ENVIRONMENTAL ASSESSMENT

for the

TRACY SUCKER CREEK PLAN OF OPERATIONS

NEPA #DOI-BLM-OR-M070-2010-0004-EA

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
GRANTS PASS RESOURCE AREA

April 2010

Dear Reader:

We appreciate your interest in the BLM's public land management activities. Public involvement for the Tracy Sucker Creek Plan of Operations project began in December 2009 when approximately 50 scoping letters were sent to the public. The scoping letter was sent to residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type, inviting them to contact the BLM with information, comments and concerns. Personal discussions and comment letters provided public input to BLM for consideration in this environmental assessment (EA).

All public input was considered by the planning and interdisciplinary teams in preparation of this EA. The project was developed by the applicant under the mining laws and BLM regulations for processing a Plan of Operations (43 CFR 3809—Surface Management; 43 CFR 3715—Use and Occupancy Under the Mining Laws), a claimant.

The analysis was completed under National Environmental Policy Act (NEPA); Department of Environmental Quality (DEQ); and other applicable federal laws and regulations. This analysis was completed consistent with the 1995 Medford District Record of Decision and Resource Management Plan (RMP) and EIS.

We appreciate your taking the time to review this EA. If you would like to provide us with written comments regarding this project or EA, please send them to me at 2164 NE Spalding Avenue, Grants Pass, OR 97526. Email comments may be sent to: Medford_Mail@blm.gov.

If confidentiality is of concern to you, please be aware that comments, including names and addresses of respondents, will be available for public review or may be held in a file available for public inspection and review. Individual respondents may request confidentiality. If you wish to withhold your name and address from public review or from disclosure under the Freedom of Information Act, you must state this clearly at the beginning of your written comment. Such requests would be honored to the extent allowed by law. All submissions from organizations or officials of organizations or businesses will be made available for public inspection in their entirety.

I look forward to your continued interest in the management of our public lands.

Abbie Jossie
Field Manager
Grants Pass Resource Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

EA COVER SHEET

RESOURCE AREA: Grants Pass Resource Area
NEPA #DOI-BLM-OR-M070-2010-0004-EA

ACTION/TITLE: Tracy Sucker Creek Plan of Operations

LOCATION (BLM land):
T 40 S, R 7 W, Section 1 – Willamette Meridian, Josephine County, Oregon

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1.0 Purpose and Need

1.1 Introduction

The Medford District Bureau of Land Management (BLM) has received a proposed Plan of Operations from Mr. Cliff Tracy to placer mine alluvial material for gold and other heavy minerals on a bench adjacent to, and on the west side of Sucker Creek (see section 2 for details of the proposal). The proposed Plan of Operations (from here on referred to as the Tracy Plan) is completed and was submitted in compliance with the General Mining Law of 1872, as amended; 43 Code of Federal Regulations (CFR) 3809 (Surface Management); and 43 CFR 3715 (Use and Occupancy Under the Mining Laws). The Tracy Plan provides the basis for the proposed action analyzed in this Environmental Assessment. The applicant, Mr. Cliff Tracy, holds an active mining claim: Sucker Creek #2, Oregon Mining Claim (ORMC) serial number 163113. Placer mining claims are typically parcels approximately 20 acres in size. The Sucker Creek #2 Claim comprises two associated parcels, and totals approximately 40 acres. It was located in February 2008 for placer gold and other valuable minerals pursuant to the 1872 general mining laws, as amended.

In this Environmental Assessment (EA), the Bureau of Land Management (BLM), Grants Pass Resource Area (GPRA), analyzes the Tracy Sucker Creek Plan of Operations project in the Sucker Creek watershed. This project is one of many that implement the Bureau of Land Management's Medford District Record of Decision and Resource Management Plan (USDI 1995) for this watershed. Management direction set forth in the RMP provides direction for resource management on BLM-administered lands according to various land use allocations. The Resource Management Plan was developed, and overall effects of its implementation were analyzed and disclosed in the Final Medford District Proposed Resource Management Plan/Environmental Impact Statement and Record of Decision (EIS 1994 and RMP/ROD 1995).

This EA analyzes the site-specific effects of implementing the Tracy Plan to determine whether effects will be within those already analyzed in the RMP or are otherwise not significant. It also analyzes an alternative to the Tracy Plan that would reduce the effects on Threatened and Endangered species to a level that would minimize or prevent degradation of habitat for these species.

This chapter of the EA describes the needs, goals and objectives (purpose and need) for the project area. The project area is the area where land management actions are proposed, and represents the area of consideration for assessing current environmental conditions and objectives outlined in BLM's Medford District RMP. This chapter identifies the project area and sets the context for development of the action alternatives and analysis of environmental effects of the alternatives.

This document complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's regulations on the National Environmental Policy Act of 1969 (43 CFR Part 46) as well as the BLM specific NEPA requirements in the Departmental Manual (H-1790-1).

This EA will assist in the decision-making process by assessing the environmental and human effects resulting from implementing the proposed project or alternatives. The EA will also assist in determining if an environmental impact statement (EIS) needs to be prepared or if a finding of no significant impact (FONSI) is appropriate.

Purpose & Need
The BLM is responsible for administering mining on certain federal lands as authorized by the General Mining Law of 1872, as amended (30 U.S.C. 22 et seq.). Under the law, qualified operators are entitled to reasonable access to mineral deposits on public domain lands which have not been withdrawn from mineral entry.

The purpose is to respond to the proposed Tracy Plan under 43 CFR 3809. Mr. Tracy asks for authorization to placer mine alluvial material for gold and other heavy minerals on a bench adjacent to and on the west side of Sucker Creek. The need for action is established under the Mining Law and by the BLM's responsibilities under the Federal Land Policy and Management Act of 1976 (FLPMA) and 43 CFR 3809 to respond to the submitted Tracy Plan, which proposes to extract gold and other heavy minerals.

The regulations require that the BLM assess the plan to determine if the proposed operations will result in unnecessary or undue degradation of public lands. Undue and unnecessary degradation is not the act of mining, but is defined as:

> conditions, activities, or practices that: fail to comply with one or more of the following: the performance standards in §3809.420, the terms and conditions of an approved plan of operations, and Federal and state laws related to environmental protection and protection of cultural resources; and, are not "reasonably incident" to prospecting, mining, or processing operations (43 CFR 3809.5; 3809.415).

This EA will analyze the environmental effects of the alternatives and determine if the project conforms with the BLM surface management regulations found at 43 CFR 3809. The BLM must ensure that the operation would not result in "unnecessary or undue degradation" as defined in 43 CFR 3809.5. The EA will also determine if the project will be approved as submitted, or require changes or conditions that are necessary to meet the performance standards of Section 3809.420 and to prevent unnecessary or undue degradation. BLM may require the potential operator to incorporate into their plan of operations other agency permits, final approved engineering design and plans, or other conditions of approval from the review of the Plan of Operations filed under 43 CFR 3809.401. As stated at 43 CFR 3809.420(a)(4), the claimant must take mitigation measures specified by BLM to protect public lands; be consistent with BLM land-use plans and activity plans; and "must conduct all operations in a manner that complies with all pertinent federal and state laws" (43 CFR 3809.420 (a)(6).

Following completion of BLM's review of the plan, including analysis under NEPA and public comment, the BLM may:
1) approve the plan as submitted (43 CFR 3809.411(d)(1);
2) approve the plan subject to changes or conditions necessary to meet the performance standards at 3809.420 and to prevent unnecessary or undue degradation (3809.411 (d)(2); or
3) disapprove or withhold approval of the plan of operations because the plan: (1) does not meet the applicable content requirements of 43 CFR 3809.401; (2) proposes operations that are in an area segregated or withdrawn from the operation of mining laws, unless the requirements of 43 CFR 3809.1000 are met; or (3) proposes operations that would result in unnecessary or undue degradation of public lands.

Approval of a mine plan of operations does not authorize the start of operations. The operator must obtain all necessary state and federal permits before beginning mine plan activities. They must also obtain a reclamation bond sufficient to pay a third party contractor for reclamation of the proposed

disturbances (43 CFR 3809.412). Additionally, consultation for Threatened and Endangered Species under the Endangered Species Act must be completed as necessary before a decision can be signed.

1.2 What is BLM Proposing and Where?

Location

Operations under the proposed Tracy Plan would occur on BLM-administered lands in Josephine County, approximately 8 miles east of Cave Junction, Oregon in T40S, R7W, Section 1 (see also Appendix A, Project Map 1). The Tracy Plan area is the riparian reserve land allocation. Objectives for these land allocations are in the Northwest Forest Plan (NWFP) and the Medford District Resource Management Plan (RMP pp. 29-30). Objectives for minerals management in riparian reserves (RMP p. 29-30), that are pertinent to the Tracy Plan, and consistent with the regulations, are to require a Plan of Operations, including a reclamation plan and reclamation bond for all mining operations in reserves; locate structures, and roads outside riparian reserves if possible—there are no structures, support facilities or roads proposed for construction in the Tracy Plan; assure physical stability of mine wastes; and develop inspection and monitoring requirements, and evaluate the results of inspection and monitoring to determine if modifications are require to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy and riparian reserve objectives.

1.3 Why is BLM Proposing the Tracy Plan Project?

The General Mining Law of 1872 grants citizens the right to locate and mine certain minerals on public lands. A claimant's statutory rights, consistent with other laws, include entry on open public lands for the purpose of mineral prospecting, exploration, development and extraction. Section 302 of FLPMA directs the Secretary of the Interior to manage public lands under the principle of multiple-use. Minerals are specifically identified as one these multiple-uses in the Act.

Mr. Tracy submitted the Tracy Plan under 43 CFR 3809 (Surface Management) and 43 CFR 3715 (Use and Occupancy Under the Mining Laws). The proposed mining operations under the Tracy Plan would occur on BLM-administered lands that are open to mineral entry.

BLM has an obligation to authorize mining activities if they would be done without "unnecessary and undue degradation" (43 CFR §3809.5), follow general performance standards (§3809.420), and approve the occupancy if it is "reasonably incident" (§3715. 0–5) to the mining operation.

1.4 Decision Factors

This Environmental Assessment will provide the information needed for the authorized officer, the Grants Pass Resource Area Field Manager, to render a decision regarding the selection of a course of action to be implemented in response to the proposed Tracy Plan. The Field Manager will decide whether to implement activities that would be carried under the Tracy Plan, as submitted, or BLM's alternative, activities that would be carried under the Tracy Plan, as amended, which includes mitigation necessary to comply with the BLM 43 CFR 3809 regulations.

In choosing the alternative that best meets the project needs, the Field Manager will consider the extent to which each alternative responds to the purposes identified for this project. The decision will also include a determination on whether or not the impacts of the proposed action are significant to the human environment. If the impacts are determined not to result in significant effects beyond those disclosed in the 1995 Final EIS and its amendments, or otherwise determined to not be significant, a Finding of No Significant Impact (FONSI) can be issued and a decision implemented.

1.5 Conformance with Land Use Plans and Other Documents

This EA tiers to or is consistent with the following documents:

1. *Final EIS/ROD for the Medford District Resource Management Plan* (RMP) (1995)
2. *Final Supplemental Environmental Impact Statement and Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (Northwest Forest Plan FSEIS 1994 and ROD 1994);
3. *Final SEIS for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2000), and the ROD and *Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001)
4. *Final Supplemental Environmental Impact Statement: Management of Port-Orford-Cedar in Southwest Oregon* (FSEIS 2004 and ROD 2004);
5. *Medford District Integrated Weed Management Plan Environmental Assessment (1998*) and tiered to the *Northwest Area Noxious Weed Control Program* (EIS 1985).

In particular, the EA is consistent with Management Direction for Energy and Minerals in the Medford District RMP (pp. 76-80), particularly in regard to Locatable Minerals (RMP p. 79), and Riparian Reserves (RMP p. 29). It is also consistent with Best Management Practices for Mineral Development (RMP pp. 171-172). This includes requiring claimant to obtain all required state and federal operating permits; using existing roads and stream crossings whenever possible; reseeding and replanting natural surfaces following operations; stockpiling topsoil for reclamation; preventing sediment from reaching the creek; stabilizing and recontouring soils following mining; not allowing encroachment on streams whenever possible; and locating and maintaining sanitation facilities in accordance with state DEQ regulations.

The claimant may need permits from the Oregon Department of Environmental Quality (DEQ), Oregon Department of State Lands (DSL), Army Corps of Engineers (ACE), Oregon Department of Geology and Mineral Industries (DOGAMI), and others as applicable to operations. The claimant is responsible for submitting applications and getting required permits from these agencies. Whether a permit is required or not is subject to these agencies' review of operations that would be carried out under the Tracy Plan.

The action taken by BLM in response to the submitted Tracy Plan shall be consistent with the 2001 Record of Decision, and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines, as incorporated into the Medford District Resource Management Plan.

On December 17, 2009, the U.S. District Court for the Western District of Washington issued an order in *Conservation Northwest, et al. v. Rey, et al.*, No. 08-1067 (W.D. Wash.) (Coughenour, J.), granting Plaintiffs' motion for partial summary judgment and finding a variety of NEPA violations in the BLM and USFS 2007 Record of Decision eliminating the Survey and Manage mitigation measure.

Judge Coughenour deferred issuing a remedy in his December 17, 2009 order until further proceedings, and did not enjoin the BLM from proceeding with projects.

The project may proceed even if the District Court sets aside or otherwise enjoins use of the 2007 Survey and Manage Record of Decision. This is because the Tracy Plan project meets the provisions of the last valid Record of Decision, specifically the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (not including subsequent Annual Species Reviews). Details of the project surveys are described in the appropriate resource section below, under Section 3, Affected Environment and Environmental Consequences.

In August, 2009, the BLM completed consultation with the United States Fish and Wildlife Service (USFWS), which addressed the effects of this project to northern spotted owls. The BLM received a Biological Opinion (BiOp) in October, 2009 (Tails # 13420-2009-F-0147).

1.6 Issues and Concerns

A variety of issues and concerns were raised during scoping by BLM's interdisciplinary team, and by the public during the scoping process. In this EA, an issue is something unique to the project area that may need particular consideration and which may contribute to defining a particular action alternative. The pertinent planning issues are:

The proposed mining area is within the riparian reserve (RMP p. 26) of Sucker Creek. Sucker Creek is designated as essential fish habitat (EFH) for Pacific salmon, under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (PL104-297).

The proposed Tracy Plan area abuts Sucker Creek, which contains Southern Oregon/Northern California Coasts (SONCC) coho salmon (*Oncorhynchus kisutch*), which are listed as threatened under the Endangered Species Act (ESA); Critical Habitat has also been designated for the species (73 FR 7816). The only Critical Habitat where activities that would be carried under the Tracy Plan would occur is in the pond where mining activities would begin. This area is not occupied by SONCC (See section 3.4, Fisheries and Aquatics for more detail).

Sucker Creek was listed as water quality limited for temperature for salmon and trout rearing, and migration by the Department of Environmental Quality (DEQ) (2004).

The proposed mining is within a designated 100- acre core area, a Known Spotted Owl Activity Center (KSOAC). KSOACs are reserved areas within the matrix land allocation, which retain 100 acres of the best habitat around known activity centers as of January 1, 1994 (RMP p. 55).

A number of issue and alternatives were considered, but not analyzed in detail. Information on this is found in Appendix C.

2.0 Proposed Action for Each Alternative

There are three alternatives under consideration for the Tracy Plan project. Alternative 1, the No-Action Alternative is described first and provides the comparative basis to taking action now by providing the decision maker and the public with an understanding of the condition in the absence of mining activity. The claimant's proposal for mining is described next and is labeled the Proposed Action (Alternative 2). The final alternative (Alternative 3) modifies the Proposed Action alternative and provides practices and specifications that reasonably minimize adverse impacts to certain surface resources (see section 1.3 above), and, "to prevent adverse impacts to threatened or endangered species, and their habitat which may be affected by operations" (43 CFR 3809.420 (b)(7)..

The EA interdisciplinary team developed one action alternative to the Proposed Action (the Tracy Plan as submitted), designed to meet the purpose and need identified in Chapter 1. In addition, a No Action alternative is presented to represent current conditions and trends, and establish a baseline for analysis. The No Action alternative also serves as a reference point in discussing project activity effects. Both action alternatives incorporate Project Design Features (PDFs) designed to reduce or eliminate potential effects from project activities.

The team developed the alternative based on the purpose and need of the project, and existing environmental conditions. Through the scoping process, the public provided comments that were considered by the interdisciplinary team and incorporated into alternative development to the extent allowed under the mining laws and BLM regulations for processing a Plan of Operations (43 CFR 3809—Surface Management; 43 CFR 3715—Use and Occupancy Under the Mining Laws).

2.1 Alternative 1: No Action

The No-Action alternative is defined as the absence of mining under this Plan of Operations. Under the No Action alternative, current management plans would continue to direct resource management in the analysis area and no plan-level mining operations would occur.

2.2 The Action Alternatives

2.2.1 Alternative 2—Proposed Plan of Operations

The following description of the claimant's proposal was prepared by the Bureau of Land Management using the submitted plan of operations, and an amendment to his plan, which was supplied following conversations with the claimant. The claimant proposes to use Forest Service Road 4612 from Caves Highway, and BLM Road 40-7-1 for access to his claim. The claimant would cross the creek with trucks and earth moving equipment to access the site across an existing ford. Heavy equipment would traverse the creek once to access the site, and be stored on-site until operations are completed. Pickup trucks would be used for resupply and to transport fuel, and would cross the creek approximately once every other day.

As measured by the BLM, the mine site for the project includes an area of alluvial rock rubble and sediment that is approximately 2.6 acres (See Appendix A, Maps) of alluvial materials adjacent to Sucker Creek. The mine site approximately parallels Sucker Creek, but the Tracy Plan proposed to exclude a minimum 20 foot buffer, as measured from the bank-full elevation. This buffer would vary from approximately 20 to 80 feet, horizontal distance, depending on site-specific conditions (e.g., a high bank on the north end of the project would extend the buffer beyond 20 feet). No mining would occur within the banks of Sucker Creek.

Mining would occur in two phases, and each phase would comprise about half of the total mining area. The first and second phases would each, in turn, consist of three steps: clearing and leveling, mining, and reclamation. Each phase is expected to take a year to complete. Phase 1, closest to the creek, will begin by clearing conifers, hardwoods, and understory vegetation, although the claimant will endeavor to retain many of the larger trees in the project area, particularly within 80 feet of Sucker Creek. Where feasible, the claimant would work between trees within the 20 to 80 foot buffer area, but leave the trees standing. The claimant could excavate up to the base of these trees. The large trees that would be removed outside of the buffer would be either pushed over with root wads attached, or stored onsite at a location recommended by the BLM, along with the stumps and other debris.

Topsoil would be removed and stockpiled onsite, at a BLM-specified location, for reclamation of the site after the operation is complete. Following site preparation, a tracked excavator and dump truck would be used to excavate, move, and process material from the placer deposit to bedrock, an estimated 10 to 15 feet deep. A preexisting excavated area (a pond) at the north end of the mining area would be enlarged to approximately 40 feet by 60 feet to accommodate a floating suction dredge with an 8 inch diameter intake and hopper. The pond may eventually be enlarged to 50 feet by 120 feet. The material would be put into a floating hopper, and material would then pass through the dredge and a sluice.

The hopper and suction dredge together comprise the on-site gold separation process. Waste rock from the dredge is discharged behind the dredge as the excavation proceeds. The operation will proceed south as the claimant excavates material on the south side of the pond and deposits material behind his equipment on the north side of the pond. The excavated area would "travel" south as the mining operation proceeds. Phase 1 would end at the south end of the Plan of Operations proposed area.

Pond water would be recirculated through the operating suction dredge during the gold separation process. Water that seeps into the pond from the existing water table exposed by the excavation will provide the water necessary to process the gravel. No water would be pumped to the pond and no water would leave the pond except through infiltration through the substrate and evaporation. The claimant's proposed water management plan consists of keeping water within the excavated pit in order to prevent an increase in turbidity in Sucker Creek. Monitoring by the claimant would assure that there will be no increase in turbidity in Sucker Creek. If any sediment from the site enters Sucker Creek, the claimant would stop immediately and take any measures necessary to remove the sediment source and institute a plan to prevent it occurring again. The claimant is responsible to assure that no sediment leaches into Sucker Creek. The only material removed from the site would be the gold and other collected valuable metals. BLM would also monitor the mining activities to assure compliance with regulations and stipulations in the authorization.

Phase 2 would involve the removal of the remaining trees and vegetation as needed within the proposed area, and placement in an onsite location specified by the BLM. Excess debris would be transferred to the area already worked through in Phase 1. Once cleared, the area will be leveled and processing would move north to the initial excavation site using the same methods as Phase 1. Reclamation would occur as detailed below in Activities Common to both Action Alternatives.

No hazardous materials or chemicals will be used to process the material and the fuel and oil will be stored away from the creeks and pit. If contamination does occur, the spill will be dealt with immediately by blocking seepage and/or removing spills from the site and appropriate authorities will be contacted. The ford crossing will be used only when necessary, once in and once out with heavy equipment, for the life of the project; crossing the ford with smaller equipment (pickup trucks) to bring in supplies and fuel would occur approximately every other day. Fuel would be secured in the back of the truck to prevent any potential of spilling fuel.

Reclamation of the site will consist of regrading and reshaping concurrently with new excavation during phases 1 and 2. However, some reshaping and replacement of woody debris would occur after the excavation is fully completed. Following recontouring of the site, the claimant would spread grass seed and plant trees and shrubs on the cleared site as specified by BLM resource specialists (e.g., silviculturalist, botanist). The claimant is also required to follow any stipulations in his state permits for remediation or reclamation, in concordance with BLM standards (see proposed reclamation activities below for details).

A seasonal shutdown would occur during periods when the soils are saturated and precipitation is common, and weather or high water makes operations impractical. The claimant proposes to leave the heavy equipment, dump truck, and dredging apparatus on site during the shutdown periods. Heavy equipment would be parked on the bench above high-water levels and the claimant would monitor site conditions to assure that no sediment or turbid water from operations enters Sucker Creek. If necessary, the mining pit would be partially filled or obstructed with logs or boulders to prevent high water flow transporting sediment into Sucker Creek. The claimant would notify the BLM and monitor site conditions during short-term periods when operations are shut down because of wet soils.

No permanent structures will be built, either for housing or to process gold. The claimant proposes to use two travel trailers as temporary living quarters during summertime mining operations north of the mining area on the west side of Sucker Creek in a level area. A small intermittent stream (12 to 18 inches wide), which ceases flowing shortly after precipitation events, would be filled with large cobbles (hardened) to prevent rutting out of the channel. The claimant would also harden the wet area that the claimant would cross on the access road to the claim with clean rock from onsite to prevent sediment from entering Sucker Creek.

2.2.2 Alternative 3—BLM Proposed Alternative

The BLM interdisciplinary team developed the following proposal to mitigate potential effects of the Tracy Plan as it was submitted, particularly, "…to prevent adverse effects to threatened or endangered species, and their habitats which may be affected by operations" (43 CFR 3809.402 (b)(7), and to meet DEQ standards for water quality.

Similar to Alternative 2, the Tracy Plan would be implemented in two phases, as described above, with the following modifications. Excavation for mining would not start in the preexisting pond near the north side of the Tracy Plan area; rather, excavation would begin south of that pond outside the buffer area, as described below.

Along Sucker Creek, a no tree-cutting or excavation buffer would be maintained where it parallels the mining activity site. While the buffer would vary depending on existing vegetation and other site characteristics (e.g., long, steep bank above the creek, tall trees), the buffer would range from approximately 40 feet up to 80 feet wide (as measured from the bank-full elevation), encompassing all tall conifers in the primary shade zone of Sucker Creek, as well as protecting the roots of trees that are providing primary shade from disturbance during mining activities. Variance in width would occur where the BLM determines it necessary to maintain the health and vigor of the trees in the primary shade zone (Appendix A, Maps).

The primary difference between Alternative 2 and 3 is that Alternative 3 would maintain a larger buffer. The intent of the larger buffer is to maintain trees within the primary shade zone (see Hydrology section for details). The buffer would range up to 80 feet wide where tall trees provide primary shade, but would be smaller in areas of small vegetation, where excavation closer than 80 feet would not remove primary shade. Because of the increased buffer size, the mining area would be approximately 1.8 acres in size, approximately 0.8 acres (31%) smaller than the mining area under Alternative 2.

2.2.3 Activities Common to both Action Alternatives

There are two high-flow channels in the upper half of the proposed mining area that are considered refugia for coho during greater than bankfull flows. These channels include some areas of contemporary placer mining activity such as remnant cobble mine tailings. Both alternatives would protect these channels with an approximate 20 foot buffer, leaving them intact because of their importance to the federally listed coho salmon found in Sucker Creek; the highest channel is greater than 80 feet from Sucker Creek.

There are conifers of medium (16-23.9 inches) to large (32-44.9 inches) diameter outside the buffer area that would need to be cleared by Mr. Tracy to accomplish his mining activities. If possible, trees would be pushed over into Sucker Creek as directed by BLM or excavated along with root wads and stockpiled at a location specified by BLM. Any trees that cannot be pushed over or dug up intact would be decked along with excavated stumps. Stockpiled trees would be stored for eventual placement on the reshaped floodplain and terrace, or for other reclamation activities such as placement of instream, large woody debris (LWD). Trees may be placed in Sucker Creek to provide refugia and habitat for fish. Large wood

is one of the most valuable habitat components to coho salmon (Solazzi et al. 2000) and is at inadequate levels in Sucker Creek due to past land practices (USDI BLM 2007).

Fine-grained mineral (sand and finer) and organic material would be removed and stockpiled separate from other material for reclamation of the site after the operation is complete. Fine alluvium would be stockpiled and bermed no deeper than 3 feet to help retain soil mycorrhizae function and thus accelerate soil recovery following reclamation (see Soils and Botany sections for further detail).

The following standards would be applied to reclamation operations.

> All areas disturbed during the mining operation shall be re-sloped and contoured to blend with adjacent natural topography, generally to match floodplain elevations. In addition, the operator shall stabilize stripped overburden by planting native grasses, shrubs, and trees to prevent long-term soil erosion, slumping and subsidence.

- Where available, sand, fine-grained silt, or loam should be placed over areas dominated by coarse rock at the surface.
- Using trees cut during clearing, place 12 to 15 pieces of coarse woody debris (CWD) per acre, having an average diameter of 20 inches and an average length of 20 feet. Some pieces would include whole trees. All pieces should be scattered throughout the mine site and if feasible, a variety of decay classes and tree species would be left.
- Slash left from tree removal would be piled in the cleared area near the stored logs.
- An appropriate mix and density of ponderosa pine and resistant Port-Orford-Cedar would be planted at an approximate 300 trees per acre (12x12 foot spacing) following completion of mining activities and CWD placement. Appropriate riparian hardwood species could also be planted for stream bank stabilization, if necessary, that would include, but is not limited to; red alder, red-osier dogwood, and willow species.
    - Resistant Port-Orford-cedar would be planted only above the high water mark. Annual monitoring would be conducted by BLM to evaluate the resistance of the planted Port-Orford-cedar.
    - Access road and any other site(s) subject to compaction would be decompacted to a depth of no less than 18 inches after all other work is completed. This may be carried out with an excavator.

2.3 Project Design Features

2.3.1 Soil Productivity, Hydrology, Water Quality and Fisheries

In areas that have direct connection to watercourses, the operator shall ensure that exposed surfaces (slope faces, stockpiles, and stripped overburden) shall be secured to prevent erosion, slumping (small landslide), or subsidence. Any combination of weed-free mulches or erosion-control structures may be used.

Equipment shall be prohibited from entering the streamside buffer along Sucker Creek except for ingress and egress to the mining site along designated routes.

Prepare a Spill Prevention, Contamination and Cleanup Plan when the Oregon Department of Environmental Quality requires such action.

Fuel and lubricant storage must meet State standards for minimum distance from a watercourse or water body.

Fill fuel tanks and change all machine fluids in fueling areas designated by the BLM.

All fuel and lubricant containers that are temporarily on site shall be placed in a spill catchment device. On-site absorbent materials will be kept on hand adjacent to storage facilities. BLM would provide a list of approved suppliers. Fuel spills must immediately be contained and cleaned up to minimize environmental damage, and BLM authorities would be informed of the spill.

Sanitation facilities would be located at a location specified by BLM. All human waste would be hauled off-site and disposed of at an acceptable facility.

2.3.2 Cultural Resources

A Cultural Resource Survey was completed in the Planning Area in July 2009. The survey revealed a cultural site located within the Plan of Operations. The site is related to historic mining and consists of tailings, a ditch segment, and an impoundment for water. The site was determined not eligible for inclusion on the National Register of Historic Places by a BLM archaeologist in August 2009. Concurrence will be received from the State Historic Preservation Office prior to signing of a decision and prior to any work being started by the claimant. If during project implementation any objects or sites of cultural value, not previously recorded, are located on federal lands, such as historical or prehistoric ruins, graves, grave markers, or artifacts, all operations shall immediately be suspended in the vicinity of the cultural value and BLM notified of the findings. Operations may resume at the discovery site upon receipt of written instructions and authorization by the BLM.

2.3.3 Botany

The miner would wash equipment before entering or leaving the site to prevent spread of noxious weeds.

Plant species used for revegetation would be native, from a local source (proper genetics), and weed free. BLM would supply native grass seed and a list of suppliers for additional plant material.

Mulch used for revegetation or erosion control shall be weed free.

BLM would monitor and if necessary, treat for noxious weeds for three years after operations are complete. Treatment methods will comply with the Medford District Integrated Weed Management Plan and Environmental Assessment (USDI 1998).

2.3.4 Port-Orford-cedar

All equipment (crew vehicles; heavy equipment; trucks; boots; and tools, including hand tools) would be washed prior to entry into the mining site and before leaving the mining site. This includes all equipment used in or around the infested stream channel.

All equipment would be inspected at an agreed-upon location designated by the BLM prior to transport to the mining site. Wash sites would be located in areas that will ensure wash water does not flow into existing stream channels, ditch lines, or areas with healthy Port-Orford-cedar.

- Water would come from a clean source (municipal or other off-site source free of *Phytophthora lateralis*) or be treated with Ultra-Clorox® bleach (Ultra-Clorox® at a rate of 1 gallon bleach per 1000 gallons of water) and will be used in a pressure washer or steam cleaner. The water source would be approved by the BLM before washing occurs. Washing is considered effective when all visible soil is removed from the equipment. The effectiveness of washing was studied and rated in the Siskiyou National Forest between 1994 and 1999 as being effective (USDI 2004 p.58). Washing minimizes the transportation of infested soil to uninfested areas (USDI 2004 p.36).

- A designated wash site would be established by the BLM for inspection of all equipment before leaving the mining site.
- There would be no Port-Orford-cedar removed from the mining site. If POC is cut down, the trees would be used on-site for down-woody debris or in-stream wood.

Port-Orford-cedar, if planted, would be disease resistant stock.

2.3.5 Wildlife

Work activities that cause disturbance above noise levels as stated below would not occur at specified distances from known spotted owl sites during the critical breeding period (March 1 to June 30 or until two weeks after the fledging period). Currently the nearest known nests are beyond these distances; however, if a new nest is discovered, the following restriction distances would be applied for each activity (BiOp Tails # 13420-2009-F-0147) to comply with the Endangered Species Act:

- Heavy equipment will not be used within 105 feet of spotted owl sites.
- Chainsaws, Impact pile drivers, jackhammers, and rock drills will not be used within 195 feet of spotted owl sites.
- Blasting (with 2 pounds of explosives or less) will not be used within 360 feet of spotted owl sites. Blasting (more than 2 pounds of explosives or less) will not be used within 1 mile of spotted owl sites.
- Habitat altering activities located within 1,000 feet of a spotted owl site will be delayed until September 30

These seasonal restrictions may be waived if protocol surveys completed by BLM find the activity center is not occupied, owls are non-nesting, or owls failed in their nesting attempt.

3.0 Affected Environment and Environmental Consequences

This section provides the basis for the comparisons of the alternatives and the reasonably foreseeable environmental consequences to the human environment of the alternatives for the proposed action. These consequences can be beneficial, neutral, or detrimental. This analysis considers both the direct effects that are caused by the action and would occur at the same place and time, and the indirect effects that are caused by the action but would occur later in time or offsite (40 CFR 1508.8).

These effects will be analyzed and described in context by describing and identifying what would take place if no action is taken, considering the present conditions on the land that were produced by past actions, and what effects are and will take place from other present and reasonably foreseeable future actions. This analysis of the effects of taking "no action" then provides the context for analyzing the "incremental effect" of taking action under each of the action alternatives, by then showing how the action alternative will change the conditions on the ground. This is the "incremental impact" that constitutes the "cumulative impact" as defined in CEQ's regulations. (40 CFR § 1508.7) ("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…"), and is consistent with the CEQ Memorandum of June 24, 2005 (see below) and 43 CFR 46.115. The temporal and spatial scales used in this analysis may vary, depending on the resource being affected.

As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the proposed action." A

description of current conditions inherently includes the effects of past actions and serves as a more accurate and useful starting point for a cumulative effects analysis than by "adding up" the effects of individual past actions. "Generally, 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." (CEQ Memorandum 'Guidance on the Consideration of Past Actions in Cumulative Effects Analysis' June 24, 2005.)

The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Following review of the guidance and examination of the proposed project, the team found that an exhaustive listing of past projects and speculation on the effects of each would not provide needed data to make an informed decision.

Information on the current environmental condition is comprehensive and more accurate for establishing a baseline condition for a cumulative effects analysis than attempting to establish such a starting point by adding up the effects of individual past actions. This would provide a list of effects without addressing the changes or improvement in conditions since the action originally occurred; unlike current conditions, past actions and perceived effects can no longer be verified by direct examination. Therefore, the affected environment and No Action effects sections for each resource considers the current condition as incorporating the effects of past actions, and then adds to this other present and reasonably foreseeable future actions. Following the Code of Federal Regulations and CEQ guidance, the effects sections add the anticipated effects of this project to the current conditions coupled with other present and reasonably foreseeable future actions. By comparing the "no action" alternative (current condition and other present and reasonably foreseeable future actions) to the action alternatives, we can discern the "cumulative impact" resulting from adding the incremental impact of the proposed action.

Unlike past actions, cataloging and analyzing other present and reasonably foreseeable future actions relevant to the proposed action *is* necessary and are summarized below. These actions are incorporated into the no action alternative descriptions in each resource section.

When encountering a gap in information, the question implicit in the Council on Environmental Quality regulations on incomplete and unavailable information was posed: is this information "essential to a reasoned choice among the alternatives?" (40 CFR §1502.22[a]). While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would not likely change relationships or conclusions. Although new information would be welcome, the team did not identify any missing information as essential for the Decision Maker to make a reasoned choice among the alternatives.

The planning team weighed the scientific evidence offered through public comments, as well as that gathered by each resource specialist. Environmental consequences of each alternative were analyzed utilizing the best scientific data available, knowledge of on-the-ground conditions, and professional expertise of each member of the planning team.

Watershed Overview/History

The following overview provides a context in which to analyze the effects of the Tracy Plan . This summary of the watershed and the future foreseeable actions provides a 'big picture' look at the watershed, puts the project into perspective, and allows for comparison of the action alternatives with the no action alternative (existing conditions).

Fifth Field Watershed: The Tracy Plan (2.6 acres) would occur on and around Mr. Tracy's mining claim, which lies in the Sucker Creek 5th field watershed (62,496 acres). BLM manages 5,801 acres (9%)

within the watershed. Approximately 3,800 acres (66% of the BLM land) are in the matrix land allocation and 2,000 acres are in late-successional reserves (LSRs) (34% of BLM).

Approximately 407 acres are nonforest (e.g., shrub, nonvegetated, or dominated by hardwoods). Of the remaining 5,394 acres, 38 percent is allocated to Deer Creek Late Successional Reserve (LSR), and/or Riparian Reserves for wildlife/fish species and water quality protection.

Of the remaining land base in the watershed, 44,147 acres (71%) are managed by the Forest Service, and 465 acres (<1%) are managed by the National Park Service. The remainder (12,082 acres) is in private, state, or county ownership (19%). (USDI BLM 2007)

Watershed Analysis Report: The Sucker Creek Watershed Analysis (2007) describes the events that contributed to the current condition such as early hunting/gathering by aboriginal inhabitants, mining, road building, agriculture and water diversions, wildfire, and timber harvest. Note that a Watershed Analysis is not a decision document.

Sucker Creek Watershed: Timber harvest on BLM lands began in the mid-1950s, peaked in the 1970s, and declined in the 1990s. Since 1950, a total of 3,000 acres have been harvested on BLM lands, representing 4% of the watershed, and 42% of forested BLM lands. Of the 3,000 acres harvested, 276 (2.6% of BLM lands; 0.4% of the watershed) have been harvested since 1990. Approximately 1,300 acres were even-aged harvest (clear-cut, overstory removal, seed tree, etc.) and the rest are a varied mix of partial cuts (1,700 acres). The Tracy Plan area, as well as the surrounding area was historically placer mined to a relatively shallow depth in the mid to late 1800s. A section of the Plan area has evidence of contemporary placer mining, which occurred during the 1990s; this is an area on the north end of the claim that is bare of vegetation and totals approximately 0.5 acres. Another section in the vicinity of the high-flow channels and Sucker Creek was also placer mined during the 1990s; this area is outside the area of operations that would occur under the Tracy Plan.

On Forest Service lands, approximately 12,000 acres have been harvested since 1950; approximately 800 acres (1.3% of the watershed) have been harvested since 1990 with 68 acres treated since 2000. The Forest Service acre summary overestimates the acres treated across the landscape as many units were treated twice (e.g. shelterwood cut followed by partial cuts). The Forest Service treatments accurately reflect past history, but the total acres overestimates the spatial extent of treatments.

<u>Foreseeable Actions:</u> Both the BLM and the U.S. Forest Service are planning young plantation thinning within the Sucker Creek watershed. BLM proposes to treat 194 acres in young stands (<80 years old), reducing fuel loading and canopy bulk density. The Forest Service is planning approximately 1,886 acres of thinning in stands 80-years old and less, 300 acres of fuels reduction treatment, and 200 acres of pre-commercial thinning. Private industrial lands are expected to continue with rotational harvest.

While it can be assumed that O&C lands in the project area will continue to be managed for timber production, no additional timber sale or other vegetation treatment activities are projected to occur in the watershed on federal lands in the next five years.

BLM proposes to improve aquatic habitat in Sucker Creek through instream placement of large wood and boulders under the Althouse Sucker Landscape Management Project. The Forest Service is in the midst of a large-scale restoration project on Sucker Creek north of this project area. The work includes adding meander, large wood, and off-channel habitat.

Rural development across the watershed has modified the landscape and ecological processes through construction of new homes and roads, and water diversions and well drilling which has disrupted hydrologic processes and further fragmented the landscape

Past and reasonably foreseeable projects in the Sucker Creek watershed include BLM's Althouse Sucker project which spans both the Althouse and Sucker Creek watershed (EA #OR117-07-02). This project proposed up to 319 acres of regeneration harvest and 106 acres of commercial thinning/group select harvest; 1,156 acres of fuel hazard reduction; and up to 608 acres of restoration thinning in the Sucker Creek watershed. However, no final decision has been made on this project at this time, and the actual decision could be significantly less.

There are approximately 40 to 50 active mining claims along an 8-mile stretch of Sucker Creek from California Bar (T40S,R7W section 1) south to where Sucker Creek enters the Red Butte Wilderness, and is the area of the watershed that is withdrawn from mining (T41S R6W, sections 4 and 31). A Plan of Operations was recently submitted for the Bean Mining claim, approximately 0.5 mile to the north. The planned area of excavation is approximately 2 acres, The project would occur in an already disturbed area with little vegetation, so there will be minimal effects on vegetation and shade for Sucker Creek, and except for an authorized diversion from Sucker Creek, all activities would occur above the high water mark for Sucker Creek. A detailed EA will be completed for this project before any activities area authorized.

One future activity that is reasonably certain to occur within the project vicinity is small scale suction dredging on both private and BLM lands. On BLM lands, use of a small (≤4 inch diam.) suction dredge by a claimant is classified as "casual" level mining and does not require permission or authorization by the BLM, although state permits are required; no scheduled monitoring is done for these activities. There are no other known proposals or reasonably foreseeable mining operations that exceed casual use in the watershed. No notification is required for casual use, but effects of "casual use" mining are anticipated to be minimal (43 CFR 3809.5).

Recent Past Actions

The effects of other present and reasonably foreseeable future actions that are not dependent on any of the action alternatives are:

1) In 2008, the Boswell Fire burned 54 acres (21 acres of plantations) at high severity levels on steep slopes on the same side of Sucker Creek as the Tracy Plan area. The fire burned to within 100 feet of the proposed mining area. This area has subsequently been replanted to BLM silviculture standards, but planting success has been marginal.
2) In 2008 thru present, an area on private property approximately 1.3 miles to the north and 2 acres in size experienced a combination of mining and stream restoration, resulting in loss of vegetation and soil. The topsoil is stockpiled on site for subsequent remediation / restoration.
3) In 2009, Indian Hill LLC was approved for building a 430 foot road across BLM land to access their land in T40-7W-13, approximately 2 miles to the south. There were no logging plans submitted by Indian Hill, so activities and effects of future activities are unknown.
4) In late 2009, there was loss of trees and soil development on a Tracy US Forest Service managed mining claim site, total approximately 1 acre, approximately 3 miles to the south.

The claimant has implemented two notice-level projects (43 CFR 3809.10 (b); 3809.21), totaling < 5 acres on Sucker Creek on both sides of the channel north of this proposal. The original Notice, on the west side, was completed in an historically mined area on which the Grants Pass Resource Area completed a stream restoration project in 2004; the restoration project included addition of large woody

material, opening up of high water refugia and tree planting. The latter mining project, on the east side near the ford crossing, is still active although the claimant has completed mining activity; reclamation is not complete. Prior to the Notice, the area was bisected by the road and had early seral development of mostly young alder and big leaf maple trees and some mid seral conifers. Under both Notices, the claimant removed the surface vegetation up to the stream buffer, excavated ponds down to bedrock and processed the material through an 8-inch suction dredge in a manner similar to his current proposal in this EA. Both operations were on the same claim as this plan. There were minimal effects on large trees, and the areas were previously disturbed by mining operations, so there were minimal effects on soil development processes; i.e., the area is similar to predisturbance conditions, except as noted in Soils and Hydrology sections below. Neither of the ponds he created are known to have leaked sediment subsurface through the soil into Sucker Creek.

Other conditions in the watershed that may contribute to cumulative effects for any particular resource are included in the Affected Environment section for that resource.

The following were found not to be affected by the proposed action or alternatives: air quality; Native American religious concerns; prime or unique farmlands; wild and scenic rivers; and wilderness. As the project is only expected to provide minimal employment, the value of mineral extraction is unknown, and because of the site's isolated location and small scale (<0.005% of the watershed), there are no expected effects on social aspects (e.g., recreation, tourism, societal costs from habitat degradation or vegetation removal) in the region, there are no expected socioeconomic effects. The proposed mine area is within the Source Water Assessment Area for Cave Junction. There are no expected effects on water quality that would affect the domestic water source for Cave Junction or the surrounding area.

3.1 Vegetation

3.1.1 Affected Environment

The Sucker Creek 5th Field Watershed is 62,496 acres, 9% (5,801 acres) of which is in BLM ownership (USDI 2007). Historic harvesting in the watershed occurred on a limited basis from 1851 until 1945. In 1945, harvesting became mechanized, which allowed for larger scale operations. This proceeded until 1990, when operations were significantly reduced for protection of the northern spotted owl (USDA 1995, 8). This activity, coupled with past mining practices and fire suppression has influenced the vegetation on the landscape today.

The area in the proposed Plan of Operation is located entirely in the riparian reserve. The adjacent, upland plant association is Tanoak-Douglas-fir-Canyon live oak/Dwarf Oregon grape (LIDE3-PSME-QUCH2/BENE2). This plant association occurs on Josephine gravelly loam (48F) soil and has the highest species richness for the tanoak series (USDA Forest Service 1996a).

By observing and comparing the upland and riparian plant associations, this portion of the watershed appears productive with well stocked stands. Riparian zones are typically more fertile than the uplands as there is more moisture available and the temperature is generally cooler. This is indicative with a higher basal area, 200-280 square feet per acre, verses the uplands having 140-220 square feet of basal area per acre. However, in this case previous mining has depleted some spots of the riparian area of mineral soil (observed during a site visit), leaving mine tailings consisting of cobbles and rock instead of productive soil.

The upland portion of the watershed is an important indicator for describing the vegetative landscape because it provides the seed source for which natural seedlings will come from for establishment. The average tree size in the upland is 22 inches diameter at breast height (DBH). Douglas-fir dominates the

overstory vegetation layer with a few sugar pine intermixed. Two vegetation plots were taken in the upland portion of the project area (Table 1). There is a very small middle layer of vegetation composed of Douglas-fir, tanoak, canyon live oak, and Pacific madrone. The understory layer of vegetation is dominated by tanoak and canyon live oak, with ground cover consisting of dwarf Oregongrape, red huckleberry and western sword-fern. The upland has good production potential with a site index of 130 for Douglas-fir (USDA 1983, 67)[1]. This same soil was historically in the riparian area; however, historic mining practices have depleted the riparian area of mineral soil as observed during a site visit.

Table 1. Upland Plot Data

	DBH (inches)	Species	Height (feet)	Age (years)	Basal Area (ft^2/ac)	Aspect
Plot 1	34.3	Douglas-fir	132	173 (estimate)	140	E
Plot 2	20.3	Douglas-fir	111	118	220	NE

Visual observations of historic mining practices have demonstrated an impact on the current vegetation in the riparian area. Mine tailings were dumped in the flood plains and occasionally reworked and left (USDI 2007). The mine tailings are composed of rock and cobble. It takes decades for organic matter to build up enough to support vegetation on these tailing piles; this is evidenced by a lack of trees growing on these mine tailings. If the soil organic matter is not in balance, consisting of the appropriate nutrients, soil productivity decreases. This means that when the soil is removed, stockpiled, and then replaced, there will be a net loss of nutrients from the site (Grier et al. 1989). Trees require sunlight, water, certain mineral nutrients, suitable temperatures, oxygen, and carbon dioxide in order to grow (Oliver and Larson 1996, 21). Organic matter is critical to soil productivity because it influences the water-holding capacity, aeration, drainage, and cation exchange within the soil (Jurgensen et al. 1996). Trees require nutrients to be readily available in the upper horizon of the soil profile where the trees' fine roots reside. The fine roots extract the nutrients from the organic matter in this upper soil horizon (Oliver and Larson 1996). Along with nutrients, mycorrhiza is also found in organic matter. Mycorrhiza is an important symbiotic fungi that unites the plant with the soil. The mycorrhiza helps the plant take in more minerals from the soil (Miller et al. 1985). When the soil is stockpiled, mycorrhiza survival is threatened. One study shows that vesicular-arbuscular mycorrhiza survival is related to the soil-water potential under which the soil is stored (Miller et al. 1985). This study also explains that arid environments could allow larger (deeper) stockpiles than mesic environments, while still maintaining mycorrhizal health. This is important because the project area is in a mesic environment, not conducive to large stockpiles (USDA 1983). A shortage of organic matter on the site is evidenced by a lack of vegetation observed in previously disturbed mine tailings. However, through time, these disturbed areas do begin to recover as evidenced by the standing trees currently in the previously mined area. The riparian plant association is Tanoak-Port Orford cedar/Vine maple (LIDE2-CHLA/ACCI). Two more plots were taken in this area (Table 2). The mean overstory tree cover is among the lowest in the tankoak series (USDA1996b). Douglas-fir is the dominant tree species in the upper vegetation layer with a small component of Port-Orford-cedar. There are also a few big hardwoods in the upper layer. The middle and lower vegetation layers are dominated by tanoak and or hardwoods. Ground cover is vine maple, dwarf Oregongrape, and western sword-fern. As evidenced by these plots, stand age is approximately 115 years old, but the stand also includes older remnant trees.

[1] Site index is tree height at a specified index age, such as 20, 25, 50, 90, or 100 years. Site index is a key variable in estimating potential productivity of forest stands through the use of yield tables (Bell 2002).

Table 2. Riparian Plot Data						
	DBH (inches)	**Species**	**Height (feet)**	**Age (years)**	**Basal Area (ft^2/ac)**	**Aspect**
Plot 3	32.0	Douglas-fir	162	116	280	Riparian
Plot 4	28.3	Douglas-fir	150	114	200	Riparian

The presence of *Phytophthora lateralis*, a deadly root disease, is well established, with approximately three to five dead Port-Orford-cedar trees per acre in the project area. *Phytophthora lateralis* (PL) is a root pathogen that predominantly spreads through waterborne spores and infested plant material or soil. PL has been known to spread through root grafting, although it is uncommon (Zobel et al. 1985). During a site visit, trees in the upper, middle, and lower vegetation layers were observed to be dead. On this same visit approximately 16 Port-Orford-cedar trees per acre were observed to be alive (seedling to mature).

3.1.2 Environmental Consequences

Alternative 1: No Action

Sucker creek has a long history of mining activity dating back to the 1850s. Please refer to the affected environment of soils for historical mining impacts to the soil. That information is directly correlated to the vegetation productivity. The vegetation in the area of the proposed Plan of Operation would continue to adapt and grow in the historically mined environment. Regeneration has, and would continue to develop from adjacent seed sources. Successional processes and soil development would continue at their current rates. This means soil productivity would improve through time. However, Port-Orford-cedar populations would continue to decline as the level of PL persists. Stands that are currently infected with PL would continue to spread the infection downstream and possibly uphill through root grafting. These stands would continue to provide a source of spores that could be spread to other uninfested stands. Large, live Port-Orford-cedar would continue to be affected by, and potentially lost from, plant communities. Habitat quality and diversity would continue to be degraded as the infestations continue. Among other mining claims along Sucker Creek, the only Plan of Operations received to date is downstream from the project area and will not have any direct or cumulative effects to this Plan of Operation on vegetation.

Alternative 2 – Proposed Plan of Operations

The proposed Plan of Operations could potentially cut all existing conifers, hardwoods, and understory vegetation outside of the buffer along Sucker Creek, an area of approximately 2.6 acres. This buffer would vary from approximately 20 to 80 feet depending on site-specific conditions (e.g., a high bank on the north end of the project would extend the buffer beyond 20 feet). The claimant would attempt to retain many of the largest trees in the project area, but would remove them if they interfered with operations. If the heavy equipment gets too close to the drip line of the buffered trees, the roots would be impacted by excavation or the weight of the equipment. Oxygen and water are two of the factors essential for tree growth. Soil compaction would reduce aeration in the soil and would restrict water movement, causing a reduction in root growth (USDA 1983 p.68). If activities result in too much stress to these tree roots, trees would have decreased vigor, and be more susceptible to insects and disease, and potentially mortality could ensue. An estimated 90 conifers would be removed if no trees are retained outside of the 20 foot buffer. There are also several hardwoods greater than 16 inches DBH in the area of planned operation area. Removing conifers and hardwoods would impact future snags in the riparian area. Without snags in the riparian area, the potential of large wood recruitment into the creek in the future would be limited.

After the trees are removed, topsoil would be stockpiled (see Soils Affected Environment for a description), and remaining soil would be dug out down to the bedrock and processed as described in section 2 of this EA. The ability of microorganisms to survive in a stockpile is dependent on a more negative soil-water potential. In mesic environments, it is suggested to stockpile soil in shallow piles with water potentials below (more negative than) –2 millipascals (MPa) (Miller et al. 1985). Shallow stockpiles will give mycorrhiza the best chance for survival. Productivity of the stockpiled soil will go down if the soil retains too much moisture (greater than –2Mpa). The soil, when moved back to its original location, would be less productive than its virgin state because the organic matter would be mixed into the substrate as it is moved to and from the stockpile location, raising larger aggregates and subsoil near the surface (Lal R. 2005). If the organic matter is inaccessible or insufficient for tree establishment, the result would be stunted growth or reduced establishment following rehabilitation of the site. Poor soil productivity would stunt growth or result in establishment failure.

Alternative 3 – BLM Proposed Alternative
The effects of removing all conifers, hardwoods and understory vegetation would be similar under this alternative as it was described in Alternative 2, but to a smaller scale because of the increase in the size of buffers. Alternative 3 would affect approximately 1.8 acres, and cut fewer trees; therefore, less soil would be dug out, moved, and stockpiled. Because of the increased buffer size, the in-stream snag recruitment would be better under this alternative than under Alternative 2.

Summary and Conclusions
Site visits to the planned area of operation indicate a lack of tree establishment in areas of mine tailings and slough pits. The removal of soil, organic matter, and subsequent alterations of the soil structure would result in reduced soil productivity. However, the trees currently on site, at approximately 115 years, are an indication that the soil productivity is recovering over time. What is not known is exactly how long it will take the site to make a full recovery from the cumulative effects of placer mining through multiple centuries (Bernell et al. 2003), or to recover from those historical effects with the additional impacts from operations under either Alternative 2 or 3. Based on the current vegetation growth of this site as well as other recovering sites, it will likely take 100 years or more to see the riparian stand fully vegetated.

3.2 Soils

3.2.1 Affected Environment

The Tracy Plan area is within the Illinois River sub-basin, a tributary of the Rogue River. The area is located southeast of Cave Junction, Oregon. The proposed mine site is entirely within the riparian reserve. About two thirds of the project area is in the floodplain including old tailing piles.

Soils
In the Sucker Creek watershed, soils are formed from Klamath Geologic Province andesitic and dacitic and old volcanic rocks in upper slopes of the watershed; melange rocks (mixed mafic) intermixed with serpentinized ultramafic rocks mainly in the mid to lower slopes of the watershed; and the broad valley bottom of mixed alluvial material between Holland and the mouth of Sucker Creek (USGS, Geologic Map of Klamath Mountains, California and Oregon, Irwin W.P., 1994). The soil on slopes adjacent to the project area is Josephine gravelly loam (48F). This soil type is deep and well-drained and formed in colluvium derived from altered sedimentary and extrusive igneous rock. There are no soils or rocks in the project area or its vicinity that would generate acid runoff water.

Alluvial deposits in the area of the proposed mine site were placer mined from the mid 1800s into the 1900s. The upper earth materials in the project area are old mine tailings. The mine tailings are a mix of

displaced alluvial material consisting of rounded cobbles, boulders, and gravel with pockets of fines. This material is not technically soil but soil development has been ongoing for roughly 100 years. This material is generally deep, extremely well-drained and is highly permeable. However, bedrock depth may be variable. The surface is undulating due to past mining, excavating, and piling activity. A layer of moss covers cobbles and boulders at the surface.

The south margin of the site consists of recent alluvium, loamy sand mixed with 0 to 35% gravel that occurs at depths of 0 to 18 inches. The margin covers about 20 percent of the site. This alluvium also occurs in low spots between tailing piles. Soil development is in beginning stages.

Productivity
Though there is little soil, vegetation has reestablished in the form of conifers and hardwoods. Organic matter is accumulating. Along with nutrients, mycorrhizae are found in organic matter and associated mineral particles. Mycorrhizae are important symbiotic fungi that unite the plant with the soil and help the plant take in more minerals from the soil (Miller et al. 1985). Larger conifers, greater than 30 inches DBH, are on the site, although mine tailings have very low productivity because it is composed of stones and very few fines. The closest designation in the Soil Survey (USDA Soil Conservation Service (1983) would be a spot symbol for "very stony spot." Very stony spots are not soil and have no interpretive information in the Soil Survey. Using Douglas fir as a standard, site index (see Vegetation Effects section) is estimated to be less than 70 on mine tailings but much higher in the recent alluvium, estimated to be 130.

3.2.2 Environmental Consequences

Alternative 1 – No Action
Under the No Action alternative the present environmental conditions and trends would continue. Soil would continue to form at current rates and there would be no loss of site productivity at the site.

Effects Common to all Action Alternatives
The primary mechanism of impacts to the existing site from mining is the overall disturbance and displacement of alluvial materials on the landscape of the riparian reserve. There would be loss of vegetative cover, loss of the organic cover by the complete disturbance and displacement of vegetation and soils, and the subsequent exposure of raw alluvial materials. This would reduce organic matter, cause loss of microorganism populations, and cause displacement and loss of the fine materials. Natural soil development process would restart at time zero; however, stockpiled and replaced fines with some organic matter, as required in Project Design Features (PDFs, section 2.3) would help to generate better productivity in a shorter term than if none were stockpiled and replaced. PDFs call for the stockpiling topsoil in berms no more than three feet high. When soil is stockpiled, mycorrhizae survival can be threatened. Research shows that vesicular-arbuscular mycorrhizae survival is related to the soil-water levels under which the soil is stored (Miller et al. 1985); they survive best in dry conditions. This study indicates that large stockpiles of topsoil in mesic environments, as in the project area (USDA 1983), are likely to lose populations of mycorrhizae. Shallow stockpiles would be driest and therefore give mycorrhizae the best chance for survival.

Even with this PDF, assuming mycorrhizae would survive, coupled with a reclamation stipulaton of regrading the surface, the net effect would be a reduction of productivity because there would be a net loss of organic matter and fine alluvial loamy sand. This is because in the working process of large equipment organic matter is masticated and either oxidized or lost through mechanical displacement. In addition, there would not be enough stockpiled fines to cover the disturbed site at sufficient thickness (at least 12 inches) to generate productivity to its current level. It is estimated that productivity would be

roughly half of its current level for the site (an average site index for Douglas-fir would be less than 70) based on the resulting lack of soil depth.

Compaction would increase where the existing access road is improved. Generally, soil bulk density and strength increases with compaction, while permeability (i.e., water infiltration rate) decreases with compaction (Lovich and Bainbridge, 1999). Soil compaction may become evident after only a few vehicle passes. In fact, Iverson et al (1981) found that soil bulk density increased logarithmically with the number of vehicle passes. Therefore, the access will increase compaction; any recovery from past compaction will be eliminated; and recovery would restart upon completion of the mining operation. However, the reclamation plan will include decompaction of all compacted areas. Table 3 below, summarizes effects to soils for each alternative.

Table 3. Summary of Effects, by Alternative, to project area riparian reserve soils

Alternative 1 No Action	Alternative 2 Claimant's Proposal (Impacted area = 2.6 acres)	Alternative 3 Agency's Proposal (Impacted area = 1.8 acres)
Maintain existing productivity. (continue natural soil development process)	Loss of productivity on 2.6 acres of riparian reserve due to: Loss of organic and humic layers Loss of soil biological community Restart soil development process Possible bank failure along the southern portion of Sucker Creek	Loss of productivity on 1.8 acres of riparian reserve due to: Loss of organic and humic layers Loss of soil biological community Restart soil development process

Alternative 2

There would be loss of productivity on 2.6 acres of riparian reserve soils (see description above under Effects Common to all Action Alternatives). This would result in a restart of the soil development process and thus loss of existing soil productivity.

Under the claimant's proposal, the claimant would attempt to retain some large trees within 80 feet of Sucker Creek, but excavation would occur up to the base of each tree, therefore loss of trees is likely, due to expected loss of over a third of their root systems. This would remove much of the root strength, and over time, likely cause many of the trees to fall over. Thus, where trees are close to Sucker Creek, at 20 to 30 feet for the stream bank, existing root strength in the banks would be reduced, resulting in potential bank failure especially in the northern portion (approximately 500 feet) of the proposed mining site where the thalweg (Thalweg is deepest part of the stream channel, generally where the highest energy of stream flow is located (Rapp C. 2003)) is directing stream energy towards the bank; this would tend to undercut the high bank (Rosgen D. 1996). The existing root strength is especially important at this end of the project because of the high bench of tailings, which prevents lateral spread at high stream flows, and the limited vegetation growing in this area as compared to the upstream end. As roots decay, root strength would be lost, and portions of the high steep bank could slide into Sucker Creek. This would likely occur one root zone at a time, affecting approximately 15 to 30% of the length of the high bank.

Alternative 3
There would be a loss of productivity on 1.8 acres of riparian reserve soils (see description above under Effects Common to all Action Alternatives). This would result in a restart of the soil development process and thus loss of existing soil productivity.

Alternative 3 would increase the width of the buffer along Sucker Creek, and overall disturbance would be reduced by 0.8 acres. As in Alternative 2, the bank in the downstream portion of the proposed mining site would be most unstable during flood flows. However, the larger buffer would result in greater residual root strength protecting the banks from stream thalweg energy (Rosgen D. 1996). Therefore, the extra buffer width would deter banks from eroding and the subsequent shifting or widening of Sucker Creek (Rosgen D. 1996). This would be the same as for the No Action alternative.

Summary and Conclusions
Both action alternatives would result in reduction of productivity of the site due to loss of soil and restarting of soil formation in the area of old tailings; however, Alternative 2 would result in loss of 2.6 acres, while Alternative 3 would result in loss of 1.8 acres. Alternative 2 would result in possible bank failure along the northern portion of the mining area while Alternative 3 would not.

The size of the work site, 2.6 or 1.8 acres, is small. Existing cumulative effects of the area's soil productivity amounts to less than 5% of the, 17,583 acre, Middle Sucker, subwatershed is affected by compaction at the 6th field scale, assuming that Althouse Sucker Landscape Management Project is complete (USDI BLM. 2008). While the local effect would be to restart soil development process, the small size of affected sites for either action alternative makes the addition to existing cumulative effect of reduced soil productivity nominal. Coupled with other projects in the watershed, including other mining and logging activities along Sucker Creek, these projects would result in a maximum of 0.1% of the area with a loss of site productivity across the Middle Sucker 6th field subwatershed. The total remains at less than 5%.

3.3 Hydrology

3.3.1 Affected Environment

Background
The Sucker Creek watershed area has a Mediterranean climate with cool, wet winters and warm dry summers with snow melt runoff accounting for very little flow. Most of the precipitation occurs between November and March. Summer months are hot and dry as the Pacific high pressure system dominates the region. Average annual precipitation in the Sucker Creek watershed ranges from approximately 52 inches in the lower elevations to 72 inches at the northeastern watershed divide. Rainfall averages approximately 62 inches per year at the proposed mining site.

The elevation at the site is approximately 2,040 feet with the elevation of the ridge above the site reaching 2,960 feet. Elevation in the Sucker Creek watershed ranges from approximately 1,400 to 6500 feet.

The Tracy Plan area is within the Illinois River Subbasin, a tributary of the Rogue River. The area is located southeast of Cave Junction, Oregon. There are four main factors that could be affected or that influence the how operations under the Tracy Plan would affect hydrologic conditions. These include channel morphology, stream temperature, riparian conditions, and erosion.

Erosion
Soil erosion is a natural process that, when in balance, is offset by soil formation. The rate of natural erosion is controlled by climate, slope, the physical properties of the soil and the vegetative cover. Part of

the natural process includes periods when there is an imbalance between soil erosion (e.g., landslides and gullies) and formation. Once the balance between the controlling factors is disturbed, the soil erosion rate may far exceed its natural rate.

As soil compaction increases, a soil's ability to support vegetation diminishes because the resulting increases in soil strength and changes in soil structure (loss of porosity) inhibit the growth of root systems and reduce infiltration of water (Harr. 1976). As vegetative cover and water infiltration are diminished or disrupted, the precipitation runoff rates increase, further accelerating rates of soil erosion.

On the east side of Sucker Creek opposite from the proposed project area, there is an eroding bank below the road (40-7-1). The roadbed is very close to the channel laterally and it is approximately 15 feet above the creek. On the uphill side of the road the slope is steep and close to the roadbed, which is why the road is so close to the creek. While the road may have increased the rate of erosion, the steepness of the hillside combined with the large bedrock outcrop on an outside bend is probably the main cause of this erosion.

Riparian

The proposed Tracy site has experienced mining activity throughout the past 150 years that have removed vegetative and duff cover, with the subsequent loss of the organic soil horizon layer. The mining was performed by human power, which limited the degree of disturbance to the site. Consequently there has been recovery to the riparian forest and development of duff and organic layers. In addition, the upper portion of the site has been accessible to flood flows allowing for the addition of sediments. However the site has not returned to its pre-disturbance condition because the mining activity disturbed the physical, biological and chemical characteristics of the riparian area, resulting in lower productivity.

In Sucker Creek, undisturbed riparian areas are generally comprised of late-seral woody vegetation communities that are mixed hardwood but conifer dominated. (DEQ, 1999).

Channel morphology

The Sucker Creek watershed has steep slopes, narrow canyon bottoms and incised streams that are products of glacial processes and uplift. In the area of the proposed mine site, the channel is transitioning from the steeper headwaters at 5-15% gradient, into a milder 1.5-2.5% gradient, although there are short stretches that are slightly steeper (ODEQ 1999). Surface water in the Tracy Plan area includes ditches, wetlands, and ponds, although only the creekside pond is considered a wetland, because of associated wetland plants. Sucker Creek is a perennial stream, and the channel is a Rosgen C3-F3 type, with a cobble and boulder substrate and is moderately entrenched and confined (Rosgen 1996).

In the upstream end of the site, the floodplain terrace is inundated approximately every 2 to 5 years, while in the middle and downstream portion the terrace is many feet thick and perched above normal flood levels based on calculations from peak flows,(USGS gaging station data).

The hydrologic regime reflects the impacts of settlement over the past two centuries. Road construction, timber harvest, mineral extraction, land development, and water withdrawals are the major factors that can potentially affect the timing and magnitude of peak and low stream flows. In 2008, there was an 54 acre fire north and west of the proposed mining site in an area that had been harvested in the late 1990s. There is also an 80 acre area that was harvested approximately 20 years ago that is immediately north of the burned area. Other than these events, there has not been any timber harvest or fire in the project area in the last 30 years. A watershed is generally considered hydrologically recovered 25 years after timber harvest (Kochenderfer and Wendel 1983; Guthrie 2008); therefore, the area immediately around the proposed mining site is not hydrologically recovered, although substantially all the entire upper watershed is because all activities in the upper watershed occurred over 25 years ago (Keppler et al. 2009).

Peak flows vary by year and are dependent on annual rainfall. Large peak flows of record such as 1955, 1964, 1974, and 1997 result from rain on snow events. Summer low flows are much lower than average winter flows largely due to precipitation patterns in the Pacific Northwest.

Stream Temperature

According to the Grayback/Sucker Key Watershed Assessment (USDA USFS 1995), summer low flows are not adequate to accommodate all beneficial uses. Summer water temperatures in the lower reaches of Sucker Creek are outside of the historic range and can be lethal to salmonids. Fish habitat in the lower reaches, which should be areas of high productivity, is deficient of large wood, high quality pools and side channels. Timber harvest and fire suppression have shifted the old-growth and late-successional forests to the higher elevations. This has resulted in a reduction in large conifers along the creek, delaying the long-term development of a large wood source (USDA USFS 1995).

The BLM completed a Water Quality Restoration Plan (WQRP) in 1999 as part of a watershed level strategy for protecting stream temperatures and aid the future recovery through active and passive restoration of streamside shade. Sucker Creek was placed on the DEQ's 303(d) for temperature because the agency considers a stream to be impaired if the seven day moving average of the summer daily maximum exceeds 64°F (17.8°C) year round for salmon and trout rearing and migration, 64.4°F for summer salmon rearing, or 55°F (12.8°C) from October 15 through May15 in waters that support salmonid spawning, egg incubation and fry emergence.

In 1999, the Upper Sucker Creek Water Quality Management Plan (WQMP) was completed for stream temperature within the lands managed primarily by the U.S. Forest Service and BLM. After the approval of the WQMP, which constitutes the total maximum daily load (TMDL), Sucker Creek was removed from the 303(d) list because, as part of developing a TMDL, there is an assumption based on specific plans in a WQMP that the watershed will attain water quality standards (i.e., no actions would increase water temperature). The TMDL includes load allocations and the responsible parties are to meet these allocations through compliance with strategies developed in implementation plans. These measures must achieve and maintain water quality standards and restore waters of the state that are water quality limited (OAR 340-042-0025). Table 4 shows 7-day average of the daily maximum temperatures (°F) recorded on Sucker Creek by the BLM downstream of the proposed mine site. During the monitoring period, Sucker Creek's temperature exceeded the 64°F criteria in seven of the eight years.

Table 4. Sucker Creek 7-day Maximum recorded temperature: 1998-2005* (°F)

Year	Day1	Day2	Day3	Day4	Day5	Day6	Day7
1998	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul
	65.2	65.2	65.2	66.1	66.1	66.1	64.4
1999	23-Aug	24-Aug	25-Aug	26-Aug	27-Aug	28-Aug	29-Aug
	60.1	62.7	62.7	62.7	61.3	63	62.1
2000	30-Jul	31-Jul	1-Aug	2-Aug	3-Aug	4-Aug	5-Aug
	65.8	66.7	66.4	65.2	65.2	64.9	64.9
2001	7-Aug	8-Aug	9-Aug	10-Aug	11-Aug	12-Aug	13-Aug
	66.9	67.5	67.8	67.5	66.4	66.7	65.8
2002	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul
	66.7	65.2	66.1	65.2	65.2	65.2	64.9
2003	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug
	64.7	65.6	65.9	66.8	67.4	67.1	65.9
2004	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul
	65.8	66.1	66.7	65.8	65.2	65.8	65.8
2005	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug
	64.5	65.3	65.9	66.2	65	65.3	65.3

* BLM data collected immediately downstream of proposed project area.

Riparian microclimate sets the boundary conditions for many of the energy exchanges that influence stream temperature. Compared to open environments, the canopy reduces solar radiation, precipitation, and wind speed near ground level, and increases long-wave radiation received at the surface. These changes in turn influence the thermal and moisture environments under forest canopies. Peak daytime net radiation over a stream within a clearcut can be more than five times greater than that under a forest canopy during summer (Brown, 1969), primarily due to the increase in incident solar radiation. Forest canopies tend to reduce the diurnal air temperature range compared to large open areas. Daytime relative humidity increases from the edge to the buffer interior in response to the increased air temperature. Lower daytime forest air temperature means that relative humidity is typically 5 to 25% higher in the forest than in an opening (Chen et al., 1995; Brosofske et al., 1997; Davies-Colley et al., 2000; Spittlehouse et al, 2004).

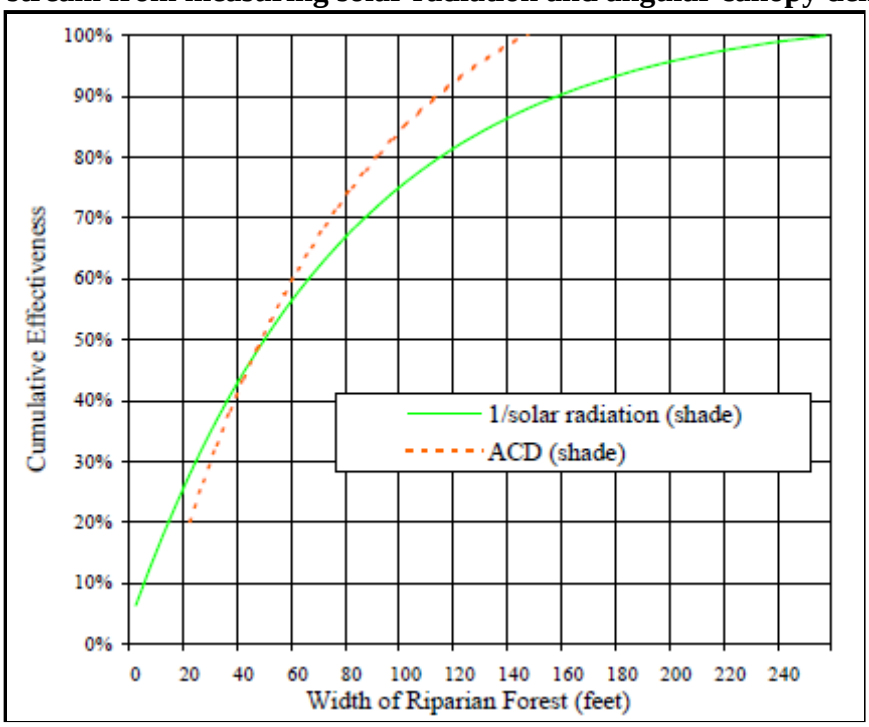
Riparian buffers provide many benefits to the stream and riparian area including bank stabilization, stream shading, water quality protection, flood-water storage and wildlife habitat. Figure 1 demonstrates how the width of the buffer impacts those benefits. While the figure provides riparian widths which would provide those benefits, the width is dependent on the potentially available riparian area. To clarify, in a narrow stream valley we would not expect there to be a riparian area one hundred feet or more wide; however, steep stream banks provide conditions that maintain ecological function within that area. Therefore, even in a narrow valley all the ecological benefits would still be provided, although in a smaller area.

Edge effects penetrating into a buffer generally decline rapidly, within about one tree height into the forest under most circumstances. In a study conducted in the Six Rivers National Forest in California, air temperatures above streams exponentially increased in relationship to riparian buffer width (Ledwith 1996). The Oregon Department of Fish and Wildlife considers western Oregon streams greater than 12 meters (40 feet) wide, bankfull width, to be in an “undesirable” condition if they have less than 50%

shade over the stream (ODFW, 1997). Sucker Creek in the vicinity of the project area averages about 50 feet in the summer.

Figure 1 demonstrates that a riparian forest can retain at least 50% of its effectiveness for shade if the forest buffer width is kept at or beyond 50 feet. Consequently, a 50 foot or greater buffer would provide some protection to the stream from insolation while also providing a seed bank for recolonization of the denuded areas, because seed trees would be retained within the buffer width.

Figure 1. Comparison of estimated benefits of riparian forests to stream shading as a function of distance from stream from measuring solar radiation and angular canopy density (ACD)*. ‡

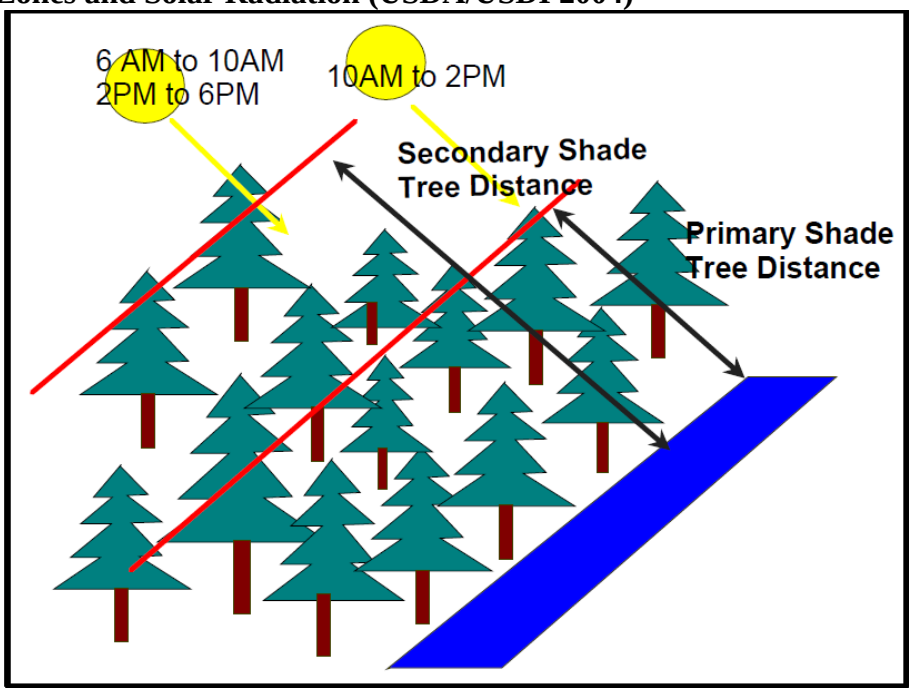


* Angular Canopy Density is the measure of canopy closure as projected in a straight line from the stream surface to the sun as it varies throughout the day.

‡ (From Pollack and Kennard, 1997; based on Steinblums et al. 1984, Brosofske et al., 1997)

Figure 2 represents the angle of the sun at different times of day and the trees needed to provide primary and secondary shade. For primary shade, trees 0 to 60 feet from a stream provide shade between 10am and 2pm. For secondary shade, trees 60 to 100 feet from the stream provide shade between 6am and 10am, and between 2pm and 6pm. The ability of riparian vegetation to provide shade to the stream throughout the day depends on vegetation height, density and position relative to the stream. According to the Sucker/Grayback TMDL (DEQ, 1999), Sucker Creek, between Grayback and Yeager creeks, is below its site potential percent of Effective Shade due to mining activity and would require 100 years for attainment. Effective Shade is a surrogate measure for the daily load of heat to a stream because it is more appropriate for guiding management activities. Effective shade screens the water's surface from direct rays of the sun and decreased levels of shade result from lack of adequate riparian vegetation. High Effective Shade levels result in cooler 7-day average temperatures.

Figure 2. Shade Zones and Solar Radiation (USDA/USDI 2004)



3.3.2 Environmental Consequences

Alternative 1 – No Action

Under the No Action alternative, the present environmental conditions and trends will continue. These trends include maturation of the riparian forest; long-term addition of large woody debris to the stream as riparian trees die or enter the stream after large floods that impact the banks; and the addition of sediment on the floodplain, especially at the upstream end of the site, as flood flows overtop the banks. The pond adjacent to Sucker Creek, a remnant from past mining activity, has a low berm separating it from the channel and is probably overtopped during high flow events. In the future, as Sucker Creek migrates laterally, this pond could become part of the active channel and provide salmonid habitat. There is an historic ditch at the upstream end of the project area that opens directly to the channel and may become completely connected to the stream at higher flow events.

The BLM has proposed the Althouse-Sucker timber project that will remove vegetation from the watershed in the form of timber sales, fuel treatments and stewardship projects. No cumulative effects to hydrology would occur from this or other projects in the watershed. See introduction to Section 3 of this document for further details.

Given the fire return interval of the area (Fire Regime 1 and 3 (<50 years)), it can be reasonably assumed that at a point in the future the Sucker Creek watershed will experience a wildfire that may be stand replacing if the past 90 years of fire suppression is not rectified. If the fires are frequent and low intensity, the forests in the watershed will continue along current successional pathways with a mosaic of age classes.

Given the history of gold mining in the watershed, it can be assumed that mining will continue well into the future. The applicant also has proposed a Plan of Operation south of this area on U.S. Forest Service lands. While this plan is not currently going forward, it is assumed that this area will be mined in the

future. Past mining activities have removed shade along Sucker Creek, and can be assumed to be partially responsible, along with other past management practices on federal and private lands, for stream temperatures that exceed the State criteria standards (see Table 4 above).

The Forest Service is in the midst of a large-scale restoration project on Sucker Creek north of this project area. The work includes adding meander, large wood, and off-channel habitat. Further downstream on private land current trends of development and agricultural use on private land in the floodplain is expected to continue, preventing re-establishment of channel sinuosity and reducing summer steam flows through surface and ground water consumption.

One future activity that is reasonably certain to occur within the project reach is small scale suction dredging. On BLM lands, use of a small (≤4 inch diam.) suction dredge by a claimant is classified as "casual" level mining and does not require permission or authorization by the BLM. Within the project reach (downstream to Cave Creek), small floating dredges (≤4" intake) are expected to be operating within the banks of Sucker Creek. Operations are limited to daylight hours and occur between June 15 and September 15, unless a variance is obtained. Up to 25 cubic yards of substrate may be moved annually by each operation in Sucker Creek before requiring an individual removal/fill permit. The turbidity plume resulting from the dredging must not extend more than 300 feet downstream. Instream and bank LWD cannot be removed from the channel. However, the LWD can be moved and the underlying substrate processed through the dredge. The suction dredging breaks up the channel armoring and deposits the processed material in a loose, unconsolidated condition. This material can become mobile during the rainy season as stream flow increase. Depending upon the intensity of flow, this material can be entrained for long distances, impacting habitat downstream.

Effects Common to all Action Alternatives

The proposed Plan of Operations would potentially cut or push over, or excavate to the base of existing conifers, hardwoods, and understory vegetation outside of the buffer along Sucker Creek. The buffer would vary from approximately 20 to 80 feet depending on site-specific conditions (e.g., a high bank on the north end of the project would extend the buffer beyond 20 feet). There are also several hardwoods greater than 16 inches DBH in the area of planned operations. Removing conifers and hardwoods would impact future snags in the riparian area. Without snags in the riparian area, the likelihood of large wood recruitment into the creek in the future would be limited.

After the trees are removed, fine-grained mineral (sand and finer) and organic material would be stockpiled (see Soils Affected Environment for a description), and remaining material would be dug out down to the bedrock and processed as described in section 2 of this EA.

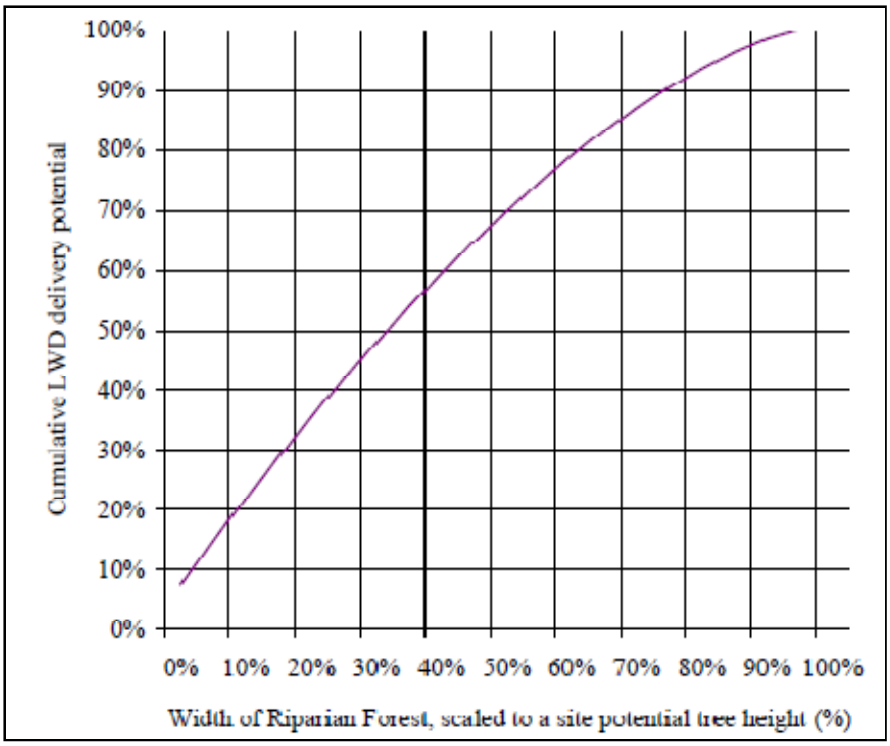
The primary mechanism of negative impacts to soils and hydrology from mining is the complete disturbance of the soil/ground structure, which reduces soil organic matter, extirpates soil microorganisms, upheaves the soil layers, and interferes with subsurface hydrology. Table 5 provides a brief synopsis of the effects of the alternatives, which are described in greater detail below.

Table 5. Effects by Alternative to Project Area Hydrology

Alternative 1 **No Action**	**Alternative 2** **Claimant's Proposal**	**Alternative 3** **BLM's Alternative**
Maturation of riparian forest. Long term source of large woody debris.	Impact 2.6 acres of riparian habitat. Loss of existing riparian forest; 100 plus year delay in reaching late-successional phase; and associated increase in stream termperature Loss of long-term source of large woody debris, higher loading of woody debris in the near-term Change in subsurface hydrology due to removal and replacement of overburden	Impact 1.8.acres of riparian habitat. Loss of existing riparian forest; 100 year delay in reaching late-successional phase Loss of long-term source of large woody debris, higher loading of woody debris in the near-term Change in subsurface hydrology due to removal and replacement of overburden

Removal of the portion of existing riparian forest as described would result in the loss of trees that are up to approximately 115 years old, although there are larger and older remnant trees in the stand that could also be lost. Consequently, after the proposed mining project is completed and the area is replanted, it would take a similar period of time to replace trees of this age in the riparian area. Additionally, the long-term possibility of large diameter trees falling into Sucker Creek, either by flooding or mortality, would be diminished. Figure 3 below shows the cumulative large wood delivery potential to a stream based as a function of riparian width. Consequently, protecting a percentage of the existing riparian forest as a buffer would allow for the long-term addition of large wood to the channel. The site potential tree height for the Sucker Creek Watershed is 185 feet. While the current vegetation height varies, the following is presented as an example to explain the change in large wood delivery potential if the riparian area was completely forested with 185 foot trees. By retaining a buffer that is 25% (46 feet) of the site potential tree height we could expect almost 40% of the delivery potential to be preserved, but it would take a buffer of 45% (Alternative 3) of the site-potential tree height would retain 60% of the delivery potential.

Figure 3. Cumulative instream LWD delivery potential of riparian forests as a function of distance from stream.



*(From Pollack and Kennard, 1997; based on McDade et al., 1990.)

Alternative 2

Under the claimant's proposal, a buffer, varying from at least 20 feet to 80 feet from the normal high-water mark along Sucker Creek would not be excavated. Under Alternative 2, the claimant would attempt to retain many of the largest trees outside the buffer area, but would remove them if they interfered with operations. However, on remaining trees along the outside buffer edge, a large portion of the roots would be excavated. An estimated 90 conifers (8 to 40+ inches dbh) would be removed if no trees are retained outside of the buffer. This would remove much of the root strength in the banks, especially in the narrower buffered areas, which could result in bank sloughing especially in the downstream portion of the proposed mining site where the thalweg, the portion of the channel where there is almost always the line of fastest flow, is directed toward the streambank. The existing root strength is especially important at this end because the high terrace, which prevents lateral spread at higher flows and the already limited vegetation growing in this area, compared to the upstream end. Furthermore, because the claimant proposes to work up to the base of the trees, this could cause these trees to die as the integrity of their root system would be compromised.

Roots in the streambank help stabilize soils and reduce erosion. Plant roots add strength to soil and thus the streambank, thereby protecting soil in streambanks from the erosive forces of water. Smaller vegetation growing near the creek also strongly influences bank stability. Burroughs and Thomas (1977) and FEMAT (1993, V-25–V-29) found the soil stabilizing benefits of root structures to be the greatest within one-half of the crown diameter of the vegetation growing along the bank. In the project area, this would mean that a riparian buffer width, depending on tree size and stream conditions, of 40 to 70 feet would provide 90% of more of the natural bank stability.

Leaving a narrow buffer under this alternative would reduce Angular Canopy Density (ACD) (the measure of canopy closure as projected in a straight line from the stream surface to the sun) (see Figure 3)

by removing critical shade trees. The amount of shade along Sucker Creek at the mine site, both currently and after the proposed mining activities, was estimated using the SHADOW stream shade model (USFS, 1993). The modeled stream temperature difference between current and assumed post-activity conditions is 0.42° F, which is above the detectability threshold of the model. In the long term (>5 years), with an assumption that trees within the buffer would die because of root damage, the modeled difference is 0.58° F, with both of these scenarios exceeding the TMDL target for stream temperature. Detailed results are located in Appendix B.

Because of the unknown effect of sorting of materials (e.g., cobbles, fines), there is an acknowledged uncertainty in this analysis. However, there would be an expected loss of fines in the topsoil at the site, and it is expected that macropore spaces would be smaller because of compaction and sorting of material. Changes in water infiltration and migration would likely negatively affect site recovery following completion of the plan, although this could result in beneficial effects in some areas and negative effects in others depending on compaction, remixing of soils and rock, and resultant pore structure. The PDF for decompaction of compacted areas would ameliorate these effect to an extent, but these effects are still expected to occur.

There is a reasonably high likelihood that turbid water would seep subsurface out of the excavated pit and into Sucker Creek. A settling pond downstream of the project area (near Cave Creek) allowed fine sediment to percolate 30 feet through terrace alluvium into Sucker Creek, turning, "the mainstem brown for a time with sediment-laden water. [The operators] used stockpiled fines… to seal the pit wall… Turbidity in Sucker Creek lasted less than one day" (USDA Forest Service 2009). Mining activity upstream at the Forest Service Tracy claim also reportedly allowed turbid water from a settling pond to enter Sucker Creek. While this was not witnessed on the claimant's two previous Notice-level operations, soil conditions in the Tracy Plan area are less compacted as evidenced by subsurface water flowing from mining tailings in a high-flow channel near the south end of the area. In addition, excavation of the existing downstream pit to enlarge it would disturb the bank material and could allow sediment to leak into the main channel of Sucker Creek.

Removal of the riparian vegetation on the 2.6 acres would be small enough to not affect surface water flow through the site because the reduced interception and evaporation rates would not be affected in any detectable manner. Infiltration rates at the watershed level would not be affected because of the small scale of the proposal. However it can be reasonably assumed that at the site infiltration rates would be affected as the floodplain is upturned and fine sediments are lost from the topsoil. The previous mining activity was performed by hand, which meant that the excavated material was not compacted after the mining was completed. Under this proposal, heavy equipment driven over the floodplain during the mining activity and the reclamation period will result in more compaction than the existing condition. Recommended PDF's will reduce compaction of the site, and ameliorate the loss of fine sediments through the stockpiling and reapplication of topsoil; however, some effects on infiltration are still expected.

The temperature model described above showed that there would be a detectable increase in temperature under this alternative. This would be added cumulatively to other sites where there is lack of shade and thus temperature increases. This would be a small factor in increasing temperature of the Sucker Creek downstream to greater than 64 degrees F, which we've already found to violate the standards as part of BLM's monitoring program (see Stream Temperature under Affected Environment above).

Restoration of disturbed lands occurs through a process of natural revegetation, and recovery would take decades before the site begins to exhibit healthy riparian functions. Replanting by the claimant would speed up recovery but success is not guaranteed. In a typical replanting project, there is an expected

mortality of 20% (Personal Communication, S. Schoeber), which would generally occur on more favorable site conditions. In this case, the available soil is limited and is expected to become an even smaller percentage of the total floodplain material. In other words, the ratio of fines to cobble will become even more skewed towards cobbles leaving a very poor medium on which to grow trees. Consequently, the BLM will be required to actively assist the revegetation process through replanting of seedlings and removal of non-native and invasive species. In the long-term the BLM will have to perform brushing and pre-commercial type thinning to hasten site recovery.

Alternative 3

The BLM's alternative would increase the width of the buffer along Sucker Creek, so that essentially all the existing primary shade is retained. The proposed buffer along Sucker Creek is based on the critical shade distance needed to avoid any decrease in canopy shade. As seen in Figure 3, buffering the riparian area to 80 feet would increase the effectiveness of the remaining shade to nearly 70%. Overall disturbance would be reduced by almost one acre. The ACD would not be reduced by removing trees behind the critical shade tree distance because the trees beyond this point are not directly contributing to shade on the stream. The SHADOW model has demonstrated that there would be no increase in stream temperature under this Alternative, because there would be no loss of primary shade (Appendix B).

As in Alternative 2, the bank in the downstream portion of the proposed mining site would be most susceptible to erosion during flood flows. However, the larger buffer would result in greater residual root strength protecting the banks from these hydraulic pressures. Therefore, the extra width may deter banks from eroding and the subsequent shifting or widening of Sucker Creek, essentially what would occur under the No Action alternative.

Removal of the riparian vegetation on the 1.8 acres would be small enough to not affect surface water flow through the site because the reduced interception and evaporation rates would not be affected in any detectable manner. Similar to alternative 2, infiltration rates at the watershed level would not be affected because of the small scale of the proposal. Except as differentiated in this section, effects of this alternative would be similar to Alternative 2, but would be less because of the smaller scale.

Summary and Conclusions

Historic mining activity has altered the riparian area and channel in Sucker Creek. While the activity lasted for the past 150 years and was spatially extensive, its hydrologic effect was limited by the available technology. Modern equipment allows a mining project to quickly remove vegetation and impact the entire floodplain down to bedrock. In addition to the immature riparian forest at the site and downstream of the project area, Sucker Creek lacks habitat complexity from dredging and a lack of large wood. This has resulted in summer stream temperatures that violate State criteria. Both alternatives result in the loss of riparian forest and delay in future large woody debris additions but Alternative 3 lessens these effects while preventing stream temperatures from increasing beyond current conditions. Mitigation efforts in both alternatives will help ameliorate the short-term effects to riparian vegetation and coarse wood and large wood stocks. Alternative 3 will have a greater efficacy as there will be more remaining riparian forest providing a greater supply of potential coarse and large woody debris.

Removal of the existing riparian forest would result in the loss of trees that are approximately 115 years old, and potentially some older remnant trees. Consequently, after the proposed mining project is completed and the area is replanted, the BLM would have to wait a similar period to have trees of this age in the riparian area. Additionally, the possibility of large diameter trees falling into Sucker Creek, either by flooding or mortality, would be diminished. This would represent a delay in the long-term recruitment of large wood as the riparian forest recovers over the next century.

Placement of large woody debris during reclamation would increase the sediment storage capacity of a reach, and result in an increase in meanders in the stream. Flow would follow a more sinuous line and reduce stream power, thereby reducing sediment transport capacity. Complexity would be enhanced because of the obstructions within the channel. The increase in large wood would sort sediment sizes through velocity breaks; stabilize gravel bars; induce local bed and bank scour, and increase pool formation and channel complexity favorable to aquatic species (Gurnell, A.M. et al. 2002)

Restoration of disturbed lands occurs through the process of natural revegetation and recovery would take approximately 115 years to recover to current stand conditions. This would be a long term process. Replanting by the claimant would speed up the recovery, but success is not guaranteed because the material in the floodplain will be excavated and replaced.

Under Alternative 2 the stream temperature model shows a small but detectable increase over existing conditions. Under Alternative 3, the stream temperature model shows no detectable increase over existing condition. Alternative 3 would provide more long-term large wood to the channel, protect the banks from erosion and provide a local seed source for recolonization of the riparian forest.

3.4 Fisheries / Aquatic

3.4.1 Affected Environment

Within the Rogue River Basin, the Illinois River and its tributaries are important spawning and rearing habitats for both anadromous and resident salmonids. The Illinois River constitutes an important portion of the remnant native wild fish population and habitat within the Rogue River Basin. Thus, the Illinois River Subbasin is believed to be the stronghold for wild anadromous fish populations in the Rogue Basin (East Fork Illinois River Watershed Analysis BLM, 2000). The majority of wild coho spawning in the Rogue Basin spawn in the Upper Illinois River. Sucker Creek produces an estimated 30% or more of the coho in the Illinois River. Therefore, Sucker Creek watershed is partially responsible for the Illinois River having the largest coho salmon population in the Rogue River basin (USDA 1997).

In 1997, the Governor's Salmon Recovery Science Team designated Sucker Creek as a core area for coho salmon protection and restoration. The lower portion (~9 miles) of Sucker Creek flows mostly through private land, with the majority having agricultural use. Agricultural factors influencing fish habitat and water quality include lack of riparian overstory vegetation, over-allocation of water (low summer flows), increased stream temperature, and potential fish barriers at water withdrawal points (USDI BLM 2007).

The Medford District RMP (p. 50) identifies Sucker Creek as a priority for potential fish habitat improvement projects, indicating a high potential for increasing fish production capability in a cost-effective manner. The RMP identified Upper Sucker Creek as a Tier 1 Key Watershed. In Tier 1 Key Watersheds, restoration of water quality to maintain or improve habitat for at risk populations of anadromous and resident fish is emphasized. In addition, the RMP (p. 23) requires that there be "no net increase of roads" in Key Watersheds. Tier 2 Key Watersheds do not contain at risk fish stocks but are important sources of high quality water.

The USFS placed fish habitat improvement structures in Grayback Creek and Cave Creek in the late 1980s to improve habitat for coho salmon and rainbow trout respectively (USDA 1997). The BLM conducted a mining reclamation project from 2000-2003 in Sucker Creek to restore stream processes and aquatic systems, and repair highly degraded fish and riparian habitat at two heavily mined sites. BLM monitored the effectiveness of treatments in 2001-2005 through spawning and snorkel surveys and concluded that coho especially had benefited from floodplain reconnection and instream large woody debris placement. Both sites currently have active mining claims located on them.

Fish Species
Anadromous salmonids present within the project area include: coho salmon (*Oncorhynchus kisutch*), fall Chinook salmon (*Oncorhynchus tshawytscha*), and winter steelhead (*Oncorhynchus mykiss*). Additionally, anadromous Pacific lamprey (*Entosphenus tridentatus*) distribution extends into the project area.

Resident salmonids within the project area consist of rainbow trout (*Oncorhynchus mykiss irideus*), cutthroat trout (*Oncorhynchus clarki clarki*), and the non-native brook trout (*Salvelinus confluentus*). Other resident fish species include native reticulate sculpin (*Cottus perplexus*) and Klamath smallscale sucker (*Catostomus rimiculus*).

Southern Oregon/Northern California Coasts (SONCC) coho salmon are federally listed as threatened. Klamath Mountain Province winter steelhead and the Southern Oregon and Northern California Coastal Chinook are BLM strategic species. BLM is required to address impacts to Threatened and Endangered Species in mining operations **(**43CFR3809**.**411(a)(2)(ii) and (iii) and 43 CFR §3809.420 (b)(7)). While the mining claimant, "…shall take such action as may be needed to prevent adverse impacts to threatened or endangered species, and their habitat which may be affected by operations," 43 CFR 3809.420 (7), it is policy that the BLM would protect, manage, and conserve sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (Bureau Manual 6840.02 and IM OR-2003-054).

Sucker Creek and Cave Creek contain federally designated SONCC Coho Critical Habitat (Table 6). Critical habitat is defined in Section 3(5)(A) of the ESA as "the specific areas within the geographical area occupied by the species ... on which are found those physical or biological features: (I) essential to the conservation of the species and (II) which may require special management considerations or protection." Critical habitat was designated (64 FR 24049, May 5, 1999) to include all river reaches accessible to listed coho salmon between Cape Blanco, Oregon, and Punta Gorda, California. Critical habitat consists of the water, substrate, and adjacent riparian zones of estuarine and riverine reaches (includes off-channel habitats).

Fish distribution limits are based on Geographic Information System (GIS) coverage, ODFW survey information, and available site-specific information.

Table 6. – Miles of Coho Critical Habitat in Potentially Affected Creeks

Stream Name	Coho Habitat (mi)
Sucker Creek	15.8
Cave Creek	0.5

Aquatic Habitat
The description of aquatic habitat conditions is based on an aquatic habitat survey conducted in 2002 by the Oregon Department of Fish and Wildlife (ODFW) and on information obtained from the Sucker Creek Watershed Analysis (USDI BLM 2007). Habitat is compared to the ODFW habitat benchmark standards for current conditions.

The Oregon Department of Fish and Wildlife (ODFW) has identified fish habitat benchmarks (Moore 1997) used to determine if a component of fish habitat is a limiting factor in trout or salmon production or survival. The ODFW benchmark for pool habitat is that pools comprise >35% of total stream area.

Adequate riparian canopy coverage (stream shade), which affects water temperatures, is identified as >70%. Adequate levels of Large Woody Debris (LWD) exist when there are more than 20 pieces of large wood per 100 meters of stream. Adequate levels of fine sediments in the gravels of riffles for function of the substrate as spawning material for salmonids is identified as no greater than the 15% by area.

The Oregon Department of Fish and Wildlife (ODFW) conducted a physical habitat survey in 2002 on Sucker Creek consisting of 3 reaches (Table 7). Reach 1 included the current project analysis area (claim site downstream to Cave Creek). Reach 2 was not surveyed due to lack of access. The average gradient for reach 1 was 1.8% and for reach 3 was 2.0%.

- Average stream shade for the two reaches was 62% and 74%, which are at adequate and desirable levels, respectively.
- The proportion of riffle substrate which was gravel averaged 38% and 40%, which are desirable levels.
- Pool frequency (channel widths between pools) in the two reaches was 5.6 and 8.2, which are desirable levels.
- The number of complex pools in the two reaches was 3.4 and 4.1, which are desirable levels.
- Pool area in the two reaches was 21% and 25%, which are adequate levels.
- The LWD (pieces per 100 meters of stream) in the two reaches averaged 9.8 and 9.3, which are undesirable levels.
- The amount of fine sediments found in spawning gravel in the two reaches averaged to 21% and 31% by area, which are undesirable levels (Table 7).

Table 7. – Stream Habitat Conditions for Sucker Creek (ODFW)

Stream Reach (river mile)	LWD Pieces	% Gravel	Silt-Sand-Organics (% Area)	% Shade	Complex Pools	Pool Freq.	% Pool	Avg. Gradient (%)
Reach 1 (Grayback u/s 2.2 miles)	U	D	U	A	D	D	A	1.8
Reach 2 (Access Denied – no survey)	-	-	-	-	-	-	-	-
Reach 3 (SE S.12 u/s to Cohen Ck)	U	D	U	D	D	D	A	2.0

Source: ODFW 2002
u/s = upstream
U = Undesirable, A = Adequate, D = Desirable

Sucker Creek was DEQ listed (2004) as water quality limited for temperature for salmon and trout rearing and migration from river mile 0 to 26 and salmon and steelhead spawning from river mile 0 to 21 (the project area is included in both ranges). The DEQ considers an impaired stream in the Illinois River Subbasin to 7-day-average temperatures above 64.4°F. In data recorded on Sucker Creek by the BLM downstream of the proposed mining site, the 7-day average of the daily maximum temperatures (°F) was above 64°F on 7 out of 8 years (see Hydrology, Table 4). The BLM completed a Water Quality

Management Plan (WQMP) in 2000 as part of a watershed level strategy for maintaining existing stream temperature, and future recovery through active and passive restoration to provide shade for streams. After the approval of the WQMP TMDL, Sucker Creek was removed from the 303(d) list because, as part of developing a TMDL, there is an assumption, based on specific plans in a WQMP, that the watershed will attain water quality standards (OAR 340-042-0025).

3.4.2 Environmental Consequences

The following analysis considers the likelihood that the No Action and the two proposed action alternatives would affect fisheries and aquatic resources, and then assesses the potential magnitude, duration, and nature of effects. The proposed actions are evaluated on how they would change fish habitat, and for this reason, the fisheries analysis is linked closely to the soil and hydrology effects analysis, which details the impacts on stream conditions (Soils and Hydrology sections). The effects on habitat are in turn used to evaluate the potential of the proposed actions to affect fish populations through production and survival.

Alternative 1 - No Action

Currently, the fish-bearing streams of the project area have poor quality rearing habitat which limits salmonid growth and survival. Land use practices which have removed riparian vegetation, straightened channels, and removed LWD from streams have resulted in loss of pool habitat which is essential for salmonid rearing. The trend toward removal of older trees along streams has resulted in a decrease in the recruitment of large logs to channels. Loss of large wood removes a main mechanism for the creation of pools and the storage of sediment. As a result, more banks erode and the sediment is deposited in downstream spawning gravels. These become embedded and are less desirable for use by spawning salmon. In Sucker Creek, the amount of fine sediments in the gravels of riffles is greater than the 15% by area identified as an upper threshold for proper function of the substrate as spawning material for salmonids.

Fish growth and survival are limited by elevated stream temperatures in Sucker Creek. The trend toward decreasing riparian shade on private land is expected to continue as streamside vegetation is removed through continuing land-use practices such as logging, agriculture and development. Loss of shade results in continued elevated stream temperatures. Low summer flow exacerbates the high stream temperatures, and this is not expected to improve as more demands are made on available water through private land use. Under Alternative 1, there would be no change in primary shade on BLM streams and stream temperatures would not be impacted.

One future private activity that is reasonably certain to occur within the project reach is small scale suction dredging. On BLM lands, use of a small (≤4 inch diam.) suction dredge by a claimant is classified as “casual” level mining and does not require permission or authorization by the BLM. Within the project reach (downstream to Cave Creek), small floating dredges (≤4” intake) are expected to be operating within the banks of Sucker Creek. Operations are limited to daylight hours and occur between June 15 and September 15, unless a variance is obtained. Up to 25 cubic yards of substrate may be moved annually by each operation in Sucker Creek before requiring an individual removal/fill permit. The turbidity plume resulting from the dredging must not extend more than 300 feet downstream. Instream and bank LWD cannot be removed from the channel.

Common to All Action Alternatives

Site access

The claimant would use an existing ford across Sucker Creek to access his claim. Turbidity and disturbance of fine sediment would occur with each crossing. The largest pulse would come from the

heavy machinery crossing once to enter and once to exit. Based on observations at this ford, turbidity would not be expected to extend more than 25 feet downstream before it dissipates, and fines would settle within 15 feet of the ford. Turbidity and fines from light vehicles would be less extensive but would be more frequent, as often as every 2 or 3 days. These crossings would produce a pulse effect each time and would remain localized. The amount of fines in the ford would decrease over time because they would be redistributed downstream with each crossing. The crossings would continue for the two-year duration of the project, with the exception of high water events which make the ford unusable for light vehicles. Because vehicle crossings potentially would take place in all months, the turbidity and fines would affect juvenile and adult fish directly. Because of the very small magnitude and pulse duration, there would not be any noticeable change in feeding or migration behavior. It is unlikely that redds would be affected by deposition of fines in this area because it would be so localized and the only suitable spawning material in the immediate vicinity is located upstream of the ford. Direct disturbance of redds would not be expected for the same reason; suitable spawning material is not located in the ford.

Reclamation

Reclamation would affect fish habitat because a measurable amount of large woody debris (LWD) recruitment potential would be created through the planting of trees within one site-potential tree height of Sucker Creek and placing key pieces of LWD in the channel. The replacement of the recruitment potential would take place over a period of up to 140 years, matching the age of the older trees currently on site. Depending on the number of trees which die from root disturbance and subsequently fall in the creek (as a result of site preparation), there could be an increase in LWD compared to what would have been recruited naturally.

Channel function and dynamics which depend on wood recruitment (e.g., pool formation) would improve, resulting in improved stream complexity and water quality. This would occur at a faster rate than under the No Action alternative. Adult holding areas and gravel retention would increase as channel function improves, resulting in increased salmonid production. Increased stream complexity would improve rearing habitat, resulting in an increase in juvenile survival.

Placing LWD would be likely to introduce sediment and cause turbidity as logs and trees are pushed through the buffer and into the main channel of Sucker Creek; mechanized equipment would remain outside the buffer. The sediment and turbidity entering the channel during the placement of LWD would be localized and would only occur during placement.

Occupancy

The claimant proposes to use two travel trailers as temporary living quarters during mining operations downstream from the mining area on the west side of Sucker Creek in a level area. Fuel and oil will be stored away from the creek and according to State requirements for minimum distance from a watercourse. Equipment refueling would be done in areas designated by the BLM. There would be no delivery mechanism for hazardous materials to enter the stream during occupancy.

Armoring the existing crossing into the area where trailers would be parked during occupancy could result in a small short term input of sediment but would remove a chronic source of sediment routing to Sucker Creek, which is 25 feet downhill. Currently, the flow from the intermittent (during rain events) stream spreads out before entering Sucker Creek. Fine sediments that have blocked the 12 inch wide channel would be removed and replaced with large cobble. This would armor the crossing and return the flow to its channel, removing a current source of turbidity.

Alternative 2

Site preparation

Activities proposed in Alternative 2 to clear the project area for mining would affect the stream temperature because of the loss of riparian vegetation. During site preparation, nearly all vegetation would be removed, except in a 20-80 foot buffer along the bank. Within this strip, some additional trees would be removed completely, and others would likely die later due to root disturbance. It is likely that stream shade would be removed because the primary shade zone extends to 60 feet from the bank, and the proposed buffer is not sufficient to protect it. The removal of shade would increase the stream temperature. The hydrology analysis modeled a temperature increase of up to 0.58 °F between current conditions and post-activity conditions at the site. This increase is important on at least the site level because the stream at this point is already above the 64°F threshold of impairment. Trees replanted during reclamation would be likely to replace the shade currently being provided by the canopy of trees; however, canopy recovery would be long-term, as trees currently occupying the site are greater than 115 years old (115 years old from plot data plus older remnant trees). Until that recovery, the temperature increase would cause a long term seasonal, sustained effect on juveniles rearing in the site reach.

Site preparation would have an effect on LWD because of the loss of trees within one Site Potential Tree Height (approximately 180 feet) of Sucker Creek. If it is assumed that no trees die in the 20 foot buffer, then the effective protected riparian strip is able to provide 20% of the future LWD recruitment that the site would have provided otherwise (Hydrology section, Table 4). The effect of the reduction of LWD recruitment extends downstream from the project area because LWD moves through Sucker Creek during high flow events. The loss of recruitment would be long term because large trees currently occupying the site are 115 years old and older. While there would be some loss of future LWD recruitment because of tree removal, there would also be increased immediate recruitment as trees along the buffer strip die; however this would result in further loss of shade. The change in LWD recruitment would negatively affect both juvenile and adult fish through the overall loss of rearing and holding habitat.

Mining

To process the placer deposit, the floating dredge will be used in an excavated pit which would, at times, extend to within 20 feet of the banks of Sucker Creek. In one case, the dredge would be in an existing excavated pit at the downstream end of the mining area. This pit is currently separated from Sucker Creek by a 5 foot wide berm. The berm is low enough that the pit is probably inundated by flows during a 10-year storm event. As such, it is accessible to coho salmon and is considered critical habitat. The pit currently has surface water and some plant species that are wetland obligates (i.e., 99% of the time, where they are found is wetland habitat).

There is a reasonably high likelihood that turbid water would leak out of the excavated pit and into Sucker Creek. A settling pond downstream of the project area (near Cave Creek) allowed fine sediment to percolate 30 feet through terrace alluvium into Sucker Creek, turning, "*the mainstem brown for a time with sediment-laden water. [The operators] used stockpiled fines…to seal the pit wall…Turbidity in Sucker Creek lasted less than one day*" (USDA Forest Service 2009). Mining activity upstream at the Forest Service Tracy claim also reportedly allowed turbid water from a settling pond to enter Sucker Creek. Although the water level in the existing pit is above the level of Sucker Creek, and therefore does not exchange water with the creek, excavation of the existing downstream pit to enlarge it would disturb the bank material and could allow sediment to leak into the main channel of Sucker Creek.

The BLM soils and hydrology analyses determined that due to the extent of excavation, a decrease in root strength is likely to result in a loss of bank stability. Bank failure along the lower half of the project area is likely to occur years after the settling ponds have been filled in.

The amount of turbidity and fine sediment that could be released to Sucker Creek from the excavation probably would be detectable. Because mining potentially would take place in all months, juvenile and adult fish would be present during episodes of sediment input and turbidity. The amount of turbidity that could percolate through the spaces of the bank material and pulse duration would probably not cause any change in feeding or migration behavior, however, because the operator is required to immediately stop any sediment routing that occurs.

The potential failure of banks due to loss of root strength along the downstream half of the project area would be punctuated by winter storm events as weakened trees fall and banks become susceptible to high flows. Turbidity and suspended sediment resulting from failure might not be distinguishable from background levels during storm events, but large localized deposits of bank material could completely bury gravels along the channel margin. Spawning adults and redds could be harmed directly if in the immediate area during failure. Surveys since 2000 have not recorded any redds in this part of the project area, possibly due to the large cobble size found there. Spawning areas that are further downstream could be affected by the input and subsequent transport of large amounts of bank material. Fine sediments which can have a negative effect on spawning gravels and redds would dissipate as they are transported and would probably not have a substantial effect on the spawning areas downstream of the project site because they are far enough away.

Reclamation

There would probably be some sediment inputs to fish habitat from reclamation because some activities would occur close to the channel. In the case of the existing downstream pit, any reclamation would be as close as 5 feet from the stream and could cause sediment to enter Sucker Creek, depending on what is required to reshape the berm to rehabilitate off-channel habitat. The sediment and turbidity entering the channel during the reshaping of the existing pit would be negligible and localized.

Summary and Conclusions

Vegetation removal and the potential for trees to die post-project within 20 feet of Sucker Creek would remove shade in the primary shade zone. This would cause an increase in water temperature of up to 0.58 °F, exceeding the TMDL temperature target, and negatively affecting SONC juvenile rearing in the site reach. Vegetation removal would also result in a long-term loss of LWD recruitment.

Mining activities would occur within 20 feet of Sucker Creek, and closer than that in an existing pit that is off-channel SONC coho salmon habitat. This pit is accessible to fish only when high flows overtop the berm which is approximately four feet higher than the normal high-water mark. Activities could also result in turbid water entering the creek, although this would be a short term event because the miner is required to stop activities and remedy any future potential should this occur. Site access would produce small amounts of turbidity and fines, but this will also be of small magnitude and short duration. Armoring the existing crossing to access the occupancy area would remove a chronic source of sediment to Sucker Creek.

Because of the expected loss of root strength in trees along the buffer's edge, winter storm events could result in bank failure, and bury gravels along the channel margin; this could harm spawning adults and bury redds in this area, although surveys have not recorded any redds in this part of the project area. Therefore, there are no expected direct impacts to spawning redds. Spawning areas that are further downstream could be affected by the input and subsequent transport of large amounts of bank material. Fine sediments which can have a negative effect on spawning gravels and redds would dissipate as they are transported and would probably not have a substantial effect on the spawning areas downstream of the project site.

Bank failure could also have a beneficial effect. As in other bank failures in mature riparian corridors, this would be associated with a pulse of LWD input to the channel. Increased adult holding areas and improved gravel retention would increase as channel function improves, resulting in increased salmonid production. Improved rearing habitat resulting from increased stream complexity would increase juvenile survival.

Negligible, localized sedimentation and turbidity could occur during site reclamation.

Turbidity effects would be likely to result from miners operating small suction dredges in Sucker Creek. Small scale dredging adjacent to the project site would be likely to cause measurable turbidity at the same time that the claimant's mining excavation and operation on the bench is predicted to cause turbidity and fine sediment input in the channel by percolation through the bank buffer. Dredging further downstream is not likely to add to the turbidity of the project site, which would be expected to dissipate by the time it reaches the downstream location. Turbidity from a dredge adjacent to the project site could, depending on the amount being released through the bank, rise to the level where it affects the daily activity patterns of juvenile coho.

Alternative 3

Site preparation

Stream temperature would not increase in this alternative because primary shade provided by riparian vegetation would not be removed. The buffer would be sufficient to protect trees providing shade and would also preserve the root strength of residual trees so that few, if any, would die later as a result of the disturbance.

Site preparation would have less of an effect on LWD than in the claimant's alternative because only trees further than 40 to 80 feet from the stream would be removed, and few, if any, others would die later due to root disturbance. If it is assumed that no trees die in the buffer area, then the effective protected riparian strip is able to provide 65% to 70% of the future LWD recruitment that the site would have provided naturally (Hydrology section Figure 3). This recruitment level is nearly three times the result from the first alternative, but it still represents a reduction from natural recruitment. The effect of the reduction of LWD recruitment extends downstream from the project area because LWD moves through Sucker Creek during high flow events. The loss of recruitment would be long term because trees currently occupying the site are 115 years old and older. There would be some loss of future LWD recruitment because of tree removal, but most of the potential would be retained. There would be little, if any, immediate recruitment from tree mortality within the buffer strip. The change in LWD recruitment would negatively affect both juvenile and adult fish, through the overall loss of rearing and holding habitat, but it would be less than one third of the reduction expected as a result of Alternative 2.

Mining

In Alternative 3, the floating dredge would be in a newly excavated pond which would not be closer than 40 feet of the banks of Sucker Creek. Along most of the mined area, the pond would be no closer than 80 feet. In this alternative, there would be no excavation in the existing pit at the downstream end of the project area where fish habitat and wetland plants occur.

In this alternative, it would be highly unlikely that turbid water would leak out of the excavated pond and into Sucker Creek because the buffer would be sufficient to keep most turbidity and sediment from routing to the creek. The amount of turbidity and fine sediment that could be released to Sucker Creek would be negligible and would not be likely to affect juvenile and adult fish negatively.

Bank failure along the lower half of the project area could still occur, even after the settling ponds have been filled in, but it would be much less likely because root strength in the banks would be retained by the wider buffer. This could also occur under the No Action alternative.

Summary and Conclusions

Site access would be likely to produce small amounts of turbidity and fines potentially affecting juvenile and adult fish directly; however, because of the very small magnitude and pulse duration, there would not be any noticeable change in feeding or migration behavior. It is unlikely that redds would be affected by disturbance or deposition of fines in this area because it would be so localized and the only suitable spawning material in the immediate vicinity is located upstream of the ford.

Armoring the existing crossing into the area where trailers would be parked during occupancy could result in a small short term input of sediment but would remove a chronic source of sediment routing to Sucker Creek. No effects from hazardous materials would be expected from site occupancy.

Stream temperature would not increase as a result of site preparation because primary shade vegetation would be retained. There would be some long term loss of future LWD recruitment because of tree removal, but most of the potential would be retained. Although there would be no immediate increase in wood input through mortality in Alternative 3, the overall input of future LWD would be 65 to 70% of what would have been provided naturally. This would negatively affect both juvenile and adult fish, through the overall loss of rearing and holding habitat, but it would be less than one third of the reduction expected as a result of Alternative 2.

Whether LWD is recruited through bank failure or placement during reclamation, the channel function and dynamics which depend on wood recruitment (e.g., pool formation) would improve, resulting in improved stream complexity and water quality. This would occur at a faster rate than under the No Action alternative. Increased adult holding areas and improved gravel retention would increase as channel function improves, resulting in increased salmonid production. Improved rearing habitat resulting from increased stream complexity would increase juvenile survival.

The amount of turbidity and fine sediment that could be released to Sucker Creek would be negligible and would not be likely to affect juvenile and adult fish.

Bank failure along the lower half of the project area could still occur, even after the settling ponds have been filled in, but it would be much less likely because root strength in the banks would be retained by the wider buffer. This could also occur under the No Action alternative.

Turbidity effects would be likely to result from miners operating small suction dredges in Sucker Creek. Small scale dredging adjacent to the project site would be likely to cause measurable turbidity at the same time that the claimant's mining excavation and operation on the bench is predicted to cause turbidity and fine sediment input in the channel by percolation through the bank buffer, although under Alternative 3, the wider buffer is expected to prevent sediment input. Dredging further downstream is not likely to add to the turbidity of the project site, which would be expected to dissipate by the time it reaches the downstream location. Turbidity from a dredge in the channel adjacent to the project site could rise to the level where it affects the daily activity patterns of juvenile coho, but only if there is already turbidity being released through the bank from the main excavation, which would be unlikely.

AQUATIC CONSERVATION STRATEGY

1. Components of the Aquatic Conservation Strategy

An integral part of the Northwest Forest Plan is the Aquatic Conservation Strategy (ACS). According to the Northwest Forest Plan, the ACS was "developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy would protect salmon and steelhead habitat on Federal lands managed by the Forest Service and Bureau of Land Management within the range of Pacific Ocean anadromy [USDA Forest Service and USDI Bureau of Land Management 1994, page B-9]."

The four primary components of the ACS are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems. The four components are Riparian Reserves, Key Watersheds, Watershed Analysis and Watershed Restoration.

Riparian Reserves (RR) are established as a component of the Aquatic Conservation Strategy, designed primarily to restore and maintain the health of aquatic systems and their dependent species. Riparian Reserves also help to maintain riparian structures and functions and conserve habitat for organisms dependent on the transition zone between riparian and upland areas.

Riparian Reserves include lands along all streams, lakes, ponds, wetlands, unstable areas, and potentially unstable areas that are subject to special Standards and Guidelines designed to conserve aquatic and riparian-dependent species. Standards and Guidelines apply to activities in Riparian Reserves that may otherwise retard or prevent attainment of ACS objectives, as defined in the Northwest Forest Plan.

Widths for Riparian Reserves necessary to ensure ACS objectives for different waterbodies are established based on ecological and geomorphic factors. Widths are typically one site potential tree height (180 feet for this project) along each side of stream channels. Widths are twice this distance along fish-bearing streams. These widths are designed to provide a high level of protection to fish and riparian habitats.

Key Watershed designation is an additional component of the ACS that is applied to watersheds that contain at-risk fish species or anadromous stocks and that provide high quality water and fish habitat. The Sucker Creek drainage is defined as a Key Watershed as defined by the Northwest Forest Plan (USDA Forest Service and USDI Bureau of Land Management 1994).

Watershed Analysis is required in Key Watersheds prior to determining how proposed land management activities meet ACS objectives. The Sucker Creek basin has been analyzed in two Watershed Analyses (USDA Forest Service 1996, USDI BLM 2007) which have been used during the analysis of this proposal.

A **Watershed Restoration** plan was recently completed for Sucker Creek (USDA Forest Service 2006); a Water Quality Management Plan (WQMP) was completed by the USFS and ODEQ in 1999. The Medford District RMP (p. 50) identifies Sucker Creek as a priority for potential fish habitat improvement projects, indicating a high potential for increasing fish production capability in a cost-effective manner. BLM included the following recommendation in the 2007 Watershed Analysis: "Adopt intent and goals of Forest Service, Aquatic Restoration Plan for Sucker Creek watershed (USDA Forest Service. 2006) by promoting and implementing projects such as, a) adding large wood to streams, increasing structure, b) stabilize road drainages where needed, c) reduce stand densities where overstocked in riparian reserves."

This watershed has been ranked as the Forest's second highest of three priority watersheds (Coquille River is first and Applegate River is third). Aquatic resource specialists evaluated the Forest's watersheds based on the following criteria:

- Key Watershed Designation
- High Erosion Potential
- Stream Crossings and Road Density in High Erosion Areas
- Depositional Reaches and Sensitivity to Disturbance
- Completed Water Quality Restoration Plan
- Miles of Coho Salmon within the Watersheds
- Total Number of Anadromous Species within the Watershed

Channels needing large wood may be immediately aided by mechanical placement of large wood; however, reestablishment of large wood recruitment from riparian forests would require thinning and time for managed stands to grow trees of suitable size. For areas with Port-Orford-cedar stands, targeted management is required to contain the spread of disease and establish resistant strains to ensure that this riparian component endures.

Restoration projects described by this plan include large wood placement, streambank stabilization/revegetation, side channel habitat development, riparian planting, riparian thinning, culvert replacement, road crossing stabilization, road decommissioning and subsoiling, slope stabilization, and Port-Orford-cedar disease treatment.

Most of the projects described have a recovery timeline of up to 10 years. Projects that address riparian thinning may require 60 years for full recovery to mature forest conditions. According to the Restoration Plan, "Current placer mining operations are generally small in scale. Stream damage from small placer activities is negligible compared with legacy impacts from large historical placer mining" (USDA Forest Service 2006).

Additional BLM Watershed Analysis recommendations include:

> Where appropriate, based on local site conditions of the riparian plant community, improve instream complexity by adding key pieces of wood and increase potential large wood recruitment. Emphasize key watershed. Specific sections recommended for large wood placement include 40S-7W-1, 40S-7W-12, & 40S-7W-13 on Sucker Creek and 39S-7W-13 & 39S-7W-24 on Little Grayback Creek (USDI BLM 2007, p.107).
>
> Wherever early to mid seral stages occur along creeks, reduce stand density to expedite larger tree growth to improve stream shade and temperature for summer rearing for fish and other aquatic organisms. Promote reduction of channel width by additions of structural elements (example: BLM lands, mined flat above Cave Creek per Sucker Creek Water Quality Management Plan, 1998). Seize opportunities to return instream flows to perennial and intermittent streams affected by mining activities (USDI BLM 2007, p.108).
>
> Reduce spawning or riffle substrate embeddedness to 30% or less and sand content to 20% or less by reduction of fine sediment load and addition of structure (USDI BLM 2007, p.108).

2. Consistency with the Aquatic Conservation Strategy

Aquatic Conservation Strategy Objectives

This section focuses on evaluation for consistency with the nine Aquatic Conservation Strategy Objectives in regard to the alternatives considered in detail. In addition, consistency findings are provided for the specific Standards and Guidelines associated with Riparian Reserves (Northwest Forest Plan, C-33 & 34) and the Standards and Guidelines associated with Key Watersheds (Northwest Forest Plan, B-19).

Complying with the Aquatic Conservation Strategy objectives means that an agency must manage the riparian-dependent resources to maintain the existing condition or implement actions to restore conditions. The baseline from which to assess maintaining or restoring the condition is developed through a Watershed Analysis. Improvement relates to restoring biological and physical processes within their ranges of natural variability.

The Standards and Guidelines are designed to focus the review of proposed and certain existing projects to determine compatibility with the Aquatic Conservation Strategy objectives. The Standards and Guidelines focus on "meeting" and "not preventing attainment" of Aquatic Conservation Strategy objectives. The intent is to ensure that a decision maker must find that the proposed management activity is consistent with the Aquatic Conservation Strategy objectives. The decision maker will use the results of this review and the Watershed Analysis to support the finding.

In order to make the finding that a project or management action "meets" or "does not prevent attainment" of the Aquatic Conservation Strategy objectives, the analysis must include a description of the existing condition, a description of the range of natural variability of the important physical and biological components of a given watershed, and how the proposed project or management action maintains the existing condition or moves it within the range of natural variability.

For the Tracy Sucker Creek Plan of Operations, existing conditions are primarily contained in the Watershed Analysis, incorporated by reference, as well as in the Environmental Assessment and the Biological Assessment. The Northwest Forest Plan requires consistency with ACS with specific reference to nine ACS Objectives. Below is a summation of the evaluation regarding consistency with the elements and components of the Objectives.

ACS Objective 1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

This project would not prevent maintenance and restoration of the distribution, diversity or complexity of watershed or landscape-scale features (e.g., vegetation, terrestrial habitats or aquatic habitats) in the Upper Sucker Creek drainage. The scale of streamside disturbance proposed is smaller than most natural disturbance events (such as slope failures, fires (e.g., Biscuit, Boswell), windthrow and floods (1964, 1997) that typically and repetitively occur in the drainage.

Both action alternatives would result in mining/excavation of a placer terrace located within a riparian area. The excavation process would potentially remove all trees and leave the area treeless for a time. The mine activity area as well as much of the length of Sucker Creek was mined in the latter 1800s and early 1900s and so is currently not in a natural condition. Nevertheless, a mature conifer stand re-established on the site and demonstrates the potential for recovery of vegetation following disturbance. Both action alternatives provide some level of protection for streamside vegetation growing on the banks of Sucker Creek because they include a buffer where excavation would not occur. While on the site scale (<3 acres), distribution, diversity and complexity would not be maintained; the action alternatives would

not prevent maintenance and restoration of distribution, diversity nor complexity of watershed and landscape-scale features on which species, populations and communities are adapted.

ACS Objective 2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

No activities or results of the Proposed Action would sever existing linkages (movement conduits) between watersheds or permanently obstruct existing connections in the drainage network. While all or most existing vegetation would be removed inside the mine activity area and in slash disposal areas, the small size of the stand perforations that result would not hinder dispersal of flora, fauna and water across the terrestrial landscape.

Finally, none of the activities or results proposed would chemically or physically impede routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species, especially threatened coho salmon.

ACS Objective 3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

The Proposed Action (Alternative 2) leaves a single row of trees in some areas along Sucker Creek. The loss of root strength would compromise the integrity of the streambank during flood flows. Alternate 3 increases the streambank protection buffer so that trees and associated root strength would not be compromised. Because a buffer of 80 feet would remain intact, bank failure in flood flows is not more likely than under the current condition. Alternative 2 would not maintain and restore the physical integrity of the aquatic system, shorelines, banks and bottom configurations. Alternative 3 would maintain the physical integrity.

ACS Objective 4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

Alternative 2 could fail to achieve Objective 4 because the Proposed Action threatens a violation of Oregon State water-quality standards by potentially increasing water temperatures downstream in Sucker Creek. Any potential increase in water temperatures may detrimentally affect some aquatic life in downstream ecosystems. Alternative 3, on the other hand, is designed to maintain and restore suitable downstream water temperatures in Sucker Creek because existing stream shade would not be altered and streamside vegetation would continue to grow larger. This would be achieved by keeping a buffer of 40 to 80 feet of intact streamside canopy.

Both action alternatives propose a gold processing pond constructed in the existing cobble boulder mining tailings. The large size of this material creates open spaces between the piled cobble boulders making it highly permeable to subsurface flow. It is likely that the muddy water in the pond could flow subsurface from the pond and discharge into Sucker Creek impacting water quality; however, if this occurs, the claimant is required to stop all activities and remedy the situation to stop the flow and prevent further discharge into the creek (section 2.2.1 Alternative 2—Proposed Plan of Operations). The Proposed Action would not maintain the water quality of Sucker Creek. Alternative 3 with the added protection would maintain but not improve the water quality of Sucker Creek.

ACS Objective 5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

As described in ACS 3 and 4, the Proposed Action has the potential to increase the sediment in Sucker Creek from the failure of a compromised streambank on Sucker Creek and the subsurface flow of muddy pond water into Sucker Creek.

Alternative 3 maintains the sediment regime including timing, volume, and rate of sediment input, storage and transport by increasing protection to the streambank of Sucker Creek through the increased buffer size.

ACS Objective 6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Hydrologic analysis (section 3.3 summary and conclusions) concluded that neither action alternative under consideration is predicted to cause a change in existing in-stream base or peak flows within Sucker Creek. Vegetation cleared as part of the mine project would not be sufficient to create any measurable change in water volumes or flows within the watershed.

ACS Objective 7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

Alternative 2 proposes mining in the existing downstream pit. This area has surface water and may be determined to be a wetland. The post mining condition of this area would consist of piled mining tailings. The highly permeable nature of mining tailings would not maintain surface water associated with a wet area or wetland unless reclaimed. Reclamation in this area (Alternative 2) and recontouring the floodplains at the upstream end of the site (both Alternatives 2 and 3) would maintain the water table elevation in wetlands and restore the duration of inundation of floodplains. No meadows would be affected by either alternative.

The action alternatives maintain the timing, variability, and duration of floodplain inundation.

ACS Objective 8. Maintain and restore the species composition and structural diversity of plant communities in Riparian Reserves and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Species composition and structural diversity of plant communities included in the Sucker Creek Riparian Reserve would not be maintained by the action alternatives. Vegetation would be completely cleared from approximately 2.6 acres. Establishment of a new forest stand following reclamation would occur over several decades.

Both alternatives remove trees that provide both bank stability and future large wood supplies. Sucker Creek lacks instream large wood (USDI BLM 2007). Alternative 3 adds a protection buffer to Sucker Creek that would, by retaining root strength, maintain bank stability and decrease the loss of future coarse woody debris. Future LWD recruitment would not be maintained in the short term, but would be replaced in the long term by replanting for reclamation.

ACS Objective 9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species, which is currently present, would not be maintained at the site scale with the implementation of either action alternative. Following reclamation, more than 100 years may be required to replace the habitat functions currently provided by the 115+ year old stand on site. The 3 acres of the project area represent about 0.0048% of the 62,496-acre Sucker Creek fifth-field watershed and 0.017% of the 17,566-acre Middle Sucker Creek 6th field subwatershed. At the watershed scale, habitat would be maintained to support well-distributed populations of riparian-dependent species.

Alternative Compliance with the Aquatic Conservation Strategy Objectives

Alternative 2 prevents attainment of the Aquatic Conservation Strategy by not maintaining 6 ACS Objectives (1, 3, 4, 5, 8, & 9).

Alternative 3 prevents attainment of the Aquatic Conservation Strategy by not maintaining 3 ACS Objectives (1, 8, & 9).

Alternative 1 - No Action does not prevent attainment of the Aquatic Conservation Strategy by maintaining all 9 ACS Objectives.

3. Consistency with Riparian Reserve Standards and Guidelines for Minerals Management

The following minerals management standards from the Medford District RMP are applicable to the proposed Tracy Sucker Creek Plan of Operations.

Require a Plan of Operations, including a reclamation plan and reclamation bond for all mining operations in riparian reserves. Such plans and bonds will address the costs of removing facilities, equipment, and materials; recontouring of disturbed areas to an approved topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and revegetating to meet Aquatic Conservation Strategy and riparian reserve objectives (RMP p.29).

A Plan of Operations is required and is complete, and terms and conditions to minimize surface resource impacts are being analyzed within the EA. The plan will be approved and actions authorized after the claimant has received all required state and federal permits.

Locate structures, support facilities, and roads outside riparian reserves. If no alternative to siting facilities in riparian reserves exists, locate in a way compatible with Aquatic Conservation Strategy and riparian reserve objectives. Road construction will be kept to the minimum necessary for the approved mineral activity. Roads will be constructed and maintained to meet road management standards and to minimize damage to resources in the riparian reserves. When a road is no longer required for mineral or land management activities, it will be reclaimed. In any case, access roads will be constructed consistent with 43 CFR 3809 and acceptable road construction standards and will minimize damage to resources in riparian reserves (RMP p. 29).

No construction of new structures, support facilities or permanent roads is proposed. An existing access road and ford are already in place and would continue to be needed for ongoing mineral or land management activities.

Avoid locating solid and sanitary waste facilities in riparian reserves. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in riparian reserves exists, if releases can be prevented and stability can be ensured, then:

Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics.

Locate and design the waste facilities using 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 reserves.

Reclaim waste facilities after operations to ensure chemical and physical stability and to meet Aquatic Conservation Strategy and riparian reserve objectives.

Monitor waste and waste facilities after operations to ensure chemical and physical stability and to meet Aquatic Conservation Strategy and riparian reserve objectives.

Require reclamation bonds adequate to ensure chemical and physical stability of mine waste facilities and to meet Aquatic Conservation Strategy and riparian reserve objectives (RMP p. 29).

All waste rock would be native materials only (cobbles, gravels, sand, soil, etc.) and the remaining materials on site following mining would be identical in composition to the present placer deposit. No rock materials would be altered physically (crushed, heated, etc.) nor would addition or use of any chemicals occur on site during processing. Regarding sanitary waste handling, all black and grey water generated by on-site residency would be held in a self-contained trailer tank or other sanitary vault and collected wastes would be hauled off-site and disposed of at an acceptable facility.

Develop inspection and monitoring requirements, and include such requirements in exploration and mining plans, and in leases or permits, consistent with existing laws and regulations. Evaluate the results of inspection and monitoring to determine if modification of plans, leases and permits is needed to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy and riparian reserve objectives (RMP p. 30).

A BLM Geologist would be responsible for the inspection and monitoring of the operations and reclamation. Monitoring during inspections would include: cleanliness of equipment to insure invasive plants and POC objectives are met, compliance with Industrial Fire Precautions Level (IFPL), campground cleanliness and sanitation, water usage, pond seepage, pond integrity and location, fuel storage and spill plan compliance, and compliance with water quality laws and regulations.

3.5 Fire and Fuels

3.5.1Affected Environment

The proposed project is along Sucker Creek and is presently vegetated by mature conifers and hardwoods. There is an area of tanoak-Douglas fir and canyon live oak-dwarf Oregon grape dominated vegetation directly above the plan. Most of the ground fuels west of the project area experienced a high severity wildfire in May, 2008 during the Boswell Fire, which encompassed 54 acres. These ground fires, which are needed to carry a fire, have disappeared which have reduced the fire hazard to a very low level of probability. The area north of the plan area is composed of sand and gravel bars, sparsely vegetated, and therefore poses a very low fire risk. The area south of the plan area is also vegetated by mature conifers and hardwoods.

3.5.2 Environmental Consequences

Alternative 1 – No Action
The Sucker Creek watershed has forest management projects proposed by the U.S. Forest Service and BLM which include commercial harvest, forest thinning, hazardous fuels reduction, pre-commercial stand improvement, and restoration thinning. The projects within the Sucker Creek 5th field watershed are listed in the beginning of this chapter (Section 3.0). These projects have no major relevance to the proposed project because none are adjacent to the project area. Riparian areas sand and gravel bars are not high priority hazardous fuels reduction areas. The vegetation in the project area would continue to grow and in time, would become denser creating more continuous fuels in the event of a wildfire.

Effects Common to all Action Alternatives - Alternatives 2 & 3
The trees to be felled along with the slash produced would be stored in a location void of combustible vegetation for future use or disposal. The trees and vegetation proposed for removal would not create a high fire hazard. The project area is small and the slash produced from either alternative would result in a low fire hazard until vegetation became reestablished in the area.

Summary and Conclusion
There would be limited slash produced from either action alternative. The Boswell Fire which burned 54 acres upslope from the project area in May 2008, has had most of the ground fuels burned off which is needed to carry a fire. Outside of the project area, there are areas of sparse vegetation which are not conducive to carrying a large wildfire. This project would not change fire hazard in the project area or the watershed because of the small scale of this project, and lack of connectivity to any other Forest Service or BLM project in the watershed.

3.6 Botany

3.6.1 Affected Environment

This project is not within the range of any federally listed plant species. Surveys for vascular and nonvascular plants were conducted by the BLM in the summer of 2009. No federally listed, State Threatened, Endangered or Candidate, Bureau Sensitive, or Survey and Manage species were found during surveys of the project area. A search of the BLM GeoBOB database and paper records of surveys on February 4, 2010 shows there are also no previously documented sites in the project area.

Surveys have not been conducted for Bureau Sensitive fungi, which is consistent with the BLM Oregon State Office Information Bulletin # OR-2004-145, Attachment 5. Above-ground fruiting structures (sporocarps) are short-lived, seasonal, and annually variable, making surveys difficult (USDA, USDI 2000). The State Office Information Bulletin set out the expectation that field units would not conduct field surveys for these species due to survey impracticality; protection of known sites along with ongoing, large-scale inventory work would provide the measures and means to meet agency policy. Occasionally surveyors find a sensitive fungus while surveying for other species. These sites are recorded and protected when necessary to prevent Federal listing of the species. For the Tracy Plan there are no known sites of Bureau Sensitive Fungi located in the project area.

BLM is required to address impacts to Threatened and Endangered Species in mining operations (43CFR 3809.411(a)(2)(ii) and (iii) and 43 CFR §3809.420(b)(7)). While the mining claimant, "…shall take such action as may be needed to prevent adverse impacts to threatened or endangered species, and their habitat which may be affected by operations," 43 CFR 3809.420(b)(7), it is policy that the BLM would protect, manage, and conserve sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (Bureau Manual 6840.02 and IM OR-2003-054).

3.6.2 Environmental Consequences

Alternative 1: No Action
The No Action alternative would not result in any direct or indirect effects to T&E, Bureau Sensitive, or State Threatened, Endangered, or Candidate, or Survey and Manage botanical species because this alternative proposes no habitat/ground-disturbing activities.

Past, present and reasonably foreseeable activities within the Sucker Creek 5th field watershed are listed in the beginning of this chapter (Section 3.0). Special status plant species on BLM lands would continue to be protected and conserved following policy and management guidelines. Populations on non-federal lands would most likely remain undetected and unprotected because no laws governing rare plants on non-federal lands exist. The Althouse Sucker Landscape Management Project and young stand management projects in the Sucker Creek watershed require buffers around special status plants to protect them from project activities. Similar buffers are used throughout the Grants Pass Resource Area and the Medford District.

The No Action alternative would have no effect on federally Threatened or Endangered plant species because there would be no habitat disturbance and the species do not occur in the project area. This alternative would also have no impact on State Threatened, Endangered, or Candidate, Bureau Sensitive, or Survey and Manage botanical species because there would be no habitat disturbance and the species do not occur in the project area.

Alternative 2: Proposed Plan of Operations
The Proposed Plan of Operations would have no effect on federally Threatened or Endangered plant species because the species are not known to occur in the project area and were not observed during surveys. This alternative would also have no impact on State Threatened, Endangered or Candidate, or Survey and Manage botanical species and would not trend toward listing Bureau Sensitive vascular plants, lichens and bryophytes because none were found during surveys, and these species are not known to occur in the project area.

The following discussion describes the possible effects on Bureau Sensitive fungi for which we are uncertain of their presence due to lack of surveys.

A search of the BLM GeoBOB database and paper records on February 4, 2010 shows there are no known sites of Bureau Sensitive fungi in the project area or the Sucker Creek 5th field watershed. The closest site is approximately 4.5 miles east of the project area in the Althouse Creek 5th field Watershed. Given the small amount of ground disturbance, approximately 2.6 acres, and the low probability of species occurrence, impacts to these species are not anticipated.

Dahlberg and Stenlid (1995) found that ectomycorrhizal mycelia networks may range in size from 1.5 to 27 meters (5 to 89 feet). Given the possibility of a small mycelia network and the level of ground disturbance (2.6 acres), if a Bureau Sensitive fungi species were present in the project area that site would likely be extirpated.

This alternative proposes to remove most of the vegetation in the project area with the exception of the vegetation as close as 20 feet from Sucker Creek. The top soil would then be removed and stockpiled. The underlying material would be excavated and filled back in as the mining progresses. After the mining is complete, approximately two years later, the site would be reclaimed by spreading the stockpiled topsoil over the project area and planting the area with trees and grass seed. Large wood would also be placed on the reclamation site. The proposed mining activities would reduce the likelihood of survival of a sensitive fungi species if it were present in the project area. A literature review of the effects of soil

stockpiling on mycorrhizae showed that biotic activity is detrimentally affected as a result of stockpiling soil for mine reclamation and road construction (Vofelsang 2004). Specifically, excavating and stockpiling soil dramatically alters fungal communities (Visser et al. 1984a, Visser at al. 1984b, in Vofelsang et al. 2004). Bureau Sensitive fungi (mycorrhizae) live in the organic and upper mineral layers of soil and are often associated with host plants. If Bureau Sensitive fungi were present it is highly unlikely they would survive implementation of this alternative due to the removal of the vegetation and stockpiling the topsoil.

If a Bureau Sensitive fungi species were present in the project, the proposed action could eliminate the local occurrence, but the likelihood of an occurrence being present is low, and other occurrences would remain. Therefore, this alternative would not trend toward listing Bureau Sensitive fungi.

Alternative 3: BLM Proposed Alternative
The BLM Proposed Alternative would have no effect on federally Endangered plant species because the species are not known to occur in the project area and were not observed during surveys. This alternative would also have no impact on State Threatened, Endangered or Candidate species, and would not trend toward listing Bureau Sensitive vascular plants, lichens and bryophytes because these species are not known to occur in the project area.

The effects on Bureau Sensitive fungi would be similar to those described in Alternative 2. The area of disturbance for Alternative 3 is approximately 1.8 acres. Given there are no Bureau Sensitive fungi known in the project area or the Sucker Creek 5th field watershed, and the small area of ground disturbance, impacts to these species are not anticipated and this project would not trend toward listing any Bureau Sensitive fungi.

Summary and Conclusions
All alternatives would have no effect on federally Threatened or Endangered plant species because they are not present in the project area. All alternatives would also have no impact on State Threatened, Endangered or Candidate species, and would not trend toward listing Bureau Sensitive vascular plants, lichens and bryophytes because they are also not present in the project area. Given the potentially small range of mycelia networks, the ground-disturbing mining activities proposed in Alternatives 2 and 3 may fragment the mycelia network, reducing or eliminating local occurrences if Sensitive Fungi are present in the disturbed area. However, given there are no known sites of Bureau Sensitive fungi in the 5th field watershed, and the small scale of the project, loss of local occurrences is not likely (i.e. the probability of adverse effects is low).

3.7 Noxious Weeds

3.7.1 Affected Environment

A survey of the project area revealed two species of noxious weeds growing in the project area, Scotch broom (*Cytisus scoparius*) and everlasting peavine (*Lathyrus latifolius*), and a large population of meadow knapweed (*Centaurea pratensis*) approximately 50 yard north of the project area at a location Mr. Tracy mined under a Notice of Operations in 2007. The meadow knapweed site has been and will continue to be treated by the BLM with an intent to eradicate the population.

Scotch broom (*Cytisus scoparius*) is a perennial shrub native to Europe and Africa. It was introduced into the United States as an ornamental, and later used to stabilize roadcuts. Scotch broom invades roadsides, pastures, and other disturbed places. It produces a large amount of long-lasting seed (up to 80 years). It can form dense fields that displace native plants and degrade habitat for wildlife. Successful control

methods include manually pulling the entire plant, herbicide application, controlled burning, and a combination of cutting and herbicide treatment.

Everlasting peavine (*Lathyrus latifolius*) is a perennial forb that has a semi-climbing growth habit. This species is native to Europe and was likely introduced as an ornamental. It grows in open areas and can quickly overgrow surrounding vegetation. The plant reproduces by seed, stolons, and rhizomes. Seeds of this plant are toxic to mammals. Control methods include hand pulling and herbicide.

Meadow knapweed (*Centaurea pratensis*) is a perennial herb that is a fertile hybrid between black knapweed (*C. nigra*) and brown knapweed (*C. jacea*), which are both native to Europe. Meadow knapweed was originally introduced as a potential forage species. This species invades moist sites, including irrigated pastures and moist meadows, river banks, streams, irrigation ditches, and opening in forested areas. It primarily reproduces by seed, but root crown fragments will resprout when disturbed by heavy equipment or cultivation. Meadow knapweed seed is carried in rivers, streams, or irrigations water, in hay or by vehicles along roadsides. Successful control methods include grazing, herbicide application, mowing, manual digging if only a few plants area present, competitive planting, and biological controls.

3.7.2 Environmental Consequences

Alternative 1: No Action
Noxious weeds can out-compete native plants, reduce habitat for native insects and animals, and threaten biological diversity. Vehicles are a primary method for transporting and establishing new populations of noxious weeds. The No Action alternative would not create additional disturbance or access that may result in new weed populations. The existing populations of noxious weeds would continue to spread until they are treated, but the spread would be slow because there is little to no bare soil for the plants to occupy. The risk of new weed infestations would continue, but again there is little bare soil in the project area available for seeds to establish.

For other projects proposed in the Sucker Creek 5th field watershed, PDFs such as washing of equipment to remove any weed seed or prologues, and using seed that is certified as weed free, have been used to reduce the risk of introducing or spreading noxious weeds.

Alternative 2 and 3: Proposed Plan of Operation and BLM Proposed Alternative
Project activities could cause noxious weeds to spread or become established through seed or plant transport by vehicles, and through soil disturbance which provides an opportunity for weeds to outcompete many native species in re-colonizing bare soil. However, due to PDFs designed to reduce the risk of weed spread (equipment washing to remove dirt containing weed seeds or plants, seeding stockpiled soil with native grasses, and control or eradication of identified noxious weed sites), the spread of noxious weeds due to project activities is not anticipated to be distinguishable above current levels and mechanisms (vehicles, wind, animals, etc.) of weed establishment and spread. Because mulch that may be used for revegetation or erosion control would be weed free, the use of mulch is not anticipated to increase the spread of noxious weeds. PDFs for reducing or eliminating noxious weed impacts are widely accepted, effective, and utilized as standard operating procedures in noxious weed control across the nation (DOI, BLM 2007).

Although the immediate potential for weed spread would be less with no action compared to the either of the alternatives, the potential for the spread of existing noxious weeds and the introduction of new infestations is similar for both alternatives because the bare soils created by the proposed activities would be mulched an seeded, eliminating areas for noxious weeds to establish. This is also because of PDFs (discussed above) and the fact that under the No Action alternative, populations of weed within the

project area would continue to establish and spread due to seed transport by existing vectors such as vehicles, wildlife, wind and water across the watershed. Given the unpredictability of weed spread through these existing vectors, it is not possible to quantify with any degree of certainty the rate of weed spread in the future or even the degree by which that potential would be affected (increased or decreased) by the proposed action.

Summary and Conclusions
Due to the small scale of the project, seeding and mulching, and PDFs to prevent mechanisms of weed transport or spread, there is a low risk for the introduction or spread of noxious weeds. Under any of the alternatives, including the No Action alternative, weed populations within the project area would continue to establish and spread. The population of meadow knapweed adjacent to the project area will continue to be treated using methods that conform with the Medford District Integrated Weed Management Plan and Environmental Assessment (Medford District BLM 1998). There are no cumulative effects anticipated when considering past mechanisms of impact or foreseeable projects in the Sucker Creek 5th field watershed.

3.8 Wildlife

Only Special Status Species (Federally Listed, Federal Candidate, Bureau Sensitive, and Survey and Manage wildlife species) known or suspected to be present within the project area or adjacent BLM lands and potentially impacted by the proposed actions are addressed in this EA.

BLM is required to address impacts to Threatened and Endangered Species in mining operations **(**43CFR3809**.**411(a)(2)(ii) and (iii) and 43 CFR §3809.420 (b)(7)). While the mining claimant, "…shall take such action as may be needed to prevent adverse impacts to threatened or endangered species, and their habitat which may be affected by operations," 43 CFR 3809.420 (7), it is the BLM's policy to protect, manage, and conserve sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (Bureau Manual 6840.02 and IM OR-2003-054).

3.8.1 Affected Environment

Northern Spotted Owl (Federally Threatened)
Spotted owls are closely associated with older forests for nesting, foraging, and roosting throughout most of their range (Forsman et al. 1984; Carey et al. 1990; and Solis and Gutierrez 1990). Suitable spotted owl nesting, roosting, and foraging habitat (NRF) is characterized by forested stands with older forest structure, multiple canopy layers, and a canopy closure of 60 percent or greater. The best quality NRF habitat has large old trees with cavities, broken tops or mistletoe platforms, large branches, dead standing and fallen decayed trees, and multiple canopies of shade tolerant hardwoods and conifers that support prey base. NRF habitat can also function as dispersal habitat. Dispersal-only habitat for spotted owls is defined as stands that have a canopy closure of 40 percent or greater and provides cover, food, and protection on a temporary basis to non-nesting owls moving between patches of NRF habitat (USDI, 2006).

The proposed mining operation on BLM is in spotted owl NRF habitat. The project is located in the home range of one spotted owl site but more than a quarter mile from the associated nest trees. Limited surveys have been conducted since nesting was last confirmed in 1998. The pair has been observed only once in 2000 and no owls were observed in during surveys conducted in 2001, 2005, 2006, and 2008.

The mining operation would take place within the 100 acre Known Spotted Owl Activity Center (USDI 1995) associated with this site. However, the location of the proposed mining operation is not within

contiguous forest cover with the historic nest site. Not all of this particular KSOAC is NRF. The mining operation is adjacent to the portion of the KSOAC which includes younger forests (currently not suitable for owls) between the mining site and the historic nest tree locations.

Fisher (Federal Candidate)

Fishers are associated with low to mid-elevation forests with a coniferous component, large snags or decadent live trees, large fallen trees for denning and resting, and complex physical structure near the forest floor, which provide habitat for fisher prey (Aubry and Lewis 2003). Suitable spotted owl NRF habitat also adequately describes suitable fisher denning and resting habitat because there is a direct correlation of key habitat features captured in the rating system and fisher habitat (high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor). The proposed mining operation on BLM is located in suitable denning and resting fisher habitat.

Forest carnivore surveys using bait stations with motion and infrared detection cameras have been conducted throughout the Grants Pass Resource Area and have detected fishers in the vicinity of Williams, the top of the Deer Creek drainage, and near Galice Creek. Surveys have also been conducted near the proposed mining operation for the Althouse Sucker project (T39S-7W-Section 35; T40S-R7W-Sections 13 and 15), but no fishers were detected. Even though fishers have not been detected at these camera locations, fishers are suspected to occur in the Sucker Creek watershed due to the available habitat and the detections of fishers in adjacent watersheds. The nearest known fisher location is on BLM land, approximately 5 miles northeast of the proposed action.

Survey and Manage Species

The proposed mining operation would occur in suitable red tree vole (RTV) habitat. RTV surveys were conducted for the Althouse Sucker Landscape Management Project, and RTVs were located in section 1 and the adjacent sections 11 and 12. No surveys have been conducted at the mining operation location.

Potential habitat exists for the Survey and Manage mollusk, *Monadenia chaceana*. However, the pre-disturbance survey requirement for the Grants Pass Resource Area was removed in, The Survey Protocol for the Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan, Version 3.0, due to a range change for the *Monadenia chaceana* species (USDA and USDI 2003). Additionally, since the late 1990s, more than 17 landscape management project areas throughout the Grants Pass Resource Area have been surveyed for mollusks using the terrestrial mollusk survey protocol (USDA and USDI 1997 and USDA and USDI 2003). Surveys have revealed no detections of *Monadenia chaceana*. Suitable habitat for the *Helminthoglypta hertleini* mollusk does not exist within the project area.

Potential nesting habitat exists for the great gray owl. However, suitable foraging isn't near enough to trigger surveys. Additionally, the mining operation is located within the Althouse Sucker Landscape Management project area. Two-year protocol surveys were completed in suitable great gray owl nesting habitat found within the Althouse Sucker project area. The nearest surveys were over 2 miles west of the mining operation. No great gray owls were detected during these surveys. Since the late 1990s, 11 landscape management project areas, including the Althouse Sucker project, evenly distributed across the GPRA have been surveyed for GGOs using the two-year survey protocol (USDA, USDI BLM 2004b). Only one project area within the GPRA, east of Williams, has documented nesting GGOs; this is approximately 12 miles from the proposed mining operation.

Additional Wildlife

Down logs and snags are present within the proposed road route that may provide habitat for some special status species and land birds (neotropical birds and year round residents). Land birds use a wide variety

of habitats, including late-successional forests, riparian areas, brush in recovering clear-cuts, and small trees in developing stands.

3.8.2 Environmental Consequences

Alternative 1: No Action
Under the No Action alternative, future foreseeable actions within the Sucker 5th field watershed listed in the introduction of Chapter 3 are expected to degrade, but not remove approximately 2,582 acres of a variety of wildlife habitats. However, special status wildlife species on BLM lands would continue to be protected and conserved following policy and management guidelines. On privately owned lands, predicting future foreseeable actions is difficult due to the multitude of individual landowners. Industrial timber lands are likely to remain in an early to mid-seral rotation, with the vast majority already quantify as unsuitable habitat across the watershed. Wildlife populations on non-federal lands would most likely remain undetected and unprotected.

Stand conditions within the proposed mining location would remain the same and no habitat modifications would occur. Therefore, there would be no negative effects to special status wildlife species or their habitats at the proposed mining location.

Alternative 2: Proposed Plan of Operations

Northern Spotted Owl (Federally Threatened)
The mining operations would remove approximately 2.6 acres of spotted owl NRF habitat within the Sucker Creek Fifth Field watershed. The project would have long term effects to spotted owl habitat, including a portion of a 100 acre KSOAC. Re-establishment of the new forest stand may be slow to develop because long-term site productivity may be adversely affected due to the mixing, sorting, and displacement of the soils during the mining operation. Even though reclamation would occur on the site by planting native vegetation and adding coarse woody debris, the recovery of the site to current NRF conditions could take at least 100 years.

This project would remove less than 0.4 percent of the NRF habitat within this owl home range for an extended period of time and possibly permanently. This small amount of removal would not preclude new owls from occupying the known spotted owl site in the future because the proposed action would not impact the large block of approximately 60 acres of contiguous nesting habitat within the KSOAC, which includes the four historic nest trees and likely represents the best nesting locations for this area. Immediately west of the KSOAC and the mining activity there are approximately 80 acres of contiguous habitat; however, this small acreage of habitat loss between the two blocks of NRF will not preclude owls from using both stands. However, several viable spotted owl KSOACs within the Medford District are transected by roads or other small openings, so adverse effects to nesting owls are not expected. Additionally, season restrictions listed as Project Design Features (section 2.3, above) would prevent disturbance to nesting spotted owls within the project area during the critical breeding season.

The removal of up to 3 acres of NRF habitat may also impact foraging by changing habitat for spotted owl prey species. Large live trees, snags, and down wood, which are important habitat for some prey species, such as dusky-footed woodrats, flying squirrels, and red tree voles, would be removed within 0.5 miles of the historic nest area. Rosenberg and McKelvey (1999) reported that spotted owls are “central place” animals with the core area (the area closest to the nest) being the focal area. Several studies (Wagner and Anthony 1998, Dugger et al. 2005, Zabel et al. 2003, Bingham and Noon 1997) indicate the core area size for the Klamath province is 0.5 miles (or 500 acres) within the nest site. Even though the proposed action is within the 0.5 mile core, the effects to foraging would be minimal because

approximately 98% of suitable habitat would be retained within the core area, which would provide areas for spotted owl foraging in the future. Additionally, these retained patches would be contiguous with the historic nest site. The proposed project is near the edge of the 0.5 mile core area and due to past management, there is not contiguous habitat from the nest site to the proposed action area, which further reduces the likelihood of indirect effects from effects on prey species as a result of the mining operation.

Fisher (Federal Candidate)

Approximately 2.6 acres of fisher denning and resting habitat would be removed as a result of the proposed action. The proposed action would remove key habitat features, such as large snags, decadent live trees, and large fallen trees, which provide complex physical structure near the forest floor and habitat for fisher prey (Aubry and Lewis 2003). No known denning sites would be impacted and proposed activities would not be expected to cause direct mortality of any fishers. The loss of habitat from the proposed action would be negligible and would not preclude fishers from using the BLM lands within the Sucker Creek 5th field watershed. Approximately 22,592 acres of suitable denning and resting habitat would be retained on federal lands within the Sucker Creek 5th field watershed. Re-establishment of the new forest stand at the mining site may be slow to develop because long-term site productivity may be adversely affected due to the mixing, sorting, and displacement of the soils during the mining operation. Even though reclamation would occur on the site by planting native vegetation and adding coarse woody debris, the recovery of the site to current denning and resting habitat conditions could take at least 100 years.

Project activity disturbance effects to fishers are not well known. Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987; Powell 1993). Disturbance from the proposed action would be temporally and geographically limited. Fishers have large home ranges and would be able to move away from the action area while the disturbance is occurring, without impacting their ability to forage and disperse within their home range.

The proposed action would not contribute to the need to federally list the fisher as threatened or endangered. Habitat features, such as large snags and coarse wood, as well as untreated late-successional forest habitat, would be retained in the adjacent BLM stands and would continue to provide denning and resting habitat within the Sucker Creek 5th field watershed. No late-successional habitat would be removed in future foreseeable actions. Therefore, after the proposed mining operation, under alternative 2, approximately, 22,589.4 acres of suitable denning and resting habitat would be retained on federal lands within the Sucker Creek 5th field watershed.

Survey and Manage Species

The proposed mining operation would remove 2.6 acres of suitable RTV habitat. Loss of RTV nests would be expected because RTVs have been detected in the area. The exact number is unknown since surveys have not been conducted at the project area, but based on survey results within the Althouse Sucker Landscape Management Project and the size of the proposed action, the loss could be up to 5 nests within the project area. However, this small loss would not contribute to the need to federally list RTVs, because of the abundance of RTVs within the 5th field watershed and the Grants Pass Resource Area. No effects are anticipated to S&M mollusks because the project is outside of the range of the *Monadenia chaceana*. No effects are anticipated to GGOs because no sites are within the project area and historic surveys haven't found GGOs in this area of the GPRA.

Additional Wildlife

The proposed action would remove approximately 2.6 acres of riparian habitat (conifers, hardwoods, brush, snags, and coarse woody material) for neotropical birds and other wildlife. However, this loss would be negligible due to the large amounts of suitable habitat retained on adjacent BLM land. Similar

late-successional riparian habitat is located adjacent to the project area within Section 1 and south of the project area in Section 12. Some individuals may be displaced during project activities. However, untreated adjacent BLM lands would provide refuge and nesting habitat, which would help minimize short term loss of habitat and temporary displacement during project activities. Additionally, the failure or loss of a nest during one nesting season would not be expected to reduce the persistence of any bird species in the watershed due to the small scope of the project.

The proposed mining operation could cause warmer, drier conditions in adjacent interior forest habitats because of reduction of the canopy closure and increased solar and wind exposure (Trombulak and Frissell 2000). This could result in reduced reproduction and survival of species with low dispersal capabilities, such as mollusks and possibly amphibians (Marsh and Beckman 2004). Species with greater dispersal capabilities could likely move to areas with more favorable microclimate conditions if suitable habitat were nearby. However, due to the small scope of this project, only negligible or undetectable effects to Bureau special-status species are expected. The mining operation is not expected to affect long term population viability of any known species or lead to the need to list sensitive wildlife species due to minimal habitat loss and the abundance of habitat nearby.

Summary and Conclusions

Even when the 2.6 acres of habitat removal from the mining operation is added with the future foreseeable actions, it is unlikely the project will have cumulative impacts to wildlife species in the Sucker Creek 5th field watershed. While, the proposed actions may potentially adversely affect local individuals of sensitive wildlife species due to the loss of habitat, this project is not expected to affect long-term population viability of any T&E, Bureau Sensitive, or Survey and Manage wildlife species known to be in the area. Additionally, this project combined with other actions in the watershed would not contribute to the need to federally list any Bureau Sensitive or Survey and Manage wildlife species, because of the small scope of the proposed action and the presence of a diversity of habitat within the Sucker Creek 5th field watershed. This project would result in a reduction of less than 0.02% of the late-successional habitat within the Sucker Creek 5th field watershed. As under the No Action alternative, other activities in the watershed are expected to degrade, but not remove approximately 2,582 acres of a variety of wildlife habitats. No late successional habitat would be removed in future foreseeable actions. Therefore, after the proposed mining operation, under alternative 3, approximately, 22,589.4 acres of suitable denning and resting habitat would be retained on federal lands within the Sucker Creek 5th field watershed. Re-establishment of the new forest stand at the mining site may be slow to develop because long-term site productivity may be adversely affected due to the mixing, sorting, and displacement of the soils during the mining operation. Reclamation activities, such as adding coarse woody debris to the upland area, will have beneficial effects by reintroducing stand structural elements important to a variety of wildlife species. In the interim, adding coarse woody debris may provide some foraging and cover habitat for some species. However, the final beneficial effects for the mining site are not expected until the recovery of the site to current late successional habitat conditions (large trees, multi-layers, large snags, and large coarse wood), which could take at least 100 years.

Alternative 3: BLM Proposed Alternative

The effects to wildlife from Alternative 3 would be similar as what was described under Alternative 2 because the proposed actions would affect habitat in a similar manner, but at a smaller scale. The proposed action would only impact approximately 1.8 acres instead of 2.6 acres.

Northern Spotted Owl (Federally Threatened)

The mining operations would remove approximately 1.8 acres of spotted owl NRF habitat within the Sucker Creek Fifth Field watershed. The proposed action would remove 1.8 acres of habitat important for

spotted owl prey species. The effects are expected to be similar because proposed actions would affect habitat in a similar manner, but at a smaller scale. See the Alternative 2 effects section for more details.

Fisher (Federal Candidate)
Approximately 1.8 acres of fisher denning and resting habitat would be removed as a result of the proposed action. The effects are expected to be similar to those described under Alternative 2 because the proposed actions would affect habitat in a similar manner, but at a smaller scale. See the Alternative 2 effects section for more details.

Survey and Manage Species
The proposed mining operation would remove 1.8 acres of suitable RTV habitat. Loss of RTV nests would be expected because RTVs have been detected in the area. The exact number is unknown since surveys have not been conducted at the project area, but based on survey results within the Althouse Sucker Landscape Management Project and the size of the proposed action, the loss could be up to 3 nests within the project area. However, this small loss would not contribute to the need to federally list RTVs, because of the abundance of RTVs within the 5th field watershed and the Grants Pass Resource Area. No effects are anticipated to former S&M mollusks because the project is outside of the range of the *Monadenia chaceana*. No effects are anticipated to GGOs because no sites are within the project area and historic surveys haven't found GGOs in this area of the GPRA.

Additional Wildlife
The proposed action would remove approximately 1.8 acres of potential riparian habitat (conifers, hardwoods, brush, snags, and coarse woody material) for neotropical birds and other wildlife. However, this loss would be negligible due to the large amounts of suitable habitat retained on adjacent BLM land. The effects are expected to be similar as described under Alternative 2 because the proposed actions would affect habitat in a similar manner, but at a smaller scale. See the Alternative 2 effects section for more details.

Summary and Conclusions
Even when the 1.8 acres of habitat removal from the mining operation is added with the future foreseeable actions, it is unlikely the project will have cumulative impacts to wildlife species in the Sucker Creek 5th field watershed. While, the proposed actions may potentially adversely affect local individuals of sensitive wildlife species due to the loss of habitat, this project is not expected to affect long-term population viability of any T&E, Bureau Sensitive, or former Survey and Manage wildlife species known to be in the area. Additionally, this project combined with other actions in the watershed would not contribute to the need to federally list any Bureau Sensitive or former Survey and Manage wildlife species, because of the small scope of the proposed action and the presence of a diversity of habitat within the Sucker Creek 5th field Watershed. This project would result in a reduction of less than 0.02% of the late-successional habitat within the Sucker Creek 5th field watershed. As under the No Action alternative, other activities in the watershed are expected to degrade, but not remove approximately 2,582 acres of a variety of wildlife habitats. No late-successional habitat would be removed in future foreseeable actions. Therefore, after the proposed mining operation, under alternative 3, approximately, 22,590.2 acres of suitable denning and resting habitat would be retained on federal lands within the Sucker Creek 5th field watershed. Re-establishment of the new forest stand at the mining site may be slow to develop because long-term site productivity may be adversely affected due to the mixing, sorting, and displacement of the soils during the mining operation. Reclamation activities, such as adding coarse woody debris to the upland area, will have beneficial effects by reintroducing stand structural elements important to a variety of wildlife species. In the interim, adding coarse woody debris may provide some foraging and cover habitat for some species. However, the final beneficial effects for most species are not expected until the

recovery of the site to current late-successional habitat conditions (large trees, multi-layers, large snags, and large coarse wood), which could take at least 100 years.

3.9 Cultural Resources

3.9.1 Affected Environment

The Tracy Plan is situated in a region that has a rich history. Archeological evidence indicates that human occupation of southwest Oregon dates back about 10,000 years. However, very few prehistoric sites have been recorded in the Sucker Creek drainage, likely due to the heavy impact from mining.

The first documentation of whites to enter southern Oregon, trappers belonging to a party of Hudson's Bay Company, occurred in the early part of 1827. Others trappers and explorers made periodic visits to the area up to the time of the discovery of gold in Jackson County, which occurred in 1851 or 1852. This brought a further influx of miners to the area. Sucker Creek was among one of the most productive mining regions in southern Oregon. Mining in the Sucker Creek drainage began in the 1850s with the original gold rush to the Northwest. This original mining peaked in the 1860s, and gradually declined until the present.

Early mining consisted of panning, sluicing, and hydraulic mining. The miners prospected by panning and sluicing banks and benches throughout the drainage. When a prospect looked good, a crew was brought in to mine using hydraulic giants, which allowed miners to work large amounts of gravel in a short period of time (USDI 2000).

Sucker Creek was placer mined in the 1970s and early 1980s by several individuals. One noticeable mining location was an area several acres in size on both sides of Sucker Creek, but most work involving heavy mechanized equipment was on the west side of the creek. The activity was short in duration. Mr. Tracy mined two areas under Notices of Intent over the past two years, one on each side of Sucker Creek. See introduction to section 3.0 for further details.

A Cultural Resource Survey was completed in the Planning Area in July 2009, which revealed a cultural site located within the Plan of Operations area. The site is related to historic mining and consists of tailings, a ditch segment, and an impoundment for water. The site was determined not eligible for inclusion on the National Register of Historic Places by a BLM archaeologist in August 2009. Concurrence will be received from the State Historic Preservation Office prior to any work being started by the claimant.

Categorizing cultural resources according to their potential uses is the process, used to make protection and utilization decisions. Use categories establish what needs to be protected, and when or how use should be authorized. This site has been categorized as “Discharged from Management.” This category is assigned to cultural properties that have no remaining identifiable use. Most often these are prehistoric and historic archaeological properties, such as small surface scatters of artifacts or debris, whose limited research potential is effectively exhausted as soon as they have been documented. Also, more complex archaeological properties that have had their salient information collected and preserved through mitigation or research may be discharged from management, as may cultural properties destroyed by any natural event or human activity. Properties discharged from management remain in the inventory, but they are removed from further management attention and do not constrain other land uses (BLM 8110 Identifying and Evaluating Cultural Resources).

3.9.2 Environmental Consequences

Alternative 1: No Action
None of the proposed actions would be implemented in the Tracy Plan. All environmental conditions and trends will continue. The historic site located within the Tracy Plan area would remain intact.

Alternative 2: Proposed Plan of Operations
Under this alternative the historic sites features will be completely altered/removed by the claimant's methods of extraction and reclamation. No evidence of past historic mining activity will remain. However, since this site has been documented, determined not eligible for inclusion on the National Register of Historic Places, and categorized as Discharged from Management, there will be no loss of important scientific information from loss of the site.

Alternative 3: BLM Proposed Alternative
This alternative allows for the retention of a 90 foot portion of the existing ditch system. The remainder of the sites features will be removed through the mining process, including reclamation. As with Alternative 2, because of documentation and categorization, there will be no loss of important scientific information from the partial loss of the site.

Summary and Conclusions
BLM recommends the historic site as not eligible for listing on the National Register. Records search revealed no documented association with persons significant in our past, nor has it made a significant contribution to the broad patterns of our history. There are no distinctive characteristics of a type, period, or method of construction at this site. Under both alternatives, there will be loss of at least part of the site. However, the site does not offer any important scientific information that was not recorded in the field. The site lacks sufficient historical and archaeological significance to merit consideration for listing on the National Register. No further study is recommended for the historic site. BLM will manage the sites according to the direction provided in BLM Manual 8100 (Cultural Resource Management).

3.10 Visual Resources and Recreation

3.10.1 Affected Environment

As designated in the RMP, the Tracy Plan area is managed as Visual Resource Management (VRM) Class IV (USDI 1995). The objective of Class IV is "to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements." (BLM VRM Manual 8431, 1989).

The existing character of the landscape in the project area is discontinuous due to variations in natural features such as different vegetation types, with both vertical dominance as well as more rounded forms; different types and levels of canopy cover and various colors of land and vegetation (seasonally and year-round). Human alterations of the landscape are also prevalent with clearings, a recent wildfire and past mining activities.

On BLM lands in the Sucker Creek drainage, there are no opportunities for camping at developed sites or for recreating on developed trail systems. The project area lies behind a locked gate which allows for travel on horse or by foot only. Recreational use in the vicinity of the project is therefore very minimal and is classified as dispersed recreation. Recreational opportunities exist on neighboring National Forest System lands, but would not be visually affected by the Tracy Plan project due to their distance from the

project area. Developed camping on Forest Service lands exists at both Cave Creek Campground and Grayback Campground, however, both of these sites are approximately 2 ½ miles from the described project area.

3.10.2 Environmental Consequences

Alternative 1: No Action
Under the No Action Alternative, there would be no change to the existing visual landscape or to existing dispersed recreational opportunities caused by this project. However, visual resources in the area may be affected by the implementation of other projects that were previously, and are currently being analyzed under separate environmental analysis including the Althouse Sucker Landscape Management Project Environmental Assessment which was completed in June of 2008 and the Programmatic Fuel Hazard Reduction Project Environmental Assessment which is currently being analyzed. In any case, these projects will also be in compliance with the RMP.

Alternative 2
Under Alternative 2, the level of visual change would be considerable and the landscape character would be altered. The proposed action would create openings in an existing dense, coarse-textured stand with full canopy closure. The level of change would be noticeable compared to existing openings that are in the surrounding landscape, yet still within RMP guidelines for VRM Class IV. In the short term, the activity would cause a considerable contrast and draw attention to the landform (i.e., soils) until vegetation fills in the openings over several years. The remaining vegetation's blend of medium to dark green colors would be unchanged.

While the area would be affected by project activities, the project would not affect dispersed recreation activities.

Alternative 3
Under Alternative 3, the level of visual change would be less noticeable due to the larger buffer of trees left along Sucker Creek; however the landscape character would also be altered. The proposal would create openings in an existing dense, coarse-textured stand with full canopy closure. The level of change would be noticeable compared to the existing openings that are in the surrounding landscape, yet still within RMP guidelines for VRM Class IV. In the short term, the activity would cause a moderate contrast and draw attention to the landform (i.e., soils) until vegetation fills in the openings over several years. The vegetation's blend of medium to dark green colors would remain unchanged.

While the area would be affected by project activities, the project would not affect dispersed recreation activities.

In the short term, there will be noticeable changes in color and texture resulting from reclamation efforts and recontouring the mining site. There will be a visible increase in browns, reds, and grays from the top soil which will be contoured to match the surrounding landscape. Texture in the short term will be less coarse; however, the effects of the reclamation on visuals in the long term would diminish once vegetation has been established. Dark greens of ferns, grasses, and other vegetation will replace the dominant brown hue of the soils and revegetation efforts would increase the coarseness and vertical lines over the long term.

Summary and Conclusions
Under both action alternatives, the project would meet the overall change in the vegetative character within the landscape area and is consistent with and would meet VRM class IV objectives as identified in the RMP (USDI 1995) and BLM H-8410-1, Visual Resource Inventory Handbook. The effects on

recreation would also be minimal as it is not an area that is commonly used for this purpose. While the area would be affected by project activities, the project would not affect dispersed recreation activities.

3.11 Greenhouse Gases and Carbon Storage

3.11.1 Context and Background

Current Oregon/Washington BLM policy directs districts to consider, under standard NEPA principles, whether greenhouse gas levels and carbon storage is an issue requiring analysis for a project. The BLM anticipates that the impact of most projects on greenhouse gas levels and carbon storage will be negligible when placed in the appropriate context for analysis. However, because of the relative newness of this issue, and the continuously and rapidly developing science, the BLM is taking a cautious approach. Because of the small scale of this project (0.004% of the watershed and 0.02% of BLM lands in the watershed), greenhouse gas emissions and carbon storage are not considered an issue in this EA, especially since the appropriate scale of analysis is a much larger scale than even the watershed.

Scientific knowledge on the interrelationship between greenhouse gas levels and climate change is rapidly changing, and substantial uncertainties and several key limitations remain. One limitation is the inability of current science to identify a specific source of greenhouse gas emissions or sequestration, and designate it as the cause of specific climate impacts at a specific location. This limitation was identified by the U.S. Geological Survey in a May 14, 2008 memorandum to the U.S. Fish and Wildlife Service, which summarized the latest science on greenhouse gases. Because specific sources of greenhouse gas emissions or sequestration cannot be designated as the cause of specific climate impacts at a specific location, the appropriate scale for analysis of climate change is global, not local, regional, or continental.

4.0 Agencies and Persons Contacted

4.1 Public Involvement

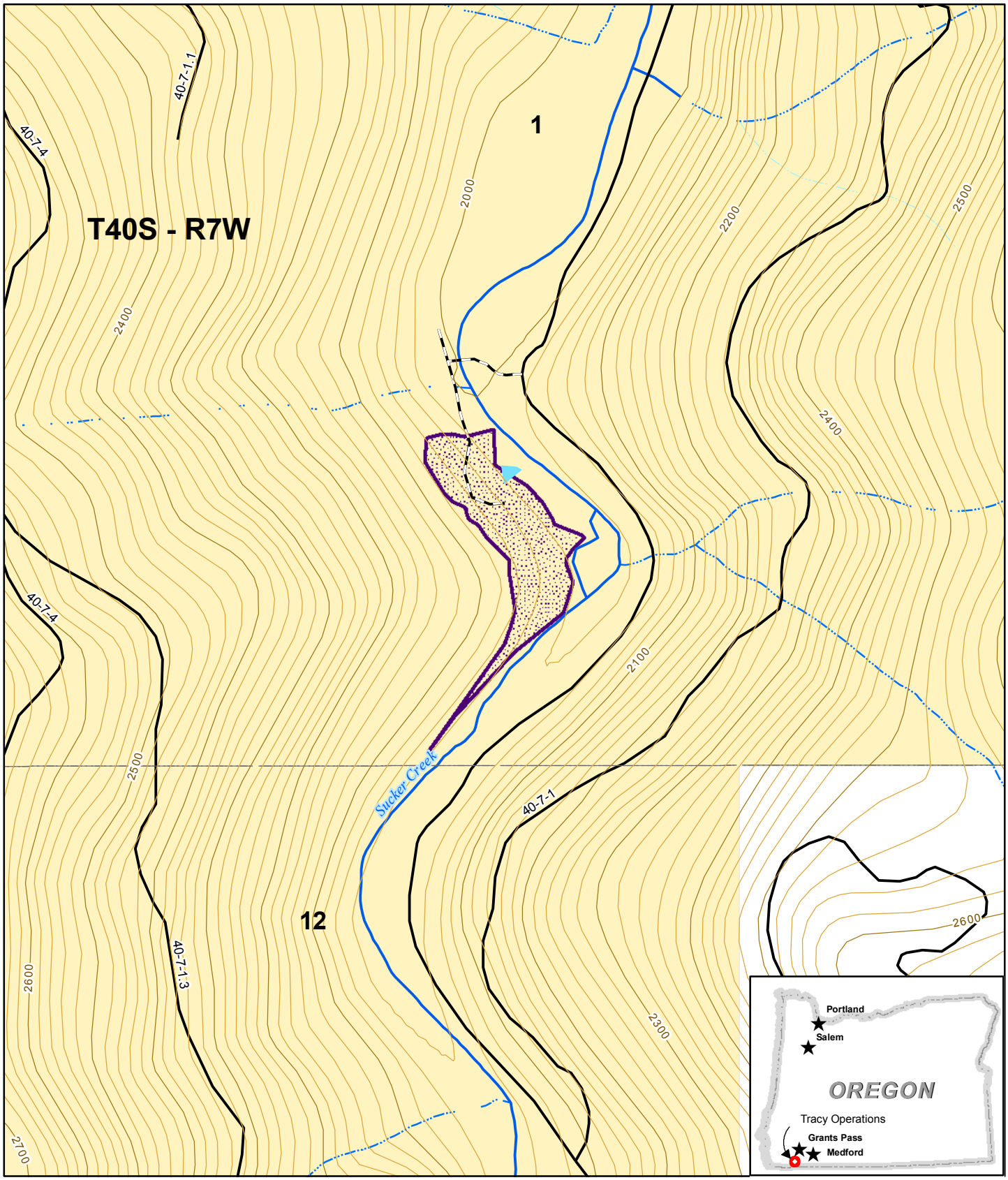
The BLM extended an invitation to the local and regional communities, Native American tribes and other state and federal agencies, private organizations and individuals to develop issues and resources important to local, state, national, and international economies.

Public involvement began in December 2009, with a scoping letter being sent to approximately 50 residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to tribal and private organizations and individuals that requested information concerning projects of this type.

The BLM coordinated and held a series of meetings with the claimant, and other federal and state agencies. Letters, phone calls, meetings, and field visits elicited a variety of issues and concerns that are addressed throughout the EA.

4.2 Availability of Document and Comment Procedures

Copies of the EA will be available for public review in the Grants Pass Interagency Office. A formal 30-day public comment period will be initiated by an announcement in the Grants Pass Daily Courier. If you would like a copy of the EA, please stop by the office or contact Tony Kerwin, Environmental Planner, at (541) 471-6564. Written comments should be addressed to Abbie Jossie, Field Manager, Grants Pass Resource Area, at 2164 NE Spalding Avenue, Grants Pass, OR 97526. E-mailed comments may be sent to *Medford_Mail@blm.gov.*



Tracy Sucker Creek Plan of Operations
Alternative 2 -Claimant's Alternative

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

Legend

- Pond
- Miner's Access Rd
- Proposed Plan Area

Stream

- Perennial
- Intermittent/Seasonal
- Ephemeral

Ownership

- BLM
- Private

Feet
0 500 1,000

Prepared By: dassali
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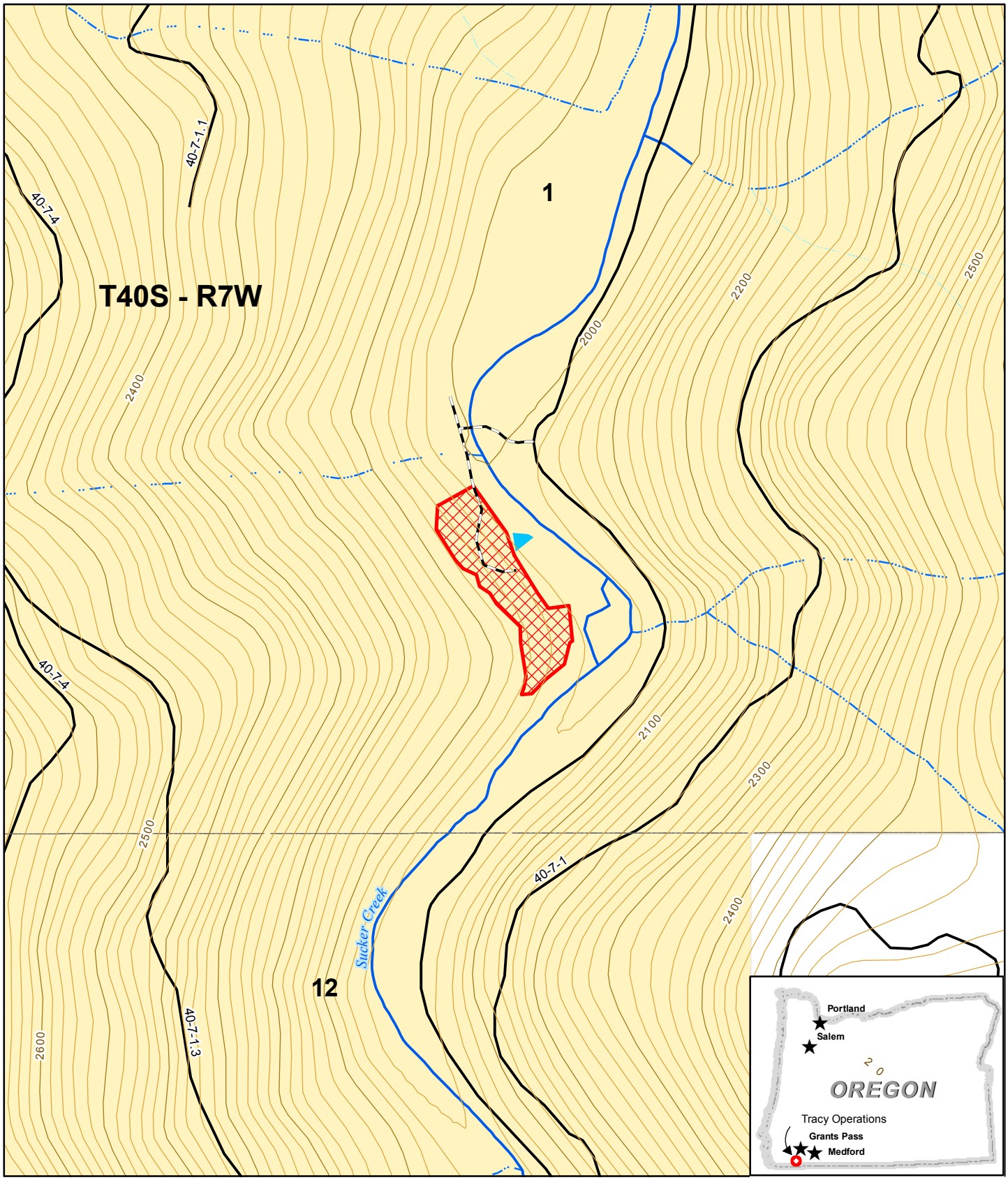

Tracy Sucker Creek Plan of Operations
Alternative 3 - BLM's Alternative

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

Legend

- Pond
- Miner's Access Rd
- BLM's Alternative

Stream

- Perennial
- Intermittent/Seasonal
- Ephemeral

Ownership

- BLM
- Private

Feet
0 500 1,000

Prepared By: dassali
Current Date: 03/26/2010 12:12:07 PM

Appendix B. SHADOW Model

SHADOW is a physically based computer model that allows land managers to estimate the amount of stream shade and maximum summer stream temperature. The model can be used for an individual stream reach or for small watersheds to analyze the stream temperature regime for complex stream networks. Shade and channel form have strong effects on the temperature of a stream through controlling how much the sun can strike the water. The SHADOW model uses trigonometry to project the amount of sunlight striking a stream using data on sun angle, which is calculated using an index day of August 1st and the latitude of the site.

SHADOW Model Data Inputs

To run the SHADOW model requires 11 input columns for each of the 3 reaches (both left and right banks of a reach) in the Tracy Plan area. Data was initially entered into an Excel spreadsheet and later pasted into an Excel spreadsheet containing the model. The data input columns are:

1. Reach Identification Code (tells where the reach is and if it has been split into two separate banks),
2. Selected Y/N (tells if a reach is included in the current 'SHADOW Model' run or excluded),
3. % Tree Overhang (the proportion of the channel covered by tree canopies in decimal %),
4. Active Channel Width (width of the bankfull channel in feet),
5. Length (reach length in feet),
6. Tree Height (height in feet of the trees contributing shade to the stream),
7. Tree to Channel Slope (angle of the bank between the bankfull channel and the closest trees providing shade),
8. Stream Orientation (the aspect of the reach in classes 0 [North-South], 45 and –45 [Diagonal], or 90 [East-West]),
9. Tree to Channel Distance (the average distance in feet of shade trees from the bankfull channel),
10. Shade Density (the canopy density in decimal % for trees adjacent to the stream), and
11. East/West/Both (instructs the model whether the calculation is for both banks [B] or only one bank [E or W]).

Additional information required by the model for Sucker Creek was the latitude and the magnetic declination.

Stream reaches are numbered starting at the top and proceeding to the north (see below for the data spreadsheet). The Tracy Plan area was broken into reaches to aid in the analysis. The mainstem was broken into the following three sections:

The SHADOW model does not compute shade for the north bank of east-west trending streams (aspect class 90) because the north bank does not contribute shade to the active stream channel. The model returns a zero for the north bank in the output column to indicate this. The SHADOW model only recognizes E, W, or B in the East/West/Both input column. In this column, North banks are designated W and South banks are designated E.

The analysis (see Hydrology section above) presents the results from three model runs. The first run uses the data on current vegetation to get current shade; the second run uses data on the claimant's proposal; the third uses data for 5-years post-project completion, and assumes that the outer buffer trees are lost because impacts on root structure from excavation or compaction; and the fourth is BLM's alternative.

					Pre-activity Conditions - No-Action Alternative												
SHADOW		3/5/2010	12:42	DATE AND TIME LAST CALULATED					HEAT								
VERSON X.XX	Louts 123 version 4.01				LATITUDE		42		RATE		4	BTU/FT^3-MIN					
		Input Last Row #	17	SOLAR	DECLINATION		18	= August 1									
					GROUND H20 TEMP		53										
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SELECTED			ACTIVE						TREE		EAST=E		TOTAL	TEMP	SUM OF	
	N/NO	% TREE	FLOW	CHANNEL		LOW	TREE	TERRAIN	STREAM	CHANNEL	SHADE	WEST=W	UNSHADED	STREAM	INCREASE	UNSHADED	STREAM
IDENT	Y/YES	OVERHANG	WIDTH	WIDTH	LENGTH	FLOW	HEIGHT	SLOPE	ORIENT	DIST	DENSITY	BOTH=B	STREAM	UNSHADED	REACH	STREAM	TEMP.
1	Y	0.4	50	65	455	16	180	0.02	30	0	0.7	W	0.09	0.09	0.14		
2	Y	0.4	50	80	136	16	160	0.1	0	0	0.4	W	0.17	0.17	0.08		
3	Y	0.2	50	70	453	16	100	0.9	-25	5	0.45	W	0.23	0.23	0.35		
4	Y	0.1	50	65	455	16	40	0.02	30	0	0.25	E	0.44	0.44	0.67		
5	Y	0.2	50	80	136	16	40	0.75	0	0	0.4	E	0.39	0.39	0.17		
6	Y	0.2	50	70	453	16	90	0.04	-25	0	0.3	E	0.26	0.26	0.39	27046	54.81

				Alternative 2. Post-Activity Conditions													
SHADOW		3/8/2010	8:37	DATE AND TIME LAST CALULATED					HEAT								
VERSON X.XX	Louts 123 version 4.01				LATITUDE		42		RATE		4	BTU/FT^3-MIN					
		Input Last Row #	17	SOLAR	DECLINATION		18	= August 1									
					GROUND H20 TEMP		53										
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SELECTED			ACTIVE						TREE		EAST=E		TOTAL	TEMP	SUM OF	
	N/NO	% TREE	FLOW	CHANNEL		LOW	TREE	TERRAIN	STREAM	CHANNEL	SHADE	WEST=W	UNSHADED	STREAM	INCREASE	UNSHADED	STREAM
IDENT	Y/YES	OVERHANG	WIDTH	WIDTH	LENGTH	FLOW	HEIGHT	SLOPE	ORIENT	DIST	DENSITY	BOTH=B	STREAM	UNSHADED	REACH	STREAM	TEMP.
1	Y	0.4	50	65	455	16	180	0.02	30	0	0.15	W	0.2	0.2	0.3		
2	Y	0.4	50	80	136	16	160	0.1	0	0	0.15	W	0.27	0.27	0.12		
3	Y	0.2	50	70	453	16	100	0.9	-25	5	0.15	W	0.38	0.38	0.57		
4	Y	0.1	50	65	455	16	40	0.02	30	0	0.25	E	0.44	0.44	0.67		
5	Y	0.2	50	80	136	16	40	0.75	0	0	0.4	E	0.39	0.39	0.17		
6	Y	0.2	50	70	453	16	90	0.04	-25	0	0.3	E	0.26	0.26	0.39	33404	55.23

Alternative 2. 5-year Post-Activity Conditions with Loss of Outer Buffer Trees - Worst Case Scenario

SHADOW		3/8/2010	8:40	DATE AND TIME LAST CALULATED					HEAT								
VERSON X.XX	Louts 123 version 4.01				LATITUDE		42		RATE		4	BTU/FT^3-MIN					
	Input Last Row #		17	SOLAR	DECLINATION		18	= August 1									
					GROUND H20 TEMP		53										
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SELECTED			ACTIVE						TREE		EAST=E		TOTAL	TEMP	SUM OF	
	N/NO	% TREE	FLOW	CHANNEL		LOW	TREE	TERRAIN	STREAM	CHANNEL	SHADE	WEST=W	UNSHADED	STREAM	INCREASE	UNSHADED	STREAM
IDENT	Y/YES	OVERHANG	WIDTH	WIDTH	LENGTH	FLOW	HEIGHT	SLOPE	ORIENT	DIST	DENSITY	BOTH=B	STREAM	UNSHADED	REACH	STREAM	TEMP.
1	Y	0.4	50	65	455	16	180	0.02	30	0	0.05	W	0.24	0.24	0.37		
2	Y	0.4	50	80	136	16	160	0.1	0	0	0.05	W	0.31	0.31	0.14		
3	Y	0.2	50	70	453	16	100	0.9	-25	5	0.05	W	0.42	0.42	0.64		
4	Y	0.1	50	65	455	16	40	0.02	30	0	0.25	E	0.44	0.44	0.67		
5	Y	0.2	50	80	136	16	40	0.75	0	0	0.4	E	0.39	0.39	0.17		
6	Y	0.2	50	70	453	16	90	0.04	-25	0	0.3	E	0.26	0.26	0.39	35820	55.39

Alternative 3. Post-Activity Conditions

SHADOW		2/23/2010	8:40	DATE AND TIME LAST CALULATED					HEAT								
VERSON X.XX	Louts 123 version 4.01				LATITUDE		42		RATE		4	BTU/FT^3-MIN					
	Input Last Row #		17	SOLAR	DECLINATION		18	= August 1									
					GROUND H20 TEMP		53										
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SELECTED			ACTIVE						TREE		EAST=E		TOTAL	TEMP	SUM OF	
	N/NO	% TREE	FLOW	CHANNEL		LOW	TREE	TERRAIN	STREAM	CHANNEL	SHADE	WEST=W	UNSHADE	STREAM	INCREASE	UNSHADE	STREAM
IDENT	Y/YES	OVERHANG	WIDTH	WIDTH	LENGTH	FLOW	HEIGHT	SLOPE	ORIENT	DIST	DENSITY	BOTH=B	STREAM	UNSHADE	REACH	STREAM	TEMP.
1	Y	0.4	50	65	455	16	180	0.02	30	0	0.05	W	0.18	0.24	0.21		
2	Y	0.4	50	80	136	16	160	0.1	0	0	0.05	W	0.25	0.31	0.09		
3	Y	0.2	50	70	453	16	100	0.9	-25	5	0.05	W	0.36	0.42	0.55		
4	Y	0.1	50	65	455	16	40	0.02	30	0	0.25	E	0.44	0.44	0.67		
5	Y	0.2	50	80	136	16	40	0.75	0	0	0.4	E	0.39	0.39	0.17		
6	Y	0.2	50	70	453	16	90	0.04	-25	0	0.3	E	0.26	0.26	0.39	28031	54.87

Appendix C. Alternatives and Issues Considered but not Analyzed in Detail

Suction-dredging Alternative

Public comments suggested that the claimant could do in-stream suction dredging with a 4 inch intake hose instead of mining as described in his proposal. Suction dredging is currently being done along Sucker Creek, and is casual use under BLM regulations; however, that is not a viable alternative to his proposal. The claimant's proposal is not to suction dredge, but to mine the bench deposit.

As stated earlier in the EA, the General Mining Law of 1872 grants citizens the right to locate and mine certain minerals on public lands. A claimant's statutory rights, consistent with other laws, include entry on open public lands for the purpose of mineral prospecting, exploration, development and extraction. Section 302 of FLPMA directs the Secretary of the Interior to manage public lands under the principle of multiple-use. Minerals are specifically identified as one these multiple-uses in the Act. As the proposed mining operations under the Tracy Plan would occur on BLM-administered lands that are open to mineral entry, denying the proposal and restricting mining to suction dredging in the creek would infringe on the claimants rights.

BLM has an obligation to authorize mining activities if they would be done without "unnecessary and undue degradation" (43 CFR §3809.5), follow general performance standards (§3809.420), and approve the occupancy if it is "reasonably incident" (§3715. 0–5) to the mining operation.

Validity of the Claim

Public comments stated that claim validity must be established before a Plan of Operations can be approved. This assumption is incorrect. Under 43 CFR 3809.100, validity is not required when a mining Plan of Operation is filed unless the mining operation is within an area that is withdrawn or segregated from mineral entry. "A plan of operation may be processed for lands open to mineral entry and containing minerals subject to the mining laws without requiring proof of validity" (BLM Instruction Memorandum No. 2003-242).

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