management Practices'. Individual, general Best Management Practices are described in *General Water Quality Best Management Practices*, Pacific Northwest Region, 11/88, which provides guidance but is not a direction document. A description is included of the process, limitations, and use of the BMP's.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water quality (i.e. stream temperatures, turbidity).

Uma NF Plan Reference number	Standard and Guideline: WATER (4-77 through 4-79)	Compliance discussion
	General	
3	Evaluations of both the ability to implement BMP's and their estimated effectiveness will be made at the project level. Projects may include general BMP's, site-specific BMP's or combinations of both.	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor surface resources. Annual inspections of mining sites monitor effectiveness of BMPs (see Inspection Items, BMP Monitoring and Stream Monitoring sections of Chapter 2).
4	Management activities will not degrade water quality, fish, or aquatic resources below the water quality goals except in temporary change due to permitted activities (FSM 2526). See Riparian/Fish Forest-wide Standards and Guidelines and Best Management Practices (BMP's).	Met under Alternative 3. See Appendix 11 (Resource Protection Measures) and Appendix 2 (General Requirements) which identify measures to be taken to protect and monitor water quality (i.e. stream temperatures, turbidity).

Appendix 10

Public Comments on the Draft EIS and Forest Service Responses

EPA Comments

Comment 1

Section 7(a)(l) of ESA requires that federal agencies conserve (i.e., protect and restore) species listed as threatened or endangered and their designated critical habitats. We are concerned about adverse effects to listed species and recommend that the Forest Service take the necessary steps (e.g., changing POOs and adding mitigation measures, including identified Reasonable and Prudent Measures identified by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service) to ensure that the action alternatives protect and restore listed species and their habitats. We recommend that the final EIS include the Biological Opinion and any recommended Terms and Conditions.

Response 1

Forest Service Requirements are designed to minimize impacts to ESA species (see DEIS p. 65) As required by Section 7 of the ESA, the Forest Service will incorporate mandatory Terms and Conditions into the Record of Decision from the Biological Opinions for the project.

Early consultation was initiated with the Regulatory Agencies beginning in the fall of 2011. Over the course of three years, two site visits were taken to Plans with the greatest potential impacts to ESA listed species, an extensive overview of the project was provided in a meeting with multiple follow-up emails to answer questions, and a draft Biological Assessment (BA) was provided for review with applicants, resulting in additional correspondence to answer questions and incorporate additional protection measures where possible. A final BA was submitted on August 27, 2014, and an updated BA was submitted September 21, 2015. The primary purpose of the updated BA was to reflect changes from Oregon Senate Bill 838 The Regulatory Services provided draft Reasonable and Prudent Measures and draft Terms and Conditions in late spring of 2015. Final Terms and Conditions will be included in the final EIS and Record of Decision.

Comment 2

Discharge of Warm Water -Proposed operations have the potential to discharge water from settling ponds either from surface or subsurface flow. Table 5-5 identifies one plan, Old Eric 1&2, under Alternative 2, having potential to discharge warm water; no plans are listed as having potential to discharge warm water under Alternative 3. Appendix 7 *"Effects to Water Resources by Plan,"* states that Old Eric 1&2 could have the potential to affect temperature from subsurface flow if water is left standing for multiple days due to the size of pond, unshaded condition, and its proximity to Granite Creek (15 feet). Please clarify whether or not there is potential for warm water discharge under Alternative 3, and make sure that document sections are consistent regarding this point.

Response 2

There is no potential for warm water discharge under Alternative 3. This is stated in DEIS Table 2-5 (p. S-14, 72) which identifies one Plan under Alternative 2 that has the potential for a discharge of warm water and no Plans under Alternative 3. Old Eric is identified in Table 3-12 as having a potential discharge of warm water under Alternative 2 but not under Alternative 3. There is no Table 5-5 in the DEIS.

The discharge of warm water is eliminated under Alternative 3 as a result of the addition of Forest Service Water Quality Protection Measures (WQPM) in Appendix 1A. The WQPM limits the amount of water that enters the settling pond to the amount that will infiltrate in a day. See Appendix 7 (Direct,

Indirect, and Cumulative Effects to Water Resources by Plan) for detailed discussion.

Comment 3

Page 113 of the DEIS refers to section *"Water Quality: Clean Water Act, Section 401 (potential for a discharge)"* for a discussion on potential impacts from warm water discharge. However, this section does not discuss nor evaluate the potential for warm water discharge, and Table 3-12, *"Potential for Discharge"* does not list any operations discharging warm water. Again, we are unclear with actual potential for discharge and if so, the temporal and potential severity of impact. The EIS should clarify whether or not there would be an impact, discuss methods used to predict the effect, and quantify the predicted impact.

Response 3

The potential for a discharge of warm water is found in the "Water Quality: Clean Water Act, Section 401" in Table 3-12 for Old Eric. Table 3-12 is a summary table only and show which of the 28 Plans have the potential for a discharge under Alternatives 2 and 3 and the nature of the pollutant. Detailed discussion of the temporal and potential severity are found in Appendix 7 for Old Eric under the heading "Clean Water Act, Section 401." In addition, the input of warm water is discussed in Water Quality: Clean Water Act, Section 303(d) under the header "Stream Temperature".

A correction has been made to the Final EIS. The discussion of warm water inputs that was present in under the header "Other Potential Water Resource Impacts" on page 116 has been removed because an input of warm water is considered a discharge of a pollutant and was already referenced under the Section 401 heading.

Comment 4a

Withdrawal of Water - Eight of the 28 plans propose withdrawing water from small tributaries for use in placer operations. Five of those plans would potentially alter stream temperature (withdrawals at approx. 100 gpm). The DEIS states that all of these streams exceed ODEQ State temperature criteria, that these plans would not be in compliance with the John Day TMDL, and all of the subwatersheds are either functioning at risk or functioning at unacceptable risk.

Under Alternative 3, impacts are minimized by using Forest Service WQPMs, which limit withdrawals to the period July 1 through August 15. This timing occurs when streams temperatures are at their highest. The DEIS does not quantitatively analyze or qualitatively describe the intensity of the impact to stream temperature.

Response 4a

Impacts to stream temperatures are minimized for three Plans as a result of Fish Protection Measures (not Water Resource Protection Measures) being added to Lightning, Tetra Alpha Placer and Tetra Alpha Mill and Lode which proposed to withdraw water. These Plans would withdraw water from streams with bull trout. The other two Plans would not have the Fish Protection Measures added because they do not have listed fish.

With respect to the question about the analysis of the intensity of impact of water withdrawals on stream temperatures, the intensity of the impact would vary considerably depending on dates of withdrawal, amount of withdrawal, length of withdrawal, and weather. Therefore, it is not possible to

assess qualitatively or quantitatively an intensity of impact. The best that can be stated is that temperature is likely to increase. A detailed discussion of site conditions for each of the Plans as it applies to water withdrawal is found in Appendix 7.

Comment 4b

We are concerned about water withdrawals that adversely affect stream temperatures, particularly in a watershed already affected by high temperatures. We are also concerned with the measure to cease withdrawals only when the stream is dry below the operation (page 115). We encourage the Forest Service to consider restricting withdrawals to periods of time that would reduce the potential to further degrade stream temperature. In the event that plans are approved that would not comply with the TMDL, the EIS should discuss the regulatory framework for approving operations that are not in compliance with other regional and local regulations/directives.

Response 4b

The Forest Service received additional clarification from Oregon Department of Environmental Quality (ODEQ) and the Office of General Council (OGC) regarding the intent of the TMDL. Forest Service Handbook 2817.23 states: "*Pursuant to CWA, the Forest Service cannot authorize a Plan of Operations until the 401 certification has been obtained or waived by the designated entity*." Furthermore, delaying authorization of a Plan of Operations until the obligations as TMDL designated management agency are complete is consistent with the last paragraph of FSM 2817.23a. This paragraph recognizes Clean Water Act situations beyond §401, §402 and §404 and supports delaying an entire Plan of Operations decision.

Therefore, in order to comply with the CWA, any activity that would not comply with the CWA must be removed from the proposed Plan (and an amended Plan submitted to the Forest Service) prior to Plan approval. In the FEIS, discussions of compliance with the CWA and TMDL have been replaced with the following discussion in Chapter 1, Decision Framework.

> *"Once the ROD is signed and issued, reclamation bonds and any 401 certifications and valid water rights determined necessary as a result of this analysis will be required before the Plans of Operation are approved and prior to commencement of mining activities (FSH 2817.23a(1)). PACFISH (which amended both Forest Plans in 1995) MM-1 requires a reclamation plan and reclamation bond for mineral operations in riparian habitat conservation areas (RHCAs). To ensure consistency with Section 401 of the CWA, if a 401 certificate and/or valid water right is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed activity(s) requiring 401 certification and/or valid water rights.*
>
> *The 401 certification is granted by the state of Oregon (ODEQ) and allows for a discharge of pollutants (sediment, heavy metals, warm water, chemicals, etc.) into waters of the state, and ensures compliance with section 401 of the Clean Water Act (CWA).*
>
> *As noted above, for those Plans proposing to withdraw water from streams, prior to Plan approval, the Forest Service will consult with Oregon Water Resources Department (OWRD) for documentation of a valid water right. If To ensure consistency with Section 401 of the CWA, if a valid water right is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed water withdrawal.*

Valid water rights are issued by the Oregon Water Resources Department, and are required for activities that withdraw water from a stream. The USFS has consulted with ODEQ and reviewed the Oregon Department of Environmental Quality John Day River Basin Total Maximum Daily Load/Water Quality Plan (TMDL). ODEQ has no authority to reduce existing valid water rights but the TMDL includes goals for maintaining and restoring flows where possible. New water right applications will be reviewed by ODEQ and conditioned based on TMDL flow restoration goals."

Comment 5a

Sediment
The DEIS evaluates sediment inputs from placer operations and suction dredge activities separately. Our comments below are organized similarly.

Placer Operations - Granite Creek and Bull Run Creek are 303(d) listed for sedimentation. Under Alternative 3, the number of plans that have potential to discharge high sediment loads is reduced from 16 plans to 2 plans - Blue Sky Run on Bull Creek and Belvadere on Olive Creek (not listed as impaired). We are pleased with the added WRPMs to reduce the potential for sediment delivery from operations.

The evaluation states that Blue Sky Run would not alter existing conditions because sediment would either move through as suspended load or settle out within 300 feet. However, Appendix 7 describes a number of potential pathways for sediment delivery. For example, for Blue Sky #3, there is a potential for bank failure, and the plan for Blue Sky #4 and Bill Run #1 includes a discharge due to "ambiguous" buffers and resulting uncertainty. The EIS should clarify the potential for sediment delivery, quantify the sediment loading, and further evaluate the effects on turbidity from suspended sediment. Given the uncertainty, the EIS should provide adaptive management measures/contingency measures that operators and the Forest Service would implement if failures occur or unanticipated releases of sediment occur.

Response 5a
The references to sediment inputs from Blue Sky #3, Blue Sky #4, and Bull Run #1 all occur under Alternative 2. Under Alternative 3, the potential for a sediment discharge via the various pathways has been reduced to only Blue Sky #3 because of the addition of Water Quality Protection Measures specific for each site (DEIS Appendix 1A). Details are found in Appendix 7 under Alternative 3.

Comment 5b
Suction Dredge Operations- Alternative 3 includes eight plans that propose to suction dredge. Six of these plans are within essential fish habitat and four of these are within 303(d) listed streams for sediment (Table 4A-l). The DEIS states that suction dredging is prohibited on any stream segment that is listed as water quality limited. However, this prohibition does not apply to streams that were subject to mining under ODEQ's 700-J permit prior to 2005 or to streams specifically authorized for mining under the 700 permit. We appreciate the inclusion of useful information regarding ODEQs permit.

Response 5b

The statement that the prohibition does not apply to streams that were subject to mining under ODEQ's 700-J permit prior to 2005 has been removed from the FEIS. The FEIS has been updated to include the following amended direction from the new May 2015 permit:

5. *This general permit does not authorize discharges from suction dredges operating on any stream segment that is listed as water quality limited in categories 4 and 5 for sedimentation, turbidity or toxics other than chlorine, on the list published by DEQ pursuant to OAR 340-041-0046 unless a stream segment is subject to a total maximum daily load (TMDL) that includes a wasteload allocation for mining under the 700PM permit. The 303(d) list as approved or established by EPA that is in effect as of January 1 of each year will be used to determine if coverage is available.*

Comment 6

However, we are concerned with activities located in EFH and that are listed as impaired. Suction dredging on other forest districts are closed to suction dredging on impaired streams under EPA's General Permit[1] or where ESA critical habitat exists without consultation with USFWS and NMFS (the Services collectively). The NPDES program in Oregon is delegated to ODEQ and we defer to their administration for their permit. However, we promote consistency of protective measures and recommend considering any additional plan-specific measures that ODEQ may believe is warranted. We also recommend that the final EIS include any Terms and Conditions imposed by the Services.

Response 6

Laws in Oregon regarding suction dredge mining have changed over the past several years. Senate Bill 838, which implemented the moratorium in Essential Salmon Habitat (ESH), streams with naturally reproducing bull trout, and streams that are 303d listed for sediment, went into effect if a new bill did not pass during the 2015 Oregon legislative session. Senate Bill 830, which would have consolidated State regulation of placer mining in 2016, did not advance in the 2015 session, so the moratorium on these activities is now scheduled to go into effect January 2016.

The current State moratorium in ESH, streams with naturally reproducing bull trout, and streams that are 303d listed for sediment is in effect until 2021, or until the Oregon State legislature changes the law. The Granite Mining FEIS will extend beyond the 2021 moratorium, and activities such as instream suction dredge mining are included in the Granite Mining analysis due to the uncertainty regarding State of Oregon rules and regulations.

Also refer to Response 1. Comment 20 clarifies the status of Essential Fish Habitat (EFH) in the Granite watershed.

Comment 7

Heavy Metals

Four plans propose accessing mine adits as part of their activity. Under Alternative 2, three of the plans would have a potential for discharging heavy metals; under Alternative 3, no plans would release heavy metals due to application of Forest Service WRPMs and General Requirements. We support the WRPMs and testing material for heavy metals. We agree with the requirement to cease mining if heavy metals are present until a detailed plan is developed and approved by the Forest

Service that demonstrates how heavy metals would be prevented from discharging to a stream. While we agree with these stipulations, we are concerned with current discharges to water from mine adits. Page 86 of the DEIS states that "none of the adits discharging water have been tested for water quality." We strongly encourage the Forest Service to develop a sampling plan and test water quality from mine adits to determine potential for contamination from the current discharge. This is necessary for understanding current conditions and quantifying potential impacts to water quality. We also recommend that the EIS include details of how material would be handled and tested (e.g., Forest Service approved lab).

Response 7

With respect to a sampling Plan for adit discharge: All Plans that proposed to do work in adits that are currently discharging water (L & H and Royal White) are required to test any adit discharge for compliance with the CWA and Safe Drinking Water Act prior to beginning of operations (see DEIS Appendix 1A which references Appendix 2 General Requirements L3, p. A2-11). Testing must occur at an approved lab and a copy of the test results sent directly to the Forest Service. Any Plan that proposes to do work in a dry adit that begins discharging water during their operation must comply with General Requirement L-8 and L-11 (Appendix 2, p. A2-11). General Requirement L-3 will be clarified in the FEIS such that the testing facility is Forest Service approved and testing procedures will follow DOGAMI protocol.

Comment 8

Monitoring

The DEIS states that Forest Service Mineral Administrators would complete annual minerals inspections and review to determine if Forest Plan standards/guides and WRPMs are being met. The DEIS states that there would be an annual inspection of operations and that depending on complexity of the operation, some of these are inspected twice, if not more, during the operating season. We are pleased about the commitment of Forest Service staff to conduct onsite inspections. We believe that many of the operations should be inspected more than once annually, particularly during initial construction, run-off events, operation and maintenance of settling ponds, a period during water withdrawal, and sampling and testing of adits.

Table 2-4 lists "Annual Inspection Items." We appreciate the summary of items and request that it include additional detail to provide a comprehensive list of items. For example, the document included observations by Forest Service staff of road related work such as stabilizing stream beds for fords, bridge construction, and other road activities. We recommend that this table also include the items mentioned in the paragraph above.

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[1] US EPA. 2013. Authorization to Discharge under the NPDES for Small Scale Suction Dredge Placer Miners in Idaho. GP No.: IDG370000.

Response 8

FSM 2817.3 direction (see below) requires that the FS inspect operations throughout the operation's activity. Therefore site visits would occur during the activities listed in the paragraph above (initial construction, run-off events, operation and maintenance of settling ponds, a period during water

withdrawal, and sampling and testing of adits). These visits would occur as needed to ensure compliance with Clean Water Act and other Federal and State laws. The variation in operation type and timing of activity limits the ability to provide a single comprehensive list of items. Individual inspections would hold specific items of potential concern that would warrant further monitoring.

> *Additional items as needed to ensure compliance with State and Federal Laws per FSM 2817.3 - Inspection and Noncompliance*
>
> > *1. Under Approved Operating Plan. When activities are being conducted under an approved operating plan, regular compliance inspections must be conducted to ensure reasonable conformity to the plan and to guard against unforeseen detrimental effects. The frequency, intensity, and complexity of inspection shall be commensurate with the potential for irreparable and unreasonable damage to surface resources.*

As stated in the DEIS, Chapter 2, "*Additional monitoring will occur using the 2012 BMP Sampling and Monitoring protocol (2012 BMPs-Appendix G) based on the number of active mines each year. A minimum of two mines or 25% of active operations, not to exceed a total of four 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*."

The draft National Core BMP Monitoring Technical Guide (Volume 2, FS-990b, in prep) is publically available when the Draft monitoring guide is released for review. When the monitoring protocols are finalized they will be posted on the webpage for the Granite mining project.

The minerals forms were recently revised in January 2015, and are available at the following link: http://fsweb.wo.fs.fed.us/wfw/watershed/national_bmps/bmp_docs-minerals.html

In addition, monitoring in Biological Opinions will be conducted as required.

Comment 9

Consistency with State of Oregon Requirements

The DEIS references compliance with ODEQ and Oregon Department of State Lands requirements throughout the document. We agree that all necessary permits/approvals should be acquired prior to the Forest Service approving POOs. The document states that a number of operators would need to acquire a 401 certification from ODEQ. However, we are unclear whether the Forest Service would need to obtain a 401 certification for approval of activities potentially affecting water quality. We request that the USFS clarify their role regarding approvals and acquiring a 401 certification. We encourage the USFS to coordinate with ODEQ and DSL on approvals related of the POOs. It may be helpful to contact Sara Christensen, Water Quality Certification Coordinator for ODEQ at christensen.sara@deq_.state.or.us.

It is our understanding that ODEQ's Section 700-J permit expired December 2014. A new permit has been issued and will be effective beginning May 2015. The final analysis should reflect any updates/modifications and demonstrate how operations will comply with the new permit. We recommend that the final EIS include information on the permit and clearly identify permit changes (e.g., suction dredging and sediment).

Response 9

FSM 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.

> 1. *CWA § 401 - Water Quality Certification: Pursuant to CWA § 401, both the Forest Service and the mining operator have CWA requirements to meet. If the mining activity "may result in any discharge into the navigable waters," (CWA, Title IV, § 401(a) (1), 33 U.S.C. 1341(a), 1972) the mining operator must obtain a 401 certification from the designated CWA federal, state or tribal entity, typically the state. This 401 certification from the designated entity certifies that the operator's mining activities and associated best management practices (BMPs), mitigation and/or reclamation are in compliance with applicable provisions of state, federal and/or tribal water quality requirements of the CWA. The mining operator must give a copy of this 401 certification to the Forest Service prior to the Agency approving the Plan of Operations. Pursuant to CWA, the Forest Service cannot authorize a Plan of Operations until the 401 certification has been obtained or waived by the designated entity. Finally, the Forest Service may not authorize a Plan of Operations if the designated entity denies the certification.*

See DEIS Appendix 2, General Requirement 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 emphasis only and not intended to cover all regulations that may apply to this operation."*

The Granite Mining FEIS and draft ROD will be completed after the State of Oregon Legislature completes its current session and the 2015 mining season is complete. The FEIS will be updated to reflect changes and current direction as needed. This will include the May 15, 2015 Revised 700PM General Permit, the outcome of legislation from the current session, and changes from the ESA regulatory agencies from their draft Terms and Conditions to final Terms and Conditions. The final analysis will reflect updates and modifications of operations and requirements to be compliance with any new permits or regulations.

As of August 2015, a State moratorium in Essential Salmon Habitat ESH, streams with naturally reproducing bull trout, and streams that are 303d listed for sediment is in effect until 2021, or until the Oregon State legislature changes the law. The Granite Mining FEIS will extend beyond the 2021 moratorium, and activities such as instream suction dredge mining on those streams are included in the Granite Mining analysis due to the uncertainty regarding State of Oregon rules and regulations.

Umatilla National Forest Minerals Administrator, Chris Helberg, spoke with Sarah Christensen of ODEQ on July 10, 2014 over the phone, and they discussed the 401 certification process for Granite miners (project file). The State will accept the Forest Service analysis and conclusions, and applicants can start the 401 process when they choose.

Refer to Response 4b for additional information about compliance with the CWA. Also refer to

Responses 5b and 6 regarding suction dredging.

Comment 10a

Biological Assessment, Table 20. The BA includes a list of 23 mine plans. The proposal is to approve 28 mine plans. It appears that operations such as Yellow Gold and Yellow Jacket were not included in the BA. All mine plans should be included in the effects analysis for ESA listed species or clarify why the five mine plans were eliminated from the ESA evaluation.

Response 10a

See BA p. 37 Table 4, asterisk below table, for rationale for No Effect for four mines. There is a discrepancy in the number of Plans because the Tetra Mill and Lode were combined into one Plan. This is corrected in the September 15, 2015 updated BA.

Comment 10b

3-36 directs reviewer to "see paragraph below Table 12. Table 12 does not exist. Recommend including all pertinent information.

Response 10b

Table 3-36 description of Pool Frequency has been corrected to read "see paragraph below Table 3-36.

Comment 10c

The DEIS describes stream fords related to Alternative 2- nine existing and two new and Alternative 3- eight existing and one new. The BA includes Table 15- eleven and nine fords respectively. This seems to be a discrepancy and it is unclear which document is accurate.

Response 10c

This was an error in the BA and has been corrected in the updated BA.

Comment 10d

Appendix 4A, Page 5. Discussion regarding listed streams states that "suction dredging did occur on these streams between 1999 and 2005 and so is grandfathered in because continued suction dredging on these streams would not constitute a new load." This paragraph is confusing because:

1) The TMDL did not include sediment and therefore, how would calculated targets apply? and (2) because suction dredging occurred prior to streams being listed for sediment should not preclude them from consideration of effects. Please clarify and include these operations in the evaluation.

Response 10d

We agree that the statement you cite from Appendix 4A, page 5, is confusing. The statement *"suction dredging did occur on these streams between 1999 and 2005 and so is grandfathered in because continued suction dredging on these streams would not constitute a new load"* will be removed from the FEIS. This statement was in reference to 303d streams and the old 700 permit. In the 2015 700 permit, the grandfather clause, as it pertains to suction dredging, has been removed, and this has been updated throughout the FEIS and appendices. Suction dredging requires State of Oregon permit(s) and the State regulates where these activities occur.

Senate Bill 838, which implemented the moratorium in ESH, streams with naturally reproducing bull

trout, and streams that are 303d listed for sediment went into effect if a new bill did not pass during the 2015 Oregon legislative session. Senate Bill 830, which would have consolidated State regulation of placer mining in 2016, did not advance in the 2015 session, so the moratorium on these activities is now in effect as of January 2016.

The State moratorium is effect until 2021, or until the Oregon State legislature changes the law. The Granite Mining FEIS will extend beyond the 2021 moratorium, and activities such as instream suction dredge mining are included in this analysis due to the uncertainty regarding State of Oregon rules and regulations.

Two Plans, Sunshine/McWillis and Yellow Jacket, are not located in ESH, streams with naturally reproducing bull trout, or streams that are 303d listed for sediment, therefore, they do not fall under the State moratorium (FEIS Appendix 4A, Table 4A-1).

Comment 10e
It is unclear if the plans in the BA are based on Alternative 4 or Alternative 3. Request clarification.

Response 10e
The BA is based on Alternative 3. Please note that there is no Alternative 4.

Comment 10f
The maps in the document are difficult to decipher. For example the names of streams are not clear (very small), impaired streams are not identified, and they do not show operations within impaired streams or EFH. The final EIS should include maps that are easier to read and include more detail regarding operations and water quality.

Response 10f
An updated streams map is included in the FEIS. In addition, comment 20 clarifies the status of Essential Fish Habitat in the Granite watershed.

Comment 11
Please include a list of acronyms.

Response 11
A list of acronyms will be included in the FEIS.

Jean Public Comment

Comment 12
I AM WRITING TO OPPOSE PLACING A MINE ON THIS SITE OWNED BY THIS NATIONALS 325 MILLION OWNERS. THIS KIND OF CONTAMINATION WILL HURT THE WATERSHED. MINES USE TREMENDOUS AMOUNTS OF WATER AND POLLUTE THAT

WATER SOURCE SO THAT ALL LIFE, WILDLIFE, BIRDS, PEOPLE, ETC ARE POISONED. IT IS TIME TO DENY PERMITS TO MINE AT THIS SITE. I WOULD LIKE TO BE PLACED ON THE LIST FOR ALL FURTHER DEVELIPMETNS TO DESTROY THIS SITE. THIS COMMETN IS FOR THE PUBLIC RECORD. PLEASE RECEIPT. JEAN PUBLIC

Response 12

The environmental effects of the proposed action and alternatives can be found in Chapter 3 of the DEIS. Mining activities are permitted in accordance with 36 CFR 228A.

NEDC/HCPC Comments

Commenters applaud the USFS for recognizing that the proposed new mining activity is likely to result in a significant impact and thus requiring Plans of Operations and an EIS. The analysis in this DEIS, however, is lacking. It fails to comply with NEPA and the agency's own regulations. The following sections outline the major inadequacies in the USFS's environmental analysis of the proposed mining operations. The USFS must revise the DEIS to address these inadequacies before signing a Record of Decision (ROD) authorizing the proposed actions.

Comment 13

I. By issuing this DEIS without the necessary supporting information, the USFS has prevented meaningful public comment and participation.

The ability of the public to meaningfully comment on an agency's NEPA analysis is an essential part of NEPA's public participation mandate. *See* 40 C.F.R. §§ 1500.1(b), 1503.1, 1506.6. Here, the USFS failed to comply with that mandate. For example, the USFS's analysis improperly relies on unspecified mitigation measures to offset the impacts of the proposed mining activities. The DEIS also notes that the USFS expected a Biological Opinion (BiOp) from the National Marine Fisheries Service and U.S. Fish and Wildlife Service (collectively, the Services) by December of 2014. DEIS at 144. Section 7 of the Endangered Species Act (ESA) "requires federal agencies to ensure that none of their activities, including the granting of licenses and permits, will jeopardize the continued existence of listed species or adversely modify a species' critical habitat." *Karuk Tribe of California v. U.S. Forest Serv.*, 681 F.3d 1006, 1020 (9th Cir. 2012) (citing 16 U.S.C. § 1536(a)(2))). In the *Karuk Tribe* decision, the Ninth Circuit concluded that the USFS's approval of a Notice of Intent to initiate suction dredge mining operations was an agency action subject to consultation under section 7 of the ESA. *Id.* at 1024. There is no BiOp included in this DEIS. Since the DEIS was issued for public review and comment in February of 2015, it is odd that the information was not complete.

Without the details of this information, the public has not been allowed to meaningfully evaluate or comment on the impacts of the proposed action. NEPA dictates that where "a draft [EIS] is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion." 40 C.F.R. § 1502.9(a). That is precisely what must happen here. It was inappropriate for the USFS to issue this DEIS for public review and comment without such critical information such as the details of mitigation measures and a complete BiOp from the Services. The USFS must complete a supplemental NEPA analysis once it receives the biological opinion from the Services, and issue the SEIS for public review and comment. The USFS's analysis in the DEIS fails to comply with the National Environmental Policy Act and the agency's own implementing regulations.

NEPA is a procedural statute designed to ensure public participation and transparent decision making by federal agencies. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989). NEPA requires an EIS include, inter alia, the (1) environmental impact of the proposed action, (2) any adverse environmental effects that cannot be avoided, and (3) alternatives to the proposed action. 42 U.S.C. § 4332(2)(C). Federal agencies must take a "hard look" at the potential environmental impacts of each major action. *Robertson*, 490 U.S. at 350.

The USFS's own regulations require a Plan of Operations for mining activity that is likely to cause significant disturbance of surface resources. 36 C.F.R. § 228.4. Because the USFS determined that the proposed mining activities are likely to cause significant disturbance of surface resources, the USFS required Plans of Operations and has prepared this DEIS. As set forth below, the analysis in the USFS's DEIS fails to conform with the letter and spirit of NEPA, the Council on Environmental Quality (CEQ) guidelines implementing NEPA, and the USFS's own NEPA regulations.

Response 13

A Biological Assessment (August 27, 2014, updated September 15, 2015) was prepared under interagency streamlining guidelines and submitted to the regulatory agencies. All mandatory Terms and Conditions will be included in the FEIS.

Notice of Intent activities (as described in the Karuk Tribe decision) are not included in the proposed action or alternatives. This is explained in DEIS Chapter 1, "Proposed Plan Activities Excluded from Analysis under 36 CFR 228.4". Any proposed suction dredging activities that are likely to cause significant disturbance of surface resources per 36 C.F.R. § 228.4 are analyzed in the DEIS

Comment 14a

The USFS's statement of purpose and need is fundamentally flawed.

The statement of purpose and need is central to a proper EIS because it provides the guideposts for the analysis of actions, alternatives, and effects. 40 C.F.R. § 1502.13. As such, the EIS must include a concrete and accurate statement of purpose and need. It is fundamental that agencies do not avoid NEPA's requirements by unreasonably restricting the statement of purpose. *Simmons v. United States Army Corps of Eng'rs*, 120 F.3d 664, 666 (7th Cir. 1997) ("One obvious way for an agency to slip past the strictures of NEPA is to contrive a purpose so slender as to define competing 'reasonable alternatives' out of consideration (and even out of existence).") *See also Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1066 (9th Cir. 1998) (stating that "[a]n agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action"). The statement of purpose and need provided in this DEIS directly contradicts the requirements of NEPA and applicable case law.

Here, the USFS describes the purpose and need as a "need to authorize the approval of Plans of Operation submitted by the miners, as specified in 36 CFR 228.4(a), and to consider the Forest Service's responsibility to approve or require modifications to these Plans in accordance with federal mining and environmental laws." DEIS at 14. This statement of purpose and need is inconsistent with the case law under NEPA prohibiting an agency from defining the objectives of its action in unreasonably narrow terms.

The statement also lacks justification. The USFS cites to 36 C.F.R. § 228.4(a) in support of its statement of purpose. This rule requires a Notice of Intent or a Plan of Operation for operations that might cause a significant disturbance of surface resources. The rule in no way supports the agency's

assertion that the statement of purpose and need must be restricted to *approving* the Plans of Operations. The USFS also cites to 36 C.F.R. § (e), which allows the USFS to ask the operator for proposed modifications to an approved Plan of Operations to address any unforeseen significant disturbance of surface resources. This rule also in no way supports the agency's claim that it must *approve* a Plan of Operations.

Response 14a

The DEIS did not state that the purpose and need must be *restricted* to approving the Plans of Operations. It did state that "*there is a need to authorize the approval of the Plans of Operations submitted by the miners, as specified in 36 CFR 228.4(a), and to consider the Forest Service's responsibility to approve or require modifications to these Plans in accordance with federal mining and environmental laws*. " It also explained the changed environmental conditions in the watershed since some of the Plans were originally approved, including listed fish species and 303(d) listed streams (DEIS, pg. 13). The purpose and need will be clarified in the FEIS to emphasize that the Forest Service needs to ensure adverse environmental effects on National Forest surface resources are reasonably minimized where mining claimants propose to conduct operations authorized by mining laws.

Under Forest Service Mining Regulations at 36 CFR 228A governing activities authorized under the 1872 Mining Law as amended, the Forest Service must conduct an environmental analysis for the POO and within 30 days notify operators that:

1. The POO is approved as submitted.
2. No plan is needed for the activities proposed (federal decision not required).
3. The proposed POO must be changed to meet the intended purpose of the regulations (proposed plan must be changed as described in the NEPA Decision Document)
4. More time is required to process the plan.
5. The plan cannot be approved until an EIS is prepared

Forest Service authority to require, evaluate, and approve or modify plans of operations for locatable minerals on National Forest System Lands is based on the 1897 Organic Act and Multiple Use Mining Act of 1955. The Forest Service has the authority under these laws to regulate the surface resource impacts of locatable mineral operations, but it may not prohibit a POO for discovery or development of such resources provided that it complies with applicable federal Mining Laws and Regulation, as well as applicable state and federal laws and regulations relating to air, water, and solid waste. Nor does the Forest Service have the authority to impose unreasonable requirements that would have the effect of denying the statutory right to explore and develop the mineral resource, provided the plan otherwise meets the intent of applicable laws and regulations. (30 USC 612)

Since 1872, an evolving body of legislation and policy has acknowledged, addressed, and directed mineral development on federal lands. The Federal Government's policy for minerals resource management is most succinctly expressed in the **Mining and Minerals Policy Act of 1970**1:

> "The Congress declares that it is the continuing policy of the Federal Government in the national interest to foster and encourage private enterprise in (1) the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries, (2) the orderly and economic development of domestic mineral resources, reserves, and reclamation of metals and minerals to help assure satisfaction of industrial, security and environmental needs... For the purpose of this Act minerals. shall include all minerals and mineral fuels including oil, gas, coal, oil shale and uranium."

Comment 14b

Although the applicant's objectives are relevant for determining the project's purpose and need, "[m]ore importantly, an agency should always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency's statutory authorization to act, as well as in other Congressional directives." Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190 (DC. Cir. 1991); see also Westlands Water Dist. v. U.S. Dep't of Interior, 376 F.3d 853, 866 (9th Cir. 2004) ("Where an action is taken pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in an EIS."). Under the National Forest Management Act, and the Wallowa-Whitman and Umatilla National Forests Land and Resource Management Plans (Forest Plans), the USFS is tasked with balancing multiple uses of the National Forests.

Response 14b

NFMA states "coordination of multiple use and sustained yield opportunities as provided in the Multiple-Use Sustained-Yield Act". MUSY states "Nothing herein shall be construed so as to affect the use or administration of the mineral resources on national forest lands…".

Comment 14c

The USFS explains that the test for sufficiency of an operating plan is "reasonableness." UNF Forest Plan, page 4–81. Even if a Plan of Operation for a mining activity is reasonable, under the Forest Plans that use must be balanced against other uses, including preservation of conditions to support fish populations. *See*, *e.g.*, DEIS at S-4 (noting that Management Area 18 and Management Area C7 "are intended to achieve and maintain optimum conditions for anadromous fish" and that the USFS's plans require it to place emphasis on protecting fish habitat and habitat investments through "reasonable provisions" in Plans of Operation and in reclamation requirements). Combined with the USFS's independent mandate under NEPA to act as a steward for present and future generations, *see* 42 U.S.C. § 4331(b), it is impossible for the USFS to reconcile its statutory objectives with the goal of approving the mining Plans of Operations, regardless of the impacts. Simply put, the Forest Plan provides that protecting federally listed fish and their habitat is more important than authorizing mining activities. The statement of purpose and need in this DEIS ignores these priorities.

Response 14c

It is the statutory right of every citizen to enter and remove valuable minerals from lands open to mineral entry (1872 Mining Law), and reasonable use of the surface that is incident to mining (added in 1955). Implementation of the regulations at §228 define the purpose of the regulations as rules and procedures through which the use of the surface of NFS lands in conection with "operations authorized by the United States Mining Laws (30 USC 21-54) (36 CFR 228.1)

On September 1, 1974 (39 FR 31317), the U.S. Department of Agriculture made effective regulations (36 CFR Part 228) designed to cover prospecting, exploration and mining activities on National Forest Lands by persons operating under the United States Mining Laws of 1872, as amended. Although these regulations do not constitute a permit to explore or mine as that is already a statutory right under the 1872 mining law, they do mandate that such exploration and mining activities be conducted so as to minimize adverse environmental impacts on the National Forest System. (Mineral Law, Sixth Edition, Maley, pg 757)

The General Mining Law of 1872 (as amended) limits the FS decision space to developing terms and conditions that minimize adverse environmental impacts to National Forest System surface resources.

Chapter 1 outlines the decision framework and the laws, regulations, and policies that frame Forest Service authorities as they pertain to mineral extraction from NFS lands.

Comment 15a

a. The USFS's environmental analysis violates NEPA by failing to consider a reasonable range of alternatives.

NEPA requires the USFS to evaluate a reasonable range of alternatives. The alternatives analysis is "the heart" of an EIS. 40 C.F.R. § 1502.14. An EIS must "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." 40 C.F.R. § 1502.14(a); 42 U.S.C. § 4332(2)(C)(iii). A reasonable alternative is one that is feasible, especially with regards to meeting the underlying purpose and need. As explained in the previous section, the statement of purpose and need is unduly narrow. In turn, the alternatives discussion is superficial and ignores NEPA's requirement to evaluate a reasonable range of alternatives. The alternatives analysis is meant to provide the federal agency and public with a "clear basis for choice among the options." 40 C.F.R. § 1502.14. Federal courts have routinely found that NEPA does not allow federal agencies from effectively reducing the discussion of environmentally sound alternatives to a binary choice between granting and denying an application. *See, e.g.*, *Save Our Cumberland Mountains v. Kempthorne*, 453 F.3d 334, 345 (6th Cir. 2006). That is precisely what the USFS has done with the three alternatives set forth in this DEIS. The DEIS outlines just three alternatives: (1) a "no action" alternative, (2) the proposed action based on the Plans of Operations submitted by the miners, and (3) a minor variation of the proposed action considering Plans of Operations as submitted by the miners with USFS requirements. The Ninth Circuit has rejected this type of avoidance approach by agencies in the past. *See Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 813 (9th Cir. 1999) (per curiam) (concluding that the EIS violated NEPA when the two action alternatives considered in detail were "virtually identical"). Indeed, "the evaluation of 'alternatives' mandated by NEPA is to be an evaluation of alternative means to accomplish the general goal of an action; it is not an evaluation of the alternative means by which a particular applicant can reach his goals." *Van Abbema v. Fornell*, 807 F.2d 633, 638 (7th Cir. 1986). By considering only the proposed action, a virtually identical alternative, and a false "no action" alternative (see below), the USFS essentially reduced the alternatives discussion to a binary choice between approving continued operations under a Plan of Operations or a Notice of Intent. This defies the purpose of the alternatives analysis under NEPA and prevents meaningful consideration of alternatives.

The USFS describes Alternative 1 as a "no action" alternative under which the mining operations would continue pursuant to Notices of Intent instead of under Plans of Operations. DEIS at S-5–S-6. This fails to comply with the requirement to consider a "no-action" alternative at 40 C.F.R. § 1502.14(d) (requiring a lead agency to consider "the alternative of no action"). A "no-action" alternative would consider the impact of not approving the proposed activities.

Instead, all of the alternatives the USFS considered would involve some form of mining activity.

Response 15a

Except for the purpose of consultation under ESA, Notice of Intent operations are those activities specifically outlined in 36CFR 228.4 and authorized within those regulations provided that these

activities do not reach the level of causing a significant disturbance. These activities do not require authorization by the District Ranger. The regulations in this section authorize these activities. The correct language that should have been started above should have been "pursuant to the regulations" not a Notice of Intent.

Under ESA, a Notice of Intent that has been submitted to the District Ranger because the operator has determined that his/her operations MAY cause a significant impact of surface resources, AND those operations are located in ESA streams, require consultation before the Ranger can determine if a Plan is necessary. If the regulating agencies issue a BO that does not have terms and conditions that apply to the mining operator, and there are no other resources that may be affected, the District Ranger could still determine that no Plan of Operations is needed. The operations would be allowed by regulation (36CFR 228.4)

The comment assumes that we "approve" all mining activities, either by approving an NOI or a POO. That is an incorrect assumption and does not take account for operations that are allowed by regulations.

> "*16 U.S.C. 478 (1982), which authorizes entry into national forests for all proper and lawful purposes, including that of prospecting, locating, and developing the mineral resources thereof, specifically states that such persons must comply with the rules and regulations covering such national forests. This statutory caveat encompasses all rules and regulations, not just those (such as Part 228) which apply exclusively to mining claimants. In this context, § 261.1(b) is merely a recognition that mining operations may not be prohibited nor so unreasonably circumscribed as to amount to a prohibition. United States v. Weiss, 642 F.2d 296, 299 (9th Cir. 1981).*" (Federal Register Vol. 70, No. 107, June 6, 2005).

The baseline condition is the current situation, which would include any currently approved mining Plans of Operations (there are currently none in the Granite Creek Watershed) and other activities allowed by regulation. Current mining activities on these sites have been limited to assessment work and NOI work as described in 36 CFR228.4.In American Rivers v F.E.R.C, 187 F.3d 1007 (9th Cir. 1999), the court held that the baseline is existing projects, not a prior condition that no longer exists. The court also held that "to the extent a hypothetical pre-project or no-project environment can be recreated, evaluation of such an environment against current conditions at best serves to describe the current cumulative effect on natural resources of these historical changes."

The "no action" alternative analyzed in the DEIS finds additional support in the Council on Environmental Quality's response to Question No. 3 of its NEPA guidance memorandum. The response states, in pertinent part: [W]here ongoing programs initiated under existing legislation and regulation will continue, even as new plans are developed. "...'no action' is 'no change' from current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the 'no action' alternative may be thought of in terms of continuing with the present course of action until that action is changed." Alternative 2 is the proposed mining Plans as submitted by the miners. Though they may contain some actions that are in violation of the Clean Water Act, they are nonetheless proposals requesting Federal Action (approval of mining Plans of Operation) and are analyzed as such.

Comment 15b

For the alternatives that the USFS did identify, this DEIS fails to "[r]igorously explore and objectively evaluate all reasonable alternatives" as required by CEQ's regulations. 40C.F.R. § 1502.14(a). The USFS eliminates Alternative 1 because it does not meet the statement of purpose and need "since Forest Service Regulations in 36 CFR 228, Subpart A, do[] not provide for denying a reasonable Plan of Operations." DEIS at S-6. The USFS appears to misread the express text of its own regulations. A Plan of Operations is required instead of a Notice of Intent "if the proposed operations will likely cause a significant disturbance of surface resources." 36 C.F.R. § 228.4(a)(3). Whether each specific Plan of Operations is "reasonable" is a separate, fact-specific determination. Plans that are not reasonable may not go forward at all. 36 C.F.R. §§ 228.4(a)(4) ("If the District Ranger determines that any operation is causing or will likely cause significant disturbance of surface resources, the District Ranger shall notify the operator that the operator must submit a proposed plan of operations for approval and that the operations *can not be conducted until a plan of operations is approved*."); 228.5(a). Pursuant to the USFS's regulations, prospecting would not continue because the USFS itself made the determination that these activities are likely to cause significant disturbance of surface resources, and thus require a Plan of Operations.

Response 15b

This assumes that we have determined all proposed mining activities will be approved in a Plan. DEIS Chapter 1, pg 15 and 16 describe activities that may continue under Alternative 1 and do not require approval. The District Rangers actually determined that some activities would not cause a significant disturbance. This also does not recognize the potential of other miners entering into the area that are conducting operations who are not required to and therefore have not contacted us. Simply by determining that an operator is required to submit a Plan would not place that person at a disadvantage over others operating in the same area. An operator that has submitted a Plan would still be allowed to conduct limited operations outlined in the regulations that did not cause surface disturbance. Only limited prospecting would continue following the activities allowed by the regulations at 36CFR 228.4.

Comment 15c

The USFS's reliance on Forest Service Regulations in 36 CFR 228, Subpart A for the proposition that it must approve the Plans of Operations is inconsistent with its own regulations governing approval of Plans of Operations. Reliance on Subpart A to eliminate consideration of a true no-action alternative is misplaced. As a result, the USFS failed to comply with NEPA and CEQ's implementing regulations by not considering a no-action alternative and failing to take a hard look at Alternative 1.

Response 15c

CEQ regulations at 40 CFR 1502.14 (Alternatives including the proposed action) states "…(d) include the alternative of no action". Forest Service NEPA Handbook 1909.15 Chapter 10, section 14.2 (No-Action Alternative) states: "The no-action alternative provides a baseline for estimating the effects of other alternative; therefore, include the effects of taking no-action in each environmental analysis".

The No Action alternative was analyzed in full in accordance with NEPA and CEQ regulations in the DEIS. See Chapter 3, pgs. 94-97, 135-139, 161, 195, 196, 197-199, 206, 218, 227, 264, 280-281, 284, and 295.

Comment 15d

Because the USFS relies on its faulty analysis of Alternative 1 as the base line for comparison of the

effects of the proposed action, DEIS at S-6, the USFS's entire environmental analysis is flawed.The USFS identified Alternative 3 as the preferred alternative. This alternative is lacking for two main reasons. First, this alternative allows mining operations and only requires additional USFS resource protection measures and requirements for the activities that do not require a 401 certification from DEQ. As explained later, the USFS has an independent duty to ensure protection of water quality. It is inappropriate for the USFS to defer to DEQ for mitigation measures to address the water quality impacts of this action. *See, e.g., Klamath- Siskiyou Wildlands Center v. BLM*, 387 F.3d 989, 998 (9th Cir. 2004) (noting that "[a] non- NEPA document – let alone one prepared and adopted by a state government – cannot satisfy a federal agency's obligations under NEPA").

Second, the USFS states that reasonable alternative mitigation measures or operating requirements will be created during the development of operating plans or plan modifications to define appropriate stipulations needed to protect other resources while still meeting the objectives of the miner. DEIS at S-2. Yet the USFS's own regulations require a Plan of Operations to include "[i]nformation sufficient to describe or identify the type of operations proposed . . . and measures to be taken to meet the requirements for environmental protection in § 228.8," 36 C.F.R. § 228.4(c), unless "development of a plan for an entire operation is not possible at the time of preparation of a plan," *id.* at 228.4(d). In that case, the miner must submit an "initial plan setting forth his proposed operation to the degree reasonably foreseeable at that time." *Id.* CEQ's guidelines state that the alternatives analysis must "[i]nclude reasonable alternatives not within the jurisdiction of the lead agency" and "appropriate mitigation measures not already included in the proposed action or alternatives." 40 C.F.R. 1502.14(c), (f).

Instead of requiring the details of proposed mitigation in the miners' full Plans of Operations or at least proposed mitigation measures in an initial plan, as required by the USFS's own regulations, the USFS simply states that mitigation measures and operating requirements will be developed when the Plans of Operations are developed. Far from the adaptive management approach authorized by the USFS's regulations implementing NEPA, 36 C.F.R. § 220.5(e)(2) (allowing adaptive management based on monitoring of impacts), deferring all details to a later date is insufficient to comply with NEPA and inconsistent with the agency's own rules.

Response 15d

DEIS at S-2 includes direction from the Umatilla National Forest Plan (pg. 4-81). Details of mitigations are not "deferred to a later date" as stated by the commenter. The DEIS includes requirements and protection measures to ensure protection of resources, including water quality (DEIS Chapter 2, and DEIS Appendices 1A and 2). Under Alternative 3, these requirements and measures would be incorporated into each Plan after a Record of Decision is signed, and when each Plan is signed by the miner and deciding official. In Alternative 2, the miners' proposed plans include mitigation measures and operating requirements proposed by the miners (Appendix 1A, and project file). For ease of reading, the FEIS will combine all Plan-specific Resource Protection Measures (from DEIS Ch. 2 and DEIS Appendix 1A) into FEIS Appendix 11. To reduce duplication in the FEIS, the Water and Soil Resources Resource Protection Measures report (DEIS Appendix 1A) will now be in the project file.

Comment 15e

In sum, the USFS must consider myriad of onsite and offsite alternatives to the proposed mining activities. The USFS improperly eliminated or ignored reasonable alternatives to the proposed action. Instead, each of the alternatives in the USFS's analysis contemplates a lot of action with a lot of resulting impacts. By failing to comply with the essential requirement to set forth a reasonable range of alternatives, the USFS's analysis in this DEIS violates NEPA.

Response 15e

CEQ regulations 40 CFR 1502.14(a) include direction to "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated". Alternative considered but eliminated from detailed study are included in the DEIS, Chapter 2, pg. 33. The WWNF Forest Plan guides the Forest Service to "analyze operating plan proposals and alternatives, including alternatives for access, reclamation and mitigation, using the Forest Service NEPA process (WWNF Forest Plan, pg. 4-33). Similarly, the UNF Forest Plan guides the Forest Service that "during the development of operating plans, reasonable alternative mitigation measures and/or operating requirements will be developed to define the appropriate stipulations needed to protect other resources while still meeting the objectives of the mineral miner. The test for operating plan requirements is "'reasonableness" (UNF Forest Plan, pg. 4-81). Alternatives 2 and 3 meet the direction in 36 CFR 228.4, the Purpose and Need as stated in the FEIS, and both the WWNF and UNF Forest Plans by analyzing the effects of the proposed Plans of Operations and providing reasonable mitigation measures and requirements to protect other resources while still meeting the objectives of the miner.

Comment 16

b. The USFS failed to take the required "hard look" at the impacts of the Granite Creek Watershed Mining Project.

NEPA requires agencies to disclose and evaluate all of the effects of a proposed action— direct, indirect, and cumulative. 40 C.F.R. § 1502.16. NEPA further defines impacts or effects to include "ecological[,] . . . economic, [and] social" impacts of a proposed action. 40 C.F.R. § 1508.8(b). Agencies must make "a reasonable, good faith, objective presentation of those impacts sufficient to foster public participation and informed decision making." *Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1177 (10th Cir. 1999). Once identified, NEPA requires federal agencies to take a "hard look" at those impacts. *Tillamook Cnty. v. U.S. Army Corps of Eng'rs*, 288 F.3d 1140, 1143 (9th Cir. 2002).

The mining activities analyzed in this DEIS would include stream fording, suction dredging, and discharges that will adversely impact water quality. DEIS at S-5. The activities would also include creation and use of access roads. The USFS has failed to identify all of the direct, indirect, and cumulative impacts that are likely to result from these activities. In certain instances, the USFS has failed to adequately discuss these impacts.

Response16

The direct, indirect and cumulative effects of all proposed actions and alternatives are included in the DEIS (Chapter 3, and Appendices 4A and 7).

Comment 17

Water Quality

Water quality standards are implemented under the CWA to supplement technology- based standards whenever "discharges of pollutants from a point source or group of point sources…would interfere with the attainment or maintenance of that water quality in a specific portion of the navigable waters." 33 U.S.C. § 1312. According to the CWA, "standards shall be such as to protect the public health or welfare, enhance the quality of water" and "shall be established taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes." 33
U.S.C. § 1313(c)(2)(A). To set water quality standards, a state must first designate the beneficial uses it must protect and then set standards to protect those uses. *See, e.g.*, O.A.R. 340-041-0101.

Based on the district court ruling in *HCPC v. Haines*, section 313 of the CWA requires all federal agencies must comply with water quality standards. 2006 WL 2252554 *1, *4 (D.Or. 2006). Federal agencies also must comply with the federal anti-degradation policy set out under 33 U .S.C. § 1313(a) and 40 C.F.R 131.12, and Oregon's anti-degradation policy set out under O.A.R. 340-041-0004. *HCPC*, at *4. As a result of these provisions, the USFS must demonstrate in its NEPA analysis that the agency's selected action will protect water quality. The USFS must also demonstrate that activities will not result in any further degradation to streams listed as water quality limited pursuant to Oregon's 303(d) list. *Id.* at *5. This includes no measurable increase in sedimentation to water-quality impaired streams. The USFS's analysis of water quality impacts in this DEIS is inadequate.

First, the USFS fails to demonstrate in the DEIS that the preferred alternative will protect water quality and not result in any further degradation to any stream listed as water quality limited pursuant to Oregon's 303(d) list. According to the DEIS, "[t]wo streams in the watershed (Bull Run Creek and Granite Creek) are currently listed as water-quality limited for sedimentation." DEIS at S-1. A number of streams were also listed for temperature but were removed after promulgation of a TMDL in 2010. *Id.* at 28. Despite this "[a]ll eleven streams continue to exceed [the temperature target as determined by the John Day River Basin TMDL]." *Id.* at 86. As a result, these streams cannot be subject to further degradation. The mining activities are likely to result in further degradation.

Response 17

FEIS Appendix 7 includes a detailed analysis of the potential for a discharge of a pollutant or a temperature increase as a result of the miner's proposed activity.

There are two parts to this comment.

1. Concerns related to streams that are water quality limited for sedimentation:

Under Alternative 3, the potential for a discharge of sediment have been eliminated as a result of site-specific WRPMs (DEIS Appendix 1A) and General Requirements (Appendix 2) EXCEPT for Belvadear and Blue Sky/Bull Run (Blue Sky site 3) because no measures could be identified that would eliminate the potential. The reduction in impacts related to sediment discharge potential between Alternatives 2 and 3 are found in Chapter 3 of the DEIS, Table 3-12. With respect to Belvadear and Blue Sky/Bull Run, a 401 certification from ODEQ would be required by the Forest Service prior to approving the Plan. Alternatively, the Plans could be approved once amended Plans are submitted to the Forest Service that exclude the proposed activity(s) requiring 401 certification. A detailed analysis of effects on water quality for each Plan is found in Appendix 7.

2. Concerns related to stream temperature:

Under Alternative 3, potential increases in stream temperature are limited to water withdrawals. These impacts are not discussed under Section 401 because the increase to temperature would be the result of a removal of water, not an input of warm water (i.e. pollutant). Instead they are discussed under the heading "Other Potential Water Resources Impacts". Under Alternative 3, a valid water right from Oregon Water Resources Department would be required by the Forest Service prior to approving the Plan. Alternatively, the Plan could be approved once an amended Plan is submitted to the Forest Service that excludes the proposed water withdrawal. This requirement for a valid water right will be found in FEIS, Chapter 1, Decision Framework.

The two other Plans (Old Eric and Grubsteak) that had the potential to affect stream temperatures under Alternative 2 would no longer do so due to the addition of Forest Service WRPMs (DEIS Appendix

1A).

Comment 18

Second, the USFS fails to demonstrate in the DEIS that the designated uses will be protected. According to the DEIS, "Granite Creek is a tributary to the North Fork John Day River, which is a tributary to the John Day River." DEIS at S-1. The designated fish uses on Granite Creek includes core cold-water habitat, Oregon DEQ, *Figure 170A: Fish Use Designations, John Day Basin, Oregon* (2003), and salmon and steelhead spawning from January 1 to June 15. DEQ, *Figure 170B: Salmon and Steelhead Spawning Use Designations, John Day Basin, Oregon* (2003). Water quality is intricately tied to the health of fish species. An EPA report notes that '[i]mbalance in loading of suspended and bedded sediment (SABS) to aquatic systems is now considered one of the greatest causes of water quality impairment in the Nation." EPA, *The Biological Effects of Suspended and Bedded Sediment (SABS) in Aquatic Systems: A Review* 1, 4 (2003). Additionally, EPA guidance for Region 10 states that "[w]ater temperatures significantly affect the distribution, health, and survival of native salmonids in the Pacific Northwest." EPA, *EPA Region 10 Guidance For Pacific Northwest State and Tribal Temperature Water Quality Standards* 1, 1 (2003). Furthermore, according to O.A.R. 340-041- 0028, "[w]ater temperatures affect the biological cycles of aquatic species and are a critical factor in maintaining and restoring healthy salmonid populations throughout the State… Surface water temperatures may also be warmed by anthropogenic activities such as discharging heated water, changing stream width or depth, reducing stream shading, and water withdrawals." Finally, suction dredge mining can mobilize mercury and potentially violate water quality standards protective of aquatic life. In a report released by the EPA in 2000, EPA concluded that "[m]ercury is highly toxic, persistent, and bioaccumulates in food chains." 65 Fed. Reg. 79,825, 79,827 (Dec.20, 2000).

Suction dredge mining can harm salmon, steelhead, and other important aquatic life that depend on clean water. Bret C. Harvey & Thomas E. Lisle, *Effects of Suction Dredging on Streams: a Review and an Evaluation Strategy, Fisheries Habitat* 1, 8–9, 12 (1998). Mining stirs up sediment. Indeed, "[o]ne of the most obvious off-site effects of dredging is increased suspended sediment because background concentrations where and when dredging occurs are usually low." *Id.* at 12. Mining also destabilizes the streambed where fish lay their eggs. *Id.* at
9. "Fishery managers should be especially concerned when dredging coincides with the incubation of young fish in stream gravels or precedes spawning runs (e.g., fall-run chinook salmon) soon followed by high flows." *Id.* at 15. Finally, the dredges can also harm fish eggs through entrainment. *Id.* at 9. Overall, the Harvey report notes that "[w]here threatened or endangered species exist, managers would be prudent to assume activities such as dredging are harmful unless proven otherwise." *Id.* at 15.

The DEIS states that both Columbia River bull trout and Mid-Columbia steelhead are listed species and are present in streams within the Granite Creek Watershed. DEIS at 14. In addition, a number of sensitive species including the Mid-Columbia Spring Chinook Salmon, the redband trout, and the Columbia spotted frog are present in the watershed. *Id.* at 14, 29. The DEIS acknowledges that "[w]ater quality has been affected by past placer mining operations" and that the "exposed soil on the mining access roads . . . could increase the amount of sediment entering these streams resulting in degradation of existing spring chinook salmon, summer steelhead, and redband trout spawning, incubating, and rearing habitat." *Id.* at 29.

Response 18

See DEIS pg. 177 for a summary of effects, and effects described by each Plan of Operation, and for site-specific rationale for effects determination, including proximity and magnitude of the action and

effects to aquatic resources. A more complete description of effects is found on DEIS pg. 158.

Also refer to Response 1 regarding regulatory consultation, and Responses 5b and 6 regarding suction dredging.

A point of clarification: Middle Columbia Spring Chinook salmon are not a sensitive species (see FEIS Table 3-31 for the list of Regional Forester's Special Status Species).

Comment 19a

The DEIS preferred Alternative (Alternative 3) allows for construction 4.18 miles of previously closed or decommissioned Forest Service roads, use of 8.21 miles of existing miner- created temporary roads, and use of 0.43 temporary new roads. *Id.* at 65. It also authorizes use of eight existing fords and construction of one new ford. *Id.* The USFS notes that there will be impacts from sedimentation specifically on Bull Run Creek and Olive Creek but fails to include a full discussion of the impacts in the main EIS document. *See, e.g.*, *id.* at 113 (noting that under the preferred alternative there is "potential to discharge sediment" but that this potential decreases "as a result of the addition of Forest Service WRPMs and General Requirements"), *see* also *id.* at 99 (analyzing the direct and indirect effects of the preferred alternative on water quality in three sentences). According to Forest Service NEPA regulations, "[m]aterial may be incorporated by reference into any environmental or decision document" but "[t]his material must be reasonably available to the public and its contents briefly described in the environmental or decision document." 36 C.F.R. § 220.4(h). Additionally, only one of the site-specific fisheries protection measures addresses sediment. *Id.* at 67. Here, the USFS fails to fully analyze the impacts from the mining plans on water-quality limited streams from sediment discharges. Additionally, what little discussion there is does not provide assurance that this concern will be addressed based on the small number of mitigations measures included.

Response 19a

A full discussion of the impacts related to potential inputs of sediment from activity on Blue Sky/Bull Run Plan (Bull Run Creek) and Belvadear Plan (Olive Creek) are found in Appendices 3 and 7.

Comment 19b

In terms of temperature, the USFS admits in the DEIS that even under Alternative 3, "five [mining plans] would still not be in compliance with the John Day Basin TMDL, though the length of effects would be shorter for Lightning, Tetra Alpha Placer and Tetra Alpha Mill and Lode because of the addition of the Forest Service Fish Protection Measures." *Id.* at 115. This is unacceptable since, as noted above, the USFS must demonstrate in its NEPA analysis that the agency's selected action will protect water quality. *See HCPC v. Haines*, 2006 WL 2252554
*1, *4 (D.Or. 2006). Further, the USFS may not defer to state agencies for an analysis of the water quality impacts of this action. *See, e.g.*, *Klamath-Siskiyou Wildlands Center v. BLM*, 387 F.3d 989, 998 (9th Cir. 2004) (noting that "[a] non-NEPA document – let alone one prepared and adopted by a state government – cannot satisfy a federal agency's obligations under NEPA.").

Response 19b

Refer to Response 4b.

Comment 19c

Finally, the USFS relies on outdated information to complete its water quality analysis. On March 27, 2015, the Oregon Department of Environmental Quality issued a revised water quality permit for wastewater discharges from small-scale placer mining operations. *See* 700PM General NPDES Permit,

available at http://www.deq.state.or.us/wq/wqpermit/docs/General/npdes700pm/permit.pdf. This 700PM general permit incorporates significant changes, including a prohibition of mining in waters impaired for sedimentation, turbidity or toxics. Looking at Appendix 4B of the DEIS, the USFS improperly relies on the outdated 700PM permit that expired in December of 2014. *Id*. at A4B-1. The USFS must update the DEIS to reflect this new permit. The permit is effective May 15, 2015 and must be incorporated into the final EIS.

Response19c

Refer to Responses 5a and 9. The new Permit information will be updated in the FEIS accordingly.

Comment 19d

Land Use and Vegetation

The DEIS recognizes that past placer mining operations have "removed trees, shrubs, and ground cover in the flood-prone areas immediately adjacent to the Granite Clear, Bull Run, Boulder, Last Chance, Tent Cent, Olive, Ruby, Lightning, McWillis, Quartz and Lucas Gulch creeks." DEIS at S-4. These disturbance activities altered instream habitat including pool frequency and distribution, substrate composition, off channel habitat, and instream large woody material, as well as riparian habitat in areas adjacent to streams and bank stability. *Id.* Use of access roads from past placer mining operations also increased sediment in streams. *Id.* The USFS must consider these impacts in conjunction with current impacts in order to obtain a full look at all the impacts to the area.

Response 19d

The proposed Plans would not further alter instream habitat (except possibly suction dredging) because the only activity that would occur in the stream channel is suction dredging. Access roads within the RHCA are discussed in Appendix 3 (Structures inside RHCA) by Plan and road number. General Requirements Z1-14 and R13 (Appendix 2) are put into place where necessary to ensure protection of water quality and avoid a discharge of sediment.

Comment 20

Wildlife

The USFS fails to adequately discuss the impacts of the proposed mining activities on wildlife in the area. First, species listed as threatened under the Endangered Species Act (ESA) that exist in the proposed action area include the Columbia River bull trout and Mid-Columbia steelhead. DEIS at S-1 – S-2. There is also critical habitat within the proposed mining area. S-4. As noted in part I above, the USFS failed to include the Services' BiOp in this public review and comment period. As such, any discussion of the impacts on listed species lacks the insight of the expert federal agencies charged with protecting those species. The USFS must revise its DEIS to include information from the BiOp once it becomes available.

Second, the USFS fails to address impacts on aquatic life that are likely to result from the impacts on water quality. The USFS recognized that temperatures for 12 streams in the Granite Creek Watershed exceed the applicable state water quality standard for summer stream temperatures necessary for bull trout spawning and rearing. DEIS at S-3. Two streams in the action area have also been identified in the past as impaired for sedimentation. These temperature and sedimentation issues are an existing major problem for fish species. In addition to the ESA-listed species mentioned above, the USFS lists Mid-Columbia Spring Chinook Salmon as Forest Service Sensitive species. These fish occupy Essential

Fish Habitat designated under the Magnuson-Stevens Act. The USFS also identified redband trout, Westslope cutthroat trout, and Columbia spotted frog as being on the Regional Forester's sensitive species list and existing in the action area. DEIS at S-2, S-4. Authorization for the proposed mining operations would allow additional impacts to these streams, further negatively impacting habitat that is necessary for the survival of ESA listed species. The USFS must consider the cumulative impacts of the proposed mining operations, when combined with historic and ongoing adverse impacts to the aquatic habitat of these fish species.

Response 20

A Biological Assessment (August 27, 2014) was prepared under interagency streamlining guidelines and submitted to the regulatory agencies. All mandatory Terms and Conditions will be included in the FEIS. See DEIS beginning p. 177 for a summary of effects, and effects described by each Plan of Operation for site specific rationale for effects determination, and as appropriate, proximity, duration and magnitude of the action and effects to aquatic resources. The analysis includes redband trout, westslope cutthroat trout. Effects to spotted frog is found on DEIS page 193.

Table 3-27 gives approximate distance of mining activities to ESA listed species. Other site specific information is included in Table 3-28 and 3-29. A description of effects of mining activities begins on p. 156 of the DEIS, and in the Biological Assessment (posted on the WWNF website) beginning on p. 60. Cumulative Effects are described in the DEIS beginning on p. 165. Additional clarification of cumulative effects of Plans of Operations that overlap in time and space with existing effects will be added to the FEIS.

January 20, 2015 National Marine Fisheries Service (NMFS) issued a final rule under authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to implement Amendment 18 to the Pacific Coast Salmon Fishery Management Plan (FMP) for Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California. Amendment 18 revises the description and identification of essential fish habitat (EFH) for Pacific salmon managed under the FMP. The final rule was effective January 20, 2015. EFH is no longer designated for chinook in the Granite watershed. Also, refer to Response 18 for status of Spring Chinook and the Regional Forester's Special Status list.

Comment 21

Cumulative Impacts & Induced Growth

The USFS also fails to fully consider cumulative impacts and induced growth that will result from the 28 proposed mining plans. The CEQ defines cumulative impact as:

> *the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.*

40 C.F.R. § 1508.7. USFS regulations note that its NEPA analysis should carried out in accordance with this section. 36 C.F.R. § 220.4.

According to the Harvey report, "[d]redging should be of special concern where it is frequent, persistent and adds to similar effects caused by other human activities." *Effects of Suction Dredging on Streams: a Review and an Evaluation Strategy*, *Fisheries Habitat*, 1, 15 (1998). The DEIS

acknowledges that the Granite Creek Watershed is recovering from past activities. Specifically, the USFS notes that "[r]estoration and reclamation work has been ongoing in the Granite Creek watershed for more than three decades, yet much remains to be done. Some actions may be one-time investments, but others will require long term investment because chronic conditions and/or severe impacts." DEIS at 82. Adding 28 more mine plans to an area that is already fragile may exponentially impact the ecosystem. The DEIS fails to consider this dynamic and must do so in order to properly determine cumulative impacts.

Finally, the DEIS fails to adequately disclose future cumulative impacts by failing to consider the collective impacts from the 28 proposed mining plans. Neither Table 3-1, *id.* at 73–79, nor Table 3-34, *id.* at 165–68, where the bulk of the cumulative effects analysis occurs, document or discuss the effects that will occur from adding an additional 28 mining plans the area.

Finally, foreseeable development resulting from an agency decision is an indirect impact that must be analyzed. 40 C.F.R. § 1508.25(c) (requiring the EIS to analyze direct, indirect and cumulative impacts from a federal action). *See also Davis v. Mineta*, 302 F.3d 1104, 1122-23 (10th Cir. 2002) (characterizing the growth-inducing effect of agency's approval of a highway project as an indirect impact requiring analysis). The USFS must address any additional impacts that are likely to result from the proposed activities, including additional use of the new access roads by persons engaged in other activities, additional camping, and the like.

Response 21

DEIS Chapter 3 includes a cumulative effects analysis of the mine access roads (pg. 248). It also includes a cumulative effects analysis for recreational activities, including camping (pg. 270).

The collective cumulative effects of the 28 mining operations are now specified in Chapter 3 of the FEIS, Table 3-22b, and a description of those effects are now found in Chapter 3, Water Resources sections under the heading "Cumulative Effects", and in the Fisheries section under the heading "Cumulative Effects Common to Alternatives 2 and 3" and Table 3-34. Table 3-22b is a summary of detailed information that was contained in DEIS Appendix 7, Tables 7-15a and 7-15b.

Comment 22a

II. The USFS must ensure that the proposed mining activities comply with the PACFISH/INFISH standards as part of its analysis under NEPA.

Under the National Forest Management Act (NFMA), the USFS must ensure that all site- specific actions are consistent with the Forest Plan. 16 U.S.C. § 1604(i). The Forest plan requires all site-specific projects to avoid degrading habitat as quantified by the PACFISH/INFISH riparian management objectives (RMO). The USFS must consider whether the project is consistent with the substantive requirements of the Forest Plan, including consistency with PACFISH/INFISH. *See ONDA v. BLM*, 625 F.3d 1092, 1109 (9th Cir. 2008) ("[B]ecause 'NEPA places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action,' *Vt. Yankee Nuclear Power Corp v. Natural Res. Def. Council*, 435 U.S. 519, 553 (1978), the considerations made relevant by the substantive statue driving the proposed action must be addressed in NEPA analysis.").

In its DEIS, the USFS cites to the various PACFISH standards but does not provide any details to explain how the Plans of Operations will be modified to ensure compliance with these standards, especially given the cumulative impacts that are likely to result from the numerous mining plans proposed in an already degraded ecosystem. *See* DEIS at 20–22. The DEIS states that compliance with PACFISH "would be monitored during annual inspections." DEIS at 59. This tangentially accomplishes

the objective of PACFISH MM-6 (requiring the USFS to develop inspection, monitoring, and reporting requirements for mineral activities), but does not actually require monitoring or reporting by the miner.

Response 22a

Refer to FEIS Chapter 2, Table 2-4, Annual Inspection Items, General Requirements (Appendix 2) and Plan-specific Resource Protection Measures (FEIS Appendix 11) designed to reduce and minimize impacts from activities . These include measures specific to some claims where a proposed activity could be mitigated, plus general measures applicable to all claims. In addition, the Biological Assessment provides descriptions of these measures, and describes compliance with PACFISH (BA beginning p. 65).

Activities such as suction dredge mining require the May 2015 700PM permit, and under the current 700PM Permit miners are required to monitor and report their activities (BA p. 6).

PACFISH MM-6 states: "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." To meet MM-6 requirements, Plan specific Water Resources and Fish Protection Measures were developed, which include inspection and monitoring. General Requirement M1 (DEIS Appendix 2) describes monitoring required by each miner. Two Plan specific monitoring requirements are found in the DEIS on p. 71. Monitoring was developed during early involvement with the Regulatory Agencies as described under interagency streamlining guidelines.

In the Biological Assessment, Appendix F describes annual inspections. Frequency of inspections needed are described. For example, to assure Plans of Operations are adhered to, ongoing inspections will occur throughout the operating season; to determine if prescribed erosion control methods are durable and self-maintaining, inspections will occur at the start of operations and before seasonal closures.

Additional monitoring will occur using the 2012 BMP Sampling and Monitoring protocol (Biological Assessment Appendix G) based on the number of active mines each year (Biological Assessment p. 38). 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 "Likely to Adversely Affect" fisheries resources would be targeted, and one to three random sites would be chosen for sampling each year. Appendix G in the Biological Assessment provides a sample monitoring form for placer/lode operations under the 2012 Forest Service National Best Management Practices.

During ESA Section 7 streamlining, including early consultation and preparation of the Biological Assessment, discussions were held regarding additional monitoring. Any monitoring required in the Biological Opinions will be implemented, including possible spawning gravel surveys of suction dredge areas of operations (Level 1 meeting notes May 18, 2015).

Comment 22b

The DEIS largely ignores the substantive PACFISH requirements, including the instruction to avoid adverse effects to listed species and designated critical habitat from mineral operations; locating structures, support facilities, and roads outside Riparian Habitat Conservation Areas (RHCA); and prohibiting solid and sanitary waste facilities in RHCAs. Later, the DEIS does rely on PACFISH for site-specific fisheries protection measures. DEIS at 66.

Response 22b
Refer to Response 22a. Also refer to DEIS Chapter 1, pgs. 20-22, Purpose and Need and to DEIS Chapter 2, Alternative 3, pgs. 59 and 66 (Table 2-4 and Site-specific Fisheries Protection Measures have been updated in the FEIS (see FEIS Appendix 11)). Detailed discussions of compliance with PACFISH as it applies to locating structures and roads inside the RHCA (MM-2) are found in DEIS Appendix 3 by Plan. Structures evaluated were ponds and bridges. Ponds are separated into source water ponds and settling ponds and discussed individually. Roads are discussed individually. Results are summarized in Chapter 3, Water Resources section on pages 120-129 under the heading "PACFISH".

Comment 22c
The impacts from the mining activities will be most evident in the ecologically sensitive riparian areas, and especially in the RHCA protected by PACFISH/INFISH's mandatory provisions. The Granite Creek Watershed is home to numerous threatened, sensitive, and indicator species. Many of the streams in the project area are already too warm to support these species. Despite these conditions and ongoing adverse impacts from current activities, the USFS is now proposing to approve Plans of Operations for numerous mining activities and attendant access roads in this region. For example, the DEIS preferred Alternative (Alternative 3) allows for construction 4.18 miles of previously closed or decommissioned Forest Service roads, use of 8.21 miles of existing miner-created temporary roads, and use of 0.43 temporary new roads. DEIS at S-7. The cursory analysis of PACFISH standards in this DEIS fails to comply with the USFS's duty to ensure the Plans of Operations comply with applicable Forest Plans. At bottom, the USFS has failed to demonstrate how management and enhancement of water quality and fish habitat will have priority over authorizing mining activities in a watershed that is already severely degraded.

Conclusion

For the reasons set forth above, Commenters respectfully request that the USFS revise the DEIS to comply with the requirements of NEPA and the USFS's own regulations.

Response 22c
Refer to Response 22a. Also please note that you have incorrectly cited text from the DEIS Summary. Summary page S-7 states "authorizing use of 4.18 miles of previously closed or decommissioned Forest Service roads", note "allows for construction 4.18 miles of previously closed or decommissioned Forest Service roads".

Oregon Water Resources Department

Comment 23
OWRD requests that we develop a State-Federal partnership in this effort for the purposes of improving customer service and for the safety of staff. Our recommendations are provided below.

1. When the FS receives a request for mining activities, OWRD recommends the FS contact the local watermaster office. The contact to the local Watermaster office is to determine if the proposed mining activity – as presented to the FS – requires any water-use authorization. The contact would be made for activities that propose to use surface water, groundwater, ponds,

springs, or other sources of water. The Watermaster office would provide written documentation to the FS's request.

2. OWRD asks that the FS no approve or grant a mining authorization without first receiving from OWRD documentation that the appropriate water-use authorization is in place for the applicant.
3. OWRD asks that the FS partner with OWRD and the appropriate Watermaster office to craft an agreement on how coordination will be implemented to assure there is no surface water or groundwater use without the proper water-use authorization.

Response 23

1&2. The Forest Service will consult with OWRD for documentation of a valid water-use authorization (water right). If a valid water right is not secured, the Plan will not be approved until an amended Plan is submitted to the Forest Service that excludes the proposed water withdrawal. This has been clarified in the FEIS, Chapter 1, Decision Framework. Also refer to Response 4b.

3. Forest Service approval of a Plan of Operations does not release the operator from following all other applicable laws or regulations and/or obtaining any other required authorizations. This would not preclude the Forest Service from considering an agreement with OWRD to cooperate with that agency in achieving compliance with their laws and regulations. We can pursue such an agreement separate from this Granite Mining analysis and at any time.

Oregon Wild Comments

Comment 24

We appreciate that the FS is trying to control mining operations in the Granite Creek watershed by requiring plans of operation and requiring miners to take some actions to reduce their environmental impacts. We remain concerned that more could be done.

This proposal looks like an expansion of mining activities, and an expansion of the environmental footprint of mining. The goal of this project should be to reduce impacts of mining so that public values in our public lands are protected, including clean water, streams, riparian areas, and fish habitat. New roads, continued use of stream fords, continued water withdrawal impact that will streams, and expanded mining's footprint is not in the public interest. There are still 11 mining plans that may affect listed fish, 5 plans that affect stream flow and stream temperature, 9 mining plans with stream fords, and 5 with suction dredging in fish habitat. More needs to be done to avoid these effects, not just minimize and mitigate effects.

Response 24

Proposed mining activities are analyzed for their potential environmental effects, regardless of the size of the area of potential impact, as required under 36CFR 228.4. The DEIS includes requirements and protection measures to ensure protection of resources, including water quality (DEIS Chapter 2, and DEIS Appendices 1A and 2). For ease of reading, the FEIS will combine all Plan-specific Resource Protection Measures (from DEIS Ch. 2 and Appendix 1A) into Appendix 11.

Comment 25a
The Appendix describing compliance with forest plan standards did not explain how all of the PACFISH standards will be met, including avoiding adverse effects to listed fish and avoiding actions that may retard attainment of RMOs.

Response 25a
Discussion of the RMOs is found in Chapter 3, Water Resources section on pages 130-132. In Table 3-20 under Alternative 3, Belvadear and Olive Tone will be corrected in the FEIS to read "Same as Alternative 2." In addition, RMOs are discussed by Plan in Appendix 7 under the header "PACFISH: Riparian Management Objective (RMO) Parameters".

Comment 25b
Hopeful 2-3 placer mine includes a ford with a steep access road. This will likely lead to unacceptable sediment production, even with the FS requirements. We urge the FS to consider alternatives that do not involve motorized vehicles crossing flowing streams (technology that had not been invented in 1872 when the mining law was passed.)

Response 25b
The proposed actions are developed by the miners, not the Forest Service, and they have the right to propose their desired method of mineral extraction as long as it is not illegal and follows all federal and state regulations. The General Requirements listed in Appendix 2, along with the site-specific protection measures listed in Chapter 2 and DEIS Appendix 1A are designed to mitigate effects of the proposed action. For ease of reading, the FEIS will combine all Plan-specific Resource Protection Measures (from DEIS Ch. 2 and Appendix 1A) into Appendix 11.

Comment 25c
All mining operations that withdraw public water resources, should be required to meter and report their water use so that there is a clear record of compliance with laws protecting water quantity and quality.

Response 25c
Refer to Response 23. The state of Oregon is agency responsible for administering and monitors the state issued water rights certificate.

Comment 26
We urge the FS to require all miners to post reclamation bonds.

Response 26
Bonding of operations is handled under 36 CFR 228.13 and is in conjunction with the requirements for reclamation of the site. This is also covered in the General Requirement - G2 on page A2-3 of Appendix 2.

Eastern Oregon Mining Association Comments

Comment 27a
There were inconsistencies about "fish protection measures" and "WRPM measures" and which operations they apply to. I had a hard time trying to understand what the effects were when they were hidden in the appendices. For the next NEPA document, I would suggest that all protection measures, WRPM measures and stipulations being required by the Forest Service be revealed in Chapter 2, Alternative 3. These can also be repeated in the appendixes, but I want to be able to look at each operation and see the direct and indirect effects discussions on fish, hydrology, soils, cultural resources, access, visuals, invasive species, structures inside the RHCA, etc. After this I would like to see the cumulative effects sections.

Response 27a
We agree with your recommendation and will place all of the Plan-specific Resource Protection Measures in FEIS Appendix 11.

Comment 27b
One major problem with the DEIS is the document has literally fallen apart. I now have it in five separate documents held together with metal clips. I suggest in the future that huge EIS documents be conventionally bound (like the North Fork Burnt River was) instead of the cheap spiral binding used for the Granite Creek Watershed Mining EIS volumes.
Also, the maps of the operations were so faint that I could not make out the areas proposed for mining (Muffin is a good example). I would suggest that color pictures could be eliminated and use the savings to pay for a proper binding.

Response 27b
We will use a stronger binding method for the FEIS and will make sure that the maps are darker.

Comment 27c
Analysis under an DEIS of 28 Plans of Operation, with a total of 104 acres analyzed, is a ridiculous waste of the miners' time spent waiting, the Forest Services' time "diligently working" and the taxpayers' money. Many of these operations will affect one acre over ten years. The reason given to EOMA for an DEIS rather than individual EAs, was because of cumulative effects. However, in looking at the cumulative effects section of the document (Appendix 7 Table 7-15), the chart discloses that that there are no cumulative effects for most operations, and the "potential cumulative effect" disclosed for all the miners without water rights who have proposed to pump water from the streams makes no sense. Miners must be in compliance with state law, thus, those miners without water rights will not be pumping from streams and their operations will not have "potential cumulative effects". I am certain that the Grant County water master could have provided this type of information while the effects section of the DEIS was being written, and I am certain that now that the DEIS is out, he will provide it.

Response 27c
The rationale for documenting the potential effects in an EIS is found in the DEIS, Chapter 1, Purpose and Need, page 14.

As some operators have proposed to withdraw water from a stream, the potential for cumulative effects from the water withdrawal should be considered. Even though the operator may not have a water right at this time, they can still apply for a new water right or transfer another water-right (see FEIS Appendix 2, G18 and G19).

Comment 28a

As far as Belvadear and Olive Tone overlapping in time and space, the Forest Service has no intention of approving the Belvadear Plan of Operation. The operation has the risk of sediment input into Olive Creek, no 401 permitting is available for this activity, so the analysis of cumulative effects is without merit. In this section, it would have made the situation clearer if the Forest Service had simply stated that the Belvadear operation will not be approved and thus, there is no risk of cumulative effects.

Response 28a

NEPA guides us to analyze and disclose the potential environmental effects of all alternatives. All Plans were evaluated for effects to resources. With respect to you comment, effects to water resources were analyzed by the Forest Service hydrologist. The responsible official will use the analysis of effects in the EIS to determine which alternative will be selected in the Record of Decision (ROD). The analysis of effects is separate from the final decision, therefore, the determination of what Plans may or not be authorized for approval will occur in the ROD.

Comment 28b

Now we need to look at the operation on Lightning Creek and the two operations on Olive Creek (actually just one operation because the Forest Service does not plan to approve the Belvadear POO). Thus, of the 27 remaining POOs, only two have legal water rights. I have spoken to DEQ, and I have read the North Fork John Day TMDL, and nowhere does this document cut off legal water rights. I was informed that the Forest Service could not use the TMDL as a "tool" to stop miners from using water under legal water rights. I was informed that water users with legal water rights must do is "*take water in a manner that minimizes effects"*.

Response 28b

The analysis of effects to water resources required evaluating everything that the miner proposed. As eight Plans stated that they would withdraw water from a creek, all eight had to be evaluated. The question of whether the miner had a valid water right was not relevant to the Water Resources analysis. Refer to Response 4b for further information about water rights.

Comment 28c

On page 85, the DEIS states that the reason stream temperatures are higher than 53.6 degrees is historic activities such as channel incision and straightening, loss of riparian vegetation, beaver trapping, timber harvest and grazing and loss of groundwater inputs due to loss of floodplain access and groundwater recharging. Since miners protect stream shade, do not impact riparian vegetation and do not work in-stream, they are doing their part to minimize impacts on stream temperatures, as the TMDL requires. There is no grazing or logging and beavers are left to do whatever it is that beavers like to do. Miners are not required to stop withdrawing water under legal water rights, simply because the stream naturally gets warmer than the State wants it to be.

Response 28c

Refer to page 85 of the DEIS for a description of the current water quality conditions in the Granite Creek watershed. Water quality and fish protection measures have been developed to reduce and minimize effects of mining operations on water quality and aquatic resources (DEIS p. 66). These measures can now be found in FEIS Appendix 11.

Comment 28d

Lightning Creek flows were 6.8 cfs on July 19, 2013 (Dolly Robson Field notes) and the DEIS shows similar flows. Pumping over a 5-6 hour period in the spring when flows are the highest (page 87 states that flows peak in May and June as snow melts), and temperatures are the lowest, recycling this process water in off-channel settling ponds, and taking only make-up water from Lightning Creek thereafter to account for losses from evaporation and seepage, and not removing stream shade and protecting riparian areas certainly meets the goals of the TMDL. Thus, Lightning Creek Placers are in compliance with the TMDL which, according to DEQ, and as stated above, requires miners to "*take water in a manner that minimizes effects"*.

Response 28d

The Lightning Creek Plan does not state when they would be withdrawing water, only that they would be taking water out of the creek. The Plan states "Water for processing will be pumped from Lightning Creek under a 1921 water right (p. 3)" and "The water will be pumped from Lightning Creek via an above ground pipeline… (p. 11)." Therefore, the worst case scenario was used when analyzing the effects of withdrawing water - during summer low flows when air and water temperatures are high.

Also refer to Response 28b.

Comment 28e

Page A9-5 is incorrect where it states "*those miners that proposed to withdraw water from streams must be in compliance with ODEQ John Day Basin TMDL which does not allow for increases in stream temperature*". The TMDL requires water users with legal water rights to minimize impacts. Withdrawing water early in the spring to fill ponds, and withdrawing only make-up water thereafter, not impacting riparian vegetation, not working instream, not removing stream shade are the feasible measures that miners on Olive and Lightning Creek have proposed in order to meet the TMDL.

Response28e

There are two parts to this comment.

1. Page A9-5 comment:

After further clarification from ODEQ, reference to the John Day Basin TMDL has been removed from Appendix 9-5 (#7) which discusses stream temperatures and compliance with the Forest Plan. The text has been replaced with the following:

"Met under Alternative 3 for the following reasons: 1) Miners do not propose to remove any trees that provide stream shade. 2) With respect to water withdrawals and potential stream temperature impacts, a valid water right would be required prior to approving that Plan. 3) WRPMs are in place to prevent an input of warm water from one of the Plans (Old Eric), and a groundwater flow reversal in another Plan (Grubsteak)."

Also Refer to Response 4b.

2. Timing of water withdrawal:

No information was provided in the Plan that stated when the water would be withdrawn. Therefore, the worst case scenario (summer low flows) was analyzed.

Oregon Department of Fish and Wildlife conducts surveys of bull trout redds (spawning nests) in the

John Day basin and their counts show sharp declines since 2001 (see Biological Assessment (BA) p. 49). Lightning Creek is designated as spawning and rearing habitat for bull trout (BA p. 51). During late summer, when bull trout begin migrating and spawning, water flows are usually at their lowest. The purpose of the fish protection measure of no water withdrawals from Lightning Creek after August 15th is to conserve habitat for this species that is considered at risk (BA p. 49).

Comment 28f

Page 115 of Chapter III states both Olive and Lightning have low flows and shallow depths. Lightning Creek does not have low flows as compared to other tributary streams in the watershed (see Robson field notes of July 19, 2013). The DEIS states that effects on stream temperatures would be based on (1) timing of withdrawal (spring when flows are high and temperatures are low) (2) amount (miners can pump from 100-250gpm using the pumps that they use in their operations) (3) existing stream (flows are near peak when ponds are filled) (4) continuous vs limited withdrawal (miners can only pump enough to fill their ponds. Continuous withdrawal would result in discharge which is against state law. Limiting legitimate water rights users is not required by the TMDL, and this "fish protection measure" is not needed to protect fish, thus, it should be eliminated from the DEIS. The only stream with valid water rights that also has bull trout is Lightning Creek. Filling ponds early and taking only make-up water thereafter will not effect stream temperatures or fish and is in compliance with the TMDL.

Response 28f

Same response as 28d and 28e. No mention was made in their Plans about when they would withdraw water. Flows vary from year to year. Therefore, just because flow was 6.8 cfs on July 19, 2013 on Lightning Creek in 2013 does not mean that they will be that high every year or later in the summer.

Comment 28g

Flows for Olive Creek are less than for Lightning Creek, with Robson reporting just over 1 CFS on July 19, 2013. As with the Lightning Creek operation, settling ponds on the Olive Tone are filled in the spring when flows are highest, and temperatures are the lowest. recycling this process water in off-channel settling ponds, and taking only make- up water from Olive Creek thereafter to account for losses from evaporation and seepage, and not removing stream shade and protecting riparian areas certainly meets the goals of the TMDL. Thus, the Olive Tone operation is in compliance with the TMDL.

Response 28g

Same response as 28d and 28e.

Comment 28h

Page S-7 gives a list of the Forest Service Requirements. Eight of these are quite specific (2 new gates etc) one states three will be monitoring measures which are not described and one states there will be the inclusion of Forest Service Requirements in Plans of Operation for protection of water quality, soils, fisheries and other resources. All miners know about the pages and pages of mitigations, so no red flags would be raised in reading this section. However, what the summary does not state is that the Forest Service intends to cut miners off from using their legitimate water rights, and the Forest Service intends to not approve the Belvadear operation. These details should be revealed in the beginning, the reader should not have to dig through all these pages of DEIS to find these important problems areas.

Response 28h

The Summary does not include all Plan-specific information – it is merely a brief summary of what's included in the DEIS. The DEIS analyzes the potential environmental effects of the alternatives, it does not approve or disapprove a Plan. Authorizing the approval of Plan will occur in the Record of Decision

(ROD).

Comment 28i
Page S-9 and S-10 state that Belvadear and Olive Tone have requirements that the miners must not use water if the stream flow downstream of the pump is diminished to the point that the stream is dry. Because these operations have legal water rights, and because when streams get low and temperatures increase, fish move downstream to cooler deeper water, this requirement is unreasonable.

Response 28i
If water is withdrawn such that the stream goes dry too quickly, fish will be stranded in that section of stream. This has been clarified in the FEIS, Chapter 3, Fisheries.

Comment 29
On page 3-10, Lightning Creek not only has the above requirement about not drying up the stream, but also is required to stop pumping even small amounts of make-up water after August 15. There is no date mentioned when pumping can begin again. Lightning Creek has pump screening specifications. No other operations have this specifically stated, although general mitigations do have pump screening standards. Unless there is a reason to single out Lightning Creek Placers, all operations that pump from streams should have the screening mitigation.

Response 29
We believe your comment refers to page S-10, not 3-10.

The proposed operating period for mining activities is June 1 – October 31. Lightning Creek is designated rearing and spawning habitat for Columbia River bull trout (Aquatics Report Table 3-27). Bull trout actively migrate and spawn in the fall, primarily in September and October, but may spawn as early as August. Water withdrawals could affect both migrating and spawning during this critical period of their life cycle, and mining activities are authorized through October. Therefore, there is no date identified after August 15 for water withdrawals to resume. The prohibition of pumping water after August 15 is to protect ESA listed bull trout during this important stage of their life cycle. The FEIS will be corrected so all pump screens are consistent with Oregon Department of Fish and Wildlife requirement ORS 496.141 (See FEIS Appendix 2, Requirement G23).

Comment 30
Page 3 states that plans in this proposed document would be in effect from 2014 to 2024. This statement should be changed to state that the period is 2016-2026 for operators who work the first possible year, but that unless NEPA compliance is no longer adequate and current, (things change in the watershed), operators can work for a ten year period beginning when their plan is approved (see page 66).

Response 30
This is a draft document and we needed an estimated start date for implementation in order to conduct the analysis. Chapter 3 explains the short and long term analysis dates in regards to potential effects and the potential to overlap other foreseeable projects within the analysis area. The start dates on the approved plan will be within 2-5 months of the date of the decision document. The sentence on page 3 will be changed to state the following: Plans proposed in this document would be in effect for ten years after the date on the signed Record of Decision.

Comment 31
Page 5 inaccurately states that the town of Greenhorn is in the Granite Creek Watershed.

CH Response31
The bulk of the town is in Baker County (the Burnt River Watershed) but the north east edge of town is located in the Grant County and the Granite Creek watershed.

Comment 32
Page 5 should state that Hopeful 1 and Hopeful 2 and 3 are located within areas withdrawn from mineral entry.

Response 32
The statement regarding the claims in the wilderness on page 5 is correct.

The southern portion of these two claims are located within the wilderness and pre-date the establishment of the wilderness, however as stated, no activity is proposed in this section of the claims.

The rest of the claims, including the area of the proposed action, are also located in an area withdrawn from mineral extraction that was established in order to improve and protect fish habitat. However, since the claim predates this designation, mining activities are allowed, as the portion they are mining was determined to be a valid claim after undergoing a BLM validity exam.

Comment 33
Page 39 begins the Table 2-2 showing Proposed POOs. Acres are consistent with page 93 except for case of the Royal White which says 10 acres, while page 93 says 3 acres.
Obviously, from looking at the miner's map, rather than the map drawn by the Forest Service, 10 acres is more accurate.

Response33
The 10 acres listed in Table 2-2 of the DEIS for Royal White were incorrect. Royal White's acres will be changed to 3 acres in Table 2-2 of the FEIS, making it consistent with Table 3-9. In the proposed Plan, the operator only listed specific locations of use, not an estimated acreage area of use, therefore the UNF Minerals Administrator estimated acres based on location of use identified in the proposed Plan. This acreage was needed in order to estimate potential detrimental soil conditions from proposed activities, and to bound the analysis area for the resource specialists to conduct their analysis (project file).

Comment 34
Page 39 also begins a description of the operations. This chart needs to remove cubic yards/yr, cubic yards/day and tons/day. Area impacted at a given time is important for the analysis and for later calculation of a reclamation bond. Some operations have cubic yards listed **per day**: Blue Sky, 5 yds/day, City Limits 3-5 yds/day, Eddy 5 yds/day, Lightning 20-50/day, Tetra-Alpha 100yds/day, Troy D 50 yds/day.

Some of the operations have cubic yards listed **per year**: Make it 15-20/year, Muffin 10 yds/yr, Old Eric 5 yds/year, Bunch Bucker 600 yards/yr, Hopeful 1 yd/yr, Hopeful 2&3 15 yds/yr, Rosebud, 2-10

yds/yr, Ruby 2-5 yds/yr, Sunshine 1000 yds/yr. Lode operation Tetra Alpha Lode has 10 cubic yds/day instead of tons/day. Royal White has 5 tons/day but in the summary it states 5 cubic yards.

No listing of cubic yards per day or year or tons are shown for the rest of the operations.

In talking to some of the mine operators, their plans of operation never contained these yardage figures**. For consistency, please remove the amount processed from this chart, and for consistency, remove cubic yards and tons from the summary.**

Response 34
All provided productions rates have been double checked with the proposed plans and some were changed to cubic yards to facilitate the effects analysis.

On page 39, Table 2-2 includes acres disturbed. The proposed production rates were provided by the operator and are included in the table in order to demonstrate the proposed level of work that will be done. These numbers whether tons or cubic yards, can then be used in the preliminary development of the amount /size of the tailing and waste rock piles area that will need to be established and the need to cleaning the settling ponds. In the case of lode operations, this is an indicator of the amount of work being done underground.
There can be considerable variability in the visual and or measured size of a ton. The weight varies on the type, size and density of the material, and the amount of water/moisture. The term “ton” and “cubic yard” became interchangeable during the analysis a cubic yard was something that could be visually explained and converted into area used.

Comment 35
On page 78, under past, ongoing and future projects, the DEIS lists ditches but should also list water withdrawals. I printed off many existing mining water rights in the Granite Creek Watershed. On page 114, the DEIS states, "*if a portion of a stream goes dry downstream, water temperature could increase as a result of a reduction in flow*". This statement is not based on science. Gimlet Creek is a good example of what happens to water temperature when the water subs into the channel bottom. The water is warm where the stream goes dry, but water temperature in Gimlet can be up to 10 or more degrees cooler where it resurfaces.

Response 35
“Authorized state water withdrawals” will be added to the list of ongoing projects in the final EIS. It is correct that inputs of cooler groundwater can reduce the stream temperature provided that the amount of input is of sufficient volume to measurably alter locally stream temperatures. This effect has been noted where seeps are present along streams. However, removal of water upstream decreases the amount of stream flow downstream. The result is that if or when groundwater inputs occur downstream, they are contributing their cooling influence on now elevated stream temperatures. The result is that the effectiveness of their contribution is less than when the full flow remained.

Comment 36
On page 115, the DEIS states that the fish protections measures were not added to Olive Tone or Belvadear. Since Tetra Alpha does not have any water rights listed with OWRD, attaching these measures to the Tetra-Alpha POOs is irrelevant. However, attaching these measures to Lightning Creek is a problem. See discussion above on the TMDL and using the TMDL as a tool to shut off miners from

using legal water rights. As stated above, even with pumping make-up water from Lightning Creek after August 15, this operation will still be in compliance with the TMDL, and pumping small amounts of water under a legal water right will not harm fish.

Response36
If a Plan stated that they were going to withdraw water, the effects of a withdrawal on stream temperatures were analyzed. The question of whether the water right is valid is a State determination. Also refer to Response 4b.

Comment 37
Page 116 has discussion of stream temperature warming in regards to Old Eric, and this discussion is a concern. The DEIS states the settling pond (i.e. pond containing the sediment laden process water) is about 80 feet long and in close proximity to Granite Creek. I was surprized to learn that the Forest Service concern is not about sediment, but about warm water entering Granite Creek via subsurface flows. "*The short distance between the pond and Granite Creek (15 feet) would not give the warm water enough time in the ground to cool prior to entering the creek"*. My question is, why isn't the Forest Service worried about sediment? Operations like the Troy D are located well over 130 feet from Granite Creek, and they are required to install a bentonite blanket. Old Eric is 15 feet away and they are required to let the warm water seep out of the pond and into Granite Creek. I am also wondering, if the ponds regularly seeps out, where does the water come from to fill the pond, since there is no water right?

Response 37
The difference in effects between Old Eric and Troy D is based on the level of work proposed at the site, the size of the holding pond, the existing vegetation, the amount of water available for use, the amount of material processed per year, the amount of time the site will be worked and the past history. As the old settling pond is full of grass and small pine trees (10 ft. tall) one would never expect to see the Old Eric settling pond full or even see the water spread far enough to even reach the sides of the holding pond. The holding pond for Old Eric is filled from a ground water and collected rain and snow and barely holds over 100 -200 gallons on a good year.

Old Eric: The pond is well vegetated with lush grasses which makes the pond very effective at trapping fine sediment. Therefore, inputs of fine sediment are not a concern. However, warm water is not trapped by the grasses and would infiltrate and re-emerge quickly resulting in a localized increase in stream temperatures. (see Appendix 7, p. A7-132)

Troy D: This pond occurs in old placer tailings and their permeability is potentially very high. The pond is also elevationally above Granite Creek. Groundwater movement would be towards the creek and there is the potential to carry fine sediment through the old placer tailings into Granite Creek. (see Appendix 7, p. 203).

Comment 38
Many of the miners with water rights in the Granite Creek watershed do not have Plans of Operation, but they do use their water. One of these water rights is used by three operators. Only the operator with an POO that will be approved under this analysis will be shut down from pumping when the stream gets low enough that it dries up downstream of his operation, the other two miners under this same water right, can dig their pumping ponds a little deeper, and they can pump up to what the water right allows as long as they want to.

Response 38
Refer to Response 23. Water withdrawals are under the jurisdiction of the State of Oregon. The State deals with the owner of the water right in its administration regarding the use of that water.

Comment 39
On page 101, we see that the Belvadear will not be approved by the Forest Service because "potential discharge exists". The operator proposed a wider buffer when he found out the Forest Service was not going to approve his plan but the Forest Service stated that since the miner had not proposed tree removal in his POO, and a wider buffer would result in some trees being removed, they would not analyze a wider buffer. I find this incredible that the miner waited ten years, the Forest Service refused to work with him on modifying his plan to eliminate impacts, and now his plan will not be approved.

Response 39
The Forest Service has not received a proposed modification to the 2010 proposed Plan for Belvadear. The table on page 101 only identifies the potential for a discharge. It does not address the question of Plan approval.

> *"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. " Forest Service Manual 2817.23*
>
> *"1. CWA § 401 - Water Quality Certification: Pursuant to CWA § 401, both the Forest Service and the mining operator have CWA requirements to meet. If the mining activity "may result in any discharge into the navigable waters," (CWA, Title IV, § 401(a) (1), 33 U.S.C. 1341(a), 1972) the mining operator must obtain a 401 certification from the designated CWA federal, state or tribal entity, typically the state. This 401 certification from the designated entity certifies that the operator's mining activities and associated best management practices (BMPs), mitigation and/or reclamation are in compliance with applicable provisions of state, federal and/or tribal water quality requirements of the CWA. The mining operator must give a copy of this 401 certification to the Forest Service prior to the Agency approving the Plan of Operations. Pursuant to CWA, the Forest Service cannot authorize a Plan of Operations until the 401 certification has been obtained or waived by the designated entity. Finally, the Forest Service may not authorize a Plan of Operations if the designated entity denies the certification. "Forest Service Manual 2817.23*
>
> *"Request a copy of operator's CWA 401 Certification from designated Federal, State, or local entity before approving a plan of operations that may result in any discharge into waters of the United States." BMP's (Best Management Practices - July 2012) "page 63"*

Comment 40
On page 130 of Chapter 3 the chart Table 3-20 states for Belvadear and Olive Tone that pumping "will be restricted to the time period prior to August 15 because water withdrawal will not occur after August 14th. This is not consistent with page 115 where it states "*fish protections measures were not added to Olive Tone or Belvadear because there are no bull trout or chinook salmon in Olive Creek (T. Hickman, Forest Service Biologist e-mail, 8/15/2014.)* This mitigation should not apply to Belvadear or to Olive Tone and the chart should be changed.

Response 40
This was an error in Table 3-20 of the DEIS and will be corrected in the FEIS. You are correct that the mitigation should not apply to Belvadear and Olive Tone.

The FEIS clarifies the impacts of water withdrawals to aquatic resources for the Plans Belvadear Group and Olive Tone. To protect fall spawning fish species, chinook and bull trout, site-specific fish protection measures have been established to minimize impacts of water withdrawals to spawning (FEIS Appendix 11, Plan-Specific Resource Protection Measures). Belvadear Group and Olive Tone are in the Upper Beaver Creek watershed where chinook and bull trout are not present. Therefore, water withdrawal fish protection measures are not needed for Belvadear Group and Olive Tone.

Comment 41a
Page 130 again states that Belvadear and Olive Tone are subject to restrictions on their legitimate water rights. Page 115 states that these mitigations should not apply to Belvadear or to Olive Tone. Applying this to Tetra Alpha is irrelevant, since there are no water rights of record which would allow pumping from Boulder Creek.

Response 41a
See Response 40 regarding Belvadear and Olive Tone.
Regarding Tetra Alpha: The analysis evaluated the effects of what the miner proposed on water resources and fisheries. The miner, in their Plan of operation (p. 5) , stated the following: “Water from the operation will be pumped from the existing ponds….only a small amount of makeup water will be pumped from Boulder Creek.” Therefore, the effect of withdrawing water from Boulder Creek was analyzed.

Comment 41b
Page 132 states that under alternative 3 the number of plans that could alter stream temperature decreases but states Boulder (no water rights) Olive and Lightning Creeks (legitimate water rights) remain as problem operations. The mitigation measure to stop pumping on August 15 is called a "Fish Protection Measure". However, the fish biologist states this mitigation is not necessary for Olive Creek because Olive Creek does not have bull trout or chinook salmon. My question is why are these required despite the recommendation of the fish biologist? And why isn't Olive Creek mentioned in the summary-it only refers to Lightning Creek and to Boulder Creek?

Response 41b
See response 40. Reference to the August 15 Fish Protection Measure for Olive Creek will be removed in the Final EIS.

Comment 42
On page 159 of Chapter 3, direct and indirect effects are listed. Water withdrawal is not mentioned as either a direct or an indirect effect on ESA or sensitive fish species.

Response 42
Direct, indirect and cumulative effects of water withdrawals on ESA or sensitive fish species are included in the FEIS, Chapter 3, Fisheries.

Comment 43
Page 165 states "for a more extensive description of inventories and reclamation plans see the hydrology report". I was informed, when I asked for this, that there was no hydrology report done for

the DEIS. This is a concern.

Response 43
Page 165 should have referenced the project file, and not the hydrology report. This statement will be corrected in the FEIS as follows: "A full listing of sites identified for investigation under the CERCLA Act can be found in the project file." With respect to the comment regarding the hydrology report, the entire hydrology report is contained within the DEIS. See Chapter 3, Appendices 1A, 1B, 1C, 3, 7.

Comment 44
Under Alternative 3, page 183 only Make-it and Old Eric contain information about cubic yards moved. This information is not relevant, is not displayed for the other operations and should be deleted for consistency.

Response 44
The above comment refers to Table 3-39. The cubic yards moved were provided by the proposed Plan of Operations (Make-it page 3, Old Eric page 6). They are included in this table because they are a large part of the reason for the Fisheries determination of NLAA. Information on the other Plans is not included because it was not part of the rationale used to make the Fisheries determination.

Comment 45a
On page 186, Olive Tone states that there will be a maximum of 8 CFS withdrawn from Olive Creek under the water right. The point that is missed in this analysis is that settling ponds are only filled in the spring. If enough water was available in the spring during peak flows, and the miner had a large pump, it would take 8.4 minutes to fill the miner's small ponds. No further pumping could take place because the DEQ WPCF permit does not allow discharge of process water. After the ponds are full, process water is recycled and only small quantities of make-up water are needed to offset losses from evaporation and seepage. Thus, the analysis on the effects of pumping water are severely flawed.

Response 45a
Neither the Olive Tone Plan nor the letter dated October 2, 2011 make any reference to when they plan to withdraw water from the creek. Therefore, the analysis assumed the worst case scenario of summer low flow and high air and water temperatures. Also refer to Responses 29 and 40.

Comment 45b
Neither Lightning Creek Placers or Belvadear has this discussion of water use, that we see on page 186, and it is not clear why the discussion only applies to Olive Tone. But regardless, there will be no measurable effects from pumping small amounts of make-up water throughout the mining season.

Response 45b
There are inconsistencies in Tables 3-38 and 3-39 regarding water withdrawals. These tables will be corrected in the FEIS. Refer to Responses 28d and 28e.

Comment 45c
Page 131 states there is a potential increase in stream temperatures in Lightning Creek from pumping, and thus, pumping water after August 15 must be stopped. But the above discussion is applicable to Lightning Creek also. Pumping ponds full in the spring, and taking only make-up water thereafter is in compliance with the TMDL which does not restrict legal water rights, but instead has the goal of minimizing impacts to stream temperatures.

Response 45c
The Lightning Plan does not identify when they plan to withdraw water from the creek. Therefore, the analysis assumed the worst case scenario: summer low flow and high air and water temperatures.

Comment 46
Page 214 equates cubic yards processed with the risk of noxious weed infestations. "..*larger scale ground disturbance as measured in cubic yards/day*" This is flawed analysis. Surface ground disturbance (areas of bare soil) increases the risk of noxious weeds becoming established, it has little to no relation to cubic yards processed.

Response 46
In the FEIS, a section has been added to the Invasive Species section titled "Assumptions." Within this section we have outlined three assumptions of the analysis. Assumption number 3 relates to this comment. This assumption states that in order to process more material a day a larger area of surface disturbance would be created. For example, a Plan that proposes to process 5 cubic yards/day would likely create a smaller bare ground signature than one that proposes to process 20 cubic yards/day.

Comment 47
Page 236 is incorrect that the Eddy Shipman has a ford on 7300680 across Olive Creek; this is Granite Creek.

Response 47
The error in naming the creek will be corrected in the Final EIS.

Comment 48
Page 237 under L&H fails to disclose the existing ford on Olive Creek, which is also access to private land.

Response 48
This road and ford is open to public travel and so therefore it is not part of the analysis. (36 CFR 228.(a) (1) (i)). Only fords on closed or decommissioned roads or temporary mine access roads were analyzed for effects related to the Plan.

Comment 49
Page 238 Yellow Gold uses all three roads listed, I was confused about "*Alt 3 preferred use (gate during use)*" Please clarify, Yellow Gold miners plan to use all three roads.

Response 49
See the Transportation protection measure on page 69 of the DEIS. While there are several roads listed for use in the Yellow Gold proposed Plan of Operation, the 7355-055 is a closed road which has been effectively closed for a number of years with a berm. Should multiple trips be required by the miners, then a gate will be required during operations in order to maintain the closure status of the road.

Comment 50
Page 242 table 3-3-53 has a table that shows open road density of only Forest system roads. This is the first time I have seen this information, usually we see table 3-52 information. This is good information for the public to see.

Response 50
Thank you for your comment.

Comment 51
Page 304 states that "*leniency was given miners with regard to historic features; and this can be seen in most of the current project areas, where many historic adits and tailings have also been worked in modern times*". The Forest Service evidently does not understand that although adits/portals and shafts may be historic in nature, these site features give the miner entry to the valuable minerals located underground. SHPO has concurred that modern day mining of an historic feature of a site is an acceptable activity. Cultural Resource personnel are tasked with recording the site features and gathering the history, it is not their task to preclude mining operations from taking place. Likewise, dredge tailings and other placer tailings may certainly be deemed historic, however, if these tailings contain valuable minerals, they are the property of the mine owner.

Response 51
A Forest Service Plan of Operations is an undertaking that requires consideration under the National Historic Preservation Act. With regard to existing mining-claim features such as adits, portals, shafts, and tailings, factors including eligibility of features for the National Register of Historic Places and the effect of the undertaking on any features that may be or are eligible for the National Register of Historic Places must be considered. If eligible features are proposed to be disturbed as part of a Plan of Operations, mitigation for adverse effects may be necessary. A mining claimant has the right to mine on federal land within the claim but does not own the federal land within the claim.

Comment 52
On page 307, under localized in-stream temperatures and reduction in stream flows, the DEIS states there are 8 plans that will pump water from creeks in the Granite watershed. The DEIS is incorrect. There are three operations with valid water rights.

Response 52
Eight Plans proposed to withdraw water and therefore effects were analyzed to stream temperature and stream flow. This will be further clarified in the FEIS. The question of whether the miner had a legal water right is a State determination and separate from the analysis of effects.

Comment 53a
On page 313, Chapter 4, DEQ is not listed as an agency that was consulted in writing this DEIS. No wonder the Forest Service does not understand that the TMDL can not be used as a tool to cut off legitimate water rights.

Response 53a
The second agency listed on page 313 is Department of Environmental Quality, also known as DEQ.

General Response for Comments 54-69
Appendix 8 is intended to provide a summary of the existing condition, proposed action, and operating expectations based on information provided by the operator and the analysis of the site. The development of expectations is used to assist the Forest Service in the determination of reasonableness, and to give some idea of the type and extent of the operation. These expectations are not considered mitigation measures.

One aspect of the analysis process is to consider the reasonableness of the proposal. In order to do so, estimations were made based on the amount of ground to be moved, production rates, and the amount of time available. In this case, we looked at the average working season over the next 10 years.

Comment 54

Altona-I was surprised that the Forest Service and miner could not find the collapsed adit that flows a very small amount of water into a series of ponds, where water eventually seeps into the ground and does not run off in a defined channel. The adit and pond location are indicated on the miner's map. Unfortunately, none of the operations contain the maps submitted by the miners. All maps were drawn by the Forest Service personnel, and for the operations I am familiar with, the Forest Service generated maps often do not reflect what was proposed in the POOs.

Response 54

The Minerals Administrator met with the operator in the field in October 2010 and was unable to locate the adit and water source. The Forest Service map does not show the location of the adit and ponds, as they could not be verified on the ground. The proposed Plan as originally submitted did not show the location of the adit or ponds. After the field visit, an amendment to the operating plan (Oct 18, 2010) was received by our office which listed an unconfirmed location of an adit with water.

Comment 55

Belvadear: The DEIS states "*no WRPMs could be identified that would prevent a discharge of sediment into Olive Creek given the location of the proposed mining in the riparian area"*. The miner thought of and proposed a WRPM. He was willing to increase the buffer and work further from the stream. The Forest Service would not analyze this modification of the POO, thus, he will not be approved to work.

Response 55

The Forest Service does not have a record of receiving a modification to the 2010 proposed Plan of Operations. Please refer to Response 39.

Comment 56

Blue Sky: An opinion is expressed on page A8-9 that if the miner hauled 5 cubic yards a day to process, that he would only process the "bottom yard". This makes absolutely no sense. Why would a miner haul 5 yards of material but only run one yard? How could he determine where the "bottom yard" was? This opinion on mining method serves no purpose in the EIS and tends to make the reader believe the analysis is less than creditable. I suggest this statement be left out of the final EIS.

Response 56

The section you refer to on page A8-9 of the FEIS will be replaced with the following language:

"This proposal is for a small scale, intermittent, family based mining operation. The operator has asked to work from June through October of each year (20 weeks-120 days) for the next 10 years to complete the project. In order to work the area identified in the Plan, the operator would have to work through a little over 1/10 of an acre a year. Based on the information provided in the Plan and collected during the analysis, it is expected that the annual operation would last from 2-8 weeks per year."

Comment 57

Bunch Bucket: The source and settling ponds are dry. Where does process water come from? Bunch

Bucket operators proposed a ten year life for their operation. The Forest Service thinks the operation will take only two years. This opinion evidently was not made by a geologist. The miner would not have proposed a ten year life of operation if it would only take him 2 years to complete his mining. I suggest you leave this opinion about how long the Forest Service would like the miners to mine out of the FEIS.

Response 57

The section you refer to in Appendix 8 of the DEIS will be replaced with the following language in the FEIS:

"This proposal is for a small scale, intermittent, family based mining operation. The operator has asked to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. In order to work the area identified in the plan, the operator would have to work through about 1 trench a year. However, based on the production rate it is estimated that this operation could be completed in as little as 2 years."

Comment 58a

Eddy Shipman:

There are no water rights out of Chipman Gulch, thus, the miner must use groundwater sources for process water, not surface water. Use of groundwater was proposed in the POO but the Forest Service left this source out of the summary compiled on the Eddy Shipman proposal.

Response 58a

The Plan states that water will be taken from Chipman Gulch and therefore that is what was analyzed. The only possible reference to groundwater in the Plan was the reference to "off-channel ponds (p.7)." However, those ponds were dry at the time of the site visit.

1. *"Water from wells at the Buffalo enters Chipman Gulch, and this water is used for milling (p. 7)."*
2. *"Process water is pumped from Chipman Gulch or taken from off-channel ponds (p. 7).*
3. *"This water is pumped from well water which flows down Chipman Gulch from the Buffalo Mine (p. 8)"*

Comment 58b

Page A8 provides some information which does not reflect what the miner proposed in his Plan of Operation. The DEIS states, "*the existing waste rock and tailings piles previously used (Adit A and across from the pond) are very limited and will only hold a few more loads*.." In fact, the miner did not propose spreading tailings on waste rock dumps or tailings piles, he proposed returning the mill tailings "*to dry shafts and pits*" (page 7 of the POO).

Response 58b

This comment concerns language on page A8-27 of Appendix 8. The operator's proposal is to process up to 5 tons per day of material. Only processed material will be returned to the mine once it is dry (it has to be put some place to dry) and there is no plan to return waste rock to the adit. The operator's Plan, page 7, paragraph 2, states "Existing rock dumps are stable and will continue to gradually increase in depth. Periodically, mill tailings will be dried, and then used to refill dry shafts and pits on the claim."

Comment 58c

Page A33- through 34 provides analysis of ponds and whether there is the potential for a discharge. I cannot find anywhere in this section where mill tailings disposal is analyzed. As far as the ponds go, the analysis states there is no potential for a discharge underalternative 3. There is also no analysis in Appendix 1A and none in appendix 7 concerning mill tailings disposal.

Response 58c

While the other comments in this section refer to specific wording in Appendix 8, the wording referenced in this comment appears to be from Appendix 3, pgs. 30-33. Appendix 3 only addresses structures (ponds, roads, bridges) inside RHCAs. Therefore, mine tailing disposal would not occur here. Discussion of mine tailing disposal occurs in Appendix 1A, p. 1A-27. Under Alternative 2, the operator proposes to use existing rock dumps and put mine tailings underground (see their Soil Resource Protection Measures). Under Alternative 3, the General Requirements (L9 and L10) in Appendix 2 would apply and these address mill tailing disposal. Discussion of disposal and reclamation is found in Appendix 8, p. A8-26. Chapter 2 page 12, addresses the existing EE/CA report for the adits and tailings on this claim, and provides a link to the website containing this report.

Comment 58d

As information, an industry standard for mill tailings removal involves removing tailings from ponds and depositing them in dry workings, such as shafts and pits. This is what the miner proposed in his Plan. One man with a wheel barrow can mine about one ton or maybe less of rock per day, some of which might be ore, some of which is waste rock, that will go on the mine dump. Two days milling a month would be the maximum. This can only happen after the portal has been reopened, and the underground workings made safe. The DEIS goes on to state, "*the lack of waste rock and tailings dumpsites will limit the expected operation to basically a testing operation with an expected duration of one season*". There is absolutely no analysis to support this writer's opinion that the operation be changed from a ten year duration to a one season duration. This opinion is arbitrary and capricious. Just the lode portion of the operation will take more than 10 years. This opinion must be deleted from the DEIS.

Response 58d

The Eddy Shipman summary in Appendix 8 of the FEIS gives a brief description of the location of the claim, the existing condition of the area, the proposal as presented in the proposed plan of operation, and operational expectations. Over the last 10 years, the operator has worked on reopening the portal without any success. Until the portal is re-opened, the ability to determine the quality of the ore and the condition of the adit are uncertain. Therefore we analyzed the proposal as submitted by the operator and under optimal conditions. In this case it was up to 5 tons of ore a day during the normal operating season over the next 10 years with no discharge or sulfites. Based on the existing conditions and findings from the EE/CA report, there is a high likelihood that the operator's findings in the adit will trigger the need for a plan modification. Should this happen the operator will be required to submit a modification to the plan under 36CFR 228 for additional protection measures prior to continuing with the lode operation, thus leading to the expected duration of one year. However, should the adit continue to stay dry and the required reports do not show sulfites or minerals exceeding clean-up standards, then the approved operation could continue as stated for 10 years. The Plan summary in the FEIS has been clarified and reflects the information in this response.

Comment 59

Grubsteak: Page A8-29 there should be no restriction to the in-stream period for the use of the ford. The ford is a hardened ford, analysis states that it will not degrade water quality under alternative 3. Fish do not spawn in hardened fords.

Response 59

Page 2 of the operators proposed plan states that they will only use the ford from July 15 – Aug 15, therefore those dates were used in the analysis.

Comment 60

On page A8-29, there is an opinion that of the 200 cubic yards excavated, only 50 yards will be processed. I was told this type of information came from the miners, however, there appears to be no supporting documentation in the DEIS. Applying this as a standard method of mining for all operations would be in error. I suggest that this speculation about the life of the mine be left out of the DEIS.

Response 60

The operation on A8-29 is the Grubsteak operation the numbers referred to above are on page A8-30. The section you refer to in Appendix 8 of the DEIS will be replaced with the following language in the FEIS:

> *This proposal is for a small scale, intermittent, family based mining operation. The operator plans to work from June through October of each year (20 weeks - 120 days) for the next 10 years to complete the project. While the operator does not give an estimated production for each year he does give a specified work area. The sides on site A will need to be re-sloped to meet Forest Service safety measures, and they may need to develop an entrance ramp if they continue beyond the current 20 foot depth. A new site B was identified for mining and will be 12 feet deep and an estimated 20 ft across. As this is within the annual high waterline of the adjacent creek and it will need to be closed prior to winter run off. Based on the information provided in the Plan and collected during the analysis, it is expected that operation could be completed well within the 10 years requested by the miner.*

Comment 61

Lightning Creek: The DEIS states that the operation could "*easily be completed*" in 3 years, but with reclamation it could take 6 years. This opinion is flawed. The summary also states that in order to process 50 cubic yards, the miner must move about 150 cubic yards of material. This is completely inaccurate. In fact, the opposite is true. If topsoil is 6"-12", this material is removed and stockpiled, and the rest of the pit is excavated and processed. But a mining operation is not as simple as digging and processing. Machinery must be greased and fueled, there may be breakdowns, weather conditions may be too wet or too dry, the operation may be shut down due to fire danger. There are so many variables in a mining operation, that an opinion about the life of the mine should not be a part of the DEIS. The Plans will be approved for a ten year period. If the miner is not through with the operation, the miner has the option of submitting another Plan of Operation which will be analyzed in the same manner that the first plan was analyzed.

Response 61

The section you refer to in Appendix 8 of the DEIS will be replaced with the following language in the FEIS:

> *This proposal is for a small scale, intermittent, family based mining operation. The miner plans to work from June through October of each year (20weeks – 120 days) for the next 10 years to complete the project. The plan calls for processing a maximum of 50 cubic yards per day. Each hole*

will be approximately 50'x100'x15'deep which means the miner will move about 2800 cubic yards from each of the 3 proposed holes. Based on a lower production rate and size of the hole, it would be possible to complete one hole per year. Based on a lower production rate of 20 cubic yards per day, it's most likely each hole will remain open for 2 years.

Comment 62

Rosebud: The operator contacted the Forest Service asking to modify his Plan of Operation. He plans to process much more than 3 cubic yards/year. He was told by the Forest Service not to change anything, let the plan be approved, then modify his plan later on. On March 24, 2013, after the miner and I talked, I contacted Chris Helberg by email about the low yardage figure tied to this plan, and she wrote back saying that she would talk to the miner. Thus, it came as a surprise that his modification was not reflected in the DEIS.

Response 62

Analysis for the proposed plans of operations, were based on the potential area of disturbance over 10 years. The processing rates proved in the proposed plans were included in the description of the proposed activity in order to give an example of the anticipated mining activity. When the analysis began on this project, a previous proposal gave an estimated processing rate of 2-10 year and that is the figure that was put into page 50 & A8-61 of the DEIS. The proposal in 2014 estimates ½ acre of mining per year which would be about right, given there is an estimated 5 acres to be mined. There are no mitigation or stipulation measures that would limit the miner to processing only 3 yards of material a year.

Comment 63

Royal White: The summary does not reflect what was submitted in the Plan of Operation. Page 3 of the POO states "*Water from run-off fills the lower Royal White portal, #2, in the spring and this water is pumped up to the Royal White #1 and is used for milling while it is available. Process water is caught in tanks and recycled. When water becomes too muddy to use in the milling process, it is drained into the existing pond at the Royal White site #1 and allowed to seep and/or evaporate. When this source of water dries up, water is hauled in from the storage reservoir located at the Blackhawk portal*". The summary states that 35 cubic yards of ore will be milled. This material should be described as tons, not cubic yards. The map in the DEIS is not the map submitted by the miners, and does not label the adits as #1 and #2, as the miners' map does.

Response 63

The original miners map labeled the upper Royal White adit as #2 and the lower adit as 1, which did not reflect what was written in the plan. Changes were made to the map and the map was reviewed by the operator in 2013.

Also refer to Response 34 and 181.

Comment 64

Page 86 states that the Royal White Lode group has at least one adit that discharges water, and further notations about the adits are made in table 3-6. The statement in regards to discharge is incorrect. The "Black Hawk" adit collects surface water behind a bulk head. The water is maintained for mining purposes; uncontrolled discharge of the water does not occur. Adit #2 of the Royal White is collapsed, the adit is dry and there is no discharge of water.

Response 64

You are correct that currently there is no discharge from the Royal White adit. This has been corrected in the text of the FEIS, and in Table 3-6.

Comment 65

No specific description of the location of the plant to be protected has been provided, according to the mine operators. The description provided in the EIS uses the wordage "*within the footprint of the proposed Plan of Operations for the Royal White Lode Claim*." The EIS provides a non-descript map indicating the plant species of concern is located near and intersected by FS Road 970. The EIS states that Forest Service personnel located the species on the Royal White claim during an analysis completed in June of 2013; however, per available location descriptions of the species (Darrach, ME and Hinchliff, C.E., 2014 ppgs 3-4); the species does not occur within the claim boundaries. There needs to be clarification as to where the population actually is located.

Response 65

The road you mention is used by the operator to get from the Black Hawk water source and their cabin to the upper adit at the Royal White, and is therefore within the proposed operations of the mine. Our correspondence files show several emails back and forth from the miner in regards to the location, identification and protection of the plant.

Comment 66

Sunshine: The summary has the opinion that mining areas 50'X100'X12' will provide only 1000 cubic yards of paygravel, which is absolutely not true. The reason for the opinion is that, "*as not all the dirt in a hole is processed (surface and waste rock is set aside)* ***half*** *of the dirt in the hole would easily give the miner the 1000 cubic yards they plan to process each year. Based on one hole a year, 1 year for start up and 1 year for re-hab, the mining could easily be completed in 6 years".*

This opinion is flawed. A 50'X100'X12' pit provides approximately 2,666 cubic yards of gravel using an expansion figure of 20%. Oversize is separated at the pit, but the miner will not leave half the gravel and only process the other half. This makes no sense at all. I suggest that this type of speculative information be left out of the final EIS.

Response 66

The section you refer to in Appendix 8 of the DEIS will be replaced with the following language in the FEIS:

> *This proposal is for a small scale, intermittent, family based mining operation. The operator plans to work from June through October of each year (20weeks-120 days) for the next 10 years to complete the project. In order to work the area identified in the plan, the operator would have to work through a little over 1/20 of an acre a year (50x20ft). However the operator plans to process 1000 cubic yards a year which would result in an estimated 8-10 cubic yards of material being processed each day during the operating season. Based on this production rate and allowing for some breaks, it is estimated that the area proposed in the plan (@1/2 acre) could be totally processed within the 10 years requested.*

Comment 67

Tetra Mill: The DEIS states this is a one season operation. There are 3 ponds, each about 12'X25'X12, with a capacity of about 533 cubic yards of tailings. 10-20 tpd will be milled once a week once the portal is open and the mine is safe, which will take a good part of the first season. There are 17 weeks in

the season, so the most tailings that could be generated during a full season of testing would be 340 cubic yards. The ponds will fill in three years, however, the plan is to amend the POO as soon as the miner can mill some of the ore. Mill tailings will be disposed of underground in the adit, which is dry. This speculation on the life of the operation is not based on facts and should be removed from the Final EIS.

Response 67

While the mill plan proposed to process 10 to 20 tons per day (TPD) Page 1 of the 2007 lode plan amendment plans to excavate and haul only 10 tons of ore for processing at the mill. This could easily be done in one year.

The proposed Plan of Operations for the lode and milling site are for the continuation of a previously approved Plan of Operations under another owner. As there was no size given for the ponds, the analysis of the ponds and their use was based on the existing ponds, which are much smaller than those you have described above. None of these ponds are over 5 feet deep and around 5 feet across. The length between the ponds varies, but they are limited by both the road and the side of slope of the hill to their current configuration. In the spring of 2013 this site was also reviewed by the tri forest geologist (Kathy Anders) and Ben Mundie from DOGAMI, and it was there opinion that the existing ponds would be filled with the sediment from the initial 10 yard run. The second page of the milling amendment – item 11, states that the ponds will be allowed to fill and that no excavation or storage of mill tailings is covered in this Plan, as the continuation of the Plan is based on milled values. Therefore, a supplement or additional Plan will need to be filed before further operations can continue.

Comment 68

Troy D: the summary and pages A3 99 and A3-100 state the process site is 136 feet from Granite Creek, but the map which the Forest Service drew "*to scale*", indicates the process site is about 190 feet away. Page A7-207 states that Troy D operators cannot use their larger pond for a settling pond. That leaves only one small pond as a settling pond, where it would be impossible to recycle process water. The DEIS states, "*if Pond B needed to be enlarged, this construction would also be in compliance with MM-2*". This statement should be changed to ***if Pond B needed to be enlarged, or one or two additional ponds constructed, this construction would also be in compliance with MM- 2"***.

Response 68

First, based on your comments, we reviewed pages A3-99 to A3-100, A7-207 and all references to “136 feet from the creek”. We see the cause of the confusion and as a result have clarified the location where the 136 feet was actually paced from in the Final EIS. The reference to “136 feet from the creek” is incorrect. The 136 foot distance was not paced from the creek but from the backside of the old placer tailings berm that lines the terrace next to Granite Creek. Therefore, this number would not agree with the distance measured off of the Minerals Administrator’s map when measured from the creek. This map was done from a scaled aerial photo and the distance from the creek to the ponds included the floodplain, terrace slope and the berm width. When the distance from the back of the berm to the pond is measured off the map, the distance is around 150 feet vs. the 136 feet paced. The text throughout the document is corrected to read as follows: The distance between the back edge of the berm and the mining area is at least 136 feet (paced).

Second, with respect to the requested change in language to allow for the construction of additional settling ponds and having them also be in compliance with PACFISH, this modification is not possible. The current proposal under analysis, did not propose the construction of additional ponds and therefore no sites were identified by the miner that could be evaluated for compliance. Should you wish to add

additional settling ponds during the development of your operation, you would need to send in a supplement to your plan.

Comment 69

Yellow Jacket: A1-98 requires L1-L12 as required stipulations. This is unreasonable, because the lode is not on Forest Service system lands. **Delete the requirement for L1- L12 from the DEIS.**

Response 69

The lode is adjacent to FS land and in the winter, the water from the ponds overflow into the creek on FS land. As the work at the lode has a potential to affect Forest Service land it must be tested as well. (36 CFR 228.8 "All operations shall be conducted so as, where feasible, to minimize adverse environmental impacts on National Forest surface resources," ….)

While the proposed processing site is on private land, it is directly adjacent to and drains onto Forest System land. The ponds drain into the adjacent tributary (1707020293L0016000.17) of Olive Creek and the processed rock (tailings) will be returned to Forest Service land after processing. In the proposed plan (page 3), it stated that the water from the Orfino adit will be used for processing. These activities on private land have a potential to adversely affect Forest System lands, therefore the Lode Requirements in Appendix 2 apply to all Plans proposing lode-related activities in the project area.

Comment 70

In Appendix 9-5 under Stream temperatures, the DEIS states that "*miners that proposed to withdraw water from streams must be in compliance with the ODEQ John Day Basin TMDL which does not allow for increases in stream temperatures"*. This statement is not correct. In the *North Fork and Middle Fork John Day Irrigation Plan*, which is tiered to the TMDL, it states, "*The provisions of this Area Plan do not establish legal requirements or prohibitions. The provisions of this Area Plan do not affect legal water rights established under the rules of the Water Resources Department (WRD)".*

Also, in an e-mail correspondence with DEQ TMDL specialist John Dadoly, the Forest Service presents a scenario and Dadoly answers: Scenario 1: Miner has a valid water right. Dadoly answers, "*Miner can withdraw water even if there is the potential to increase stream temperatures. Even where there are water rights, whether irrigation or mining, DEQ encourages water conservation and all feasible measures toward protecting in-stream flows, after all WRD-permitted irrigation is a huge part of the temperature problem in Oregon streams. There may be incentives such as WRD's conserved water program (I don't know that would work for these intermittent or occasional type withdrawals, or working with watershed councils to find different methods than withdrawal, etc., or the USFS working with the new Integrated Water Resource Strategy.* ***But we've never attempted to ban someone from using their water right".***

Lightning Creek and Olive Tone operators fill ponds early, recycle all water, pumping only small amounts of make-up water, protect riparian vegetation and stream shade and do not work in-stream. These operations are in compliance with the TMDL. Operations without valid water rights would not be in compliance.

Response 70

The Lightning Creek and Olive Tone operators did not identify in their Plans when they would pump water from the creek. Therefore, the worst case scenario was used: summer low flows and high air

and water temperatures.

Also refer to Response 4b.

Comments on General Requirements (DEIS Appendix 2) from EOMA, Campbell, Cox, Cree, Holoboff, Knapp, Lewallan LaDouceur, Myers, and Roan

Comment 71
General Requirements

Page A2-3 states "*The bond shall also cover the removal of all equipment and improvements authorized in the plan*". This statement should be clarified. Miners who propose to remove their equipment each fall should not have equipment removal included in their bonds. If equipment removal is included in every miners' bond, and they do remove their equipment each fall, then their bond would have to be "adjusted" every year.

Response 71
Forest Service bonding direction comes from 36 CFR 228.13 and 2800 Forest Service Manuals and Handbooks. A number of items go into determining the final cost of any given bond. The actual bonded items and their costs will be clarified between the operator and the Forest Service prior to the approval of the proposed plan.

Comment 72
G6 is not reasonable. Requiring miners to create new snags, when diseased or dead trees are removed for safety, is unreasonable. Many times the only trees available in the "same area" are healthy growing trees that should never be killed to make a snag. Once the snag has been created, woodcutters will simply cut it down for firewood, or it will become another danger tree. **G6 was not a requirement under the North Fork Burnt River Mining EIS and it should not be a requirement under the Granite Watershed Mining Projects EIS.**

Response 72
Requirement G6 will be modified to the following in the FEIS:

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.

Comment 73
G7 Remove "*see project file for additional Fisheries/Aquatics direction*" since this information is not available.

Response 73
This language will be removed from the FEIS and Appendix 2. All Fisheries/Aquatics direction relative to this analysis is documented in the Biological Assessment and FEIS.

Comment 74a

G20 needs to be clarified. The first part "*Extended occupancy (longer than allowed under the Forest Order) must be incidental and necessary for the level of proposed mining..."* needs to be changed to read, "***Extended occupancy (longer than allowed under the Forest Order) must be incidental and necessary for the proposed mining..."*** If the activity is mining, even with hand tools, the activity comes under the General Mining Law of 1872, as Amended, and Forest Orders do not apply.

The second part "*And authorized in the Plan of Operation*" is also unreasonable. The 36CFR228 regulations do not require that occupancy be approved under a Plan of Operation.

Response 74a

36CFR 228.4 (a)(1)(v.) states:

Operations, which in their totality, will not cause surface resource disturbance which is substantially different than that caused by other users of the National Forest System who are not required to obtain a Forest Service special use authorization, contract, or other written authorization;

Umatilla Forest Order No 2009 0614-00-1 states:

> *7. Camping for a period longer than allowed by the order. For the purpose of this order, this restriction applies to any person who camps in excess of 14 days within any 30 day period, except by written authorization by the Forest Supervisor or District Ranger 36 CFR 261.58(a).*

Wallowa Whitman Forest Order No. 2010-0616-WW-12 states:

> *8. Camping for a period longer than allowed by the order. For the purpose of this order, this restriction applies to any person who camps in excess of 14 days within any 30 day period, except as authorized by a Forest Supervisor or District Ranger 36 CFR 261.58(a).*

Pursuant to 36 CFR, Sec. 261.50(e), the following persons are exempt from items these orders:

> *(1.) Persons with a special use permit from the forest specifically authorizing the prohibited act or omission.*
>
> *Therefore, any person staying longer than the Forest Order allows would be required to obtain a permit. Extended occupancy has the potential to cause surface disturbance which may be substantially different than that caused by other users limited to 14 days in a 30 day period. Improper sanitary practices or disposal of refuse, the potential of fire, compaction of soil, impacts to sensitive resources such as found in riparian areas, or occupying a site popular to recreationist. At the minimum, notice is required when the mining occupancy will extend longer than the 14 days allowed for other forest users. Mitigation measures may be required that would limit the impacts to surface resources. Mitigations may include but not limited to, relocating the camp site, self-contained sanitary facilities, commercial garbage collection or proof of proper refuse disposal, restrictions on fires and smoking, and limits on the time of*

year the site may be occupied.

The Organic Administration Act states:

> *Nor shall anything in such sections prohibit any person from entering upon such national forests for all proper and lawful purposes, including that of prospecting, locating, and developing the mineral resources thereof.* ***Such persons must comply with the rules and regulations covering such national forests.*** *(16 U.S.C. 478)*

Comment 74b

The third part of this stipulation is also not reasonable "*No person not actively involved in the day to day operations will be authorized to stay longer than allowed under the Forest Order..."* This stipulation is too subjective-the Forest Service may interpret this to mean the person must be actively mining to be on site, however this is not true. The General Mining Law, as amended, is the authorizing law as long as occupancy is "*reasonably incident*" to the mining operation. A single miner may run an operation, and be involved in the "*day to day operations*", while the wife or partner is on site for safety (common sense does not allow one miner to operate alone). Forest orders are for recreation activities, the mining laws and the 36 CFR228 regulations have nothing to do with recreation. **G20 needs to be rewritten**.

Response 74b

The District Ranger will determine if the occupancy is incident to mining. The example outlined above may well be authorized as incident to mining. However, the final decision is that of the authorized officer to determine if the proposed occupancy involves a person actively involved in the operations.

Comment 74c

G22, "*When the operator is contemplating a sale of the claim associated with their Plan of Operations, the claimant/operator shall notify the District Ranger*" is not a requirement under the regulations, is unreasonable, and is completely unenforceable. This sort of information can be provided to the miners in a letter, but it is not appropriate as a stipulation. **G22 should be deleted**.

Response 74c

G22 will be deleted from the Final EIS, as it will not change the environmental effects or how claims are administered.

Comment 75

G23 should be rewritten, since using pumps to recycle process pond water does not require screening. G23 should read "***When pumping water from streams, mesh on hydraulic pumps must have no less than .....".***

Response 75

G23 has been revised since the DEIS to make it consistent with Oregon Department of Fish and Wildlife requirements for fish screens ORS 496.141, and currently states, "*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*."

This requirement includes drafting from all water sources, as there is the potential for spotted frogs in ponds to be sucked into a pump during water drafting.

Comment 76

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*" was not well thought out and is not reasonable. How far would the inspector be willing to drive to inspect the equipment? Many operators are from the west side of Oregon or from other states. How would the inspector make sure the equipment was in "working order"? What happens if a miner is ready to haul equipment in and the mineral administrator is on training or on vacation or is sick or otherwise can't come out? G24 was not a condition of approval in the NFBR Mining Projects EIS and G24 is both unworkable and unreasonable. H8 "*All equipment shall be checked for fluid leaks on a daily basis...."* covers the intent of G24 and is reasonable**. G24 should be deleted**.

Response 76

General Requirement G24 was written to mimic similar contract specifications that are required for timber, fire, road construction and other service contracts on Forest System lands Inspections are usually held at the closest Forest Service compound or a pre-arranged meeting place.

The General Requirement H8 is a daily requirement for the operator.

Comment 77

IS2 needs to be rewritten to include Mining Plans of Operation, since POOs are not permits. In addition, "*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"* should be deleted. IS2 should be changed to "***All equipment to be operated in the project area shall be cleaned in a manner sufficient to prevent noxious weeds from being carried into the project area. This requirement does not apply to passenger vehicles and other equipment used exclusively on roads. Cleaning of equipment, if needed, will occur off NFS lands. Equipment will be cleaned on-site prior to moving it to another site if the site is known to have noxious weed infestations***". This stipulation was required of miners in the NFBR FEIS and is reasonable.

Response 77

The Pacific Northwest Region Invasive Plant Program Preventing and Managing Invasive Species Record of Decision (Region 6 Invasive Species ROD) has identified 23 prevention and management standards for all activities on NFS lands. Prevention standard 2 states "*Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of* ***all heavy equipment*** *(bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands. This standard does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time*." The portion of this standard requiring the forest service to inspect all equipment, and requiring the cleaning of equipment once on NFS lands has been removed to match the intent from the recent Regional Invasive Species EIS Record of Decision.

Comment 78

IS3 is unreasonable, since miners would not be able to conduct ongoing reclamation if every time they were ready to fill their excavations, they would need an opinion from the FS Minerals Administrator. IS3 should be rewritten to reflect the same stipulation found in the NFBR FEIS "***Prior to its use, any rock sources (e.g. pits and quarries) will be inspected for noxious weeds. Rock source material contaminated with high priority noxious weed propagules will not be utilized***".

Response 78
Prevention Standard #7 from the Region 6 Invasive Species ROD states "*Use only gravel, fill, sand, and rock that is judged to be weed free by District or Forest weed specialist*." This standard has been made a part of all regional Forest Plans as is required in order to be compliant with Forest Plan direction .

When returning excavated material back to its original location, inspections would be exempt.

Comment 79
S5, "*All noxious weed infestations will be avoided during times of seed production*" is unreasonable and unenforceable. Miners need to be aware of the noxious weed problems on the Forest, but running over a Scotch thistle is unavoidable in a lot of areas. IS5 should be rewritten as follows: "***To the extent practicable, all noxious weed infestations will be avoided during times of seed production***".

Response79
IS5 has been modified to read "*All ground disturbing activities will avoid inventoried (as identified on the map provided in IS1) noxious weed infestations 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*."

Comment 80
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. A modification to the Plan may be required per direction found in 36CFR 228.4 (e")*" ***is not reasonable.*** L5 should be re-written to state that the District Ranger will be immediately notified upon the miner's receipt of test results that exceed the EPA and ODEQ's standards. The results will directly impact the operation, and this information is essential for the miner to know and for the miner to immediately act on. The Forest Service is often untimely in replying to correspondence (I can provide numerous examples, if needed) so the best protection for the environment is for the miner to receive the results and for the miners to provide the results to the Forest Service.

Response 80
This general requirement requires a copy of the test results to be sent to the Forest Service. While the operator would arrange with the lab for their own copy of the report, the Forest Service must also receive its copy of the testing results directly from the lab. This is in line with similar DOGAMI requirements.

Comment 81
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)/owner(s) will be held responsible until the tailings and waste rock are in stable, non leaching condition*" is unreasonable and needs to be rewritten. Just because waste rock or tailings exist on a claim, does not automatically make the miner responsible for reclamation/stabilization**.** Also, under the 36CFR228 regulations, the owner of the claim is not responsible for reclamation, it is the operator who is responsible**.** This stipulation should be rewritten to state, **"*If waste rock and/or tailings generated during the course of the mining operation exceeds EPA standards for human health and safety, and concentrations exceed baseline, the operator will be responsible for containing/controlling these materials. The operator will be held responsible until the tailings and waste rock are in a stable, non leaching condition*".**

Response 81
Since this is already enforced through the CERCLA Act and is just a restating of federal laws, requirement L10 will be removed from the FEIS.

Comment 82
R1, "*Prior to reclamation, the operator will coordinate with the Forest Service on reclamation activities for ....placement of topsoil, use of slash, seed mixes and seeding rates..."* is not reasonable. The Plans of Operation require most miners to conduct reclamation that is ongoing with the mining operation. Refilling excavations to normal land contours, placing topsoil, and seeding are all included in the Plan and in the attached stipulations. Miners must be able to conduct reclamation activities as the need arises. R1 should be changed to "***Reclamation should be ongoing to stabilize the area and so that a minimum amount of ground will be open at a given time***". This stipulation is found in the North Fork Burnt River Mining stipulations and this should replace R1.

Response 82
This requirement directs the operator to coordinate with the FS on how to handle material that will eventually be used in reclamation. Good communication will be necessary between the operator and the minerals administrator both during and out outside of normal inspections. In working together and planning ahead for the year's activities, there should be no delays for the operator when it comes to reclamation or opening a new hole. The change you recommend is identical to R2.

Comment 83
R4 and R5 are not reasonable. Certified weed free straw is not available locally, County extension agents will not certify local fields because of liability issues. Growers have such stringent requirements, such the application process, and inspection just before harvest, and unless the inspections take place at the appropriate time, the grower may not be able to get the straw baled before wind or rain ruins everything. The only inspector comes out of Ontario. No farmers I talked to wanted anything to do with this program, which leaves the miners with no option except for being in noncompliance if they cannot find some straw.

Response 83
In accordance with the Region 6 Invasive Species ROD "if State certified straw and/or mulch is not available, individual forests should require sources certified to be weed free using the North American Weed Free Forage Program standards or a similar certification process." In the past, the Wallowa-Whitman and Umatilla National Forests have deemed that straw from fields that have been 'certified for weed free seed production' by the OSU extension office, is sufficient to meet the requirements of this standard. These sources could vary year to year, but the extension office would be able to provide current, local sources of weed free material. Therefore, this requirement can be met.

Comment 84
R4 and R5 should be rewritten. R4 can have "**or woody debris mulch**" **or simply delete the requirement for straw.** R5 should state "***For topsoil stockpiles, native/desirable non native seed mixes as recommended by the Forest Service botany specialist will be used or the stockpiles covered with plastic***". This stipulation is found in the North Fork Burnt River Mining stipulations and this should replace R5.

Response 84
Ongoing reclamation requirements R4 and R5 were intended to provide organic material that easily

decomposes in order to provide some of the material needed for the development of soil and soil structure. The development of soil and soil structure are needed to allow for the long-term restoration of the soil productivity of these mining sites. The use of woody debris and plastic do not meet the intent of these requirements as it pertains to soil development because they do not decompose rapidly. These requirements mimic those found in service contracts and restoration projects undertaken by the Forest Service.

Comment 85
R7 needs to be absorbed into the revised R5.

Response 85
R7 is a requirement that is specific to stockpiled topsoil, while R5 is a more inclusive requirement discussing stabilization of the entire site. These requirements are separated to reduce confusion.

Comment 86
R12 is not reasonable in two areas. Mine sites are often harsh sites. Many have no topsoil, they do not have an "A" horizon and native seed will not germinate**. Use of desirable non-native seed mixtures, which are free of noxious weeds and which will germinate quickly to hold the soil and outcompete the weeds should be included in R12.**

As stated above, certified weed free straw is not available locally, and the miners should have the choice of using woody debris as mulch.

Reclamation stipulations should be based on the results obtained on the ground. If the operator is able to achieve appropriate levels of vegetation without straw, this end result should be the goal, not what methods the miner uses to get these results.

Response 86
R12 has been modified to read "*Following re-contouring of the ground, the ground will be seeded with an appropriate seed species mix or locally appropriate native trees and shrubs. Appropriate seed mixes will be created through consultation with the Forest Service*."

Mulching of a newly seeded area is often necessary to encourage establishment of the seeds and growth of young plants. Mulching can protect seeds from overexposure to the heat, encourage retention of moisture, and reduce depredation by birds and small mammals.

Comment 87
R13 is reasonable in that newly constructed roads should be reclaimed, however it is **not reasonable as to the requirement that certified straw be used, since this is not available locally.**

Response 87
See Response 83.

Comment 88
R16 is not reasonable as it pertains to spreading a thick 3" mat of straw. Three inches of straw is detrimental to germination. The Forest Service botanist for the Lyman Quarry Project EA stated, "***Certified Weed-Free Straw mulch 1/2 inch is recommended on the newly seeded or planted bare soil. The mulch should not be any thicker on seeded areas or germination will be inhibited*".**

Response 88
R16 has been modified to the following:
"*In mid to late fall, after completion of operations, the miner will distribute certified weed-free straw, 3 inches thick over approximately two-thirds of the area leaving small open patches distributed across the site. Seeding will not take place at this time, but will occur the following year when the straw has partially dried*."

The 3 inches of straw is designed to provide organic material where none exists due to mining activity and provide materials needed to begin the development of soil and soil structure. However, since thick layers of mulch can inhibit germination, the requirement was modified to give the straw time to begin decomposing in order to 1) create microsite conditions conducive to seed germination and 2) decrease in thickness. By waiting until the following year to seed, increased success of re-vegetation activities is expected. Since the cost for native species materials is high, increasing the success of these restoration activities is important.

Comment 89
In addition, if straw is not available, the miner should have the option of using woody debris as mulch. R16 should be rewritten "***After seeding, the mine operator will distribute certified weed free straw, if available, 1/2 inch thick over approximately two-third of the area in mid to late fall. Woody material, if available, can take the place of straw. Some patchy open areas are acceptable".***

Response 89
See Response 88.

Comment 90
R17 is not reasonable where it requires the miner to consult with the Forest Service before spreading topsoil. If the Plan of Operation requires ongoing reclamation, the miner should be allowed to conduct his mining and reclamation whenever needed, without waiting for the Forest Service to come out and take a look**. Delete the part about consulting with the FS.**

Response 90
R17 will remain as is because consultation between the miner and the Forest Service minerals administrator is ongoing. Therefore, the miner and the minerals administrator will already have discussed the appropriate location for the soil to be placed after a particular activity has been completed.

Also refer to Response 82.

Comment 91
Z13 is not reasonable as it pertains to a miner's gate. If the location is approved by the Forest Service, **the miner should have the option of constructing the gate of materials located on site, rather than purchasing an expensive powder river gate**.

Response 91
Even though it is the miner's gate, the placement and use of the gate is approved under the Plan of Operations and therefore must meet Forest Service specifications and requirements. This General Requirement mimics similar contract specifications and Forest Service safety policy which requires a metal gate, and does not specify a manufacturer.

Anderson Comments

Comment 92
The laws related to mining as published on page 18, chapter 1are a perfect example of why you have problems. It quotes only those portions of the law that you like, not the true position.

Part of the mining law you fail to recognize states, that when a miner finds a viable deposit he is granted an exclusive vested possessory right to all the property within the boundaries of his claim. The Supreme Court states that as long as miner complies with mining law his ownership is the same as patented.

The Organic Act which created the Forest Service specifically states that if land within it boundaries is found to be better adapted for mining or agriculture it may be restored to the public domain. If the Forest Service had followed this directive most of these problems would not have been part of your responsibility.

The multiple use act is correct to the point where it says the United States has the right to manage the vegetative surface resources thereof, and they leave out the rest of that sentence that says "except locatable mineral deposits that are sub ject to location under the mining laws of the United States".

FIPMA states "no provisions of this act amends the mining law or the rights of any claim under the act." Note: Every law that effects the land has this clause. "No provisions of this act amends or impairs any previous granted right".

Thus all claims that have recovered a substantial amount of ore are considered perfected and are private property and not under the jurisdiction of the Forest Service unless they are impacting others beyond the boundaries of their claim.

If you recognize and follow these laws which have not been repealed or over turned by the courts you can save a great deal of time, work, and money and allow mining to make the money necessary to continue to pay for our government.

Response 92
This comment is outside the scope of this analysis. The commenter disagrees with the interpretation of the laws granting authority to regulate mining on National Forest System lands. The Organic Administration Act states:

> "Nor shall anything in such sections prohibit any person from entering upon such national forests for all proper and lawful purposes, including that of prospecting, locating, and developing the mineral resources thereof. **Such persons must comply with the rules and regulations covering such national forests.** (16 U.S.C. 478)"

Campbell Comments

Comment 93
The Granite Creek Watershed Mining DEIS is a completely confusing document. I had great difficulty finding my operation (Olive Tone) since there are references to my proposal throughout the two volumes. There were inconsistencies about "fish protection measures" and "WRPM measures" and which operations they apply to. I had a hard time trying to understand what the effects were, especially when they were hidden in the appendices. It would have greatly benefitted me, and I would guess other readers feel the same way, if the effects of each operation and the stipulations and water quality protection measures were all in one place.

Response 93
Refer to Response 27a.

Comment 94
Analysis under a DEIS of 28 Plans of Operation, with a total of 104 acres analyzed, seems a big waste of time and money. Miners have been waiting for years for their operations to be approved. Many of these operations will affect one acre over ten years, it seems like a simple Environmental Assessment would have been more appropriate instead of a full blown Environmental Impact Statement.

Response 93
Refer to Response 27c.

Comment 95
I have a legal water right to use water from Olive Creek, but most of the operators will use off-channel ponds for their water sources. The document makes it seem like just anyone can pump their process water out of any creek, and this is not true under state law. Miners must be in compliance with state law, thus, those miners without water rights will not be pumping from streams and their operations will not have "potential cumulative effects".

Response 95
As some operators have proposed to withdraw water from a stream, the potential for cumulative effects from the water withdrawal should be considered. Even though the operator may not have a water right at this time, they can still apply for a new water right or transfer another water-right (see FEIS Appendix 2, G18 and G19).

Also refer to Response 27c.

Comment 96
The DEIS states that my operation on Olive Creek will affect water temperatures and fish, which is not at all true. It is my understanding that the TMDL does not cut off legal water rights, and further that DEQ actually stated that the Forest Service cannot use the TMDL as a "tool" to stop miners from using water under legal water rights. I was informed that all water users with legal water rights must do is "*take water in a manner that minimizes effects"*. That is exactly what I do.

On page 85, the DEIS states that the reason stream temperatures are higher than 53.6 degrees is historic activities such as channel incision and straightening, loss of riparian vegetation, beaver trapping, timber harvest and grazing and loss of groundwater inputs due to loss of floodplain access and groundwater

recharging. Since I protect stream shade, do not impact riparian vegetation and do not work in-stream, I am doing my part to minimize impacts on stream temperatures, as the TMDL requires. There is no grazing or logging and I haven't even seen a beaver on my claim, but I wouldn't harm it if it was there. The TMDL does not require me to stop withdrawing water under legal water rights, simply because the stream naturally gets warmer than the State wants it to be.

Page A9-5 is incorrect where it states "*those miners that proposed to withdraw water from streams must be in compliance with ODEQ John Day Basin TMDL which does not allow for increases in stream temperature*". As stated above, the TMDL requires water users with legal water rights to minimize impacts. Withdrawing water early in the spring to fill ponds, and withdrawing only make-up water thereafter, not impacting riparian vegetation, not working instream, not removing stream shade are the feasible measures that I use in order to meet the TMDL.

Page 115 of Chapter III states both Olive and Lightning have low flows and shallow depths. The DEIS states that effects on stream temperatures would be based on (1) timing of withdrawal (spring when flows are high and temperatures are low) (2) amount (miners can pump from 100-250gpm using the pumps that they use in their operations) (3) existing stream (flows are near peak when ponds are filled) (4) continuous vs limited withdrawal (miners can only pump enough to fill their ponds. Continuous withdrawal would result in discharge which is against state law. Limiting legitimate water rights users is not required by the TMDL, and this "fish protection measure" is not needed to protect fish, thus, it should be eliminated from the DEIS. Filling ponds early and taking only make-up water thereafter will not effect stream temperatures or fish and is in compliance with the TMDL.

Page S-9 and S-10 state that Belvadear and Olive Tone have requirements that the miners must not use water if the stream flow downstream of the pump is diminished to the point that the stream is dry. Because these operations have legal water rights, and because when streams get low and temperatures increase, fish move downstream to cooler deeper water, this requirement is unreasonable.

Response 96
Refer to Response 28.

Comment 97
Page 3 states that plans in this proposed document would be in effect from 2014 to 2024. This statement should be changed to state that the period is 2016-2026 for operators who work the first possible year, but that unless NEPA compliance is no longer adequate and current, (things change in the watershed), operators can work for a ten year period beginning when their plan is approved (see page 66).

Response 97
Refer to Response 30.

Comment 98
Page 39 also begins a description of the operations. This chart needs to remove cubic yards/yr, cubic yards/day and tons/day. Area impacted at a given time is important for the analysis and for later calculation of a reclamation bond. Olive Tone cubic yards processed isn't even on this chart, and none of the other operations should have this information either, as some is for a daily amount and some is for a yearly amount. In talking to some of the other mine operators, their plans of operation never contained these yardage figures For consistency, remove amount of material processed from this chart and from the summaries.

Response 98

Refer to Response 34.

Comment 99
On page 78, under past, ongoing and future projects, the DEIS lists ditches but should also list water withdrawals. On page 114, the DEIS states, "*if a portion of a stream goes dry downstream, water temperature could increase as a result of a reduction in flow*". This statement is not based on science. Gimlet Creek in the North Fork Burnt River watershed is a good example of what happens to water temperature when the water subs into the channel bottom. The water is warm where the stream goes dry, but water temperature in Gimlet can be up to 10 or more degrees cooler where it resurfaces.

Response99
Refer to Response 35.

Comment 100
On page 115, the DEIS states that the fish protections measures were not added to Olive Tone or Belvadear. It is unclear whether this pertains to the fish protection measure of cutting off of my legal water use on August 14 or whether it pertains to the fish protection measure of cutting off my legal water right if the stream goes dry somewhere downstream of my operation. Either prohibition of my legal use of water is unreasonable.

Response 100
Refer to Response 35 and 36.

Comment 101
There are a lot of mining water rights in the Granite watershed besides mine. Many of the miners with water rights in the Granite Creek watershed do not have Plans of Operation, but they do use their water. It would be unreasonable for the Forest Service to cut off a legal state water right for a miner with a POO, while all the other miners without POOs get to continue to pump water. If a downstream water user is affected by a junior water right, the Grant County Water Master will take care of the matter, not the Forest Service.

Response101
Refer to Response 38.

Comment 102
On page 130 of Chapter 3 the chart Table 3-20 states for Belvadear and Olive Tone that pumping "will be restricted to the time period prior to August 15 because water withdrawal will not occur after August 14th. This is not consistent with page 115 where it states "*fish protections measures were not added to Olive Tone or Belvadear because there are no bull trout or chinook salmon in Olive Creek (T. Hickman, Forest Service Biologist e-mail, 8/15/2014.)* This mitigation should not apply to Belvadear or to Olive Tone and the chart should be changed.

Response 102
Refer to Response 40.

Comment 103
Page 130 again states that Belvadear and Olive Tone are subject to restrictions on their legitimate water rights. Page 115 states that these mitigations should not apply to Belvadear or to Olive Tone.

Response 103
Refer to Response 40.

Comment 104
Page 132 states that under alternative 3 the number of plans that could alter stream temperature decreases but states Boulder (no water rights) Olive and Lightning Creeks (legitimate water rights) remain as problem operations. The mitigation measure to stop pumping on August 15 is called a "Fish Protection Measure". However, the fish biologist states this mitigation is not necessary for Olive Creek because Olive Creek does not have bull trout or chinook salmon. My question is why are these required despite the recommendation of the fish biologist? And why isn't Olive Creek mentioned in the summary-it only refers to Lightning Creek and to Boulder Creek?

Response104
Refer to Response 40.

Comment 105
On page 159 of Chapter 3, direct and indirect effects are listed. Water withdrawal is not mentioned as either a direct or an indirect effect on ESA or sensitive fish species.

Response105
Refer to Response 42.

Comment 106
On page 186, Olive Tone states that there will be a maximum of 8 CFS withdrawn from Olive Creek under the water right. The point that is missed in this analysis is that settling ponds are small, and they are only filled in the spring. If enough water was available in the spring during peak flows, and I had a large pump (which I don't) it would take 8.4 minutes to fill my small ponds. No further pumping could take place because the DEQ WPCF permit does not allow discharge of process water. After the ponds are full, process water is recycled and only small quantities of make-up water are needed to offset losses from evaporation and seepage. Thus, the analysis on the effects of my pumping water are severely flawed.

Neither Lightning Creek Placers or Belvadear has this discussion of water use, that we see on page 186, and it is not clear why the discussion only applies to Olive Tone. But regardless, there will be no measurable effects from pumping small amounts of make-up water throughout the mining season.

As I said before, I fill my ponds early, recycle all water, pumping only small amounts of make-up water, protect riparian vegetation and stream shade and do not work in-stream. My operation is in compliance with the TMDL. Operations without valid water rights would not be in compliance.

Response 106
Refer to Response 45.

Cox Comments

Comment 107
I did see that on page 3, it states that plans in this proposed document would be in effect from 2014 to 2024. This statement should be changed to state that the period is 2016-2026 for operators who work the first possible year.

Response 107
Refer to Response 30.

Comment 108
Page 5 inaccurately states that the town of Greenhorn is in the Granite Creek Watershed.

Response 108
Refer to Response 31.

Comment 109
Page 39 begins a description of the operations. This chart needs to remove cubic yards/yr, cubic yards/day and tons/day. Surface area impacted at a given time is important for the analysis and for later calculation of a reclamation bond. Some operations have cubic yards listed per day, some have cubic yards listed per year, like the Sunshine/McWillis. For several of the operations there is no listing of cubic yards at all. For consistency, please remove the amount processed from this chart, and for consistency, remove cubic yards and tons from the summary.

Response 109
Refer to Response 34.

Comment 110
In the appendix summary for Sunshine, the summary has the opinion that mining areas 50'X1OO'X12' will provide only 1000 cubic yards of paygravel, which is absolutely not true. The reason for the opinion is that, *"as not all the dirt in a hole is processed (surface and waste rock is set aside) half of the dirt in the hole would easily give the miner the 1000 cubic yards they plan to process each year. Based on one hole a year, 1 year for start up and 1 year for re-hab, the mining could easily be completed in 6 years".*

This opinion is flawed. A 50'X1OO'X12' pit provides approximately 2,666 cubic yards of gravel using an expansion figure of 20%. Oversize is separated at the pit, but the miner will not leave half the gravel and only process the other half. This makes no sense at all. In addition, time is not just spent digging and processing. Equipment must be fueled and greased, sometimes the weather is too wet or too dry to operate, sometimes the Forest Service shuts operations down due to fire danger. I suggest that this type of speculative information be left out of the final EIS.

CH Response 110
Refer to Response 66.

Cree Comments

Comment 111a
My Plan of Operation states that I will use well water from the Buffalo Mine or will use off- channel

sources. Since I do not have a water right *I* will use my off-channel ponds as a water source for placer processing.

Response 111a
The analysis was conducted on the information provided in the proposed Plan of Operation which was dated June 24, 2004. Page 7 lists Chipman Gulch as one of the sources, and so it was included in the analysis. "Water from the wells at the Buffalo enters Chipman Gulch and this water us used for milling." And then "Process water is taken from Chipman Gulch or taken from off-channel ponds."(These ponds are not identified on the map or during field review).

Comment 111b
Page S-7 gives a list of the Forest Service Requirements. One of these is for two new gates. My access road, 7300680 is currently closed with a guardrail gate that cannot be opened. I plan to replace it with a good gate that will not hurt my back.

Response 111b
Plan-specific Transportation Protection Measures on page 68 of Chapter 2 of the DEIS allow you to install a gate, but it must meet Forest Service specifications. Note that these protection measures will be consolidated into Appendix 11 of the FEIS.

Comment 112
Page 3 states that plans in this proposed document would be in effect from 2014 to 2024. This statement should be changed to reflect when the Plans of Operation get approved.

Response 112
Refer to Response 30.

Comment 113
Page 39 also begins a description of the operations. This chart in not accurate for my operation. I am only one man. There is no way I can mine more than 1 ton of rock each day-some of this material will be ore, some will be waste rock. There will also be a lot of time spent putting in the new portal. Also, as information, the Eddy/Shipman claims are lode claims and ore is measured in tons rather than in cubic yards.

Response 113
Page 7 of the Eddy Shipman proposal states that "*Up to 5 tons per day will be crushed and milled …*") and that figure was used in the analysis. A request to do less can be coordinated with the minerals administrator according to 36 CFR 228. We have converted tons to cubic yards for consistency of analysis for all Plans. Refer to Comment 34 for more details.

Comment 114
Page 236 is incorrect that the Eddy Shipman has a ford on 7300680 across Olive Creek. The creek I cross on road 7300680 is Granite Creek.

Response 114
Refer to Response 47. The error in naming the creek will be corrected in the Final EIS.

Comment 115

Page A8 provides some information which does not reflect what I proposed in my Plan of Operation. The DEIS states, *"the existing waste rock and tailings piles previously used (Adit A and across from the pond) are very limited and will only hold a few more loads.."* In fact, I did not propose spreading tailings on waste rock dumps or tailings piles, I proposed returning the mill tailings *"to dry shafts and pits"* (page 7 of the POO).

Response 115
Refer to Response 58b.

Comment 116
Page A33- through 34 provides analysis of ponds and whether there is the potential for a discharge. I cannot find anywhere in this section where mill tailings disposal is analyzed. As far as the ponds go, the analysis states there is no potential for a discharge under alternative 3.
However, since mill tailings appear to be a concern, I have decided not to mill on site. I will process only placer gravels on site, and ore will be hauled to another site for milling.

Response 116
Refer to Response 58c.

Comment 117
I understand the concern for the small area on the west side of the highway where dump rock evidently has high arsenic levels. As I have time, and have a backhoe on site, I will cap this rock dump with about a foot of soil and vegetate the surface. Where the adit discharge seeps across the dump, I will direct that small flow into the vegetated area beside the dump. I will not be reopening this adit. The adit I will be opening is located east of the highway. I have already hauled timbers down to the adit in anticipation of opening it back up. The DEIS is not correct, as far as I can tell, when it states on page A8-26 that *"the collapsed adit (A) is on the east side of the 73 road and ....an Engineering Evaluation/Cost Assessment (EE/CA) ...showed that metal concentrations were near clean-up level in waste rock, tailings and soil"*. In fact, there were no concerns noted for this area. I think that the ore is similar to the Buffalo ore, and is naturally buffered with a high percentage of calcite. Granite Creek in this location does not have elevated metals, it is not until the confluence with Chipman Gulch that the water has high levels of arsenic. It should be noted that even Chipman Gulch is not being impacted in the area of my claims. The EE/CA attributes the high arsenic levels in the area of my claims with *"upstream sources"*

The adit I will be opening is dry, and is located over 150 feet from the old ditch that parallels Granite Creek. I will construct a sump at the mouth of the portal in case there is some seepage, and the ditch, which I talk about in my Plan of Operation, will work well as a secondary containment to ensure no adit water or sediment or dump rock could possibly enter Granite Creek.

Response 117
The sump and capping the rock dump were not mentioned in the proposed Plan, and were therefore not analyzed in the DEIS.

Adits A and B as shown on the map in Appendix 8 were analyzed in the DEIS. It's unclear if what you describe above differs from the proposed Plan and may therefore require a supplemental analysis as described in 36 CFR 228.

Comment 118

The DEIS is not correct where it states that *"the lack of waste rock and tailings dumpsites will limit the expected operation to basically a testing operation with an expected duration of one season"*. There is absolutely no analysis to support this. There are approximately 400 feet of underground workings (200 feet of drfit and 200 feet of crosscut) and plenty of surface area on the dump for depositing the rock from the work I am planning. The tunnel is in competent rock, and once I have reconstructed the portal, I will be able to work safely underground. This is not a one season operation. There is no basis at all for this opinion. Just the lode portion of the operation will take more than 10 years. This opinion on the life of my operation should be deleted from the DEIS.

Response 118
This comment refers to information in DEIS Appendix 8, pg. A8-27. The Forest Service's concerns are limited to the effects on the surface resources. The location identified in the field review as the location for the tailings and waste rock is rather small and was estimated to hold an additional 10-20 cubic feet of material. The proposed Plan talks about processing up to 5 tons (es.t 4- 5 cubic yards per day). With the limited area designated for tailings and waste rock, along with the known contamination concerns from past mines (see the EE/CA for the old central mine), the small area would quickly fill with waste rock. The Forest Service is not limiting the miner to a one year Plan of Operations. However, a supplement or modification of the plan may be needed to identify additional waste disposal sites.

Gates Comments

Comment 119
Sending you an e mail about my concerns with the wording on the rose buds plan of operation. It states that we will process 3 yds of material a year . I would like to remove that sentence or wording and not be committed to that amount of material as we all know that amount of material could be ran in a day . I would really appreciate if we could address this as soon as possible . Thank you and have a great day !!

Response 119
Refer to Response 62.

Holoboff Comments

Comment 120
Analysis under a DEIS of 28 Plans of Operation, with a total of 104 acres analyzed, is a waste of the tax payers' money. Some of these operations are so small, and so non-surface disturbing (one acre over ten years!) that they could have worked under NOIs.

Response 120
Determination made by the authorized officer on the requirement that mining must be authorized in a Plan of Operations is site specific and dependent on the resources impacted by the operations, not necessarily the size of the operations.

The phrase "*will likely cause significant disturbance of surface resources*", which triggers the requirement of submission and approval of a proposed plan of operations (36 CFR 228.4 (a)(3)) means that, based on past experience, direct evidence, or sound scientific projection, the District Ranger reasonably expects that the proposed operations would result in impacts to National Forest System

lands (NFS) and resources which more probably than not need to be avoided or ameliorated by means such as reclamation, bonding, timing restrictions, and other mitigations measures to minimize adverse environmental impacts on NFS resources (70 FR 32713, June 6, 2005).

Comment 121
The DEIS is a lot of rhetoric about nothing. In looking at the cumulative effects section of the document (Appendix 7 Table 7-15), the chart discloses that that there are no cumulative effects for most operations, and the "potential cumulative effect" disclosed for all the miners without water rights who have proposed to pump water from the streams makes no sense. Miners must be in compliance with state law, thus, those miners without water rights will not be pumping from streams and their operations will not have "potential cumulative effects". If miners are pumping water illegally, the Grant County Water Master will simply shut them down.

Response 121
Refer to Response 28a and Response 95.

Comment 122
As far as Belvadear and Olive Tone overlapping in time and space, the Forest Service has no intention of approving the Belvadear Plan of Operation. The DEIS states that my operation runs the risk of sediment input into Olive Creek, everyone knows that no 401 permitting is available, so the analysis of cumulative effects is without merit. In this section, it would have made the situation clearer if the Forest Service had simply stated that the Belvadear operation will not be approved and thus, there is no risk of cumulative effects.

Response 122
Refer to Response 28a.

Comment 123
Of the 27 remaining POOs, only two have legal water rights. Jan Alexander has spoken to DEQ, and I have read the North Fork John Day TMDL, and nowhere does this document cut off legal water rights. I was informed that the Forest Service could not use the TMDL as a "tool" to stop miners from using water under legal water rights. I was informed that water users with legal water rights must do is "*take water in a manner that minimizes effects"*.

On page 85, the DEIS states that the reason stream temperatures are higher than 53.6 degrees is historic activities such as channel incision and straightening, loss of riparian vegetation, beaver trapping, timber harvest and grazing and loss of groundwater inputs due to loss of floodplain access and groundwater recharging. Since miners protect stream shade, there is no logging or grazing and we don't work in the stream, we are all doing our part to minimize impacts on stream temperatures, as the TMDL requires. Miners are not required to stop withdrawing water under legal water rights, simply because the stream naturally gets warmer than the State wants it to be.

Response 123
Refer to Response 28b.

Comment 124
Page A9-5 is incorrect where it states "*those miners that proposed to withdraw water from streams must be in compliance with ODEQ John Day Basin TMDL which does not allow for increases in stream temperature*". The TMDL requires water users with legal water rights to minimize impacts. Withdrawing

water early in the spring to fill ponds, and withdrawing only make-up water thereafter, not impacting riparian vegetation unless necessary, not working instream, not removing stream shade are the feasible measures that the miners who share the water right on Olive Creek do in order to meet the TMDL.

Response 124
Refer to Response 28b.

Comment 125
Page 115 of Chapter III states both Olive and Lightning have low flows and shallow depths. The DEIS states that effects on stream temperatures would be based on (1) timing of withdrawal (spring when flows are high and temperatures are low) (2) amount (miners can pump from 100-250gpm using the pumps that they use in their operations) (3) existing stream (flows are near peak when ponds are filled) (4) continuous vs limited withdrawal (miners can only pump enough to fill their ponds. Continuous withdrawal would result in discharge which is against state law. Limiting legitimate water rights users is not required by the TMDL, and this "fish protection measure" is not needed to protect fish, thus, it should be eliminated from the DEIS. Filling ponds early and taking only make-up water thereafter will not effect stream temperatures or fish and is in compliance with the TMDL.

Response 125
Refer to Response 28b.

Comment 126
Page S-9 and S-10 state that Belvadear and Olive Tone have requirements that the miners must not use water if the stream flow downstream of the pump is diminished to the point that the stream is dry. Because these operations have legal water rights, and because when streams get low and temperatures increase, fish move downstream to cooler deeper water, this requirement is unreasonable.

Response 126
Refer to Response 28b.

Comment 127
On page 78, under past, ongoing and future projects, the DEIS lists ditches but should also list water withdrawals. There are many existing mining water rights in the Granite Creek Watershed. On page 114, the DEIS states, "*if a portion of a stream goes dry downstream, water temperature could increase as a result of a reduction in flow*". This statement is not based on science. Streams that sub into the gravel are cooled by groundwater and temperatures are lower when they emerge to flow on the surface.

Response127
Refer to Response 35.

Comment 128
On page 101, we see that the Belvadear will not be approved by the Forest Service because "potential discharge exists". I proposed a wider buffer in an effort to eliminate this risk, but the Forest Service would not work with me. They said they could not allow me to work further from the stream because there were trees in that location that would have to be removed. I waited all these years for the Belvadear Plan to be approved, only to find out now that the Forest Service will approve nothing.

Response128

Refer to Response 39.

Comment 129
On page 130 of Chapter 3 the chart Table 3-20 states for Belvadear and Olive Tone that pumping "will be restricted to the time period prior to August 15 because water withdrawal will not occur after August 14th. This is not consistent with page 115 where it states "*fish protections measures were not added to Olive Tone or Belvadear because there are no bull trout or chinook salmon in Olive Creek (T. Hickman, Forest Service Biologist e-mail, 8/15/2014.)* This mitigation should not apply to any Olive Creek operation and the chart should be changed.

Response 129
Refer to Response 40.

Comment 130
Page 130 again states that Belvadear and Olive Tone are subject to restrictions on their legitimate water rights. Page 115 states that these mitigations should not apply to Belvadear or to Olive Tone. These sections contradict each other.

Response 130
Refer to Response 41.

Comment 131
On page 159 of Chapter 3, direct and indirect effects are listed. Water withdrawal is not mentioned as either a direct or an indirect effect on ESA or sensitive fish species. This is correct, and miners with legal water rights will continue to pump water for their operations.

Response 42
Refer to Response 42.

Comment 132
Under Alternative 3, page 183 only Make-it and Old Eric contain information about cubic yards moved. This information is not relevant, is not displayed for the other operations and should be deleted for consistency.

Response 44
Refer to Response 44.

Comment 133
On page 186, Olive Tone states that there will be a maximum of 8 CFS withdrawn from Olive Creek under the water right. The point that is missed in this analysis is that settling ponds are only filled in the spring. If enough water was available in the spring during peak flows, and the miner had a large pump, it would take 8.4 minutes to fill the miner's small ponds. No further pumping could take place because the DEQ WPCF permit does not allow discharge of process water. After the ponds are full, process water is recycled and only small quantities of make-up water are needed to offset losses from evaporation and seepage. Thus, the analysis on the effects of pumping water are severely flawed.

Response 133
Refer to Response 45a.

Comment 134
In the appendix, the DEIS states for the **Altona** that they could not find the water source, and therefore no approval of processing on the claim will occur. My plan now is to access the Altona from my adjacent private land. Processing will take place on my property rather than on the claim.

Response 134
Any changes in the proposed plan of operations are subject to 36 CFR 228.5 (c) and are subject to approval by the authorized officer in the same manner as the initial plan of operations. It is possible, based on the proposal that the analysis completed in the Granite EIS may be sufficient, but only a review of the new proposal can tell us that for certain. Activities on private land may which may affect Forest Service land are still subject to 36 CFR 228, subpart A.

Also refer to Response 54.

Comment 135
In the discussion about the **Belvadea**r, the DEIS states "*no WRPMs could be identified that would prevent a discharge of sediment into Olive Creek given the location of the proposed mining in the riparian area"*. I actually did think of and proposed a WRPM. I was willing to increase the buffer and work further from the stream, but the Forest Service would not analyze this modification of the POO.

Response 135
Refer to Response 55.

Comment 136
In Appendix 9-5 under Stream temperatures, the DEIS states that "*miners that proposed to withdraw water from streams must be in compliance with the ODEQ John Day Basin TMDL which does not allow for increases in stream temperatures"*. This statement is not correct. In the *North Fork and Middle Fork John Day Irrigation Plan*, which is tiered to the TMDL, it states, "*The provisions of this Area Plan do not establish legal requirements or prohibitions. The provisions of this Area Plan do not affect legal water rights established under the rules of the Water Resources Department (WRD)".*

Also, in an e-mail correspondence with DEQ TMDL specialist John Dadoly stated, "***But we've never attempted to ban someone from using their water right".***

I have always filled my settling ponds early, the Forest Service even agreed that there was no potential for a discharge from my ponds, I recycle all water, pumping only small amounts of make-up water. I protect stream shade and do not work in-stream. My operation will not be approved, I know, nonetheless, it is in compliance with the TMDL. .
The EOMA April newsletter had a list of unreasonable stipulations, and I agree with EOMA that the following stipulations must be rewritten, clarified or deleted.

Response136
Refer to Responses 4b and 70.

Note: No comment #137

Knapp Comments

Comment 138
Page 3 is in error, since it states the document would be in effect from 2014 to 2024. If I am correct, it is now 2015, so this part of the DEIS should be corrected. Page 66 says operators can work for a ten year period beginning on when their plan is approved.

Response138
Refer to Response 30.

Comment 139
There were inconsistencies about "fish protection measures" and "WRPM measures" and which operations they apply to. I had a hard time trying to understand what the effects were when they were hidden in the appendices. For the next NEPA document, I would suggest that all protection measures, WRPM measures and stipulations being required by the Forest Service be revealed in Chapter 2, Alternative 3. These can also be repeated in the appendixes, but it really would have helped me if all the information on the Lightning Creek operation was found in one location.

Response139
Refer to Response 27a. For ease of reading, the FEIS will combine all Plan-specific Resource Protection Measures (from DEIS Ch. 2 and Appendix 1A) into Appendix 11.

Comment 140
In looking at the cumulative effects section of the document (Appendix 7 Table 7-15), the chart discloses that that there are no cumulative effects for most operations, and the "potential cumulative effect" disclosed for all the miners without water rights who have proposed to pump water from the streams makes no sense. Miners must be in compliance with state law, thus, those miners without water rights will not be pumping from streams and their operations will not have "potential cumulative effects". I am certain that the Grant County water master could have provided this type of information while the effects section of the DEIS was being written, and I am certain that now that the DEIS is out, he will provide it.

Response140
Refer to Response 27c.

Comment 141
The DEIS states that my operation on Lightning Creek and the two operations on Olive have the potential of affecting water quality and fish and would not comply with the TMDL. Jan Alexander talked to DEQ about the requirements for water users under the TMDL. She was informed that nowhere does this document cut off legal water rights. She was further informed that the Forest Service could not use the TMDL as a "tool" to stop miners from using water under legal water rights. The only requirement for miners was to "*take water in a manner that minimizes effects"*.

Response 141
Refer to Response 28b.

Comment 142
On page 85, the DEIS states that the reason stream temperatures are higher than 53.6 degrees is historic activities such as channel incision and straightening, loss of riparian vegetation, beaver trapping, timber harvest and grazing and loss of groundwater inputs due to loss of floodplain access and groundwater recharging. Since my operation was designed by my husband and me to protect stream shade, not impact

riparian vegetation and not mine instream, I am doing my part to minimize impacts on stream temperatures, as the TMDL requires. There is no grazing or logging and beavers are not bothered. The TMDL does not require me to stop withdrawing water under legal water rights, simply because the stream naturally gets warmer than the State wants it to be. If a junior water right user affects a senior downstream user, the Grant County Water Master will handle the problem, not the Forest Service.

Response 142
Refer to Response 28c.

Comment 143
Lightning Creek flows were 6.8 cfs on July 19, 2013 (Dolly Robson Field notes) and the DEIS shows similar flows. Pumping over a 5-6 hour period in the spring when flows are the highest (page 87 states that flows peak in May and June as snow melts), and temperatures are the lowest, recycling this process water in off-channel settling ponds, and taking only make-up water from Lightning Creek thereafter to account for losses from evaporation and seepage, and not removing stream shade and protecting riparian areas certainly meets the goals of the TMDL. Thus, Lightning Creek Placers are in compliance with the TMDL which, according to DEQ, and as stated above, requires miners to "*take water in a manner that minimizes effects"*.

Response 143
Refer to Response 28d.

Comment 144
Page A9-5 is incorrect where it states "*those miners that proposed to withdraw water from streams must be in compliance with ODEQ John Day Basin TMDL which does not allow for increases in stream temperature*". The TMDL requires water users with legal water rights to minimize impacts. Withdrawing water early in the spring to fill ponds, and withdrawing only make-up water thereafter, not impacting riparian vegetation, not working instream, not removing stream shade are the feasible measures that miners, like myself, have proposed in order to meet the TMDL.

Response 144
Refer to Response 28e.

Comment 145
Page 115 of Chapter III states both Olive and Lightning have low flows and shallow depths. Lightning Creek does not have low flows as compared to other tributary streams in the watershed (see Robson field notes of July 19, 2013). The DEIS states that effects on stream temperatures would be based on (1) timing of withdrawal (spring when flows are high and temperatures are low) (2) amount (miners can pump from 100-250gpm using the pumps that they use in their operations) (3) existing stream (flows are near peak when ponds are filled) (4) continuous vs limited withdrawal (miners can only pump enough to fill their ponds. Continuous withdrawal would result in discharge which is against state law. Limiting legitimate water rights users is not required by the TMDL, and this "fish protection measure" is not needed to protect fish, thus, it should be eliminated from the DEIS. Filling ponds early and taking only make-up water thereafter will not effect stream temperatures or fish and is in compliance with the TMDL.

Response 145
Refer to Response 28f.

Comment 146
Page S-9 and S-10 state that Belvadear and Olive Tone have requirements that the miners must not use water if the stream flow downstream of the pump is diminished to the point that the stream is dry. Because these operations, as well as the Lightning Creek operation, have legal water rights, and because when streams get low and temperatures increase, fish move downstream to cooler deeper water, this requirement is unreasonable.

Response 146
Refer to Responses 29 and 40.

Comment 147
On page 3-10, Lightning Creek not only has the above requirement about not drying up the stream, but also is required to stop pumping even small amounts of make-up water after August 15. There is no date mentioned when pumping can begin again. Lightning Creek has pump screening specifications. No other operations have this specifically stated, although general mitigations do have pump screening standards. Unless there is a reason to single out Lightning Creek Placers, all operations that pump from streams should have the screening mitigation.

Response 147
Refer to Responses 29 and 40.

Comment 148
Page 3 states that plans in this proposed document would be in effect from 2014 to 2024. This statement should be changed to state that the period is 2016-2026 for operators who work the first possible year, but that unless NEPA compliance is no longer adequate and current, (things change in the watershed), operators can work for a ten year period beginning when their plan is approved (see page 66).

Response 148
Refer to Response 30.

Comment 149
Page 39 also begins a description of the operations. This chart needs to remove cubic yards/yr, cubic yards/day and tons/day. Surface area impacted at a given time is important for the analysis and for later calculation of a reclamation bond, but not cubic yards. In fact, several of the operations don't even mention cubic yards. In talking to some of the mine operators, their plans of operation never contained these yardage figures**. For consistency, please remove the amount processed from this chart, and for consistency, remove cubic yards and tons from the summary.**

Response 148
Refer to Response 34.

Comment 150
On page 78, under past, ongoing and future projects, the DEIS lists ditches but should also list water withdrawals. I printed off many existing mining water rights in the Granite Creek Watershed. On page 114, the DEIS states, "*if a portion of a stream goes dry downstream, water temperature could increase as a result of a reduction in flow*". This statement is not based on science. Gimlet Creek is a good example of what happens to water temperature when the water subs into the channel bottom. The water is warm where the stream goes dry, but water temperature in Gimlet can be up to 10 or more degrees cooler where it resurfaces.

Response 150
Refer to Response 35.

Comment 151
On page 115, the DEIS talks some more about complying with the TMDL. Please see the above discussion. Even with pumping make-up water from Lightning Creek after August 15, this operation will still be in compliance with the TMDL, and pumping small amounts of water under a legal water right will not harm fish.

Response 151
Refer to Response 29 and 36.

Comment 152
On page 159 of Chapter 3, direct and indirect effects are listed. Water withdrawal is not mentioned as either a direct or an indirect effect on ESA or sensitive fish species. That leads me to believe that pumping from Lightning Creek will not affect fish adversely, which is the truth.

Response 152
Refer to Response 42.

Comment 153
On page 186 there is a discussion about Olive Creek and pumping, and it is not clear why the discussion only applies to Olive Tone and not Lightning Creek. But regardless, there will be no measurable effects from pumping small amounts of make-up water throughout the mining season.

Response 153
Refer to Response 29, 40 and 45a.

Comment 154
Page 131 states there is a potential increase in stream temperatures in Lightning Creek from pumping, and thus, pumping water after August 15 must be stopped. Pumping ponds full in the spring, and taking only make-up water thereafter is in compliance with the TMDL which does not restrict legal water rights, but instead has the goal of minimizing impacts to stream temperatures.

Response 154
Refer to Response 45c.

Comment 155
On page 307, under localized in-stream temperatures and reduction in stream flows, the DEIS states there are 8 plans that will pump water from creeks in the Granite watershed. The DEIS is incorrect. There are three operations with valid water rights.

Response 155
Refer to Response 52.

Comment 156
On page 313, Chapter 4, DEQ is not listed as an agency that was consulted in writing this DEIS. No

wonder the Forest Service does not understand that the TMDL can not be used as a tool to cut off legitimate water rights.

Response 156
Refer to Response 53.

Comment 157
In the appendix under Lightening Creek, the DEIS states that the operation could "*easily be completed*" in 3 years, but with reclamation it could take 6 years. This opinion is not correct. The summary also states that in order to process 50 cubic yards, the miner must move about 150 cubic yards of material. This is completely inaccurate. In fact, the opposite is true. If topsoil is 6"-12", this material is removed and stockpiled, and the rest of the pit is excavated and processed. But a mining operation is not as simple as digging and processing. Machinery must be greased and fueled, there may be breakdowns, weather conditions may be too wet or too dry, the operation may be shut down due to fire danger. There are so many variables in a mining operation, that an opinion about the life of the mine should not be a part of the DEIS. The Plans will be approved for a ten year period. If I am not through with the operation, I have the option of submitting another Plan of Operation which will be analyzed in the same manner that the first plan was analyzed.

Response 157
Refer to Response 61.

Comment 158
In Appendix 9-5 under Stream temperatures, the DEIS states that "*miners that proposed to withdraw water from streams must be in compliance with the ODEQ John Day Basin TMDL which does not allow for increases in stream temperatures"*. This statement is not correct, as already stated. In the *North Fork and Middle Fork John Day Irrigation Plan*, which is tiered to the TMDL, it states, "*The provisions of this Area Plan do not establish legal requirements or prohibitions*. The provisions of this Area Plan do not affect legal water rights established under the rules of the Water Resources Department (WRD*)"*.

Also, in an e-mail correspondence with DEQ TMDL specialist John Dadoly, he states, "***But we've never attempted to ban someone from using their water right"*.**

I fill my ponds early from Lightning Creek, recycle all water, pumping only small amounts of make-up water, protect riparian vegetation and stream shade and do not work in-stream. Thus, my operation is in compliance with the TMDL. Operations without valid water rights would not be in compliance.

Response 158
Refer to Response 70.

Note: No Comment #159.

LaDouceur Comments

Comment 160
I appreciate the opportunity to comment on the DEIS as it pertains to my proposed Plan of Operation at the L&H. I had some difficulty finding all the places in the DEIS where my operation was referenced. It seems a little overkill to write a full Environmental Impact Statement for only 28 small scale mining operations, several only impacting an acre in ten years!

Response 160
Please refer to the index at the beginning of the FEIS. Also refer to Response 27a.

Comment 161
Page 3 states that plans in this proposed document would be in effect from 2014 to 2024. This statement should be changed to state that the period is 2016-2026 for operators who work the first possible year, but that unless NEPA compliance is no longer adequate and current, (things change in the watershed), operators can work for a ten year period beginning when their plan is approved (see page 66).

Response 161
Refer to Response 30.

Comment 162
Page 39 also begins a description of the operations. This chart needs to remove cubic yards/yr, cubic yards/day and tons/day for consistency. This is irrelevant, surface area impacted at a given time is important for the analysis and for later calculation of a reclamation bond, not cubic yards.

Response 162
Refer to Response 34.

Comment 163
Page 237 under L&H fails to disclose the existing ford on Olive Creek, which is also access to private land.

Response 163
Refer to Response 48.
Note: No Comment #164.

Lewallan Comments

Comment 165
Page 3 states that plans in this proposed document would be in effect from 2014 to 2024. If I am correct, it is now 2015, so this part of the DEIS should be corrected. Page 66 says operators can work for a ten year period beginning on when their plan is approved.

Response 165

Refer to Response 30.

Comment 166
Page 39 begins a description of the operations. This chart needs to remove cubic yards/yr, cubic yards/day and tons/day. Area impacted at a given time is important for the analysis and for later calculation of a reclamation bond. Some operations, like mine at the Troy D, have cubic yards listed per day: Blue Sky, 5 yds/day, City Limits 3-5 yds/day, Eddy 5 yds/day, Lightning 20-50/day, Tetra-Alpha 100yds/day also list cubic yards/day.

Response 166
Refer to Response 34.

Comment 167
Some of the operations have cubic yards listed per year: Make it 15-20/year, Muffin 10 yds/yr, Old Eric 5 yds/year, Bunch Bucker 600 yards/yr, Hopeful 1 yd/yr, Hopeful 2&3 15 yds/yr, Rosebud, 2-10 yds/yr, Ruby 2-5 yds/yr, Sunshine 1000 yds/yr. Lode operation Tetra Alpha Lode has 10 cubic yds/day instead of tons/day. Royal White has 5 tons/day but in the summary it states 5 cubic yards. None of this is consistent, and in addition, no listing of cubic yards per day or year or tons are shown for the rest of the operations .

In talking to some of the mine operators, their plans of operation never contained these yardage figures. For consistency, please remove the amount processed from this chart, and for consistency, remove cubic yards and tons from the summary.

Response 167
Refer to Response 34.

Comment 168
In the appendix, the DEIS states for Troy D in the summary and on pages A3-99 and A3-100, that the process site is 136 feet from Granite Creek, but the map which the Forest Service drew *"to scale"*, indicates the process site is about 190 feet away. Page A7-207 states that I cannot use my larger pond for a settling pond. That leaves only one small pond as a settling pond, where it would be impossible to recycle process water. The DEIS **states, *"if Pond B needed to be enlarged, this construction would also be in compliance with MM-2"* . This statement should be changed to:**
"If Pond B needed to be enlarged, or one or two additional ponds constructed, this construction would also be in compliance with MM-2".

Response 168
Refer to Response 68.

Note: No Comment #169

Markley Comments

Comment 170
The Draft Environmental Impact Statement (DEIS)for the Granite Creek Drainage area lists a need for its existence due to recent changes stream water quality and fish protection. The draft is a response to 28 plans of operations, submitted by separate mining groups or individuals.
If a complete Environmental Impact Statement (EIS) were to be drafted by the forest service it should also include grazing, timber, recreation, wildlife habitat, and fire prevention impacts.
The DEIS also includes restrictions that are not related to the significant issues listed in the need for the DEIS. Only two significant issues are raised at the beginning of the DEIS but 10 to 12 issues are brought up for plan of operation restrictions above and beyond the need for an EIS.

Response 170

The DEIS documents the potential environmental effects from the 28 proposed mining operations, and is not intended to analyze potential effects of all activities on Forest Service land. The cumulative effects of the proposed mining activities, when added to the effects from other past, present and reasonably foreseeable future activities (such as grazing, timber, recreation, etc.) can be found in the cumulative effects sections of Chapter 3 of the DEIS.

The two significant issues introduced in Chapter 1 of the DEIS relate to water quality and fisheries. The majority of the effects analysis responds to those two issues (DEIS Chapter 3, Water Resources, and DEIS Chapter 3, Fisheries). However, that does not preclude the Forest Service from analyzing the potential effects of the proposed action (and alternatives) on other resources, and providing measures to protect those resources from potential environmental effects in order to meet laws, regulations and policies that may or may not be related to the 2 significant issues.

Comment 171

For Yellow Gold placer on page A7-209 & A7-210 the report used scenario A as a worst case example but there is no scenario A, they are listed as 1 through 4. The proposed pond will be located east of FS7355-E2A.

There is no reason given for the berm or gate on FS7355-050 since it seems to have the same impacts as FS7355-020 and less impact as FS7355-E2A. Things like closed road restrictions to mining areas should be implemented by and at the cost of the forest service since access to mining is allowed by law and a road closure is not a significant issue but a forest planning issue.

Also a map review of the Yellow Gold area of impact shows that only about half of the 9 acres stated will be used.

Due to the multiyear preparation of the DEIS and only a 28 day comment period for my part I will not have time include comments on individual issues in the statement. I will say that a review should be made on the non-significant issues.

Response 171

First, you are correct that there is no “scenario A”. It has been corrected to read “scenario 1”.

Second, with regard to the proposed settling ponds, the comment refers to the 2013 map, which was created by the UNF minerals administrator for use in the DEIS. The location of the ponds on the 2013 sketch map was based on the information found in the field and the proposed Plan which showed the ponds between the road and the creek. Moving the ponds to the east side of the 7355-E2a may be possible, but it will need to be reviewed in a field visit.

The confusion is due to the fact that the hydrologist visited the site in 2004. The map submitted by the miner at the time did not label the roads on the map and settling pond location was unclear. Therefore, under Alternative 3, a Water Resource Protection Measure for Yellow Gold was written to ensure that a discharge would not occur. The protection measure states as follows:

> *Settling ponds would be located with input from the minerals administrator and district hydrologist and appropriate WRPMs identified and implemented*

Third, with respect to the roads, several of the roads have been effectively closed in this area for some time. The operator has asked to open these roads for vehicle access directly related to the proposed mining activity. This would require the removal of the current berm, and the development of the existing road bed/path. As the road is being opened for mining use only, it is the operator's responsibility to maintain the road and limit access to incidental mining use. It was felt that the placement of a gate would allow the operator to have multiple entrees over time, while also maintaining an effective road closure to reduce unwanted resource damage in the area. (36 CFR 228.8(f) and 228.12).

The 7355-020 road is open to public travel and is the main access road in this area.
Based on the operator's description and the ground, the pond locations, roads to be used, the proposed work area and camping site, it was estimated that approximately 9 acres would be impacted by this proposal, and that is reflected in the map on DEIS page A8-88.

Markley Comments – Part 2

I am adding more comments to the Granite Creek Watershed Mining Project DEIS. These comments refer to the appendices 1C and 2. Again I do not have time to comment on the individual plan alternatives. Only to make general comments. Below is a list of them.
Comment 171a
M1 Monitoring 36CFR261.11(c) relates to pollutants in the stream.

Stream clarity and sediments are a naturally occurring substance. They can have adverse effects but are not a pollutant unless processing chemicals are deposited in or near a stream, lake, or other water. Although they can have adverse effects on stream quality the required Oregon DEQ addresses the issue of sediments and monitoring in the required permits.
Response 171a
36 CFR 261.11 (c) prohibits "Placing in or near a stream, lake or other water any substance which does or may pollute a stream, lake or other water."
Inputs of sediment and warm water are considered pollutants under Section 401 of the Clean Water Act, and under Oregon anti-degradation statute. The following definitions from Section 502 of the CWA and OAR 340-041-0001 apply to this analysis.

> According to the **CWA (Section 502 (6))**, "the term "pollutant" means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. "
> According to the **CWA (Section 502(16))**, "the term "discharge" when used without qualification includes a discharge of a pollutant, and a discharge of pollutants."
> According to the **CWA (Section 502(19)**), "the term "pollution" means the man-made or man-induced alteration of the chemical, physical, biological and radiological integrity of water. "
> **OAR 340-041-0001 Antidegradation Policy** states: ""Pollution" means such contamination or other alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt, or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any water of the state that either by itself or in connection with any other substance present can reasonably be expected to create a public nuisance or render such waters harmful, detrimental, or injurious to public health, safety, or welfare; to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses; or to livestock, wildlife, fish, other aquatic life or the habitat

thereof."

Therefore stream temperatures and sedimentation increase above existing levels from the proposed activity would be considered a man-induced alteration of the physical and biological integrity of the water, and that alteration is defined above as a pollutant. Therefore, those discharges of pollutants are not permitted.

Comment 171b

R2 is already addressed individually in each plan of operation. The wording is good but it is redundant.

"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**."**

Response 171b

General Requirement R2 was included in Appendix 2 as not all Plans stated that reclamation will be on going.

Comment 171c

R3 and several areas in the general requirements. *Certified Weed free* wheat and barley straw cannot be acquired within 150 miles of the National Forest. Would it still be certified after the trip across the state?

Response 171c

This is in reference to General Requirement R3 located on page A2-12 (Appendix 2). The weed free designation is tied to the field where it was grown. So any certified weed free straw would still be certified after being transported across the state. Also refer to Response 83.

Comment 171d

R1-R17 Reclamation Requirements Each POO has a reclamation plan, individualized for each plan, but if R1 – R 17 remain as requirements alongside the stipulations for reclamation in each plan, the chance for conflicts will be a numerous.

Some of the general requirements just don't pertain to some plans, such as R7 the handling of stock piled topsoil when there may not be any topsoil. Or R13 scarifing the mine access road and reseeding to specification wouldn't do very well if the mine access road is a county road or maybe even a paved road. As it reads I would need to seed the highway on the City limits claim.

The Reclamation Requirements R1- R17 should be changed to Guidelines.

Response 171d

We agree that not all General Requirements are applicable to each Plan. The final approved Plan of Operations will include a list of specific General Requirements that apply to each Plan.

Comment 171e

G6 for timber and snags, is in direct conflict with Forest Service Manual FSM2813.13b (2) .

Response 171e

The Forest Service Manual 2813.13b (2) states – "*Right to cut timber on the claim for mining uses and for necessary clearing, except that timber cut in the process of necessary clearing cannot be sold by the claimant. The United States has the right to dispose of timber and other vegetative resources."*

This is consistent with General Requirement G6.

Comment 171f

G20 &G21 Right to occupancy. Is in direct conflict with Forest Service Manual FSM2813.13b (1)

(Quote)

b - Claims Validated Subsequent to Act of 1955

Such claims which otherwise come under Title 30, United States Code, Section 612 (30 U.S.C. 612) carry the same surface rights as those described in section 2812, except for the following modifications:

1. Right to occupancy and use necessary for prospecting, mining, and processing, but not the exclusive right to the surface. Lands containing such claims are subject to the rights of the United States to manage and dispose of the vegetative resources, to manage other resources except locatable minerals, and to the right of the United States, its permittees **(sic)** and licensees, to use so much of the surface area necessary for such purposes and for access to adjacent lands.

2. Right to cut timber on the claim for mining uses and for necessary clearing, except that timber cut in the process of necessary clearing cannot be sold by the claimant. The United States has the right to dispose of timber and other vegetative resources.

3. Right to additional timber required for mining purposes, if timber was removed from the claim by the Forest Service after claim location. The quantity and kind of timber to be provided, free of charge from the nearest available source which is ready for harvesting, will be substantially equivalent to that previously removed from the claim. *(End Quote)*

Response 171f

G20 states that the extended occupancy must be incidental to the mining operation and authorized in the plan of operations. FSM 2813.13b (1) does not give you exclusive rights to the surface, but does allow for occupancy and use, which is necessary (incidental) to the mining operation.

The Forest Service Manual 2813.13b (1) states – "*Right to occupancy and use necessary for prospecting, mining, and processing, but not the exclusive right to the surface. Lands containing such claims are subject to the rights of the United States to manage and dispose of the vegetative resources, to manage other resources except locatable minerals and to the right of the United States, its permittees and licenses, to use so much of the surface area necessary for such purposes and for access to adjacent lands.*

2812 – Provisions of the 1955 Multiple-Use Mining Act

The 1955 Multiple-Use Mining Act (69 Stat. 367; 30 U.S.C. 601, 603, 611-615) amended by United States mining laws in several respects. The act provides that common varieties of mineral materials shall not be deemed valuable mineral deposits for purposes of establishing a mining claim.

The act also provides that:

1. Ming claims located subsequent to the act shall not be used, prior to patent, for purposes other than prospecting, mining, or processing and uses reasonably incident thereto;

(a) Ming claims located subsequent to the act are (prior to issuance of patent) subject to the right of the United States to manage and dispose of vegetative surface resources, and to the right of the Unites States, its permittees and licensees to use so much of the surface for such purposes or for access to adjacent land. Such other activities shall not endanger or materially interfere with prospecting, mining, and mineral processing; and

(b) Prior to patent, a claimant may not remove or use vegetative or other surface resources except to the extent required for prospecting, mining, or processing operation, or uses reasonably incident thereto 30 U.S.C. 612

2. The Forest Service in cooperation with the Secretary of the Interior, or such officer as the Secretary of the Interior may designate, Is responsible for determining the existence and status for unpatented mining claims. The act provides procedures by which a claim located before July 23, 1955 may become subject to the restrictions set forth in paragraph 1 (30 U.S.C. 613)

3. The owner(s) of any unpatented mining claim located prior to the act may waive and relinquish all right there under which are contrary to limitation in paragraph 1 (30 U.S.C. 613).

4. The act may not be construed as restricting any existing rights on any valid mining claim located prior to the act except as a result of proceeding pursuant to Title 30 United States Code, section 613 (30U.S.C 613) or as a result of a waiver pursuant to 30 U.S.C 614 and 615.

Comment 171g

G7 & G24 is in conflict with Forest Service Manual FSM2813.14

G7 restricts the right to reasonable access and G24 causes undue hardship on bona fide prospectors and miners.

(Quote)

- Right of Access to Claim

The right of reasonable access for purposes of prospecting, locating, and mining is provided by statute. Such access must be in accordance with the rules and regulations of the Forest Service. However, the rules and regulations may not be applied so as to prevent lawful mineral activities or to cause undue hardship on bona fide prospectors and miners.

(End Quote)

Response 171g

The use of G7 & G24 insures that the miner's access is in accordance with the rules and regulations that the forest Service has to follow. More specifically G7 insures that the access requested by the miner will be in compliance with and protect the habitat as required in the Endangered Species act and does not restrict the miner's reasonable access to the area. Whereas, G24 mimic similar Forest Service contract specifications that are required for timber, fire, road construction and other service contracts. These mitigations help insure that the resources are protected and as the Inspections are usually done pre-season at a pre-arranged meeting place, this will not restrict the operator's access to the site nor create

an undue hardship on the operator.

Comment 171h

L1 – L12 Lode Mines should also be posted as guidelines since they conflict with Forest service guidelines and federal regulations. Again each individual plan of operations will address specific environmental issues related to its particular case. A few of the most notable conflicts are listed below.

L12 Decontamination procedures' will be required on all equipment leaving or coming into an adit site. This is in conflict with current procedures, since ropes straps and safety equipment, cannot be decontaminated.

Response 171h

The requirement is meant to reduce the spread of several things (diseases and noxious weeds or animals from one mine to the next). This is a Federal Fish and Wildlife requirement that can be located at http://www.whitenosesyndrome.org/topics/decontamiation

This requirement is similar to the Mine Safety and Health Administration (MSHA) human health requirements for cleaning bat, bird and mouse droppings. Additional information can be located at http://www.msha.gov

Comment 171i

L6 winter runoff cannot be completely diverted without putting the tailings indoors.

Response 171i

While it would be nice if all tailings and waste rock were immediately put back under ground, we recognize that is not possible for all operations. General Requirement L6 states: "*Water and winter run off will be diverted around the tailings and waste rock piles*". The intent of this requirement is to make sure that tailings or waste rock are not situated such that winter runoff from the surrounding area either goes through or over the newly created pile.

Comment 171j

L10 When the natural surroundings exceed the EPA standards. Will the operator be liable for cleaning it up? One example is natural levels of arsenic are above EPA standards. Is the Government willing to decontaminate the forest?

Response 171j

The answer is no, an operator is not held responsible for naturally occurring background contaminant concentrations. However, background must be established before mining operations begin in the media that may be contaminated e.g. soil, water, or vegetation when bioaccumulation is a concern. The Plan summaries in Appendix 8, and the existing condition in Chapter 2 give details on known lode sites of concern. Requirement L10 is *only* applied to those mining plans that will be working either in a lode or with lode tailings. If operations or mining activity result in an increase in contaminants found in background, the miner could be held liable to remediate the release to background concentrations.

Comment 171k

Appendix 1C uses no scientific basis for the use of Bentonite blankets. I don't understand putting a foreign substance in the soil without scientific data to back it up. It appears to only be used as a personal

opinion with no time given for the pond to seal itself. There is also no procedure for cleaning sediment from the ponds with the blankets in place. Could you add some supporting data to support this theory.

Response 171k

The bentonite blanket will not be placed in the ponds for Olive Tone and Troy D (the only 2 Plans with this requirement). The bentonite blanket is actually going to be buried in a trench between the pond and the creek as described in Appendix 1A, Alternative 3. Appendix 1C (now Appendix 1B in the FEIS) will be updated to correctly show where the blanket will be placed for these 2 Plans. Therefore, there will be no problem cleaning the ponds because no material will be in the ponds. The use of these materials to impede the flow of sediment and water towards the creek has been used in mining operations and in lagoon ponds to prevent contaminants. The Whitman Ranger District in 2010 used the bentonite blanket approach in the Beaver Creek channel sealing project. Sections of the channel were drying up as a result of historic placer mining, which had eliminated the fines, causing the channel to go dry. Since completion of the project, the stream has had perennial flow because the bentonite blanket has decreased the permeability of the channel sediments at a depth of about six feet.

With respect to the blanket being a foreign substance, it is actually clay situated between 2 layers of felt, and is much more natural than filter cloth or plastic.

Refer to the following article by Rollins and Dylla for the effectiveness of bentonite blankets : http://cedb.asce.org/cgi/WWWdisplay.cgi?17099

Marmolejo Comments

Comment 172

On Monday April 6, 2015 at about 1430, Chris Helberg (Minerals Specialist North Fork John Day Ranger District, Umatilla NF) received a phone call from Chad Marmolejo regarding the Muffin proposed Plan of Operations in the Granite Mining DEIS. Chad was unable to get his written comments completed due to a family emergency and asked to submit a verbal comment regarding his proposed plan for the Muffin claim. He stated that there is a 10-yard per year processing estimate in the table in Chapter 2 page 48 of the DEIS. He said that that estimate was for his original testing plan, not his mining Plan of Operations. This is an error that wasn't caught when hand written edits were made to his Plan of Operations. The mining POO proposes to open one hole at a time, up to 25' by 25', and that would yield much more than 10 yards per year. He said this is not reasonable as there are several acres that he plans to mine over the 10 year period, and he needs to process more than that per year in order to mine the area as designated in his plan.

A one-page faxed copy from his Plan of Operations was submitted to clarify that he wanted to mine the area instead of just test and explore.

Response 172

Refer to Response 34 .

The Plan analyzed in the Granite DEIS was dated September 16, 2012. That Plan includes changes made to the plan in the field with the miner and the minerals administrator on September 16, 2012.

To date, the Forest Service has only received the one-page fax referred to in your comment, and the faxed copy includes out of date information from a previous proposed Plan (prior to May 2012). Any changes from the Plan currently analyzed in the Granite Mining DEIS would require a review per 36 CFR 228.5. We assume you do not want us to analyze an out of date Plan.

As you discussed with Chris Helberg, the faxed page deleted any references to testing and exploration, as you did not want to limit your operation to one hole per site. Our analysis did not limit your operation to one hole per site, but covered multiple holes in a 3-acre area over 10 years.

This is displayed in the map and various tables in the document. The 10 yards per year is a remnant from the Plan previously under analysis in the Granite EIS. As the Plan describes an area to be mined, the use of the 10 cubic yards per year will be dropped from the FEIS. The Plan summary (Appendix 8) and the Biological Assessment both refer to multiple holes in a 3-acre area over 10 years.

Myers Comments

Comment 173

Botanical Protection Measures
Reference EIS pages: S-11, pg. 69, ppgs.225-229
No specific description of the location of this species has been provided to the mine operators or owner. The description provided in the EIS uses the wordage "within the footprint of the proposed Plan of Operations for the Royal White Lode Claim." The EIS provides a non-descript map indicating the plant species of concern is located near and intersected by FS Road 970. The EIS states that Forest Service personnel located the species on the Royal White claim during an analysis completed in June of 2013; however, per available location descriptions of the species (Darrach, ME and Hinchliff, C.E., 2014 ppgs 3-4); the species does not occur within the claim boundaries.

Response 173
Refer to Response 65.

Comment 174
The two issues noted to most likely adversely impact L tarantuloides by mining activity are soil compaction and the introduction of invasive plant species. Road 970 is used by a multitude of individuals in addition to the owner/operators of the Royal White. This includes claimants of neighboring mines for whom there are no mitigations written into the EIS. Others using the road include Forest Service employees; the Vinegar Hill fire brought heavy traffic and equipment into the area for the purpose of land protection. Individuals and groups accessing the forest for recreation are also frequent. The EIS narrates active domestic grazing is not taking place in the Granite Creek EIS, pg.229.

Domestic cattle grazing has been prevalent every summer for decades in the area where L. tarantuloides are identified in the EIS, and signs of their annual presence are notable by the common observer. That being said, the cattle also provide the service of keeping tall grasses which dry in mid to late summer at bay, and thus contribute to managing wildfire risks within the WWNF.

Travel in the area of concern by Royal White operators would not present an elevated risk to the species, and the primary identified work sites in the Plan of Operation (POO) for this mine are not located in the proximity of the protected plant. Lastly, the worksites identified in the POO which would be most likely to have heavy equipment usage present with compacted soils, and would not be an ideal environment for the identified plant species as described in Darrach and Hinchliff's article. The owner and operators of the Royal White are in agreement with the Forest Service's mitigation plan to fall trees or otherwise create a traffic barrier to protect the plants from inadvertent travel in the area where the plants have currently been located. Ms. Helberg, Umatilla NF mineral administrator, has also stated a willingness to provide further detail on the location of the plant and this is appreciated.

Response 174
The protection measures provided in the DEIS for *L. Tarantuloides* will be implemented by the Forest Service and was documented in your claim due to its location.

There are no current permits or authorization s to graze cattle grazing in the Granite Creek watershed. If you have problems with cattle in your area, please inform our office and we will check on the ownership of the traveling cattle.

We are aware of the other public uses in the area which do not require any authorization from our office. Your daily travel route to and from the mine site does include a known location of a protected plant, therefore the DEIS includes protection measures to reduce the risk of injury or loss of the plant resulting from your proposed activities. As discussed in your emails with the minerals administrator, she will be glad to show you the plant on the ground so that you can reduce any potential impacts to them as well.

Comment 175

Water Resources
Reference EIS pages: ppgs. 86-87, Table 3-6

Page 86 reads that the Royal White Lode group has at least one adit that discharges water, and further notations about the adits are made in table 3-6. The statement in regards to discharge is incorrect. The "Black Hawk" adit collects surface water behind a bulk head. The water is maintained for mining purposes; uncontrolled discharge of the water does not occur. Adit #200 of the Royal White is collapsed at the time of this writing and currently does not discharge water from the mine.

Response 175
Refer to Response 64.

Comment 176

Roads/Miner Access
EIS reference pages: 237, Table 3-51, A6A-5, A6B-3, A8-66,

Roads accessing the Royal White Lode group meet criteria to be considered as R.S. 2477 roads (sections of private roads accessing the lode group may be exempt), and therefore the miner should not be weighted with a bond in regards to these roads. In regards to the roads of the Royal White

Lode group, initial rights-of-way would have been established either in or prior to 1895. The Black Hawk now part of the Royal White group was located in 1895 and the Royal White was located in 1897. These dates precede the dates the national forests were established in the area; the Wallowa-Whitman was formed in 1954 as a merger of the Wallowa and Whitman forests, the Whitman National Forest was established in 1908 from part of the Blue Mountain Forest which was established in 1906 (Davis, Richard C., 2005). The location and established right-of-ways for the claims pre-dates the Transfer Act of 1905. There has been continual claim to the Royal White lode group since each claim's location notice was filed, and therefore the roads used to access the working areas of the mine have not been abandoned.

Response 176

The roads (1042-970, 978, 982 and 979) are existing Forest System roads open to public use and per 36CFR 228.4 do not require a bond or plan of operations if the operator's use is similar to the public's use.

The other two roads (1042-E2a and c) are documented for their existence prior to the start of your proposed operations, and while they are not Forest System roads, they are or could be used by the miner as other public roads are used. Access and maintenance on these roads is covered by the Z requirements in Appendix 2 and are considered as existing (E) temporary access roads.

The BLM does not list your claim as having surface rights.

Comment 177

We'd also like to address road 1042-E2c. This road is listed in table 3-51 as a mine access road to shafts located at the Black Hawk #100; however, this is not a road we would deem as a "mine access" road. Both Table 3-51 and the map on page A8-66 show the road accesses shafts. There are currently no open shafts in the area indicated on the map. 1042-E2c is a dead-end spur; it is likely remnants of the original road that ran from the Black Hawk mill site (located at the end of 1042-978) and the upper workings and hoist of the Black Hawk (traces of this road are visible in the timbered area to the east of the Black Hawk adits). 1042-E2c is primarily used by hunters and/or four-wheelers, and is not a road that was included on the mine map provided to the U.S. Forest Service in 2010. The area deemed as a road does serve as a turn-around and parking area at times as the road substantially narrows and is gated just beyond the junction of what is deemed 1042-E2c with the primary access road.

Response 177

Road # 1042-E2c is labeled as a mine access road as it exists on the ground, but is not currently designated as a Forest System road. Thank you for the additional information on the road and please refer to Response 180 for more information.

Comment 178

Comments on POO Summary and Map

EIS reference pages: A8-64, A8-65, A8-66

The summary of the Royal White plan presented in Appendix A8 (64-66) states the mine operators would start working in June. The start and end of the working season would be weather dependent; this greatly varies from year to year. Also, as mine development proceeds, work could occur in the

winter months. Temperatures underground remain stable and would permit work on the vein and adit to be done regardless of weather on the surface. The months of June through October were provided as an approximation of months that would be workable given the current status of the mine and general weather patterns.

A prior plan of operation for the Royal White lode group was approved in 1992, and the resubmitted plan of 2002 has been pending approval by the Forest Service. Exploration and testing of ores has taken place within the mine. On-going reclamation efforts have also taken place including removing old equipment, removal of a non-essential building, and securing and gating adits.

Response 178
June was used in this analysis as the most likely time that people would start working above ground based on past experiences with the weather and access to the area. For work underground which does not affect the surface resources and maintenance of existing portal gates, an approved plan of operation is usually not required. (36 CFR 228.4 (a) (1) (iv) states "*Underground operations which will not cause significant surface resource disturbance.*"

Comment 179
The summary references two shafts; shafts that historically existed near the Black Hawk workings #100 were filled prior to 1975. There are currently no shafts open to the surface on the Royal White Lode group (historical mine pits and trenches are present).

Response 179
The map shows the location of what was believed to be the remnants of two shafts. This was based on site visits and reviews of old maps in the area. Thank you for the additional background information.

Comment 180
The owner and operator(s) wish to review the equipment list included in the summary with the mineral administrator (Forest Service) as this is an evolving piece of the plan. The original plan was submitted in 1992 and re-submitted in 2002. Over this lapse of time some equipment is no longer effective or functional, and more modern updates will be required. A modification to the original POO will likely be necessary in this regard.

Response 180
During the review of the bond, it is possible to revise the list of equipment based on the needs of the operation and in accordance with analysis.

Comment 181
The summary in the EIS provides an approximation of cubic yards to be ran. As the Royal White Lode group is a hard rock lode mine approximations of processed and worked material should be presented as tons. Accurately converting tons to cubic yards requires having specific knowledge about the type and density of the material being converted. Ore bodies and country rock processed or moved from underground mining can be mixed in their type and densities thus making it much more practical to use tonnage as estimation of materials to be processed.

Response 181
In order to get some idea of the area used to hold the tailings, and the number of truck loads moved,

we had to look at cubic yards rather than tons. While not precise, it does give us an idea of the size of the operation and its potential effects to surface resources. Also refer to Response 34.

Comment 182

Of minor note, the "Black Hawk" is a historical name and used by the operators and owner for identification of specific adits. It is also known locally by this name; however, it is not recorded under this claim name with the BLM.

Response 182

As you have stated, the Black Hawk is an historical name for the site and does show up on some of the older maps, county records and in references from the Oregon Department of Oregon Geology and Mining Industry (DOGAMI) information, therefore it was used in the summary (Appendix 8) for those looking for that historical connection.

Comment 183a

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 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.

First, concern exists in regards to the Forest Service personnel's availability and timeliness in regards to providing written approvals and being available to make determinations about merchantable trees or placement of downed trees. The Forest Service's inability to respond in a timely manner may create significant time and financial delays for the miner whom in most cases has a relative short seasonal time frame to work. If a dead tree "snag" presents as an immediate safety risk, allowances should be made to remove it.

Creation of a new snag is beyond the scope of a miner. The creation of snags should be included as part of regular forest management as there are many factors that should be considered before a new snag is created including but not limited to the current density of snags in the area, the type of species currently present as snags, the type of wildlife most likely to be using the snag and for what purposes they would be using it.

Creating a snag in and of it's nature is also creating a "hazard" tree. Since all the mining activities in this EIS are located on public lands this in turn has potential to create safety hazards to the public; this is an unfair liability to post on the miner.

Mining plans in the Granite EIS are small, averaging 2-10 acres. If there are no suitable live trees on the claim to create a snag, is the miner supposed to create a new snag outside the claim boundaries on national forest? Is killing a mature tree to create a snag appropriate if snag densities in the sub-ecosystem are already adequate?

There are various methods for the creation of a snag (topping, blasting, insect, fungal, or bacterial infestation, or girdling). The most likely method a miner would have available for creating a snag

is girdling. Girdled trees are very susceptible prey to woodcutters on the national forest, and therefore would have a short lived lifespan as a snag.

G6 should not be a blanket regulation; again, snag creation should be part of forest management and not a requirement made of a miner.

Response 183a
Refer to Response 72.

Comment 183b

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 structrues in a neat and safe condition during non operating periods.

This regulation seems unnecessary. Plans of operation have historically covered a ten year period, and approval of a POO would seemingly cover on-going work at a mine site even if for some unforeseen reason a miner is unable to mine for a season (which would equate a year in the Granite Creek EIS as working timeframes are generally limited to summer and early fall) without an annual written report.

Response 183b
This requirement is a reiteration of 36 CFR 228.10 - Cessation of operations, removal of structures and equipment, and was included as a reminder to the operator.

Comment 184

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.

The requirement needs to be clarified and edited. The statement, "no person not actively involved in the day to day operations will be authorized to stay longer than allowed under the Forest Order" should be removed or significantly edited. There is no clear definition of what qualifies as "actively involved." The mining plans in the Granite EIS are all remote locations that do not have the availability of immediate medical response teams. Many mine operations have only one sole "operator." Having another individual on the mine site is essential for safety purposes. This person may or may not qualify as being "actively involved."

The additional requirement of having extended occupancy authorized in a Plan of Operation is not reasonable. 36CFR228 regulations do not require approval under a POO; they require only that the extended occupancy be incidental and necessary for the proposed mining; "...and authorized in the Plan of Operations." should be removed from G20.

Response 184
Refer to Responses 74a and 74b.

Comment 185

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. If a new owner wishes to submit the same Plan, additional environmental analysis may not be needed.

Phrasing and requirements of G22 are problematic and not reasonable. First the wording "contemplating a sale" is too vague. Contemplating generally equates to thought and not necessarily action. Additionally, there should be allowances for an approved plan of operation to accompany the sale of a mining claim. In many instances this would provide for continuity of environmentally sound practices and be economical. It does not make sense for the Forest Service to incur the additional costs of personnel, travel, and resources to re-design an already effective plan of operation, nor does it make sense for an individual purchasing a mine to wait twenty years for the Forest Service to evaluate a re-submitted plan of operation when a valid one is already in place. In general, the proposed mining plans of the Granite EIS are all small mines ran by families or small groups of partners. Miners holding title to claims may choose to sell to these involved family members or partners who have an intimate understanding of the plan and mine; again, it is a waste of resources to have these individuals re-submit a plan of operation should they purchase the mine claim. G22 should be removed from the regulations and instead expectations in regards to the sale of a claim should be communicated to miners in a letter. Each claim and plan of operation should be considered on a case by case basis in regards to the need for re-submission of a plan of operation.

Response 185

Refer to Response 74c.

In some cases, there may be options for transferring a plan of operations to new owners. In working with the minerals administrator, those options can be discussed with the both parties prior to or even after the sale of the claim. The transfer of a previously approved plan is based on many factors such as the age of the associated analysis, changes in the environment, new regulations and what the new owner/operator would like to do. In order for a plan to be approved, the parties involved with the operation and the land Forest Service need to agree to the proposed plan and both sign off on the document. Proposed plans are reviewed for compliance with existing analysis and when there are changes in the plan or in the environment then new analysis may be necessary.

Comment 186

General comments on the "R" regulations:

There are repeat mentions that "certified weed free straw" be used in the reclamation process. "Certified weed free straw" is not available. Options for other forms of mulch should be included in the regulations such as the use of woody debris. An addendum should also be included that allows for non-native seed mixtures free from noxious weeds to be used in reclamation should native seed mixes not be available. These mixtures germinate quickly, hold top soil, and act as a preventative measure to invasive or noxious plant species gaining foothold.

Response 186

Refer to Responses 82-90.

Comment 187

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 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 G6.

Similar concerns exist with Z3 as in G6 in regards to the availability of Forest Service personnel. If an immediate safety risk presents to the miner, there should be allowances for the hazard tree to be removed. Clarification for "left on the ground" should be added. There are numerous instances where a tree cannot be "left on the ground" where it is fell, and there is concern Z3 could be interpreted in this way. Mine access roads can be steep and narrow and without a good area to leave a fallen tree safely. A fallen tree may need to be moved, and thus also may need to be cut into smaller pieces to facilitate the move.

Additionally, a miner should not be held responsible for trees that are harvested, fell, or otherwise tampered with by others using the forest. This may be a difficult discernment for Forest Service authorities to make if they are visiting a site after the fact or without consulting the mine owner and operators thus creating concern a miner may unduly be found to be out of compliance with regulations.

Response 187

General Requirement Z3 was written to mimic similar contract specifications that are required for timber, fire, road construction and other service contracts on Forest System lands. It applies to the use of existing closed or temporary roads as they may not have been recently used. Before opening these roads for use, the Forest Service surveys for the presence of hazard trees and has them removed. The phrase “left on the ground” is in reference to the fact that it is not the property of the person requesting the road be opened, and the designation of hazard is for safety reasons and not for profit. As stated in Z3, the trees will be left in a stable manner, so as not to roll onto the road or encroach the travel way. This often means cutting the trees to move them out of the road, and placing the trees perpendicular to the slope so that they will not roll. Should the trees be merchantable or usable as fire wood, they could be sold or claimed by a person with a firewood permit.

Should an operation experience vandalism of any kind, it would be in their interest to inform the mineral administer and local law enforcement of the problem in a timely manner.

Comment 188

In closing, we encourage the Forest Service, tribes, and invested environmental groups not to negate the historical and current cultural importance of the Royal White Lode group as well as a many of the other mines listed in the Granite Creek Mining Project EIS. Mines composing the Royal White Group were established in the late 1800's; the story that accompanies the mine rivals that of any great American West novel, and hundreds of peoples' personal and family stories are tied to its foundation and existence. The structures remaining on the mine tell a physical story, and garner interest from a wide variety of forest users. Throughout the years my family has maintained this claim, we have been good stewards of the land; we pick up other peoples' trash, and we have maintained the roads many others use including the Forest.Service. We answer the public's questions about the history of the area and the mine. Given my family's long lived ties to the mine, we care deeply for the land where the Royal White is located and hold its health and beauty in high

esteem. We believe that an environmentally sound, multi-purpose forest plan including mining is an accomplishable goal.

The US Forest Service's mission is to "sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations." Small miners are an integral part of the Forest Service's mission. Not only can miners contribute to the on-going health of the forest by responsible management of resources, but they also harvest a necessary resource from the forest. Minerals located on the national forests, especially gold, are essential to our country's economy and autonomy. Gold has impacted nearly every American; it's found in everything from your cell phone to life saving medical equipment.

Response 188
Thank you for your comment. The DEIS documents the historical and current cultural importance of mines listed in the Granite Creek Mining Project EIS (DEIS pg. 11-14).

Roan Comments

Comment 189
Page 3 states that plans in this proposed document would be in effect from 2014 to 2024. This statement should be changed to state that the period is 2016-2026 for operators who work the first possible year, but that unless NEPA compliance is no longer adequate and current, (things change in the watershed), operators can work for a ten year period beginning when their plan is approved (see page 66).

Response 189
Refer to Response 30.

Comment 190
Page 39 also begins a description of the operations. This chart needs to remove cubic yards/yr, cubic yards/day and tons/day. Area impacted at a given time is important for the analysis and for later calculation of a reclamation bond. Some operations have cubic yards listed per day, some have cubic yards or tons listed per day. I am not sure what difference this makes. The bottom line for analysis and calculating a bond would be amount of ground disturbance at a given time. For consistency, please remove the amount processed from this chart, and for consistency, remove cubic yards and tons from the summary.

Response 190
Refer to Response 34.

Comment 191
In the appendix under Yellow Jacket, the document states**,** A1-98 requires L1-L12 as a required stipulations. This is unreasonable, because the lode is not on Forest Service system lands. **Delete the requirement for L1-L12 from the DEIS.**

Response 191
Refer to Response 69.

Comment 192
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. A modification to the Plan may be required per direction found in 36CFR 228.4 (e")"* ***is not reasonable.*** L5 should be re-written to state that the District Ranger will be immediately notified upon the miner's receipt of test results that exceed the EPA and ODEQ's standards. The results will directly impact the operation, and this information is essential for the miner to know and for the miner to immediately act on. The Forest Service is often untimely in replying to correspondence (I can provide numerous examples, if needed) so the best protection for the environment is for the miner to receive the results and for the miners to provide the results to the Forest Service.

In addition, L5 should not apply to my operation since this portion is on private land.

Response 192
Refer to Response 69.

Comment 193
A final concern I have is the picture of my cabin, which is on private land, not on the Forest. The Forest Service did not ask to enter my private property to take this picture, nor did I give permission for it to be displayed in the DEIS, along with a detailed map that I did not draw showing how to get to the cabin. Information such as this just invites trespass and vandalism.
Please remove the picture from the final EIS.

Area around old cabin site (Directly south of cabin site)

Response 193
The picture of your cabin in front of the claim has been removed from the Final EIS.

Smith Comments

Comment 194
There are too many agencies – one has to file with the county and then the BLM, Get various permits from different departments in the state, the DEQ, and the Forest service. He would like to be able to go to one agency and get everything he needs. This would reduce the confusion, anger and frustration that the miners have to go through in order to get a permit and be legal.

Response 194
This comment is outside the scope of this analysis. We sympathize with the frustration expressed, but due to the many laws governing mining and agencies jurisdiction, but there is not a simple resolution to this issue. The management of mineral resources on federal lands remains with BLM, and management of the surface resources on National Forest System lands is that of the Forest Service. Additionally, as operations involve the movement of more material, or within the waters of the State, the state has jurisdiction. Some resources, such as Endangered Species, are regulated by other Federal Agencies. The Forest Service works with all the agencies to address the various issues and when possible, tries to keep the miners informed of any agency they may have to contact for additional permits or requirements.

Sunderman Comments

Comment 195
As a member of EOMA, I have had the opportunity to mine and prospect on a few of the claims the organization has and to become aware of the many rules, regulations, and restrictions put forward by the US Forest Service as well as the Bureau of Land Management. I am fully aware of the need for these guidelines, however, in my opinion, I also feel that there has been a growing need for guidelines for the various agencies to abide by as well. Rather than spending huge amounts of time and dollars putting together large volumes of "Final Supplemental EIS and ROD's, perhaps more time spent with those individuals you are targeting with your studies would eliminate the need for the overwhelming volumes your agency produces.

After reading thru the Granite Watershed Mining Projects EIS and the comments submitted by Ms. Jan Alexander, I can only say that most of the unreasonable stipulations she outlines in her rebuttal could have been eliminated thru careful compilation of the many facts BEFORE the publishing of same. Instead of a "them against us" mindset, perhaps a "we together" could work more to everyone's advantage, saving huge amounts of time, my tax dollars, and what seems like extra stress to enjoy a right that was extended to me by just being a US Citizen!

Response 194
Thank you for your comment. The NEPA process allows for public and permit holder participation through scoping, formal comment period, and the objection period. In addition, for this project, we have met individually with many of the miners with proposed Plans in the Granite Creek Watershed to discuss and clarify their proposed activities.

APPENDIX 11

Plan-specific
Resource Protection Measures
Under
Alternative 3

ALTONA

Water Resources Protection Measures (WRPM)

1. Measurement of the buffer would start at the top of the valley floor terrace-channel bank break in slope of the side channel (See Appendix 1A and Figures 1A-2 and 1A-3 for explanations of this feature).

2. Put straw bales/coils on the valley floor between the activity site and the creek [side channel]

BELVADEAR

Water Resources Protection Measures

No WRPMs could be identified that would prevent a discharge of sediment into Olive Creek given the location of the proposed mining in the riparian area. Discharge potential remains.

BLUE SKY/BULL RUN

Water Resources Protection Measures

<u>Blue Sky/Bull Run (Blue Sky site #2)</u>

1. Place straw bales/coils along the low berm that separates the activity site from Swamp Creek to increase the effectiveness of the low berm.

<u>Blue Sky/Bull Run (Blue Sky site #3)</u>

1. Measurement of the buffer would start at the top of the valley floor terrace-channel bank break in slope of the side channel (See Appendix 1A and Figures 1A-2 and 1A-3 for explanations of this feature).

2. Put straw bales/coils on the valley floor between the activity site and the side channel of Bull Run Creek.

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 the 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 (See Appendix 1A and Figures 1A-2 and 1A-3 for explanations of this feature).

2. Miner's protection measure related to straw bales applies to this site because the site is adjacent 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 (See Appendix 1A and Figures 1A-2 and 1A-3 for explanations of this feature).

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 (See Appendix 1A and Figures 1A-2 and 1A-3 for explanations of this feature).

2. Miner's protection measure related to straw bales applies to this site because site is adjacent to Bull Run Creek.

3. Temporary bridge: The bridge would be replaced with a two-track road [proposed 7375-M1b] would be made to access the site through the forest. Location of the two-track would be determined with input from the Forest Service.

Fords

Swamp Creek ford: Rock and slope ford approaches

Transportation Protection Measures

To prevent the public from using temporary mine access Road 7355-M1a, the miner will maintain the berm as an effective road closure, or if multiple trips will be made on Road 7355-M1a throughout the season, the miner will install a gate according to Forest Service specifications (project file).

Cultural Resource Protection Measures

Blue Sky 2: To protect and preserve the historic integrity of the hand-piled tailings adjacent to the south side of the Blue Sky 2 work area, conduct mining activities to avoid the hand-piled

tailings adjacent to this work area with a 30-foot buffer. The hand-piled tailings are not located within the proposed work area.

Wildlife Protection Measures

Ponds

*Source water pond***:** General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

Settling pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

ODEQ requirements related to Suction Dredging

Bull Run Creek has been identified as essential salmon habitat. Suction dredge mining is currently not authorized on essential salmon habitat streams until 2021 as a result of the State moratorium. Should the moratorium be lifted prior to 2021, the miner will adhere to the terms and conditions listed in the ODEQ 700PM permit that is in place at that time.

BLUE SMOKE

Water Resources Protection Measures

Processing site

Water level must stay at consistent elevation in both the processing and overflow settling pond (Pond #3) and must maintain the existing difference in water surface elevations between ponds to prevent a change in subsurface water elevation through the fill.

Wildlife Protection Measures

Ponds

Source water and settling ponds: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

ODEQ requirements related to Suction Dredging
Granite Creek has been identified as essential salmon habitat. Suction dredge mining is currently not authorized on essential salmon habitat streams until 2021 as a result of the State moratorium. Should the moratorium be lifted prior to 2021, the miner will adhere to the terms and conditions listed in the ODEQ 700PM permit that is in place at that time.

BUNCH BUCKET

Water Resources Protection Measures

No activity in the very small creek mentioned in the Plan (site 1) would occur without first receiving input from the minerals administrator and district hydrologist and appropriate WRPMs identified and implemented.

Cultural Resource Protection Measures

To protect and preserve the historic integrity of the two historic sites located on the edge of the work area, the miner will avoid the sites with a 30-foot buffer. The two historic sites are not located within the proposed work area.
To protect and preserve the historic integrity of the cabin, shed and outhouse, all of which are owned and used by the miner for Plan activities, the miner and Forest Service will work together to maintain the historic appearing character of the existing buildings.

CITY LIMITS

Wildlife Protection Measures

<u>Ponds</u>

Source water pond and settling ponds: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

EAST TEN CENT

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.

Wildlife Protection Measures

Ponds

Source water pond and settling pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

EDDY SHIPMAN

Water Resources Protection Measures

Ford:

1. The channel bed must be stable and the 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. Rock both approaches to the ford used to access Adit A (FS 7300-680 and TA road 7300-E1d).

Processing site specific

1. Build a berm 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 use of the source water and the 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 specific

1. If any placer mining occurs in old lode tailings or results in disturbing the old lode tailings than L3 and L5 apply.

2. Place a straw bale berm between the existing horse corral and creek to prevent runoff of nutrients.

3. No removal of stream shade bearing trees

Transportation Protection Measures

To prevent the public from using closed Road 7300-680, the miner will maintain the berm as an effective road closure, or if multiple trips will be made on Road 7300-680 throughout the season, the miner will install a gate according to Forest Service specifications (project file).

GRUBSTEAK

Water Resource Protection Measures

Ford

1. Rock southwest approach of ford

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 (see Appendix 1A, Figures 1A-2 and 1A-3 for explanation of this feature).

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.

HOPEFUL #1

Cultural Resource Protection Measures

To protect and preserve the historic integrity of the two-room cabin and outhouse, both of which are owned and used by the miner for Plan activities, the miner and Forest Service will work together to maintain the historic appearing character of the existing buildings.

Wildlife Protection Measures

Ponds

Source water and settling pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

HOPEFUL 2 & 3

Water Resources Protection Measures

East Ford

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. North approach: Rock the north approach to the slope break plus 25 feet of additional road.

3. South approach: The south ford approach and the existing south access road (TA 1035-E1d) are treated as a unit because of the complexity of the WRPMs. See WRPMs under TA road 1035-E1d below

TA road 1035-E1d (used to access Site 4 and the south side processing area) and south approach of ford

The south side approach to the east ford and TA 1065-E1d are combined because the discharge call under Alternative 2 is because the characteristics of the road (granitics and rutted) and the ford approach (fines) and the way the road and ford approach interact. In identifying Forest Service WRPMs to prevent a discharge of sediment into Granite Creek from the use of TA 1035-E1d and the ford approach it was necessary to divide the road into segments. See map and sketch in the project file for delineations of segments.

Segment A: The south side ford approach to the first water bar.

1. Rock this section of road/ford approach.

Segment B: The road steepens for about 35 feet to reach the top of the hill.

1. 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.

2. 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.

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

Segment C: The portion of the road at the top to the hill to the second water bar

1. 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.

2. This portion of road will be rocked.

Segment D: The portion of the road between Segment C and the south processing site. None needed except in the vicinity of the unnamed tributary. WRPMs for this area below.

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

Pond 2 (North processing site)

1. 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.

2. Source water pond will be the west pond and at least 7 feet from the terrace break in slope.

3. Settling pond:

    a. Will be the east pond
    b. Will be at least 7 feet from the terrace break in slope.
    c. A sediment berm will be created along the stream-side edge of the settling pond to eliminate a small swale.
    d. Straw bales will be put on the stream-side edge of the sediment berm.

Fish Protection Measures

Fords

See Water Resource Protection Measures above.

Wildlife Protection Measures

Pond 2 (South side)

Source water and settling pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat.

L and H

Water Resources Protection Measures

Lode portion

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.

Cultural Resource Protection Measures

The historic structure (collapsed cabin remains) at the site is potentially eligible for the National Register of Historic Places. Before any mining work can be completed within 30-feet of the cabin remains, or in the cabin remains themselves, a determination of eligibility would need to be made. If the cabin remains are determined to be eligible for the National Register (a likely outcome), mitigation would be required for any mining work that would cause an adverse effect to the cabin remains. Mitigation measures would need to be consulted upon with the Oregon State Historic Preservation Office and possibly the Advisory Council on Historic Preservation. Mitigation would need to be funded by the miner.

LIGHTNING CREEK

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.

Cultural Resource Protection Measures

The historic mining site is being considered eligible for the National Register of Historic Places (NRHP). To protect and preserve the historic integrity of the seven historic structures proposed for use on the site, the miner and Forest Service will work together to maintain the historic appearing character of the existing structures.

Wildlife Protection Measures

Ponds (Existing Processing area ponds)

Existing processing area ponds: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

ODEQ requirements related to Suction Dredging

Lightning Creek has been identified as essential salmon habitat. Suction dredge mining is currently not authorized on essential salmon habitat streams until 2021 as a result of the State moratorium. Should the moratorium be lifted prior to 2021, the miner will adhere to the terms and conditions listed in the ODEQ 700PM permit that is in place at that time

LITTLE CROSS 1

Water Resource Protection Measures

Placer 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.

ODEQ requirements related to Suction Dredging

Granite Creek has been identified as essential salmon habitat. Suction dredge mining is currently not authorized on essential salmon habitat streams until 2021 as a result of the State moratorium. Should the moratorium be lifted prior to 2021, the miner will adhere to the terms and conditions listed in the ODEQ 700PM permit that is in place at that time.

LUCKY STRIKE

Cultural Resource Protection Measures

The historic mining site is being considered eligible for the National Register of Historic Places (NRHP), with the north end non-contributing to eligibility, and the south end with contributing standing structures.

For the north end of the site, where current mining work is planned in adits/shafts, no protection or preservation is necessary. No actual mining work is planned for the south portion of the site, but maintenance and possible restoration of the historic cabin and stamp mill are planned. To protect and preserve the historic integrity of the cabin and stamp mill, the structures should be maintained with historic appearance, and any work to be done should meet the Secretary of Interior Guidelines for Historic Preservation. If plans are proposed that would adversely affect the structures, mitigation would be necessary. Mitigation measures would need to be consulted upon with the Oregon State Historic Preservation Office and possibly with the Advisory Council on Historic Preservation. Mitigation would be funded by the miner.

MAKE IT

Water Resources Protection Measures

1. This WRPM is for clarification purposes: 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 processing pond level below the pond outlet elevation so that the pond and Granite Creek remain hydrologically connected via surface flow.

Cultural Resource Protection Measures

To protect and preserve the historic integrity of the historic structures and remains on the site, the miner will avoid all structures and remains (cabin, pole structure, footbridge, trash dumps and debris, dam/pond, and car parts) with a 30-foot buffer. The structures and remains are not located within the proposed work area.

Wildlife Protection Measures

Ponds

Source water pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

MUFFIN

Water Resources Protection Measures

Sites 1, 2, and 3

Limit the size of the hole at any one time to either 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 wetland meadow area (wetland protection measure)

Wildlife Protection Measures

Ponds

Source water pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

Secondary, small overflow settling pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

OLD ERIC 1 and 2

Water Resources Protection Measures

Settling Pond

Water temperature related: No standing water is permissible in the settling pond beyond 1 day.

Wildlife Protection Measures

Ponds

Settling pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

ODEQ requirements related to Suction Dredging

Granite Creek has been identified as essential salmon habitat. Suction dredge mining is currently not authorized on essential salmon habitat streams until 2021 as a result of the State moratorium. Should the moratorium be lifted prior to 2021, the miner will adhere to the terms and conditions listed in the ODEQ 700PM permit that is in place at that time.

OLIVE TONE

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 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 (Appendix 1B 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.

ROSEBUD

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.

Fish Resource Protection Measures

Miner would limit loss of water in the processing pond to no more than 6 inches of water during daily operations.

Wildlife Protection Measures

Ponds

Source water pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

ROYAL WHITE

Botanical Protection Measures

To preclude the possibility of any severe damage (e.g. direct mechanical destruction of plants or soil compaction) to the population of Lomatium tarantuloides at the Royal White site by inadvertent forays into the area by mining equipment, the miner will not breach the area protected by fallen trees immediately adjacent to Forest Service Road 1042970 that transects the population. Prior to commencement of mining activities, the Forest Service will fall small trees or install another type of barrier around the area to be avoided and protected.

RUBY

Water Resources Protection Measures

Fords

1. Clear Creek ford: The southwest approach to the ford that crosses Clear Creek will be rocked and sloped. The northeast approach would be rocked.

2. Ruby Creek ford and TA 1310-E1a:

   The Ruby Creek ford and TA 1310-E1a are combined because the discharge call under Alternative 2 is the result of the way the road and Ruby Creek interact and can mobilize and transport sediment AND the way road use, the ford and Ruby Creek interact to mobilize and transport sediment. 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. See map in the project file for delineations of segments.

Segment A: The portion of TA 1310-E1a between the Clear Creek ford and the Ruby Creek ford.

1. 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.

1. 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: The portion of the road between the Ruby Creek ford and Site 2

1. 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.

2. 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: The portion of the road between Site 2 and Site 1

1. 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.

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 (See Appendix 1A, and Figures 1A-2 and 1A-3for explanation of this feature)

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 waddles must be placed between work sites #1, 2 and 3 and Ruby Creek.

4. Straw bales or waddles must be placed across the access road to sites 1, 2, and 3 to trap any sediment generated by the activity and prevent it from entering into Clear Creek

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 (See Appendix 1A, and Figures 1A-2 and 1A-3for explanation of this feature)

2. Straw bales or waddles 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 needed

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

Transportation Protection Measures

For safety reasons and to prevent the public from using the miner's ATV bridge on temporary mine access Road 1310-E1a, the miner will install a sign stating "Mining use only – ORMC - claim number XX". The miner will also install a gate in front of the bridge according to Forest Service specifications (project file).

Cultural Resource Protection Measures

To protect and preserve the historic integrity of the historic collapsed structures and features during mining activities, the miner will avoid the structures and features with a 30-foot buffer. The structures and features are not located within the proposed work area.

SUNSHINE MCWILLIS

Water Resources Protection Measures

Processing Site 1

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.

Mining at Mining Site #2

1. Straw bales or waddles must be placed between the edge of the hillslope and the gulch at mining site #2.

ODEQ requirements related to Suction Dredging

McWillis Gulch is not essential salmon habitat. The miner will adhere to the terms and conditions listed in the May 2015 ODEQ 700PM permit.

Cultural Resource Protection Measures

The cabin at the site is potentially eligible for the National Register of Historic Places. The cabin is not in a planned work area for the mine, but it may be utilized while mining occurs. To protect and preserve the possible historic integrity of the cabin, the structure should be maintained with historic appearance, and any work that may be done should meet the Secretary of Interior Guidelines for Historic Preservation. If plans are proposed that would adversely affect the structure, mitigation may be necessary. Mitigation measures would need to be consulted upon with the Oregon State Historic Preservation Office and possibly with the Advisory Council on Historic Preservation. Mitigation would be funded by the miner.

TETRA ALPHA PLACER

Water Resources Protection Measures

<u>Stage 1 area</u>

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.

<u>Stage 2 area</u>

1. Measurement of the 25 foot buffer will begin at the hillslope-meadow boundary.

2. A straw bale berm will be constructed at the base of the hillslope.

<u>Fords</u>

West ford (existing): used to access Stage 1 area

1. Ford approaches will be rocked.

East ford (proposed): used to access Stage 2 area

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 waddles 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

Proposed TMA 7355-M3d (meadow portion): Proposed miner access road to access Stage 2 area where it crosses the meadow:

1. Road will be rocked to at least 20 feet back from the creek in the meadow area 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 Forest Service personnel.

Fish Protection Measures

1. The miner will provide the Forest Service with advanced notification of ford construction so that a fisheries biologist or minerals administrator can monitor the fords and ensure that they 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.

Cultural Resource Protection Measures

To protect and preserve the historic integrity of heritage sites on the access road to the planned work areas, FS road 7355-010 used to access the work areas will not be widened, and any work on the road will require pre-approval by the Forest Service. The mine operator will be allowed to drive on the open Forest Service Road 7355-010, however the miner has not proposed any mining activity within 30 feet of the sites.

Wildlife Protection Measures

Ponds

Source water /settling pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat.

TETRA ALPHA MILL and LODE

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

Cultural Resource Protection Measures

To protect and preserve the historic integrity of heritage sites on the access road to the planned work areas, FS road 7355-010 used to access the work areas will not be widened, and any work on the road will require pre-approval by the Forest Service. The miner will be allowed to drive on the open Forest Service Road 7355-010, however the miner has not proposed any mining activity within 30 feet of the sites.

Wildlife Protection Measures

<u>Ponds</u>

Source water pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat.

TROY D

Water Resources Protection Measures

1. Pond A would be used only as the source water pond. (See site map in project file)

2. Pond B 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 (Appendix 1B 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.

Wildlife Protection Measures

Ponds

Source water pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat

Settling ponds: Varies. General Requirement R15 does not apply only if the pond is NOT enlarged because it provides wildlife habitat. If enlarged, then R15 applies.

YELLOW GOLD

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.

Transportation Protection Measures

To prevent the public from using closed Road 7355-050, the miner will maintain the berm as an effective road closure, or if multiple trips will be made on Road 7355-050 throughout the season, the miner will install a gate according to Forest Service specifications (project file).

Wildlife Protection Measures

Ponds

Source water pond: General Requirement R15 does not apply. Do NOT reclaim as it provides wildlife habitat.

YELLOW JACKET

Water Resources Protection Measures

Lode activities are located on private property. However, the miner must ensure that there is no discharge of water, heavy metals or sediment onto Forest Service lands or placement of lode material onto Forest Service lands.

ODEQ requirements related to Suction Dredging

Orofino Gulch is not essential salmon habitat. The miner will adhere to the terms and conditions listed in the May 2015 ODEQ 700PM permit.

Errata to Granite Creek Watershed Mining Project FEIS

April 28, 2016 FEIS

FEIS Tables 2-1 and 2-3: Eddy Shipman existing ford is located on Granite Creek, not Olive Creek.

FEIS Table 2-1: For Muffin: From Column 5 "Alternative 2", delete "(approx 10 cubic yds/year)".

For Rosebud: From Column 5 "Alternative 2", delete "(processing 2-10 cubic yds per year)".

Both changes are in line with response to comments 62 and 172 (FEIS Appendix 10).

FEIS Appendix 10 (Comments and Responses): The response to comment 185 is changed to clarify which parties are responsible for signing the final Plan of Operations. Response 185 is re-written to the following:

Response 185

Refer to Response 74c.

In some cases, there may be options for transferring a plan of operations to new owners. In working with the minerals administrator, those options can be discussed with both parties *(buyer and seller*) prior to or even after the sale of the claim. The transfer of a previously approved plan is based on many factors such as the age of the associated analysis, changes in the environment, new regulations and what the new owner/operator would like to do. In order for a plan to be approved, the *current owner/operator of the claim* and the Forest Service need to agree to the proposed plan and both sign off on the document. Proposed plans are reviewed for compliance with existing analysis and when there are changes in the plan or in the environment then new analysis may be necessary.

FEIS Table 3-30 is adjusted to match Table 3-24 and clarify contents.

The numbers in the 5th column were incorrectly copied into the FEIS, and the Table title and footnote were edited to clarify what the values in the table represent. See the corrected Table 3-30 below.

Table 3-30: Plans, proximity of Plans to steelhead and Bull Trout DCH, maximum area disturbed by Plan claim, total possible disturbed area over the life of the proposed Plan and size of new proposed ponds.

Plan	Distance to Steelhead DCH	Distance to Bull Trout DCH	Maximum Area of Active Surface Disturbance at any one time (in acres)	Approximate Total Area Potentially Disturbed from Mining Activities* (in acres)	Ponds E=use existing B=to be built
Altona	1.0 mile	> 5.0 mi.	0.02	5	Build 2 10'x 20' x 6'
Belvadear	20 ft.	>5.0	0.25	3	E
Blue Smoke	>300 ft.	>300 ft.	0.01	1.75	E
Blue-Sky/Bull Run	30 ft.	30 ft.	0.2	1.7	E
Bunch Bucket	150 ft.	150 ft.	0.01	10	Expand E
City Limits	200 ft.	200 ft.	0.01	1	E
East 10 Cent	10 ft.	2.0 miles	0.01	2	E
Eddy Shipman	10 ft.	10 ft.	0.25	2.5	Build 2 10'x 20' x 6'
Grubsteak	20 ft.	20 ft.	0.25	2	E
Hopeful 1	150 ft.	150 ft.	0.01	1	E
Hopeful 2 & 3	50 ft.	50 ft.	0.25	3.5	1 E, 1 B 10'x 10' x 10' 1 B 10' x 15' x 4'
L&H Placer	0.5 miles	>7.0 miles	0.01	8	E
Lightning Creek	150 ft.	150 ft.	0.12	5	E
Little Cross I	50 ft.	50 ft.	0.25	1	none
Lucky Strike	>2.0 miles	>2.0 miles	0.01	2	none
Make It	50 ft.	50 ft.	0.01	2	E
Muffin	0.25 miles	0.25 miles	0.25	2.5	E
Old Eric 1&2	150 ft.	150 ft.	0.01	1	E
Olive Tone	50 ft.	>5.0 miles	0.02	2	Build 2 10'x 20' x 6'
Rose Bud	200 ft.	200 ft.	0.01	5	E
Royal White	>2.0 miles	>2.0 miles	0.01	3	Build 2 150' x 10' x 6'
Ruby Group	20 ft.	20 ft.	0.01	2.5	None
Sunshine/McWillis	0.25 mile	>5.0 mile	0.25	2.5	E
Tetra Alpha Placer	25 ft.	25 ft.	0.5	8	E
Tetra Alpha Lode & Mill	25 ft.	25 ft.	0.1	2	E
Troy D	25 ft.	25 ft.	0.01	8	E
Yellow Gold	>2.0 miles	>2.0 miles	0.07	9	Build 3 15'x 20' x 6', 1 E

Plan	Distance to Steelhead DCH	Distance to Bull Trout DCH	Maximum Area of Active Surface Disturbance at any one time (in acres)	Approximate Total Area Potentially Disturbed from Mining Activities* (in acres)	Ponds E=use existing B=to be built
Yellow Jacket	0.25 miles	>5.0 Miles	0.25	7.5	Private Land
		Total	**2.79 acres**	**104.45 acres**	
*this is potential total area disturbed - due to operational size limits displayed in the column to the left, the entire area would not be disturbed at one time; this table does not include suction dredging					