UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
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Refer to NMFS No.: WCRO-2020-02400

January 22, 2021

Michelle Capp
District Ranger
Cle Elum Ranger District
Okanogan–Wenatchee National Forest
803 West 2nd Street
Cle Elum, WA 98922

Re: Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Swauk Mining Plans of Operation Project

Dear Ms. Capp:

Thank you for your letter dated August 27, 2020, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (U.S.C. 1531 et seq.) for the Swauk Mining Plans of Operation Project (Project). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA)[16 U.S.C. 1855(b)]for this action. We have included the results of that review in Section 3 of this document.

In this biological opinion (opinion), NMFS concluded that the proposed action is not likely to jeopardize the continued existence of ESA-listed Middle Columbia River steelhead (*Oncorhynchus mykiss*) or result in the destruction or adverse modification of their critical habitat. We have provided the rationale for our conclusions in the attached opinion.

As required by Section 7 of the ESA, NMFS provided an incidental take statement (ITS) with the opinion. The ITS describes reasonable and prudent measures (RPMs) NMFS considers necessary or appropriate to minimize incidental take associated with these actions. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements that the Federal agency and any person who performs the action must comply with to carry out the RPMs. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's effects on EFH pursuant to section 305(b) of the MSA, and includes two Conservation Recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations are identical to the ESA Term and Conditions. Section 305(b)(4)(B) of the MSA requires Federal agencies provide a detailed written response to NMFS within 30 days after receiving this recommendation.

Please contact Justin Yeager of the Columbia Basin Branch at (509) 962-8911 x805 or electronic mail at justin.yeager@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Michael Tehan
Assistant Regional Administrator
Interior Columbia Basin Office
NOAA Fisheries, West Coast Region

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

Swauk Mining Plans of Operation

NMFS Consultation Number: WCRO-2020-02400

Action Agency: U.S. Forest Service

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify critical habitat?
Middle Columbia River steelhead	Threatened	Yes	No	Yes	No

Fishery Management Plan That Describes EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued By:

Michael Tehan
Assistant Regional Administrator

Date: January 22, 2021

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ACRONYM GLOSSARY

BA	Biological Assessment
BMP	Best Management Practices
CFR	Code of Federal Regulations
CFS	Cubic feet per second
COA	Conditions of Authorization
DPS	Distinct Population Segment
DQA	Data Quality Act
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FR	Federal Register
FSR	Forest System Road
ft/s	feet per second
GPM	Gallons per minute
GRAIP	Geomorphic Road Analysis and Inventory Package
HUC	Hydrologic Unit Code
ICTRT	Interior Columbia Basin Technical Recovery Team
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
MCR	Middle Columbia River
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
opinion	Biological Opinion
ORMC	Oregon Mining Claim
PBF	Physical and Biological Feature
PCE	Primary Constituent Element
Project	Swauk Mining Plans of Operation Project
RM	River Mile
RPM	Reasonable and Prudent Measure
U.S.C.	United States Code

1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1. Background

National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), and its implementing regulations at 50 CFR 402, as amended.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov]. A complete record of this consultation is on file at the Columbia Basin Branch field office in Ellensburg, Washington.

1.2. Consultation History

The following chronology documents key points of the consultation process that culminated in this opinion for NMFS' listed species:

1) On February 19, 2020, the U.S. Forest Service (Forest Service) requested formal ESA consultation with NMFS regarding the likely adverse effects of the Swauk Mining Plans of Operation Project (Project) to Middle Columbia River (MCR) steelhead. In addition, the Forest Service requested Essential Fish Habitat consultation for Chinook salmon and coho salmon. We assigned the consultation request tracking number WCRO-2020-00302.
2) On March 5, 2020, NMFS sent the Forest Service an insufficiency letter requesting additional information and provided additional comments on the biological assessment (BA).
3) During March and April 2020, NMFS and Forest Service staff participated in numerous phone calls and exchanged emails attempting to clarify the proposed action to an extent that would enable the initiation of consultation.
4) On April 20, 2020, NMFS closed out the Forest Service's request for consultation (WCRO-2020-00302) after receiving no response from the Forest Service.
5) On June 4, 2020, NMFS and the Forest Service participated in a virtual meeting to discuss the Project.
6) On June 29, 2020, NMFS received a cover letter and BA requesting consultation for the Project. The NMFS consultation request was assigned tracking number WCRO-2020-01735.

7) On July 14, 2020, NMFS requested additional information and clarifications on numerous inconsistencies throughout the BA.
8) On August 18, 2020, NMFS closed out the Forest Service request for consultation (WRCO-2020-01735) on the Project after receiving no response from the Forest Service.
9) On August 31, 2020, NMFS received a cover letter and BA requesting consultation for the Project. We assigned the consultation request tracking number WCRO-2020-02400.
10) On September 25, 2020, NMFS sent the Forest Service the proposed action section of the biological opinion for review to ensure accuracy.
11) On October 7, 2020, NMFS received the updated proposed action from the Forest Service.
12) On November 19, 2020, the Forest Service and NMFS reached an agreement on how the Forest Service will manage water withdrawals included in the action.

NMFS bases this opinion on information provided in the BA, the draft environmental assessment, Forest Service specialist reports, Washington State Department of Fish and Wildlife hydraulic project approvals, draft conditions of authorization, draft reclamation plans, Forest Service inspection reports, and emails between the Forest Service and NMFS.

1.3. Proposed Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The Forest Service proposes to approve and authorize 10 plans of operation under the General Mining Law of 1872 and the Federal Land Policy and Management Act of 1976. All 10 mines are located on the Cle Elum Ranger District, on the Okanogan–Wenatchee National Forest, in Kittitas County, in the State of Washington. Nine are within the upper Swauk watershed and one (Old Town Mine) is located in the lower Swauk watershed. The action authorizes these mines to operate for 3 to 15 year terms.

The General Mining Law of 1872, as amended (30 U.S.C. 21-54), governs mining operations. This law confers a statutory right to enter public lands to search for minerals. 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. The Organic Act of 1897 and mining regulations, found at 36 CFR 228, authorize the Forest Service to require plans of operation and to regulate exploration and mining on National Forest System lands. Miners operating on National Forest System lands shall "to the extent practicable, harmonize operations with scenic values, take measures to maintain and protect fisheries and wildlife habitat, and construct and maintain roads in a manner that will minimize or eliminate damage to soil, water, and other resource values" (36 CFR 228.8).

Multiple documents help describe the proposed action including each applicant's proposed plan of operation, the conditions of authorization (COA), and the reclamation plan. The COA was created by the Forest Service to document the best management practices (BMPs), mitigation,

and monitoring to protect surface resources on National Forest System lands. All of these documents help informs the BA and NMFS' opinion for each of the ten plans of operation.

1.3.1. Plans of Operation for Mine Operations

Eleven mine owners have submitted plans of operation for ten mine operations. For all ten mines, there will be a maximum of 35.6 acres of total ground disturbance in the Swauk watershed (Figure 1) from past, ongoing, and future mining activities (Table 1). This total includes the disturbance from use of non-system roads buffered by 25 feet to the left and right of the centerline. These mines will be authorized for 3 to 15 year terms (Table 2) and include the following four activities:

1. Surface prospecting with hand tools is most likely occurring at all ten mining operations. Prospecting with hand tools does not require authorization unless the authorizing officer determines significant impacts are likely to occur or impacts have been documented during monitoring (36 CFR 228.4). They are included in the project description as part of the existing condition.

2. Small-scale exploration includes small trenches generally no deeper than 15 feet and no wider than 5 feet. The total area of disturbance is no larger than one-tenth of an acre and these are usually dug using a small excavator. Material is sampled by hand in 5- or 10-gallon buckets.

3. Large-scale exploration with heavy equipment may include pits or trenches of varying sizes.

4. Underground exploration is done with hand tools and may involve the use of explosives.

Each of the four activities above includes one or more of the following ground disturbing actions: trenching, excavation, extraction, sorting, light (chainsaws) and heavy (dump trucks, loaders) equipment work, water withdrawal, and driving on non-administrative and National Forest System roads with light, moderate, and heavy equipment.

Table 1. Mine information.

Mine	Claimant	Existing Mine Footprint (acres)	Proposed Mining Footprint (acres)	Buffered Access Route (acres)	Total Footprint (acres)	Riparian Reserve[1] Impacts (acres)	Non-System Road Use (miles)
Old Town	Levin	2.3	3.0	0.7	6.0	1.3	0.24 (0.1 is new)
Eagle's Beak	Baasch	1.0	0	0.3	1.2	1.2	0.18
Edna G	Levesque	2.4	2.3	0.8	5.6	2.2	0.32
Golden Eagle	Foreman and Parker	0.3	0	0.9	1.2	0	0.16
Maverick	Hand	0.5	0.1	1.8	2.5	2.3	0.34
Big Chic	Mihal	6.2	4.2	0.8	11.2	8.5	0.13
WJ	Fox	0.4	0	0.3	0.7	0.7	0.05
Ferris' Dream	Miller	0	0	1.4	1.4	0.4	0.23
Thomas Jeffery	Rhodes	0	0.4	1	1.4	1.4	0.22
Southern Star	Sanders	0.3	0.2	3.9	4.4	0.4	0.75 (0.1 is new)
Totals		13.4	10.2	11.9	35.6	18.4	2.62

Table 2. Years of Authorization per Claimant.

Mine	Total Years of Authorization *	Operation Season
Old Town	5	March 1–Oct 15
Eagle's Beak	10	April 1–Oct 31
Edna G	10	April 1–Oct 31
Golden Eagle	5	May 1–Oct 31
Maverick	15	April 1–Oct 31
Big Chic	10	April 1–Oct 31
WJ	5	April 1–Oct 31
Ferris' Dream	5	April 1–Oct 31
Thomas Jeffery	3	April 1–Oct 31
Southern Star	10	April 1–Oct 31

* Full reclamation will be complete in the last year of authorization.

[1] Riparian reserves are identified as portions of watersheds where riparian-dependent resources receive primary emphasis.

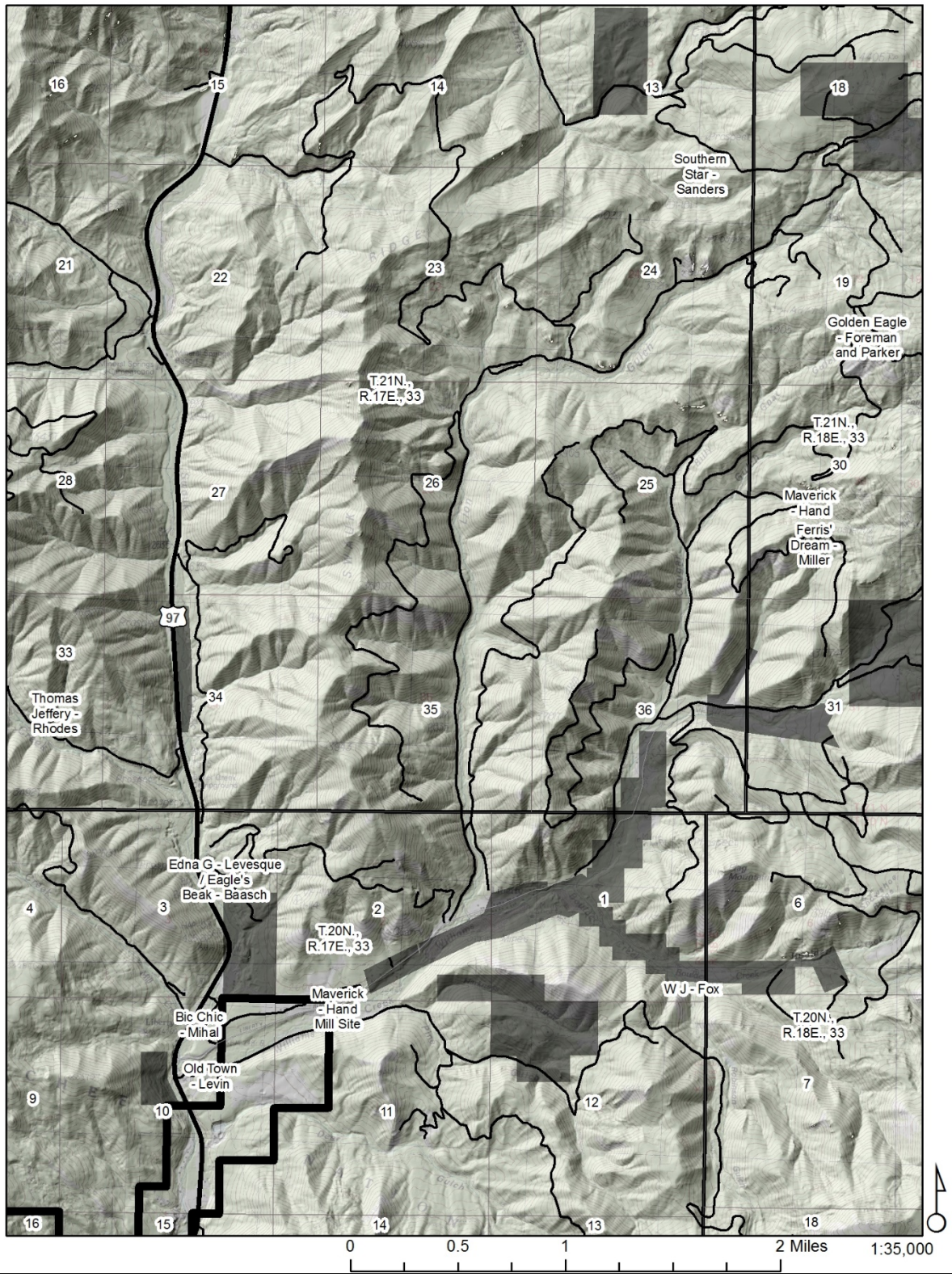

Figure 1. Swauk Mining Plans of Operation area and vicinity, Kittitas County, Washington.

Each plan of operation is unique and includes actions proposed by the applicant and modified by the draft COAs, and draft reclamation plans. We will detail each below.

Old Towne Mine–Levin
The Old Town Mine has been worked by several claimants over many years with the most recent activity occurring in the late 1990s. Mr. Levin purchased the claims in 2008 and submitted a proposed plan of operation to conduct exploration work on his claims named Yellow Stone Fraction [Oregon Mining Claim (ORMC) 155134], Yellow Stone North (ORMC 155135), and Yellow Stone South (ORMC 170804). The proposed plan includes placer mining and processing on the surface. No new structures are proposed. Mine exploration at the Old Towne Mine is estimated to take 5 years to complete.

Mining will consist of an open pit placer operation excavating a series of blocks (five total) to bedrock. Excavation will start in block 1 (50,000 square feet), a previously disturbed area that includes the settling pond and processing plant. Then mining will move through blocks 2–5. Block 2 (22,500 square feet), block 3 (60,000 square feet), block 4 (15,000 square feet), and block 5 (37,500 square feet) will be new disturbance, requiring the removal of all vegetation. Each block will be stripped of topsoil (first 6 inches), subsoil (next 6 inches), and overburden down to bedrock. The ore layer is immediately above bedrock and can vary in depth. Topsoil, subsoil, and overburden will be stockpiled for reclamation adjacent to each block. The ore-bearing layer will be hauled to an onsite plant for processing, where the ore is washed and separated. Concurrent reclamation is proposed and only one trench or pit with a maximum of 2 acres and a maximum depth of 65 feet will be open at a time. Activities also include the maintenance and management of a 1-acre settling pond with a maximum 5-foot depth. The maximum area of disturbance is 6 acres, with 3 acres from previous activities and 3 acres of proposed new activity.

The plan proposes to lease a water right from an adjacent gravel pit operated by Lavinal Incorporated, located one-half mile upstream on Swauk Creek. This water lease would be for 20 gallons per minute (gpm) [0.04 cubic feet per second (cfs)] during the mining season from March 1 to November 14, with the water being hauled to the mine. The water will be withdrawn on an intermittent basis and not continually from Swauk Creek. The water will be used to wash the ore in the processing plant. Water leasing is administered by the Washington State Department of Ecology (Ecology). Mr. Levin must submit proof of lease approval to the Cle Elum Ranger District. If a lease cannot be obtained, operational water must be hauled from off-site, meeting all State requirements.

Access to the mine is off U.S. Route 97 and a number of non-system roads. One new temporary road is proposed to maintain access to private land during the excavations of blocks 4 and 5. Haul routes will be established within areas of disturbance. There are 0.24 miles of non-system road that will be used in the project area, including 0.1 miles of new temporary access across the southern boundary. A historic wagon road dating back to the early 1900s intersects the Old Town mine. This segment of road is along the northern boundary of the claim.

Concurrent reclamation will include backfilling excavations, decompacting disturbed surfaces, and recontouring slopes for seeding at the end of each season. The mine area has previous tunnels that will be excavated during the mining operation. Backfilling will bury what remains of the tunnels. Over-steepened slopes will be recontoured to create natural and stable slopes (1:1). All facilities and structures will be removed including those associated with the electrical service. The existing settling pond will be reclaimed at the end of mining operation by backfilling and vegetating. All disturbed areas will be mulched and seeded; trees will be planted, where applicable. Road access will be blocked with boulders and logs. Existing disturbance from previous mining activities within the riparian reserve will be reclaimed in the first year of operation and will include backfilling, decompaction, recontouring, and seeding.

Eagle's Beak Mine–Baasch
Richard Baasch submitted a proposed plan of operation to conduct exploration work on his mining claim named Eagle's Beak (ORMC 156076). The proposed plan consists of surface prospecting with hand tools and water pressure mining underground with power sluice/high-bank operations (a high banker uses a sluice box, hopper, and water supply as a stationary concentrator). The Eagle's Beak and Edna G mines are directly adjacent to each other and share some mining infrastructure. The operator estimates it will take 10 years to complete exploration work.

The current disturbed area equals 1.3 acres with this entire area within the riparian reserve. The operator will remove vegetation to facilitate access and mining. Clearing is limited to 200 feet along Swauk Creek and the two water withdrawal sites.

Water from Swauk Creek will be used for placer mining and diverted at one of two designated withdrawal sites. A centrifugal pump will be used to pump water through lay-flat hose or pipe to an existing hillside work-area. The rate of use is 0.67 cfs up to a total of 67.4 acre-feet per year from May 1 to October 1. Water is used to wash pay dirt material through ground-sluice/high-banker/trommel techniques to recover native gold. The resulting mix of mud, silt, sand, and aggregate are directed into an existing retention pond where the aggregates settle out and water returns to the water table. Water from the retention pond is also reused for processing.

Access to the mine is by U.S. Route 97, FSR 9700214, and seven non-system roads. The existing non-system roads equal 0.35 miles. All non-system roads will be obliterated during reclamation. The Eagle's Beak and Edna G mine share some roads (total 0.50 miles). No new roads will be built for the Eagle's Beak Mine.

Reclamation of this site will include backfilling excavations and decompacting all disturbed surfaces. All prospecting holes will be reclaimed at the end of each season. Reclamation includes backfilling the settling pond with stockpiled material. Recontouring will create stable slopes (1:1) to match native topography. The adit will be backfilled a minimum of 6 feet and the trench in front of it will be backfilled with rock. All ground disturbance will be covered with mulch and native seed. Access will be blocked with boulders and logs.

Edna G Mine–Levesque
In 2005, Ed Levesque purchased the mining claims that make up the Edna G Mine. In 2008, the Forest Service notified Mr. Levesque that a plan of operation was required when significant impacts were identified. Mr. Levesque continued mining without authorization and was placed in a status of noncompliance with the 36 CFR 228 Subpart A regulations. Mr. Levesque, submitted a proposed plan of operations to conduct exploration work on his claims named Edna G (ORMC 156434), Edna G #2 (ORMC 156435), and G and G (ORMC 156436). The proposed plan includes placer mining and processing on the surface. The operator estimates it will take 10 years to complete the exploration work.

Portions of the Edna G overlap with the Eagle's Beak Mine, including the settling pond. A tunnel associated with Eagle's Beak will be excavated during Edna G operations. Open pit placer excavation will also occur up to FSR 9700160. Ground preparation will include removal of all vegetation. Wastewater is pumped to one of two small ponds used for storage (.08 acres) and infiltration (0.12 acres). Existing disturbance is 3.2 acres (including roads) with an additional 2.3 acres of pit excavation proposed. The operator receives water through the water right for Baasch (Eagle's Beak Mine).

The mine is accessed from U.S. Route 97, FSR 9700214, and four user-created non-system roads that total 0.15 miles. Some access roads are shared with the Eagle's Beak mine (total 0.50 miles) No new roads are proposed, and haul routes will be limited to authorized areas of surface disturbance.

Concurrent reclamation is not proposed. The operator has the choice of bonding for all reclamation at the end of mining operations or conducting concurrent reclamation by October 31 of each year of authorization. Reclamation will include backfilling excavated areas with rock and recontouring surfaces to stable slopes no greater than 1:1. The two ponds will also be backfilled.

Golden Eagle–Foreman/Parker
James Foreman and Mel Parker submitted a proposed plan of operations to conduct exploration activities on their mining claim named Golden Eagle (ORMC 160904). The Golden Eagle Mine was authorized in 2017 for one year. An existing shaft was reopened to conduct preliminary exploration (reclaimed by backfilling in July 2020). The proposed plan consists of the excavation of exploration trenches, surface prospecting, using a non-system road for vehicle access, and camping. The operators are requesting authorization for 5 years to complete their work.

This claim area was mined in the past. Topsoil was stripped away by earlier mining activity. The area currently affected by mining activities and buffered road access is 1.2 acres. There are no additional acres proposed to be affected. The area identified for trenching is within existing disturbance and has sparse to no vegetation. One trench will be dug at a time (160 square feet). Each trench is to be reclaimed before excavating the next. Processing will be done outside of National Forest lands.

Access to the mine is by U.S. Route 97, FSR 9712000, 9712123, and one non-system road.

Concurrent reclamation is included in the plan. One trench will be reclaimed before excavating the next trench. The entire length of the non-system road will be obliterated during final reclamation. An existing shaft and a vehicle-loading ramp will be reclaimed in the first year of authorization. Rock will be used to backfill shafts and excavation areas, as needed.

Maverick Mine–Hand
Dwight Hand submitted a proposed plan of operations to conduct exploration work on his claims named Maverick #1 (ORMC 13799), Maverick #2 (ORMC 13800), Maverick #4 (ORMC 13802), Emma (ORMC 47837), White Lightning (ORMC 163684), and processing on the Mill Site (ORMC 49457). The proposed plan consists of working underground, processing ore, and using pre-existing structures. The operator estimates it will take 15 years to complete the exploration work.

The Maverick Mine consists of four separate sites in the Liberty area across 2.5 acres. The mine is pre-existing with no new tunnels or structures proposed. Processing will be done at the existing mill site off the county road southwest of Liberty. The processing area is 0.37 acres with six structures that house processing components. The settling pond is 0.04 acres. The ground disturbance at the First of August tunnel is 0.11 acres; this includes waste rock from the tunnel and material that has been eroding from the slope above. The upper mine includes the 85th Hole, My Last Hole, and White Lightning tunnels. The 85th Hole will be backfilled with waste rock as mining progresses. Underground mining will periodically require explosives. The operator needs ten trees, minimum diameter of 10 inches, per year for tunnel supports (150 trees). Trees must be pre-approved before cutting and the number of trees authorized will be based on the rate of underground excavation. Danger trees may be identified over time and authorized for removal with a limit of two trees per acre per year (75 total trees). Source areas for tree harvest will be upland of the site. No tree felling beyond danger trees will be authorized in the riparian reserve.

At the mill site, water will be pumped from Williams Creek into a 500-gallon storage tank using an electric pump delivering no more than 1.0 cfs. No more than 1,250 gallons of water will be used per day. Water will be pumped between April 1 and October 31 of each year.

The mine sites are accessed from U.S. Route 97, Liberty County Road, FSR 9718118 and a non-system road off FSR 9718118. The processing area is located southeast of the county road and FSR 9726 junction. The remaining three sites and camp are on FSR 9718118 and the upper tunnels off a spur road. There are 0.34 miles of non-system road. No new roads will be built and no trails will be widened.

Final reclamation will close all tunnels with rock. All non-system roads and access will be obliterated. The settling pond will be backfilled. All personal property, garbage, structures, and other improvements will be removed. All facilities associated with the electrical service will be removed.

Big Chic Mine–Mihal
Alexander Mihal submitted a proposed plan of operations to conduct exploration work on his mining claims named Big Foot (ORMC 167136) and Chic Placer #1, #2, and #3

(ORMC 171245-7). The proposed plan consists of surface prospecting using hand tools, exploration trenching, mining in three pre-existing tunnels, camping, using pre-existing structures and road use. The operator estimates it will take 10 years to complete the exploration work.

The Big Chic Mine has had previous mining activity that was abandoned by a previous owner. Mr. Mihal purchased one claim and has staked others. The area currently impacted from mining activities and buffered road access is 7 acres, with another 4.2 acres of impact proposed (total of 11.2 acres). There are three existing tunnels on the mine site that will be explored using hand tools. Surface work includes exploration trenches and pits. Trenches will be excavated with the maximum dimensions of 5 feet wide, 30 feet long, and no deeper than 10 feet. Only one trench will be excavated at a time and must be reclaimed before starting the next trench or before equipment is demobilized. Maintenance and management of a settling pond is proposed using existing seasonal ponds created by previous mining operations. Water will be collected through groundwater infiltration into one of the ponds and the rest will be hauled in from off National Forest System lands, if necessary. Processing will consist of the separation of placer gravels using a self-contained processing plant. The pond and processing area are on less than 1 acre, which includes staging for equipment. Vegetation will be removed across the 4.2 acres of new disturbance. Danger trees must be authorized prior to removal and will be used for reclamation, no more than two trees per acre, per year (220 trees total).

The mine is accessed from U.S. Route 97, Liberty County Road, and a non-system road. The length of mine access road is 0.13 miles. No new roads are proposed.

Concurrent reclamation is included in the plan. Final reclamation will backfill remaining excavations, ponds, and tunnels with rock and recontour surfaces to stable slopes no greater than 1:1. All non-system roads will be obliterated. All personal property, garbage, structures, and other improvements will be removed. All facilities associated with electrical service will be removed.

WJ Mine–Fox
Larry Fox submitted a proposed plan of operation to conduct exploration work on his claims named WJ and WJ #2, #3, and #4 (ORMC 170098-101). The proposed plan consists of working underground, processing ore, and using pre-existing structures including a cabin. The operator estimates it will take 5 years to complete the exploration work.

The area currently impacted from mining activities and buffered road access is 0.7 acres. There are no additional acres proposed to be impacted. Mining operations include underground exploration and sampling with hand tools. Onsite processing will include crushing 10 cubic yards of material per week. Material will be hauled by all-terrain vehicles to the processing plant. Crushed material will be sent through a shaker table to separate the ore into concentrates. The final processing of concentrates is offsite. Waste rock is sand sized grains and will be put in an old shaft, along with wastewater. Water will be brought in from offsite and stored in a 300-gallon tank. Danger trees must be authorized prior to removal and be used for reclamation and stream

restoration, no more than two trees per acre, per year (10 trees). There is an unauthorized culvert in Robinson Creek, which will be removed in the first year of the mining operation.

The mine is accessed from U.S. Route 97, Liberty County Road, FSR 9726000, and one non-system road. There is 0.05 miles of user-created, non-system roads. No new roads are proposed.

Reclamation will backfill the adit and an existing pit with rock. All structures, improvements, and the culvert will be removed. Natural flow of Robinson Creek and Boulder Creek will be restored and banks stabilized.

Ferris' Dream Mine–Miller
Henry Miller submitted a proposed plan of operations to conduct exploration work on his mining claims named Billy Belle (ORMC 155877), Bumble Bee (ORMC 155878), and Hard Rock (ORMC 155879). The proposed plan consists of exploration in a pre-existing tunnel, surface prospecting, and a non-system road use for vehicle access to the tunnel. The operator estimated the time to complete their work is 5 years.

The area currently impacted from mining activities and buffered road access is 1.4 acres. No additional area will be disturbed. Much of the disturbance is for access to prospecting sites and a tunnel. Very little vegetation will be removed. Danger trees must be authorized prior to removal and will be used for reclamation, no more than two trees per acre, per year (15 trees total).

The mine access is from U.S. Route 97, Liberty County Road, FSR 971800, and two non-system roads. There are 0.23 miles of non-system road. No new roads will be built.

Reclamation will include backfilling the adit with rock at the entrance to the tunnel. After the tunnel is backfilled a minimum of 6 feet, the remaining material will be pulled back against the slope. Over-steepened slopes will be recontoured to match natural slopes no greater than a 1:1 ratio. All non-system roads will be obliterated.

Thomas Jeffery Mine–Rhodes
Jeff Rhodes submitted a proposed plan of operation to conduct exploration work on his mining claim, Thomas Jeffery (ORMC 175365). The proposed plan consists of excavating three trenches and re-opening a road. The work duration is estimated to be 3 years.

The area has been mined and includes a naturally revegetated roadbed. The area currently impacted from mining activities and buffered road access is 1 acre, with another 0.4 acres of impact proposed. Baker Creek is immediately south of the trenching area with FSR 9700192 in between. Preliminary exploration is proposed, which consists of trenching (225 square feet) with a backhoe. Processing will be completed onsite with self-contained gold processing equipment. Processing water will be discharged into the trench prior to backfilling. Up to 300 gallons of water per day will be brought to the site in totes from a municipal water supply. Vegetation will be removed from the 0.4 acres of new proposed impact during trenching. Trenching must avoid damaging trees and tree roots, except that up to two danger trees per acre may be removed annually.

The mine access is from U.S. Route 97, FSR 9700192 (Baker Creek Road), and the old roadbed. The roadbed goes up a drainage and terminates beyond the proposed area. The drainage channel is dry except during brief periods of snowmelt and runoff. No new roads will be constructed.

Concurrent reclamation is required. Each trench will be reclaimed before the next trench is excavated and before equipment is demobilized. Rock will be used to backfill trenches. If they occur, over-steepened slopes will be recontoured to match native topography.

Southern Star Mine–Sanders
Warren Sanders, co-owner and designated representative, Daniel Sanders, Douglas Sanders, and Marcia Sanders submitted a proposed plan of operations to conduct exploration work on their claim named Southern Star (ORMC 153543). The proposed plan consists of working underground, using pre-existing roads, constructing of a new road, stockpiling waste rock in a designated area. The operator estimates it will take 10 years to complete the exploration work.

The site was mined in the past and includes three existing tunnels and mine access roads. Operations include underground exploratory work in existing tunnels, onsite processing, and surface prospecting with hand tools. Explosives will be used during underground mining. The area currently impacted from mining activities and buffered road access is 4.2 acres, with another 0.2 acres of impact proposed. New disturbance will expand areas for overburden piles, the processing site, and equipment staging.

Waste rock will be staged adjacent to the source tunnel, except for tunnel 4. No waste rock will be allowed on the ground at tunnel 4, or the lower portion of the access road, as these areas are in riparian reserve. Proposed waste rock pile 7 will be 0.05 acres and will not be authorized for use until all other existing stockpiles are at capacity. A small trench will be excavated next to waste rock pile 5 for the processing plant. Material will be run through a sluice and the wastewater discharged into the trench to percolate into the ground. Up to 3 cubic yards of material will be processed onsite each year. All remaining ore will be processed offsite.

The operator has an existing water right with the State of Washington for 0.5 acre-feet (0.005 cfs) per year for domestic and 1.0 acre-feet (0.02 cfs) per year for mining from an unnamed spring. Water from this unnamed spring feeds into a settling pond through a pipe on the ground surface. The pond is a 0.002-acre impoundment within a drainage. Sediment will be removed from the pond, as needed, but no more than once every 5 years. Tunnel 1 periodically has a small wetted area at the adit that does not flow out of the immediate area. Roads and working areas will be cleared of deadfall and brushed periodically. The Forest Service must approve removal of danger trees. The removal will not exceed two trees per acre, per year (88 trees total). Timbers for shoring may be needed over time. Source areas for shoring will be upland of the site. No tree felling beyond danger trees will be authorized in the riparian reserve.

The mine access is from U.S. Route 97, FSR 9711000, FSR 9712000, FSR 9712121, and non-system roads. There are 0.05 miles of non-system road.

Reclamation will remove the pond and restore the natural flow of the intermittent drainage. All personal property and improvements will be removed. All non-system roads will be obliterated. Waste rock will be used to backfill tunnels. The processing area pond will be reclaimed. Over-steepened slopes will be recontoured to native topography at a 1:1 ratio. All disturbed areas will be seeded and/or planted with vegetation.

1.3.2. Water Withdrawals

The following table summarizes the water use included as part of the proposed action. All water withdrawals are intermittent (as needed) and seasonal depending on the mine and water right. They also must comply with all BMPs and regulatory requirements.

Table 3. Proposed water withdrawals in Swauk Mining Plans of Operation.

Mine	Source	Point of Diversion (POD)/Position in Watershed	Period of Use (months)	Maximum Instantaneous Water Use (cfs)	Total Acre-Feet per Year
Southern Star	Unnamed Tributary to Hurley Creek, tributary to Swauk Creek	First order, headwaters near ridge, snowmelt, shallow groundwater	April–October	0.02	1.5
Eagle's Beak[2]	Swauk Creek	Third order, valley floodplain	April–November	0.67	67.4
Maverick	Williams Creek	Second order	April–November	1.00	
Old Town	Swauk Creek	Third order, valley floodplain	March–November	0.04	
			Total	1.73	

1.3.3. Best Management Practices

As mentioned above, each plan of operation has a number of documents to help ensure compliance with BMPs and regulatory requirements. These include:

- The Conditions of Authorization—Forest Service document of BMPs and mitigations needed to protect surface resources on NFS lands.
- The reclamation plan—documents the elements of reclamation needed to return the land to an ecologically stable state.
- The reclamation bond—calculated to ensure sufficient value is posted to cover all reclamation costs.

All applicants are required to obtain all necessary State and Federal permits as a condition of the Forest Service's authorization. Mine operations that require water must have a valid water right issued by Ecology. If no water right exists water must come from offsite, from a legal source, and must meet State water quality standards for that use. Once onsite, water must be stored and used in compliance with the authorized plan. In addition, the Forest Service agreed to the following modification of BMP AQS5.1 as modified in a November 19, 2020 email:

[2] The Edna G Mine receives water from the Eagle's Beak water right.

- Any water drafting or pumping would maintain a continuous surface flow of the stream without altering the original wetted width. When the Swauk Creek Ecology gage falls below 20 cfs, each applicant will withdraw no more than 5% of the total flow volume as measured at the gage and never more than their water right. For example, if the flow at the Swauk Creek gage is 10 cfs each applicant can only withdraw 0.5 cfs or their maximum allowable water right, whichever is less. The applicant and Forest Service will monitor both water withdrawals and the Ecology gage in Swauk Creek to ensure these withdrawal rates are not exceeded. In addition, any water intake used for drafting water will be screened according to NMFS Juvenile Fish Screen Criteria For Pump Intakes for salmonid fry (National Marine Fisheries Service 1996) and Anadromous Salmonid Passage Facility Design (National Marine Fisheries Service 2011c).

- Screen mesh openings shall not exceed 3/32 inches (2.38 mm) for woven wire or perforated plate screens, or 0.0689 inches (1.75 mm) for profile wire screens, with a minimum 27% open area.

- To reduce the risk of juvenile fish becoming trapped against the screen, it is crucial that the fish be able to swim faster than the approach velocity for an extended period of time. For salmonid fry (less than 2.4 inches in length), the maximum approach velocity for a passive pump is 0.20 ft/s (feet per second); and for salmonid fingerlings (more than 2.4 inches in length), the maximum approach velocity for a passive pump is 0.40 ft/s.

- When possible, pump intake screens shall be placed in locations with sufficient sweeping velocity to sweep away debris removed from the screen face. Pump intake screens shall be submerged to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and adjacent natural or constructed features.

Best management practices for operations and reclamation are a fundamental part of the proposed action and this opinion. They are common components to all mining operations and are included in multiple locations as described above and are hereby incorporated by reference.

1.3.4. Monitoring and Inspection

The Forest Service will monitor and inspect the mines for compliance with the BMPs and design elements during the life of the mine. Monitoring will occur annually at a minimum. Preferably, monitoring would occur once in the spring, once in the fall, and once when the operation is active. Inspection reports include a list of BMPs identified for review during inspection. During an inspection, each BMP will be checked for compliance. If issues are identified, whether unanticipated surface impacts or activities not in compliance with the authorization, the Forest Service will work with the operator to resolve the issue(s). If this fails to correct the issue(s), the operator can be told to cease that work until the issue is resolved. If the operator is willfully disregarding the COA or BMPs, the operator can be placed in a status of non-compliance and told to cease work until the issue(s) is resolved. Only after the operator has refused, verbally or by their actions, to come into compliance with the authorized plan can legal action be pursued.

The operator(s) are responsible for all Federal, State, and county laws and regulations, and for obtaining all permits applicable to operation prior to authorization [36 CFR 228.8(g)]. To ensure that this opinion remains valid, the Forest Service must keep NMFS informed of any changes to the proposed action including any non-compliance.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS, and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1. Analytical Approach

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not

change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species, or destroy or adversely modify critical habitat:

1. Evaluate the range-wide status of the species and critical habitat expected to be adversely affected by the proposed action.
2. Evaluate the environmental baseline of the species and critical habitat.
3. Evaluate the effects of the proposed action on species and their habitat using an exposure–response approach.
4. Evaluate cumulative effects.
5. In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species; or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
6. If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Range-wide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species.

2.2.1. Status of the Species

For Pacific salmon, steelhead, and other relevant species, NMFS commonly uses four parameters to assess the viability of the populations that, together, constitute the species: spatial structure, diversity, abundance, and productivity (McElhany et al. 2000). These "viable salmonid population" criteria therefore encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are collectively at appropriate levels, they maintain a population's capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. These attributes are influenced by survival, behavior,

and experiences throughout a species' entire life cycle, and these characteristics, in turn, are influenced by habitat and other environmental conditions.

"Spatial structure" refers both to the spatial distributions of individuals in the population and the processes that generate that distribution. A population's spatial structure depends fundamentally on habitat quality and spatial configuration, and the dynamics and dispersal characteristics of individuals in the population.

"Diversity" refers to the distribution of traits within and among populations. These range in scale from DNA sequence variation at single genes to complex life history traits (McElhany et al. 2000).

"Abundance" generally refers to the number of naturally produced adults (i.e., the progeny of naturally spawning parents) in the natural environment (e.g., on spawning grounds).

"Productivity," as applied to viability factors, refers to the entire life cycle (i.e., the number of naturally spawning adults produced per parent). When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany et al. (2000) use the terms "population growth rate" and "productivity" interchangeably when referring to production over the entire life cycle. They also refer to "trend in abundance," which is the manifestation of long-term population growth rate. For species with multiple populations, once the biological status of a species' populations has been determined, NMFS assesses the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance documents from technical recovery teams. Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as metapopulations (McElhany et al. 2000).

The summary that follows describe the status of the ESA-listed species, and their designated critical habitats considered in this opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, are in the listing regulations and critical habitat designations published in the Federal Register (FR) (Table 3) and in the most recent 5-year status review (National Marine Fisheries Service 2016), as well as applicable recovery plans and 5-year status reports (National Marine Fisheries Service 2009; National Marine Fisheries Service 2011a; Yakima Basin Fish & Wildlife Recovery Board 2009). These additional documents are incorporated by reference.

Table 4. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register (FR) decision notices for ESA-listed species considered in this consultation. Listing status: 'T' means listed as threatened; 'E' means listed as endangered.

Species	Listing Status	Critical Habitat	Protective Regulations
Steelhead (*O. mykiss*)			
Middle Columbia River	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Middle Columbia River Steelhead

The MCR steelhead distinct population segment (DPS) was listed as threatened on March 25, 1999 (64 FR 14517), and its threatened status was reaffirmed on June 28, 2005 (70 FR 37160). The threatened status once again affirmed during 5-year status reviews on August 15, 2011 (76 FR 50448), and again on May 26, 2016 (81 FR 33468). The DPS comprises 20 historical populations (three of which are extirpated) grouped into four major population groups (MPGs) in Washington and Oregon. This DPS includes all naturally spawned populations of steelhead (and their progeny) in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, excluding steelhead from the Snake River Basin. Seven artificial propagation programs are considered part of the DPS: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs.

The life history characteristics for MCR steelhead are similar to those of other inland steelhead DPSs. Most fish smolt at 2 years and spend 1 to 2 years in salt water before re-entering freshwater, where they may remain up to a year before spawning (Howell et al. 1985). All steelhead upstream of The Dalles Dam are summer-run (Reisenbichler et al. 1992) fish that enter the Columbia River from June to August. Adult steelhead ascend mainstem rivers and their tributaries throughout the winter, spawning in the late winter and early spring. Fry emergence typically occurs between May and the end of June.

The areas affected by the proposed action are in the Swauk Watershed, which is occupied by steelhead from the Upper Yakima population of the Yakima MPG. For the rest of the species status section we will mostly focus on the Yakima MPG.

Abundance. Abundance estimates have been recently made for 16 of the 17 extant MCR steelhead populations. Seven of the 16 populations are currently above the average abundance thresholds that the Interior Columbia Basin Technical Recovery Team (ICTRT) identifies as a minimum for low risk. The remaining nine populations are at moderate or high risk of extinction due to low abundance.

The latest Northwest Fisheries Science Center status review (Northwest Fisheries Science Center 2015) characterized two MCR steelhead populations as being at high risk of extinction in terms of abundance. The Naches River and Upper Yakima River populations were rated at moderate risk for integrated abundance and productivity. The remaining populations in the Yakima MPG

are at low risk. Due to relatively high returns for most years since 2001, abundance of Satus Creek and Toppenish Creek populations are greater than the minimum abundance targets for viability (Table 4). Upper Yakima and Naches River returns had improved leading up to the 2015 review, but were still well below the targets (Northwest Fisheries Science Center 2015). However, since 2017, abundance has declined markedly. This decline is thought to be driven primarily by marine environmental conditions and a decline in ocean productivity. NMFS is currently conducting a status review for publication in 2021.

Productivity. Based on 20 full brood-year returns of MCR steelhead, most populations have replaced themselves, and a few have not, when only natural production is considered. Relative population status varies widely across the DPS. Based on a 2007 analysis, productivity is insufficient to meet recovery needs (Interior Columbia Basin Technical Recovery Team 2007a) for most populations. Estimates of required productivity increases required to reach a low risk of extinction depend on assumptions regarding future hydropower operations and ocean conditions.

Table 5. Summary of the MCR steelhead Yakima River Group status and Interior Columbia Basin Technical Recovery Team viability criteria.

	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			Rating
Population	Minimum Abundance Target	Natural Spawning Abundance 2005–2014	Productivity (returns-per-spawner) 2005–2014	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Naches	1,500	1,244	1.83	Moderate	Low	Moderate	Moderate	Moderate
Satus	1,000	1,127	1.93	Low	Low	Moderate	Moderate	Viable
Toppenish	500	516	2.52	Low	Low	Moderate	Moderate	Viable
Upper Yakima	1,500	246	1.87	Moderate	Moderate	High	High	High Risk

The Upper Yakima population has a very high abundance/productivity gap (NWFSC 2015), indicating that this population is among the poorest performing in the DPS.

Spatial structure. The NWFSC (2015) uses the term "natural processes risk" instead of "spatial structure" and characterizes the risk to MCR steelhead populations as "very low" to "moderate" for all populations. The distribution across spawning areas of the Upper Yakima population continues to be substantially reduced from historical levels with only 11 of the 14 major spawning areas occupied. Three impassable storage dams block significant portions of the Yakima River headwaters. As such, the spatial structure risk for the Upper Yakima population is moderate.

Diversity. The ICTRT (Interior Columbia Basin Technical Recovery Team 2007b) identified 20 existing populations in four MPGs as described previously. The Yakima River MPG consists of the Satus Creek, Toppenish, Naches, and Upper Yakima populations. The NWFSC (2015) characterized most populations in the DPS and MPG as moderate risk. Risks due to the loss of life history and phenotypic diversity are inferred from habitat degradation, including passage impacts within the Yakima Basin.

Flow regulation by the U.S. Bureau of Reclamation (Reclamation) has created a reduced out-migration window and a shift in the adult in-migration timing, both due to elevated temperatures in the lower river and flow modifications in the early migration season (Interior Columbia Basin Technical Recovery Team 2005). Risk to the Upper Yakima population is further elevated by flow management that affects rearing conditions in the mainstem Yakima River and passage issues at and below Roza Dam, in addition to historic stocking of out-of-basin rainbow trout in the Upper Yakima.

Limiting factors. The most significant factors limiting productivity of the MCR steelhead DPS include: (1) mainstem Columbia River hydropower adverse effects (i.e., modified hydrograph, increase in lentic conditions/decrease in riverine conditions, passage barriers, increased stream temperature, reduced dissolved oxygen, and invasive species); (2) riparian degradation and reduced large wood recruitment; (3) altered floodplain connectivity and function; (4) reduced streamflow; (5) degraded water quality; and (6) predation and competition (National Marine Fisheries Service 2011b). Within the Yakima Basin, Reclamation's management of the Yakima Project to provide for irrigation water is the single largest limiting factor.

Recovery plan. In 2009, NMFS adopted a recovery plan for MCR steelhead that was developed by multiple organizations in both Washington and Oregon. The Yakima Steelhead Recovery Plan that is part of the larger recovery plan is particularly relevant to the subject consultation. This plan outlined specific recovery actions intended to reduce threats associated with land and water management activities in the Yakima Basin.

Summary. The MCR steelhead DPS is not currently meeting the viability criteria described in the Mid-Columbia Steelhead Recovery Plan (National Marine Fisheries Service 2009). To achieve viable status for the Yakima MPG, two populations should be rated as viable, including at least one of the two classified as large—the Naches River or the Upper Yakima River—neither of which currently meets viable status. The other two populations out of the four in the Yakima should be rated as maintained.

2.2.2. Status of Critical Habitat

This section examines the status of designated critical habitat affected by the proposed action by examining the condition and trends of PBFs throughout the designated areas. These features are essential to the conservation of the listed species because they support one or more of the species' life stages (e.g., sites with conditions that support spawning, rearing, migration, and foraging).

For salmon and steelhead, NMFS ranked watersheds within designated critical habitat at the scale of the hydrologic unit code (HUC) 5 in terms of the conservation value they provide to the listed species they support. The conservation rankings are high, medium, or low. To determine the conservation value of each watershed to species viability, NMFS' critical habitat analytical review teams evaluated:

1) The quantity and quality of habitat features (e.g., spawning gravels, wood and water condition, side channels).

2) The relationship of the area compared to other areas within the species' range.
3) The significance of the population occupying that area to the species' viability criteria.

Thus, even a location that has poor quality habitat could be ranked as a high conservation value, if it were essential due to factors such as limited availability (e.g., one of a very few spawning areas), a unique contribution of the population it served (e.g., a population at the extreme end of geographic distribution), or the fact that it serves another important role (e.g., obligate area for migration to upstream spawning areas).

The following table describes the PBFs of the habitat types within the full range of designated critical habitat for MCR steelhead. Range-wide, all habitat types are impaired to some degree, even though many of the watersheds comprising the fully designated area are ranked as providing high conservation value. The proposed action, however, affects only freshwater habitats.

Table 6. Physical and biological features of critical habitats designated for MCR steelhead.

Physical and Biological Features		
Site Type	**Site Attribute**	**Species Life History Event**
Freshwater spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development
Freshwater rearing	Floodplain connectivity Forage Natural cover Water quality Water quantity	Fry emergence from gravel Fry/parr/smolt growth and development
Freshwater migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Estuarine areas	Forage Free of artificial obstruction Natural cover Salinity Water quality Water quantity	Adult sexual maturation and "reverse smoltification" Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
Nearshore marine areas	Forage Free of artificial obstruction Natural cover Water quantity Water quality	Adult growth and sexual maturation Adult spawning migration Nearshore juvenile rearing
Offshore marine areas	Forage Water quality	Adult growth and sexual maturation Adult spawning migration Subadult rearing

Interior Columbia Recovery Domain

Habitat quality in tributary streams in the Interior Columbia Recovery Domain range from excellent in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban development (National Marine Fisheries Service 2009; Wissmar et al. 1994). Critical habitat throughout much of the Interior Columbia Recovery Domain has been degraded by intense agriculture, alteration of stream morphology (i.e., channel modifications and diking), riparian vegetation disturbance, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, logging, mining, and urbanization. Reduced summer stream flows, impaired water quality, and reduction of habitat complexity are common problems for critical habitat in developed areas.

Many stream reaches designated as critical habitat in the Interior Columbia Recovery Domain are over-allocated, with more allocated water rights than existing streamflow conditions can support. Withdrawal of water, particularly during low-flow periods that commonly overlap with agricultural withdrawals, often increase summer stream temperatures, block fish migration, strand fish, and alter sediment transport (Spence et al. 1996). Reduced tributary stream flow has been identified as a major limiting factor for MCR steelhead in this area (National Marine Fisheries Service 2007; National Marine Fisheries Service 2011d).

Despite these degraded habitat conditions, the HUCs that include critical habitat for this species are largely ranked as having high conservation value. Conservation value reflects several factors, including: (1) how important the area is for various life history stages; (2) how necessary the area is to access other vital areas of habitat; and (3) the relative importance of the populations the area supports relative to the overall viability of the DPS.

2.2.3. Climate Change

One factor affecting the range-wide status of MCR steelhead and aquatic habitat is climate change. The U.S. Global Change Research Program (USGCRP) (2018) reports average warming in the Pacific Northwest of about 1.3ºF from 1895 to 2011, and projects an increase in average annual temperature of 3.3ºF to 9.7ºF by 2070 to 2099 (compared to the period 1970 to 1999), depending largely on total global emissions of heat-trapping gases (predictions based on a variety of emission scenarios including B1, RCP4.5, A1B, A2, A1FI, and RCP8.5 scenarios); the increases are projected to be largest in summer (Melillo et al. 2014; USGCRP 2018). The 5 warmest years in the 1880 to 2019 record have all occurred since 2015, while 9 of the 10 warmest years have occurred since 2005 (Lindsey and Dahlman 2020). Climate change has negative implications for designated critical habitats in the Pacific Northwest (Climate Impacts Group 2009; Independent Scientific Advisory Board 2007; Scheuerell and Williams 2005; Zabel et al. 2006), characterized by the Independent Scientific Advisory Board (ISAB) as follows:

- Warmer air temperatures will result in diminished snowpack and a shift to more winter/spring rain and runoff, rather than snow that is stored until the spring/summer melt season.

- With a smaller snowpack, watershed runoff will decrease earlier in the season, resulting in lower stream flows in June through September. Peak river flows, and river flows in general, are likely to increase during the winter due to more precipitation falling as rain rather than snow.

- Water temperatures are expected to rise, especially during the summer months when lower stream flows co-occur with warmer air temperatures.

These changes will not be spatially homogeneous across the entire Pacific Northwest. Low-lying areas are likely to be more affected. Climate change may have long-term effects that include, but are not limited to, depletion of important cold-water habitat, variation in quality and quantity of tributary rearing habitat, alterations to migration patterns, accelerated embryo development, earlier emergence of fry, and increased competition among species.

Climate change is predicted to cause a variety of impacts to Pacific salmon and their ecosystems (Crozier et al. 2008; Martins et al. 2012; Mote 2003; Wainwright and Weitkamp 2013). The complex life cycles of anadromous fishes, including salmon, rely on productive freshwater, estuarine, and marine habitats for growth and survival, making them particularly vulnerable to environmental variation. Ultimately, the effects of climate change on salmon and steelhead across the Pacific Northwest will be determined by the specific nature, level, and rate of change and the synergy among interconnected terrestrial/freshwater, estuarine, nearshore, and ocean environments.

The primary effects of climate change on Pacific Northwest salmon and steelhead are:

- Direct effects of increased water temperatures on fish physiology.

- Temperature-induced changes to stream flow patterns, which can block fish migration, trap fish in dewatered sections, dewater redds, introduce non-native fish, and degrade water quality.

- Alterations to freshwater, estuarine, and marine food webs that alter the availability and timing of food resources.

- Changes in estuarine and ocean productivity that affect the abundance and productivity of fish resources.

- Water temperature increases, and depletion of cold water habitat that could reduce the amount of suitable salmon habitat by about 22% by the year 2090 in Washington State.

Specifically on the Forest, a 2-day workshop was held to review options for adapting national forests in eastern Washington to climate change (Gaines et al. 2012). Some recommendations from this workshop included protecting cold-water areas, restoring beavers, restoring fish passage (to cooler headwater areas), and reducing the impacts of roads on riparian habitats, water quality, water quantity, and flow regimes.

In summary, climate change is expected to make recovery targets for these salmon populations more difficult to achieve. However, habitat restoration actions can ameliorate the adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains, and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters; protecting and restoring riparian vegetation to reduce stream temperature; retiring irrigation water diversions; and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; Independent Scientific Advisory Board 2007).

2.3. Action Area

"Action area" means all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The action area for this project includes the mines, all ground disturbance, associated roads and access routes, and reclamation areas. For this consultation, the action area is comprised of twelve disconnected locations associated with 10 mines. The Maverick Mine has four locations and two of the mines are adjacent to each other (Eagle's Beak and Edna G). These two adjacent mines will be considered as one site. Five of the 10 mines are located adjacent to steelhead critical habitat. The action area also includes the effect of sediment input and movement 300 feet downstream of each mine. It also includes the reduction of stream flow at three of the four mines that withdraw water: Maverick Mine, Eagle's Beak Mine, and Old Town Mine. The Southern Star Mine also has a water right for water use, but the location and amount are not expected to have any effects on ESA-listed MCR steelhead or the critical habitat. For the three mines with water withdrawals, the action area extends downstream to Swauk Creek for the Maverick Mine and Williams Creek for Eagle's Beak and Old Town Mines. This downstream extent includes sufficient stream length to encompass all potential effects to ESA-listed species and designated critical habitat. Project-related flow reductions below this downstream extent are expected to no longer be discernable from ambient conditions and would not have the potential to cause any meaningful impact to salmonid species or designated critical habitat.

The action area is used by MCR steelhead, and is designated as critical habitat (September 2, 2005; 70 FR 52630). The Swauk Creek major spawning area of the Upper Yakima River population of the Yakima MPG will be affected by proposed actions. This area supports rearing, migration, and spawning. The action area is also designated as EFH for Chinook and coho salmon (Pacific Fishery Management Council 2014).

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species

or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

Climate change is likely to play an increasingly important role in determining the abundance of MCR steelhead and the conservation value of designated critical habitats in the Pacific Northwest, see Section 2.2.3 above for more details.

The Swauk Watershed ranges from 2,440 feet to 6,000 feet in elevation. Average annual precipitation ranges from 20 to 30 inches. Four precipitation zones exist (rain, transient snow, rain-on-snow, and snow); below 4,000 feet rain-on-snow storm events are common. These storms cause rapid melting of snowpack, resulting in flooding throughout the lower watershed. Flooding is especially significant in the western half of the watershed, which is controlled by shallow bedrock geology, resulting in hillslopes dissected by a dense drainage network (more than six stream miles per square mile) of first order streams. The eastern half of the watershed is underlain by deep-seated landslide deposits, which hold more water, have fewer drainages, and therefore less rapid runoff. Soils throughout most of the watershed are highly erodible (U.S. Forest Service 1997).

Swauk Creek's watershed condition and function are a result of the current and past land uses, as well as natural events. Forest management actions and disturbances include road construction, logging activities, fuel reduction, sheep grazing, wildfires, recreation, watershed restoration, and mineral exploration (U.S. Forest Service 1997). The road network is especially detrimental; road density is very high (4.4 miles per square mile; Forest system and unclassified routes) with many road miles located within the riparian reserves contributing to an altered hydrologic regime, reduced riparian water storage, sedimentation and turbidity in streams. There are at least 55 miles of trails in the Swauk Watershed. There are also an estimated 182 miles of skid trails, many of which have over time become non-system routes used by recreationists. The overall drainage network is 437 miles in length including intermittent and ephemeral streams. Twenty percent of the trails and skid trails are thought to be routing water to the existing stream network, representing a 10% increase in the drainage network. The Swauk Watershed Analysis posits that road management is the single most important remedial action for improving hydrologic functions for fish and wildlife habitat in this watershed (U.S. Forest Service 1997).

Fine sediment deposits are found throughout the Swauk Watershed, with high levels in Swauk Creek, Lion Gulch, Cougar and Billy Goat Gulch. Land uses have resulted in soil compaction and loss of organic soil horizons, which have changed the watershed's ability to absorb and store water. Dispersed recreation has especially affected riparian areas as off-highway vehicle trails and campsites have decreased riparian vegetation affecting stream temperatures and water storage. Wetlands (generally found at stream confluences) have been degraded by the intense land use, further affecting water storage.

Streams in the watershed may have historically been perennial, but because of the changed conditions mentioned above including a lack of large wood, are now intermittent. Increased peak flows have caused many of the channels to incise, desiccating their surrounding floodplain and

riparian areas. During the summer, stream temperatures in the watershed frequently exceed State standards for the 7-day average, daily maximum temperature; portions of Swauk Creek and Williams Creek are on the Ecology 303(d) list for impaired temperature (Washington State Department of Ecology 2020). Elevated temperatures are the result of decreased riparian canopy and decreased summer (base) flow in streams (Creech and Stuart 2016).

Floodplain and channel alterations have degraded conditions in stream channels, floodplains, and shallow aquifers. Several heavily-used dispersed campsites in the riparian reserve appear to be expanding every year, causing soil compaction, loss of ground cover, and loss of both understory and overstory vegetation within riparian reserves. Previous attempts to confine use at these sites have failed; users have removed boulders and expanded the footprint of disturbance. User-built trails extend from some sites, crossing streams to access closed roads and unauthorized trails and trails. Most pools in the project area lack complexity and adequate cover for fish. Historic and ongoing management activities throughout the project area have reduced and continue to reduce pool quality due to channel instability and erosive banks from road and stream interactions, suction dredging, livestock grazing, and lack of large wood. Numerous road-stream crossings increase sediment inputs and alter the routing of fine sediments through the system, often filling pool habitats.

Runoff in the Upper Swauk subwatershed is characterized by two peaks and are attributed to spring snowmelt and winter rain-on-snow events, see Table 6. Ecology gage data and Forest Service flow measurements indicate that rain on snow and snowmelt peaks generally occur between February and May, and flow steadily declines to annual lows by August. The U.S. Geological Survey StreamStats program estimates that the mean annual precipitation in the watershed is approximately 27 inches per year, but precipitation varies widely throughout the watershed, depending on location and elevation.

Flows in the Swauk Creek are continuously monitored at Ecology Gage No. 39M130, Swauk Creek below First Creek. This gage is located approximately 0.5 miles northeast of the intersection of U.S. Highways 97 and 970, approximately 6 miles downstream from the closest mine site. Daily mean flows typically drop below 3 cfs during the late summer in normal to drier than normal years.

Table 7. Swauk Creek Streamflow Data.

	Streamflow (CFS)						
Parameter	**2014 (Partial*)**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020 (Partial*)**
Maximum	227	236	498	311	411	255	269
Minimum	3.0	1.6	1.6	2.3	1.7	1.4	1.7
August Median	5.9	2.4	2.6	3.8	2.8	3.3	2.9
September Median	3.9	3.4	3.0	2.9	3.0	3.7	2.3

*Period of Record: May 2014 to September 2020

In summary, the overall condition of the Swauk Watershed is functioning at risk or worse for multiple habitat indicators as shown in Table 7. Many of these habitat indictors have not recovered from past management activities, and ongoing actions continue that degradation.

Table 8. Overview of the Environmental Baseline Conditions in the Swauk Watershed.

Diagnostic/Pathway Indicators	Baseline Environmental Conditions
Temperature	Functioning At Risk
Sediment/Turbidity	Functioning At Risk
Chemical Contamination/Nutrients	Functioning Appropriately
Physical Barriers	Not Properly Functioning
Substrate Embeddedness	Functioning At Risk
Large Wood	Not Properly Functioning
Pool Frequency/Quality	Functioning At Risk
Off-Channel Habitat	Functioning At Risk
Refugia	Functioning At Risk
Width/Depth Ratio	Functioning At Risk
Stream Bank Condition	Functioning At Risk
Floodplain Connectivity	Functioning At Risk
Change in Peak/Base Flows	Functioning At Risk
Increase in Drainage Network	Not Properly Functioning
Road Density and Location	Not Properly Functioning
Disturbance History	Not Properly Functioning
Riparian Reserves	Functioning At Risk
Disturbance Regime	Functioning At Risk
Integration	**Functioning At Risk**

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b).

The Swauk Mining Plans of Operation Project includes activities that are expected to have direct effects to MCR steelhead and their critical habitat. These include mining, road use and

maintenance, vegetation removal, and reclamation activities. There are 10 mine operations of which only seven are located in areas with the potential to affect MCR steelhead or their critical habitat, they are the Old Town Mine, Eagle's Beak Mine, Edna G Mine, Big Chic Mine, Thomas Jeffery Mine, WJ, and the Maverick Mine (see Figure 2 and Table 8). The other three mine operations (Golden Eagle, Ferris' Dream, and Southern Star) are not likely to have direct effects to MCR steelhead or their critical habitat because they are higher in the watershed near small, intermittent channels. The following analysis is focused on the general effects of the proposed action on the environment and then on the response of MCR steelhead to these effects.

When assessing the potential effects of an action, NMFS evaluates whether individuals or critical habitat will be exposed to stressors produced by the action. NMFS then evaluates whether those stressors will elicit responses from exposed individuals or affect critical habitat.

2.5.1. Fish Exposure

MCR steelhead migrate, spawn, and rear in Swauk Creek and some of its tributaries, including Williams Creek. In 2003 and 2004, the Yakama Nation radio tagged numerous steelhead passing over Roza Dam. They tracked steelhead up to river mile (RM) 19.2 in Swauk Creek and also tracked them moving into Williams Creek and First Creek (Karp et al. 2009). However, most steelhead remained in Swauk Creek between RM 8.1 and RM 19.2. Adult steelhead migrate into Swauk Creek from March to May and spawn during that period. Egg incubation and emergence occur from mid-March to late June. Juvenile steelhead rear in Swauk Creek and Williams Creek year-round and *O. mykiss* have been found in Lion Gulch and Cougar Gulch. Critical habitat in Swauk Creek goes to RM 19.2 and in Williams Creek to RM 2.8. Over the last several years, the Forest Service and others have removed multiple stream barriers (mostly culverts) in the Swauk Watershed. Some of those include barriers in Williams Creek and Cougar Gulch. These culvert replacements have improved access for both adult and juvenile steelhead.

NMFS assumes that one or more life stages (e.g., adults, juveniles, and alevins) of this species will be present in Swauk Creek to RM 19.2 and Williams Creek to RM 2.8 and may be affected by the proposed action. There are no known barriers to steelhead in Baker Creek, Boulder Creek, or lower Cougar Gulch Creek. However, many of these streams (Baker and Boulder) are relatively high gradient, so we do not expect spawning to occur in them. Figure 2 displays steelhead critical habitat, fish bearing streams (any type of fish), and the mine locations. Table 8 details the distance mine sites are located from streams and steelhead critical habitat.

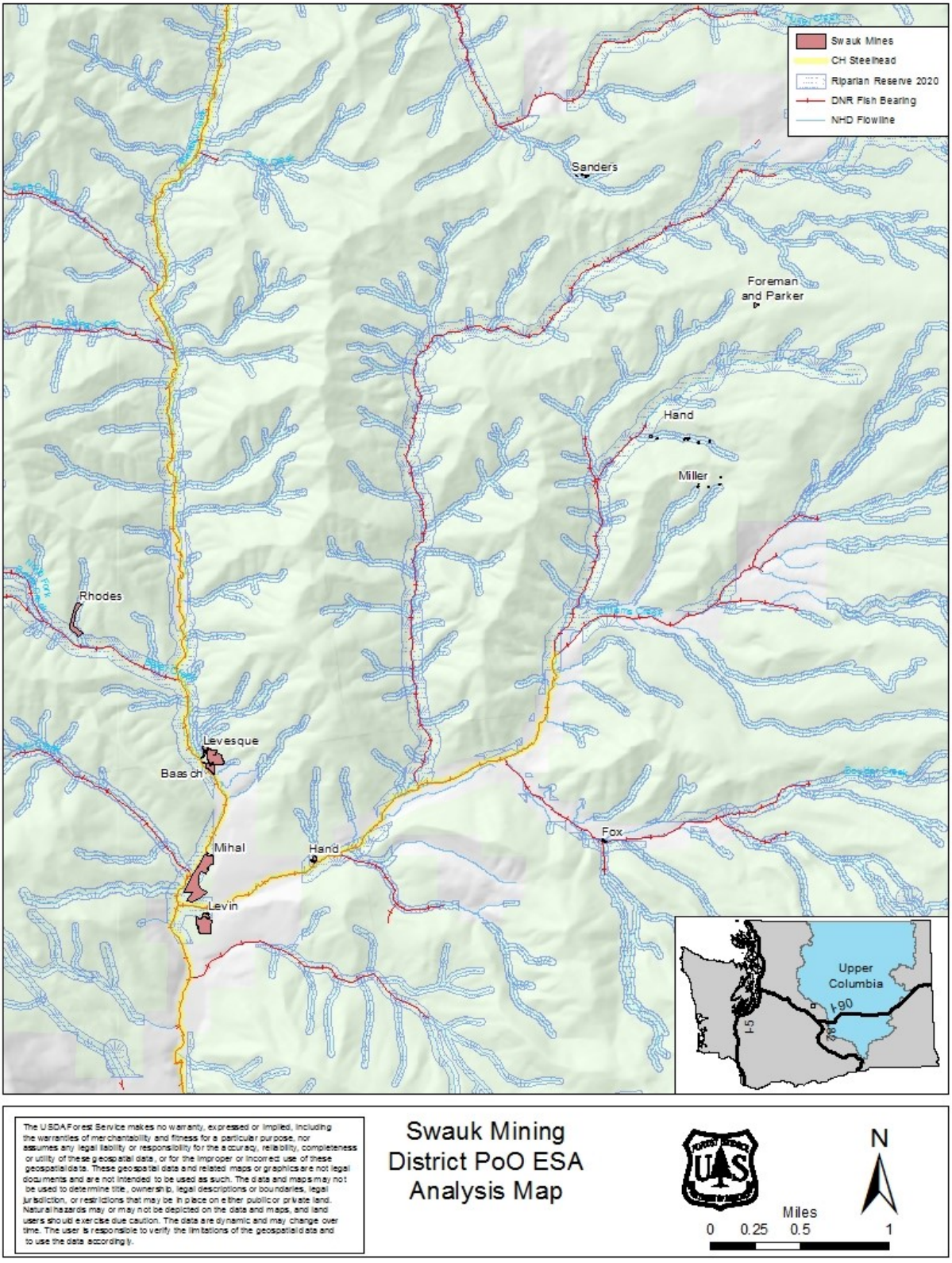

Figure 2. Mine claimant locations relative to streams, fish-bearing streams, and steelhead Critical Habitat.

Table 9. Distances from mine sites to stream, steelhead critical habitat, and fish bearing streams.

Mine	Claimant	Distance of mine to a stream (feet)	Distance of mine to fish-bearing stream (feet)	Distance of mine to MCR Steelhead Critical Habitat (feet)
Old Town	Levin	0	0	0
Eagle's Beak	Baasch	0	0	0
Edna G	Levesque	0	0	0
Golden Eagle	Foreman and Parker	446	7,661	13,339
Maverick	Hand	0	0	0
Big Chic	Mihal	0	0	0
WJ	Fox	0	0	4,167
Ferris' Dream	Miller	72	6,550	8,622
Thomas Jeffery	Rhodes	0	309	3,782
Southern Star	Sanders	0	2,731	12,619

2.5.2. Effects on the Environment

Water Quality—Stream Temperature from Vegetation Removal

Removal of shade producing trees and vegetation is one of the mechanisms that affects stream temperature. Temperature determines many chemical, physiological, and biological processes in rivers and streams (Mccullough et al. 2009). Summer stream temperature is a critical characteristic of habitat and water quality in the Pacific Northwest and increasing summer temperatures have contributed to the decline of native salmonid populations (Poole et al. 2001). Water temperature in a stream is a function of both external factors such as solar radiation, air temperature, precipitation, flow, and internal factors such as width-to-depth ratios, groundwater inputs, and hyporheic exchange (Moore et al. 2005; Poole et al. 2001; Poole and Berman 2001). However, solar radiation is generally the dominant component of the energy budget in terms of heat gain (Caissie 2006; Johnson 2004). Shade minimizes stream warming by reducing inputs of heat energy from solar radiation.

Vegetation removal and clearing can influence water temperature at multiple levels, including at the sub-reach, reach, and potentially subwatershed scale. Removing trees in riparian areas reduces the amount of shade, which leads to increases in thermal loading to the stream (Moore et al. 2005). The primary factors that influence shade are riparian vegetation (Groom et al. 2011a) and the surrounding terrain (Allen et al. 2007), but often riparian vegetation provides most of the shade (Allen 2008; Allen et al. 2007). Substantial effects on shade in clearcut systems have been observed with no-cut buffers ranging from 66 to 99 feet (Brosofske et al. 1997; Groom et al. 2011b; Kiffney et al. 2003), and small effects were observed in studies that examined no-cut buffers 150 feet wide (Groom et al. 2011a). For no-cut buffer widths of 150 to 227 feet, the effects of tree removal on shade and temperature were either not detected or were minimal (Anderson et al. 2007; Groom et al. 2011a; Groom et al. 2011b).

Elevated stream temperatures in the Upper Swauk Creek watershed result from activities which have decreased riparian canopy cover (shade) and summer (base) flows (U.S. Forest Service 1997). During the summer, stream temperatures in the Upper Swauk watershed frequently exceed State standards for the 7-day average, daily maximum temperature. Portions of Swauk Creek and Williams Creek are on Ecology's 303(d) list (2012) as temperature impaired, for which a draft Total Maximum Daily Load (Creech and Stuart 2016; Whiley and Cleland 2003) has been completed. The Whiley and Cleland report (2003) established the required pollutant reduction (defined in terms of acceptable effective shade loss along streams) to achieve the water quality standard for each impaired stream, based on its geologic zone, size of the drainage area, and forest vegetation group. The resulting target shade level for Upper Swauk Creek's streams is "70% Total Effective Shade". This standard must be met to fulfill requirements of Section 303 (d) of the Clean Water Act.

For the proposed action, there are approximately 18.4 acres of potential riparian reserve that will be disturbed across 10 mine sites. This includes locations on both Swauk Creek and Williams Creek, 12 acres and 2.5 acres (14.5 acres total) of riparian reserve impacts respectively. The BA describes various levels of riparian reserve disturbance from complete vegetative clearing to removal of only danger trees. At some of these mines, the vegetation has already been cleared or removed, such as at the Old Town Mine (0-24% canopy cover), and we can expect this condition to remain as long as the mine is active. Of the total acres effected by proposed activities (35.6 acres), approximately 10 acres have less than 25% canopy cover and 11 acres with canopy cover measured at 75% or greater. The remaining 15 acres have between 25% to 75% canopy cover. The proposed action includes vegetation clearing, danger tree removal, and tree removal for tunnel supports. The tree source for tunnel supports will be located outside of riparian reserves but is not further described in the BA. The BA notes potential danger tree removal at six of the 10 mines. However, NMFS assumes that miners will remove trees that pose a risk to human life at all mine sites. We multiplied the mine acres by years of operation with 2 trees per acre cut and determined the total number of danger trees could total up to 622 trees. This is likely an overestimate of the total number of danger trees based on recent history and the low likelihood of this many danger trees existing over a 35.6-acre area. Since the danger trees must meet specific Forest Service criteria and there are not likely to be that many danger trees, NMFS estimates that no more than half of the 622 danger trees will be removed for a total of 311 danger trees cut across 35.6 acres.

In general, we expect the proposed action to reduce canopy cover and stream shade on both Swauk Creek and Williams Creek. These streams already fail to meet State of Washington stream temperature criteria and are on the 303(d) list as temperature impaired. The proposed action will further decrease canopy cover and is expected to further degrade the existing conditions for the next 15 years. This will be particularly critical across the 14.5 acres of riparian reserve that are adjacent to critical habitat in Swauk and Williams Creeks. However, when placed in a watershed perspective, the additional degradation of 14.5 acres of riparian reserve out of 5,855 acres of riparian reserve amounts to a 0.25 % decrease for the watershed. In addition, The Forest Service is requiring revegetation of all disturbed areas with both seeding and planting as part of each mines reclamation plan. Over time, once reclamation begins, these mine sites will recover and stream shade will increase, although slowly.

Water Quality—Stream Temperature and Water Quantity from Water Withdrawal

Water will be diverted from Swauk Creek, Williams Creek, and a small spring in the headwaters of Hurley Creek (see Table 10). The period of use for water withdrawal for all mine sites allows water to be removed during the descending limb of hydrographs, post-peak flows, and during low flows. In general, we expect these water withdrawals will reduce the thermal capacity and water quantity in Swauk Creek and Williams Creek. This may be significant in magnitude at the Eagle's Beak and Maverick mines where low stream flows and significant water withdrawals are located in areas occupied by MCR steelhead. Only a very small amount of water will be withdrawn for use at the Southern Star and Old Town mines; therefore, withdrawals at these sites will have minor effects on water quality.

Table 10. Proposed water withdrawals in Swauk Mining Plans of Operation.

Mine	Source	Point of Diversion (POD)/position in watershed	Period of use (months)	Maximum instantaneous water use (cfs)	Total Acre-Feet per year
Southern Star	Unnamed Tributary to Hurley Creek, tributary to Swauk Creek	First order, headwaters near ridge, snowmelt, shallow groundwater	April–October	0.02	1.5
Eagle's Beak	Swauk Creek	Third order, valley floodplain	April–November	0.67[3]	67.4
Maverick	Williams Creek	Second order	April–November	1.0	
Old Town	Swauk Creek	Third order, valley floodplain	March–November	0.04	
			Total:	1.73	

Stream Temperature

There is potential for warming of stream temperatures at the Eagle's Beak and Maverick mines where water withdrawals reduce stream flows in areas occupied by MCR steelhead. Reducing stream flow will enable solar radiation to heat the water faster; however, minimization measures will limit the reduction of volume through timing restrictions (including modified BMP AQS5.1, which reduces water use to 5% of the total flow volume when the Swauk stream gage is below 20 cfs). In addition, the water withdrawals are always limited to the approved water right, and reflect intermittent use and seasonal restrictions. Due to implementation of these minimization measures, potential changes in stream temperature will likely not be measureable.

Water Quantity

Four applicants will withdraw water for mining operations of which only three will directly reduce the amount of water in either Swauk Creek or Williams Creek. Rapid removal of water can quickly decrease the amount of available space and habitat for salmonid rearing and migration in the action area. Water quantity for spawning is unlikely to be affected due to the

[3] The Edna G Mine receives water from the Eagle's Beak water right.

timing of steelhead spawning (spring). However, in the summer and fall when juvenile steelhead are rearing in Swauk and Williams creeks, there will be small reductions in suitable habitat, particularly at low flows.

The water withdrawals in the proposed action consist of both non-consumptive use and consumptive use. Non-consumptive use is when the water remains in or is immediately returned to the location in the stream from which it was extracted. Consumptive use is where the water is removed from the stream and then is either consumed or stored to be returned later or is removed from the stream entirely. The proposed action consists of both of these with the majority of the water being returned, albeit later in time (hours to days). Since there is water storage capacity at some of these mines and water is not always immediately needed, there can be a lag between the time of pumping and water returning through ground water back to the creek, depending on the mine. There is also likely to be some water lost to evaporation, water use, or water storage. At the Eagle's Beak and Edna G mines, the water will be used for washing gravels and directed to one or more retention ponds where it will return to shallow aquifers that discharge to Swauk Creek. At the Maverick Mine, the water will be pumped from Williams Creek, stored in a 500-gallon storage tank for use, and directed into an infiltration pond after use. The Old Town Mine will transport water withdrawn from Swauk Creek to the mine site where it will be put to use and subsequently discharged into an infiltration pond.

Water withdrawals at the Eagle's Beak, Maverick, and Old Town Mines all have the potential to reduce flows in areas where fish are present. As discussed in the environmental baseline section, stream flow in both Swauk Creek and Williams Creek is already impaired from past land use activities and existing water withdrawals. Both the Eagle's Beak and Old Town Mine withdrawals will exacerbate low flow conditions in Swauk Creek. When flows drop below 20 cfs, Eagle's Beak may not divert more than the equivalent of 5% of the gaged flow at the Swauk Ecology gage and Old Town may not divert more than its 0.04 cfs water right. The Maverick mine will withdraw water from Williams Creek, no more than equivalent of 5% of the gaged flow of Swauk Creek. Previously these mines have been entitled to divert up to a combined 1.71 cfs. As proposed under the proposed action, the combined diversions would not exceed 0.18 cfs when flow at the Swauk Ecology gage is at its lowest recorded level (1.4 cfs). See Table 11 for flow information at flows below 20 cfs. At most, this withdrawal rate would reduce the flow from 1.4 to 1.22 cfs, assuming no return waters from the infiltration ponds. However, the likelihood of all three mines withdrawing their full amount at exactly the same time is very low, given that they withdraw water only when needed. Therefore, NMFS expects the effects of water withdrawals will be small.

Table 11. Mine water withdrawal scenarios and stream flow.

	Flows (cfs)			
Ecology Gage flow	20	10	5	1.4
Eagle's Beak	0.67	.5	0.25	0.07
Maverick	1	.5	0.25	0.07
Old Town	0.04	0.04	0.04	0.04
Totals	1.71	1.04	0.54	0.18
Swauk flows	18.29	8.96	4.46	1.22
Flow change (percent)	9	10	11	13

Suspended Sediment and Substrate Embeddedness

Ground disturbance is the primary mechanism that can produce sediment that can be mobilized into stream channels. Project elements that can increase the potential for sediment delivery to the stream network include mining (excavation and processing), access routes (creation and use), vegetation removal, and reclamation.

The BA describes how mining activities may introduce fine sediment and soil to water bodies (causing turbidity and sedimentation), affecting water quality. This is particularly true where existing soils are compacted or displaced, with little to no ground cover. These conditions can accelerate overland flow of water and sediment, as well as, concentrate water routing and flow. The risk of this occurring is elevated where these activities are located in close proximity to a waterbody; only one claim (Golden Eagle) is located on a hillslope well away from streams. The Eagle's Beak, Edna G, Old Town, Big Chic, and Maverick mines pose the greatest risk to water quality as they are located adjacent to or along floodplains of Swauk or Williams Creeks. The other mines are located higher in the watershed adjacent to small, intermittent stream channels.

Mining activity is expected to release pulses of sediment into Swauk Creek and Williams Creek. The Forest Service is requiring specific design criteria and BMPs for mine operations to control sediment generation and delivery. However, even with those we expect increased sediment delivery to the stream network. This will be particularly evident where mine operations use water to process minerals. In general, most washed material, which includes mud, silt, sand, and aggregate, will be directed into retention ponds where sediment is expected to settle out. If these retention ponds are filled to capacity, not maintained, or overflow, sediment and organic material will flow directly into the stream. However, the Forest Service is requiring BMPs, such as HS 32 that require maintenance of retention ponds to prevent overtopping and delivering sediment to a waterbody. Also, where retention ponds are closely connected to ground water, there is the possibility of a subsurface flow connection to the stream where turbid water could be delivered.

Use of roads and compaction also have the potential to increase runoff and sediment delivery to streams. A roads analysis was conducted using GRAIP-Lite as detailed in the Forest Service hydrology specialist report. Per that analysis, the existing road system at the analyzed mines produces 314 tons of sediment each year. Increased traffic from proposed activities would result in an additional 24 tons of sediment per year for the life of the proposed action, an increase of 7.6% for the life of the proposed action. After reclamation and road decommissioning, the sediment production would decline by an estimated 94 tons per year from the existing condition.

Non-road ground disturbance also has the potential to deliver sediment to the stream network. The proposed action authorizes 35.6 acres of ground disturbance with 18.4 of those acres in the riparian reserve. Much of that acreage will be cleared, excavated, or modified in a manner that reduces vegetation, increases compaction, and disturbs the soil in some manner. We expect that proposed activities will add sediment from overland flow in areas that are adjacent to or near streams. The Forest Service has proposed sediment and erosion control BMPs that will minimize the amount of sediment delivered to streams as much as possible. Nonetheless, it is not possible to completely eliminate the potential for sediment delivery, and we expect increases in sediment delivery to streams from project activities across the majority of the 18.4 riparian reserve acres.

In addition, one mine (Fox) will remove an unauthorized culvert on Robinson Creek. This action is expected to produce a brief pulse of sediment that is expected to dissipate within one-quarter mile downstream. The removal will occur during the inwater work window and includes the use of minimization measures, including straw bales to trap and filter sediment. Even with these minimization measures, we expect some sediment to reach areas that could be occupied by salmonids, including *O. mykiss.*

Large Wood

Removal of trees within one site potential tree height of a stream has the greatest potential to affect recruitment of woody material (Forest Ecosystem Management Assessment Team 1993). For near-stream riparian inputs, multiple studies suggest that stream wood input rates decline exponentially with distance from the stream and vary by stand type and age (McDade et al. 1990; Pollock and Beechie 2014; Van Sickle and Gregory 1990).

The proposed action has the potential to remove approximately 18.4 acres of vegetation in the riparian reserve across 10 mines. A portion of this area will have all vegetation removed and some will have selective vegetation removal. In addition, danger tree removal of up to two trees per acre per year will be allowed. We will assume that all 35.6 acres will have some level of danger tree removal for the life of each of the 10 plans of operation. The proposed action will reduce wood recruitment to the stream in both the short term and long term. Wood loading in Swauk Creek and Williams Creek has been heavily modified from past activities including mining, timber harvest, and recreation. This action will further reduce the number of pieces of large wood reaching streams in the project area, including Williams Creek and Swauk Creek. In addition, the reduction of large wood on intermittent streams can have effects on other stream habitat features that contribute to overall watershed health, including sediment deposition, pool formation, refugia, and floodplain connectivity, among others. Overall, the proposed action will decrease the amount of wood (all sizes) available to be recruited for instream wood. However, the magnitude of effect is limited to 18.4 acres of riparian reserve.

2.5.3. Effects on Middle Columbia River Steelhead

The proposed action will result in increases in stream temperature, sediment delivery, and suspended sediment (turbidity). The proposed action will also reduce instream wood, wood recruitment, and stream flow.

Juvenile MCR steelhead will be exposed to very small increases in stream temperatures, typically in July through September when stream temperatures are already elevated. This is particularly critical in the project area because these streams already approach their maximum thermal tolerance level for salmonids during the summer. Thus, any increases in temperature are likely to be detrimental to salmonids. The reduction in shade-producing vegetation from proposed actions will increase solar radiation to the stream, albeit only across 18.4 acres. The water withdrawal component will reduce the volume of water and allow solar radiation to heat the water faster, although, BMPs will reduce this effect. The slight increase in stream temperatures from these activities are likely to be very small. However, because existing stream temperatures are already elevated, any increases in stream temperature could increase the risk of reduced growth, reduce competitive success of juveniles in relation to non-salmonid fish, increase disease virulence, and reduce disease resistance (Marine and Cech 2004; McCullough et al. 2001; Reeves et al. 1987). These slight increases in stream temperatures are expected to result in behavioral affects to rearing steelhead along short sections of Swauk Creek and Williams Creek. Juvenile steelhead in these affected streams will likely move to colder water or migrate either upstream or downstream to more suitable habitat. These movements may make these fish more vulnerable to predation or reduce their fitness from competition or lack of forage, which may reduce the likelihood of long-term survival of individual fish.

The exposure of juvenile and adult steelhead to increased turbidity and changes in substrate character from sediment generated by the proposed action is reasonably certain to occur. An increase in suspended sediments (turbidity) and deposition of fine sediments can adversely affect fish and filter feeding macroinvertebrates downstream from each of the source locations. At moderate levels, turbidity has the potential to reduce primary and secondary productivity; at higher levels, turbidity may interfere with feeding and may injure and even kill both juvenile and adult fish (Berg and Northcote 1985; Spence et al. 1996). However, Bjornn and Reiser (1991) found that adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that may be experienced during storm and snowmelt runoff episodes. Increased turbidity is expected to elicit behavioral responses from a relatively small number of steelhead occupying areas downstream from areas (culvert removal, ground disturbance including road use, and mining activities) delivering sediment. Steelhead will likely respond to the increased suspended sediment by attempting to move to locations with lower concentrations of fine sediment. Failure to avoid increased suspended sediment is likely to result in gill irritation or abrasion, which can reduce respiratory efficiency or lead to infection and a reduction in juvenile feeding efficiency due to reduced visibility. Fine sediment deposition may clog substrate interstices and thereby diminish intragravel flows. In addition, fine sediments may act as a physical barrier to fry emergence (Redding et al. 1987). Eggs deposited in gravel with a high percentage of fine sediment have a lower survival to emergence (Spence et al. 1996).

Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects caused by turbidity (Newcombe and Jensen 1996). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such seasonal high pulse exposures. However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Servizi and

Martens 1991). In a review of 80 published reports of fish responses to suspended sediment in streams and estuaries, Newcombe and Jensen (1996) documented increasing severity of ill effects with increases in dose (concentration multiplied by exposure duration).

The most critical life stage that will experience increases from fine sediment deposition from project activities are incubating eggs. Steelhead eggs are in the gravel from mid-March to late June. This also coincides with snowmelt runoff and higher turbidity levels. We expect increased levels of turbidity and resulting levels of fine sediment deposition in spawning gravels in Swauk Creek, Williams Creek, Cougar Gulch, Baker Creek, and Robinson Creek. For those incubating eggs that are present in those areas, we would expect decreases in survival to emergence. We expect these negative effects to last for the duration of the plans of operation (3 to 15 years). Upon completion of mining and reclamation, the mine sites will slowly recover and sediment delivery should be reduced to natural levels for these areas. However, that is expected to take decades to occur.

Mining activities and danger tree removal is expected to reduce large wood recruitment and wood delivery to the stream network across 18.4 acres of riparian reserve. The proposed action will remove trees, both large and small. Wood functions to create complex rearing habitats by trapping sediment, streambed aggradation, sorting spawning gravels, formation of pools, improving pool frequency and quality, and improving connectivity to off-channel and floodplain habitats. The proposed action will reduce the creation of potential rearing habitat for juvenile MCR steelhead along short segments of Swauk Creek, Williams Creek, Cougar Gulch, Baker Creek, and Robinson Creek for potentially the next several decades. MCR steelhead use pools, instream wood, and off-channel and floodplain habitats for velocity refuge, foraging, and predator avoidance. Reducing the creation of complex rearing habitat will reduce the habitat carrying capacity in those creeks in the action area affected by vegetation removal.

Water withdrawal at three mines will periodically reduce the amount of stream flow in Swauk Creek and Williams Creek, particularly during low stream flow. However, this effect will be reduced at flows below 20 cfs through BMPs that reduce the amount of water withdrawal to 5% of the stream gage flow or their maximum water right, whichever is less. The non-consumptive nature of the water withdrawal will also help offset the reduction in flows, although the return flows are expected to occur later in time (hours to days). Even with BMPs and the generally non-consumptive nature of the water withdrawals, NMFS expects there to be effects to MCR steelhead. During periods of decreased stream flow, juvenile fish are likely to become more vulnerable to predation or stranding. Additionally, the withdrawal rate could be enough to decrease the amount of available habitat and preferred cover, especially on the stream margins. Therefore, even a small and localized reduction in water quantity will likely lead to behavioral modifications of some smolts and rearing juvenile salmonids.

As baseline stream flows decrease throughout the summer, water withdrawals of even small amounts will cause greater effects on water quantity and space and increase the risk of reduced rearing capacity for juveniles. Some individuals may be able to move from their preferred location and some salmonids may move downstream to more suitable habitat. However, displaced individuals are reasonably certain to experience increased predation, increased

competition with other juveniles, and a reduction in feeding due to a less favorable feeding position. Because of the small stream size and the modified environmental baseline conditions, it is anticipated that only a small number of juveniles and smolts will be affected. However, NMFS cannot predict the number precisely because the distribution and abundance of fish within the action area at the time of the action are not a simple function of the quantity, quality, or availability of predictable habitat resources within that area. Rather, the distribution and abundance of fish also show wide, random variations due to biological and environmental processes operating at much larger demographic and regional scales.

2.5.4. Effects on Critical Habitat

Designated critical habitat within the action area for MCR steelhead considered in this opinion consists of freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, and their essential PBFs as listed below. The effects of the proposed action on these PBFs are summarized as a subset of the habitat-related effects of the action that were discussed more fully above.

1. Freshwater spawning sites
    a. Substrate—The proposed action will cause an increase in suspended sediment and fine sediment deposition from mining, ground disturbance, vegetation clearing, and road use.
    b. Water quality—The proposed action will cause an increase in suspended sediment from mining, ground disturbance, vegetation clearing, and road use. It will also cause a small increase in stream temperature from vegetation removal and danger tree management.
    c. Water quantity—The proposed action will reduce water quantity in Swauk Creek and Williams Creek from water withdrawals for mining and processing.
2. Freshwater rearing sites
    a. Floodplain connectivity—The proposed action will not reduce floodplain connectivity over existing conditions. Although, the proposed action will reduce large wood recruitment to the stream network, which reduces the potential for the creation of complex habitat features, including floodplain connectivity.
    b. Forage –The proposed action will increase suspended sediment that will cause minor reductions in the production of invertebrates. The action will also remove vegetation adjacent to streams, reducing the input of insects.
    c. Natural cover—Reductions in wood recruitment potential and delivery of wood to the stream network will occur in the action area, reducing the creation of cover habitat (pools, access to floodplains and off-channel habitats) and rearing potential for MCR steelhead. The negative effects on natural cover will change the quality and function of this PBF in the action area for several decades.
    d. Water quality—The proposed action will cause an increase in suspended sediment from mining, ground disturbance, vegetation clearing, and road use. It will also cause a small increase in stream temperature from vegetation removal and danger tree management.

e. Water quantity—The proposed action will reduce water quantity in Swauk Creek and Williams Creek from water withdrawal for mining and processing.

3. Freshwater migration corridors
    a. Free of artificial obstruction—The proposed action will not create any artificial obstructions.
    b. Natural cover—Reductions in wood recruitment potential and delivery of wood to the stream will occur in the action area, reducing the creation of cover habitat (pools, access to floodplains and off-channel habitats) and rearing potential for MCR steelhead. The negative effects on natural cover will change the quality and function of this PBF in the action area for several decades.
    c. Water quality—The proposed action will cause an increase in suspended sediment from mining, ground disturbance, vegetation clearing, and road use. It will also cause a small increase in stream temperature from vegetation removal and danger tree management.
    d. Water quantity—The proposed action will reduce water quantity in Swauk Creek and Williams Creek from water withdrawal for mining and processing.

2.6. Cumulative Effects

"Cumulative effects" are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline vs. cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

NMFS is not aware of any specific future actions that are both reasonably certain to occur in the action area and that would likely contribute to cumulative effects on steelhead. For this description of cumulative effects, NMFS assumes that future non-Federal activities in the area of the proposed action will continue into the future at present or slightly increased intensities.

NMFS searched for information on future State, tribal, local, or private actions that were reasonably certain to occur in the action area. Most activities that occur across the action area either are on Federal land or require some type of Federal permit, which will require some type of future ESA consultation. In addition, most future State or tribal actions would likely have some form of Federal funding or authorization and therefore would be reviewed by NMFS.

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

The status of MCR steelhead is driven by the risk of extinction from low abundance and low to moderate risks of extinction due to low productivity, spatial structure, and diversity for most populations. The MCR steelhead DPS is not currently meeting the viability criteria described in the Mid-Columbia Steelhead Recovery Plan (National Marine Fisheries Service 2009). To achieve viable status, two populations should be rated as viable, including at least one of the two classified as large—the Naches River or the Upper Yakima River—neither of which currently meets viable status. The Critical Habitat Analytical Review Team rated the Middle Upper Yakima Watershed (HUC 5: 1703000103), where the proposed action will occur, as having a high conservation value to the MCR steelhead DPS (National Marine Fisheries Service 2005).

The information presented in the environmental baseline section (Section 2.4) details that the habitat quality in tributary streams in the Interior Columbia Recovery Domain range from excellent in wilderness and roadless areas to poor in areas subject to heavy agricultural and urban development (National Marine Fisheries Service 2009; Wissmar et al. 1994). The Swauk Watershed has been highly modified by timber management, grazing, road building, recreation, mining, and other activities. Reduced summer stream flows, impaired water quality (high water temperature), and reduction of habitat complexity are a few of the problems.

The cumulative effects of State and private actions within the action area are anticipated to continue at approximately the same level that they are now occurring. It is likely that the overall pattern of State and private development especially in wildland urban interface will continue and contribute adversely, in some areas, to the condition of riparian habitat.

As noted in Section 2.2, climate change is likely to affect MCR steelhead. The ISAB identified a number of effects climate change would have on Columbia Basin salmon. A few of these include: (1) water temperature increases, and depletion of cold water habitat that could reduce the amount of suitable salmon habitat by about 22% by the year 2090 in Washington State; (2) variations in precipitation that may alter the seasonal hydrograph and modify shallow mainstem rearing habitat; and (3) earlier snowmelt and higher spring flows with warmer temperatures that may cause steelhead yearlings to smolt and emigrate to the ocean earlier in the spring (Independent Scientific Advisory Board 2007; O'Neal 2002). Specifically on the Okanogan–Wenatchee National Forest (Gaines et al. 2012), recommendations included protecting cold-water areas, restoring beavers, restoring fish passage, and reducing the impacts of roads on riparian habitats, water quality, water quantity, and flow regimes. Climate change is

expected to make recovery targets for these salmon populations more difficult to achieve. However, habitat restoration actions can at least partially address the adverse impacts of climate change on salmon.

The proposed action will increase sediment delivery, increase summer water temperatures, reduce forage, and reduce low water flows. These actions are reasonably certain to cause a decrease in the rate of egg survival and the fitness of juvenile steelhead.

The proposed action will contribute modestly to previously identified limiting factors and disrupt normal behavioral patterns, which will create or increase the risk of injury to MCR steelhead. Significant disruption will occur to the following biological processes and behaviors: egg incubation, feeding, and rearing. Increased stream temperatures are likely to affect fish in short sections of Swauk Creek and Williams Creek. Juvenile steelhead in these affected streams will likely move to sections more suitable, which makes fish more vulnerable to predation or a reduction in fitness, which reduces the likelihood of long-term survival of individual fish. Increased sediment to streams could affect migrating and spawning adult steelhead, incubating eggs, pre-emergent fry, and rearing and migrating juveniles. The effects from sedimentation and suspended sediment are likely to be relatively short-term (3–15 years). However, the addition of fine sediment in spawning gravels or onto incubating eggs will likely lead to reduced egg survival during that time. Due to conservation measures proposed by the Forest Service and the location of the mines, most activities will only have a small and localized effect exposing only a small number of individuals. Thus, the effects are not likely to cause a biologically meaningful effect at the population scale in terms of abundance, diversity or spatial structure. The incubating eggs and juveniles that are likely to be injured or killed due to the action are too few to cause measurable effects on the long-term abundance or productivity of the affected population, primarily because only a small proportion of individuals from the upper Yakima River population will be exposed. Karp (2009) observed that in all years, fewer than 16% of the upper Yakima River population entered Swauk Creek and of these, not more than 5% entered Williams Creek. It is not clear if any steelhead spawned in the action area during the 4 years assessed by Karp (2009). Based on these data, it does not appear that the effects of the proposed action will reduce the productivity or survival of MCR steelhead, even when combined with a degraded environmental baseline and additional pressure from cumulative effects and climate change.

Based on our analysis, adverse effects from the proposed action will cause a small short-term decline in the quality and function of PBFs in the action area. The quality of the PBFs at the watershed-scale is not likely to significantly decline as a result of the proposed action due to the minor to moderate intensity and localized nature of effects from increased sediment and temperature, and decreased large wood and flows. The effects of the proposed action will not impede the ability of this critical habitat to play its intended conservation role because, although the reduction in quality of PBFs caused by the proposed action makes the affected habitat less than ideal for MCR steelhead, the effects of the action will not render the habitat unusable or incapable of supporting migration, spawning, or rearing.

Given the above, the proposed action will not be likely to meaningfully change the limiting factors, will have no discernible effect on population viability, and will not impede recovery of

the MCR steelhead DPS. Therefore, the proposed action will not appreciably reduce the likelihood of both the survival and recovery of the MCR steelhead DPS.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, any effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of MCR steelhead, or destroy or adversely modify its designated critical habitat.

2.9. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1. Amount or Extent of Take

In the opinion, NMFS determined that the proposed action was reasonably certain to result in incidental take as follows:

- Injury to incubating eggs and juvenile steelhead from increased suspended sediment from mining, ground disturbance, vegetation clearing, and road use.
- Injury to juvenile steelhead from increased stream temperature from vegetation removal and water withdrawal.
- Injury and behavioral changes to juvenile steelhead from decreased water flow from water withdrawal.

The distribution and abundance of fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. Additionally, there is no way to count or observe the number of fish exposed to the effects of the proposed action over the period of time during which these effects will occur (3–15 years). In such circumstances, NMFS cannot provide an amount of take that would be caused by the proposed action, and instead uses an indicator of the extent of take.

The indicator for the extent of take from increases in suspended sediment is the number of miles of access roads (2.62 miles), one culvert removal over Robinson Creek, and surface disturbance across 18.4 acres of riparian reserve. This indicator is proportional to the effects from mining, road use, and vegetation clearing because these activities can cause sediment delivery to the stream system. Thus, the extent of take indicator that will be used as a reinitiation trigger for this pathway is 2.62 miles of access roads, 1 culvert removal, and 18.4 acres of ground disturbance.

The indicator for the extent of take from increases in stream temperature and reduction of large wood is the total number of acres (18.4 acres) of riparian reserve included in the proposed action. These indicators are proportional to the effects from vegetation clearing, mine disturbance and danger tree removal, and it captures tree removal within up to 300 feet from the stream. Thus, the extent of take indicator that will be used as the reinitiation triggers for this pathway is the number of acres of riparian reserve (18.4 acres).

The indicator for the extent of take from water withdrawal is the amount of water and as outlined in the proposed action and this opinion. More specifically, each of the water withdrawals consulted on in this opinion will not exceed the maximum instantaneous flow and/or the total acre-feet to be withdrawn each year. In addition, when the Swauk Creek Ecology gage falls below 20 cfs the applicants will withdraw no more than 5% of the total flow volume measured at the gage or their maximum allowable water right, whichever is less.

Although the surrogates are largely coextensive with the proposed action, they nevertheless function as effective reinitiation triggers because they can be measured and monitored as the roads are constructed and used during the timber sale portion of the project and then again as the roads are decommissioned. If at any time the level or method of take exempted from take prohibitions and quantified in this opinion is exceeded, reinitiation of consultation will be required.

2.9.2. Effect of Take

In the opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species, or destruction or adverse modification of critical habitat.

2.9.3. Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

The Forest Service shall:

1. Minimize the effects of water withdrawals at all mine sites covered in this opinion.
2. Minimize the effects of turbidity and sediment input to the stream network.
3. Monitor the project to ensure that the conservation measures are meeting the objective of minimizing take and that the amount or extent of take is not exceeded.

2.9.4. Terms and Conditions

The terms and conditions described below are non-discretionary, and the Forest Service or any applicant must comply with them in order to implement the RPM (50 CFR 402.14). The Forest Service or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement RPM 1:
    a. Any water drafting or pumping would maintain a continuous surface flow of the stream without altering the original wetted width. When the Swauk Creek Ecology gage falls below 20 cfs the applicant will withdraw no more than 5% of the total flow volume measured at the gage. For example, if the flow at the Swauk Creek gage is 10 cfs the applicant will withdraw only 0.5 cfs or their maximum allowable water right, whichever is less. The applicant and Forest Service will monitor both water withdrawal and the Swauk gage to ensure these withdrawal rates are not exceeded.
2. The following terms and conditions implement RPM 2:
    a. Follow Ecology's water quality standards for turbidity using WAC 173-201A-200.
    b. All water infiltration and retention ponds will be maintained as to prevent overtopping and flow into a waterbody.
    c. Manage user built roads and access roads to minimize sediment delivery to the stream network. The Forest Service will implement applicable design criteria as outlined in Table 34 of the BA.
3. The following terms and conditions implement RPM 3:
    a. By January 31, 2022, and every year afterward, the Forest Service shall report monitoring items to include, at a minimum, the following:
        i. Mine operations and monitoring details
            1. Starting and ending dates of annual mining operations.
            2. Any monitoring and inspection reports performed or received by the Forest Service.
            3. Water withdrawal information including quantity (daily and yearly), location, and any changes to the water right.
            4. Report any danger tree management that occurred including number, size, location, and use of the danger tree.
            5. Results of turbidity monitoring or visual inspections, if any.
            6. Report any non-compliance issues and resolutions, if any.

7. A description of any elements of the proposed plans of operation that were completed differently than depicted in the BAs, associated addendums, COAs, reclamation plans, and communications, or this opinion.
8. Report any reclamation that occurred.

b. If take is exceeded, contact NMFS promptly to determine a course of action.

c. All reports will be sent to National Marine Fisheries Service, Attention: Justin Yeager, 304 South Water Street, Suite 201, Ellensburg, Washington, 98926. NOTICE: To follow inactive projects and, if necessary, withdraw the opinion for an incomplete project, the Forest Service shall provide an annual report even if no actual work was completed in a particular year.

2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). The following conservation recommendations are discretionary measures that we believe are consistent with this obligation and therefore should be carried out by the Federal action agency:

1. The Forest Service should consider using riparian reserve trees cut for vegetation clearing or part of the danger tree program to be used for in-stream restoration projects to increase natural cover and stream productivity in streams that are low in large wood or complex habitat.
2. The Forest Service should pursue actions that decrease stream temperature in Swauk Creek and Williams Creek including restoration actions such as large wood placement, vegetation planting, and floodplain restoration.

Please notify us if the Federal action agency carries out any of these recommendations so that we will be kept informed of actions that are intended to improve the conservation of listed species or their designated critical habitats.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Swauk Mining Plans of Operation Project.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by NMFS where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of incidental taking specified in the ITS is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the identified action is subsequently modified in a manner that causes an effect to

the listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by the Forest Service and descriptions of EFH for Pacific Coast salmon (Pacific Fishery Management Council 2014) contained in the fishery management plans developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

The proposed action and action area are described in the BA and this opinion. The project area includes habitat that has been designated as EFH for various life stages of Chinook salmon (*O. tshawytscha*) and coho salmon (*O. kitsutch*). Habitat areas of particular concern within the action area include complex channel and floodplain habitat, thermal refugia, and spawning habitat.

3.2. Adverse Effects to Essential Fish Habitat

See Section 2.4 of the opinion for a description of the adverse effects on anadromous species habitat for Pacific salmon. The effects of the action on Pacific Coast salmon EFH are similar to those described above in the ESA portion of the document.

NMFS concludes that the proposed action will have adverse effects on EFH designated for Pacific Coast salmon in freshwater habitats where Forest Service program activities occur. Based on information provided by the action agency and the analysis of effects presented in the ESA

portion of this document (Section 2.4), we conclude that the proposed action will have the following adverse effects on EFH for Pacific Coast salmon.

Specifically, NMFS has determined that the action will adversely affect EFH as follows:

1. Freshwater EFH quantity and quality, including salmon spawning habitat will be reduced from increased sedimentation/substrate embeddedness at the site scale.
2. Freshwater EFH quality, including salmon rearing habitat will be reduced from increased stream temperatures at the site scale.
3. Freshwater EFH quality, including salmon rearing habitat will be reduced from decreased inputs of large wood at the site scale.
4. Freshwater EFH quality and quantity, including salmon rearing habitat will be reduced from decreased stream flow from water withdrawals at the site scale.

3.3. Essential Fish Habitat Conservation Recommendations

NMFS believes that the following conservation recommendations are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH.

1. The Forest Service should implement RPM #1 and RPM #2 and their terms and conditions described in the ITS to minimize adverse effects to EFH due to water withdrawals, increased sediment delivery, and stream turbidity.
2. The Forest Service should implement RPM #3 and its terms and conditions described in the ITS to ensure completion of monitoring and reporting to confirm that these terms and conditions are effective for avoiding and minimizing adverse effects to EFH.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing adverse effects described in Section 3.2 above, EFH for Pacific Coast salmon.

3.4. Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the Forest Service must provide a detailed response in writing to NMFS within 30 days after receiving EFH Conservation Recommendations. Such a response must be provided at least 10 days prior to final approval of the action, if the response is inconsistent with any of NMFS' EFH Conservation Recommendations, unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(1)].

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how

many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5. Supplemental Consultation

The Forest Service must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations [50 CFR 600.920(l)].

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The DQA specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the Forest Service. Other interested users could include the applicants, potential users of the Okanogan–Wenatchee National Forest as well as people interested in the conservation of MCR steelhead. Individual copies of this opinion were provided to the Forest Service. The document will be available within 2 weeks at the NOAA Library Institutional Repository (https://repository.library.noaa.gov). The format and naming adheres to conventional standards for style.

4.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3. Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased, and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion (and EFH consultation) contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

5. REFERENCES

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