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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232

Refer to NMFS No: WCR-2019-02487

December 31, 2019

Richard White, Field Manager
Bureau of Land Management
Cottonwood Field Office
2 Butte Drive
Cottonwood, Idaho 83522

Lt. Col. Christian N. Dietz
U.S. Army Corps of Engineers
Walla Walla District
201 North Third Avenue
Walla Walla, Washington 99362-1876

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Boulder Creek Vegetation Management Project, Little Salmon River, HUC 17060210, Adams County, Idaho

Dear Mr. White and Lt. Col. Dietz:

Thank you for the August 30, 2019 letter from the Bureau of Land Management (BLM), Cottonwood Field Office requesting initiation of consultation on the subject action with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.). NMFS conducted this consultation in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016). The enclosure also addresses the BLM's 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. This enclosure also serves as consultation for the U.S. Army Corps of Engineers' (COE) issuance of a permit, if needed, for this project under section 404 of the Clean Water Act (33 U.S.C. 1251 et seq.).

In the biological opinion (Opinion) section of the enclosed document, NMFS concludes that the Boulder Creek Vegetation Management Project is not likely to jeopardize the continued existence of Snake River spring/summer Chinook salmon and Snake River Basin steelhead. NMFS also determined that the action will not destroy or adversely modify designated critical habitat for Snake River spring/summer Chinook salmon and Snake River Basin steelhead. Rationale for our conclusions is provided in the attached Opinion.

As required by section 7 of the ESA, NMFS provides an incidental take statement (ITS) with the Opinion. The ITS describes reasonable and prudent measures (RPM) NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the BLM, COE (where relevant to 404 permit), and any permittee who performs any portion of the action must comply with to carry out the RPM. 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, and includes five Conservation Recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These Conservation Recommendations are similar but not identical to the ESA terms 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 these recommendations.

If the response is inconsistent with the EFH Conservation Recommendations, the action agency must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. 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, in your statutory reply to the EFH portion of this consultation, NMFS asks that you clearly identify the number of Conservation Recommendations accepted.

Please contact Benjamin Matibag, Northern Snake Branch Office, at (208) 378-5694 or at benjamin.matibag@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Michael P. Tehan
Assistant Regional Administrator
Interior Columbia Basin Office

Enclosure

cc: C. Johnson – BLM
M. Kosterman – USFWS
M. Lopez – NPT

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

Boulder Creek Vegetation Management
Little Salmon River, HUC 17060210
Adams County, Idaho

NMFS Consultation Number: WCRO-2019-02487

Action Agencies: Bureau of Land Management, Cottonwood Field Office
U.S. Army Corp of Engineers

Affected Species and NMFS' 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?
Snake River steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	Yes	No
Snake River spring/summer Chinook salmon (O. tshawytscha)	Threatened	Yes	No	Yes	No

Fishery Management Plan That Identifies 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 P. Tehan
Assistant Regional Administrator

Date: December 31, 2019

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ACRONYMS

Acronym	Definition
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practices
cfs	cubic feet per second
COE	U.S. Army Corps of Engineers
CWA	Clean Water Act
DPS	Distinct Population Segment
DQA	Data Quality Act
ECA	Equivalent Clearcut Area
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
HUC	Hydrologic Unit Code
ICTRT	Interior Columbia Basin Technical Recovery Team
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
LWD	Large Woody Debris
mg/L	Milligrams per liter
$MgCl_2$	Magnesium Chloride
mi/mi^2	Mile per Square Miles
MPG	Major Population Group
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NTU	Nephelometric Turbidity Unit
Opinion	Biological Opinion
PBF	Physical or Biological Features
PCE	Primary Constituent Elements
PFMC	Pacific Fishery Management Council
Project	Boulder Creek Vegetation Management
RCA	Riparian Conservation Area
RMP	Resource Management Plan
ROS	Rain-on-Snow
RPM	Reasonable and Prudent Measures
SPCC	Spill Prevention, Control, and Countermeasure Plan
Tribe	Nez Perce Tribe
USFWS	U.S. Fish and Wildlife Service
VSP	Viable Salmonid Population
WEPP	Water Erosion Prediction Project

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

The 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 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/welcome]. A complete record of this consultation is on file at the NMFS Snake Basin Office in Boise, Idaho.

1.2. Consultation History

This Opinion is based on information provided in the Cottonwood Bureau of Land Management (BLM) August 30, 2019, biological assessment (BA), various e-mail and telephone conversations, and North Idaho Level 1 Team meetings. The main exchanges in the interagency communications for this consultation are summarized below.

September 20, 2018: The BLM provided a draft BA to NMFS.

December 19, 2018: The NMFS provided comments and suggestions on additional information to include in the BA.

April 11, 2019: The BLM provided a Soils Report for the project.

May 16, 2019: The BLM provided a revised draft BA for review.

June 24, 2019: The NMFS provided comments on draft BA to the BLM.

July 18, 2019: The BLM provided a draft BA to NMFS for review.

August 28, 2019: The NMFS, U.S. Fish and Wildlife Service (USFWS), and BLM determined that the BA was sufficient to initiate formal consultation.

August 30, 2019: The NMFS received a final BA and request for formal consultation. Consultation was initiated on August 30, 2019.

October 23, 2019: The NMFS received an addendum from BLM on roads within the Trail Creek watershed.

Because this action has the potential to affect tribal trust resources, NMFS provided copies of the draft proposed action and terms and conditions for this Opinion to the Nez Perce Tribe (Tribe) on December 9, 2019. On December 23, 2019, the Tribe responded with a comment requesting field verification of correction of sediment sources. NMFS coordinated with BLM on that additional conservation measure/monitoring and added it to this Opinion.

1.3. Proposed Federal Action

"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). The BLM action may also require a U.S. Army Corps of Engineers (COE) permit under section 404 of the Clean Water Act (CWA). 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). We considered whether or not the proposed action would cause any other activities and determined that it would not.

As stated in the BA, the Boulder Creek Vegetation Management Project (Project) includes both timber harvest and thinning of vegetation on 2,458 acres and prescribed fire on 3,408 acres. The BLM will implement the Project from 2020–2032 and all activities would occur within the Little Salmon River watershed (Figure 1 and Figure 2) and generate up to 20 million board feet of timber products. Road reconstruction work would be conducted prior to log hauling activities in order to conform to Best Management Practices (BMPs). Road decommissioning would occur concurrent with or after timber harvest activities as some of the roads are needed to conduct the harvest. The majority of work will be carried out by sale contractors and overseen by BLM contract administrators to ensure BMPs are implemented. It is expected that within 3 years after timber harvest, post-project work will be completed (road decommissioning, prescribed burning, planting, etc.).

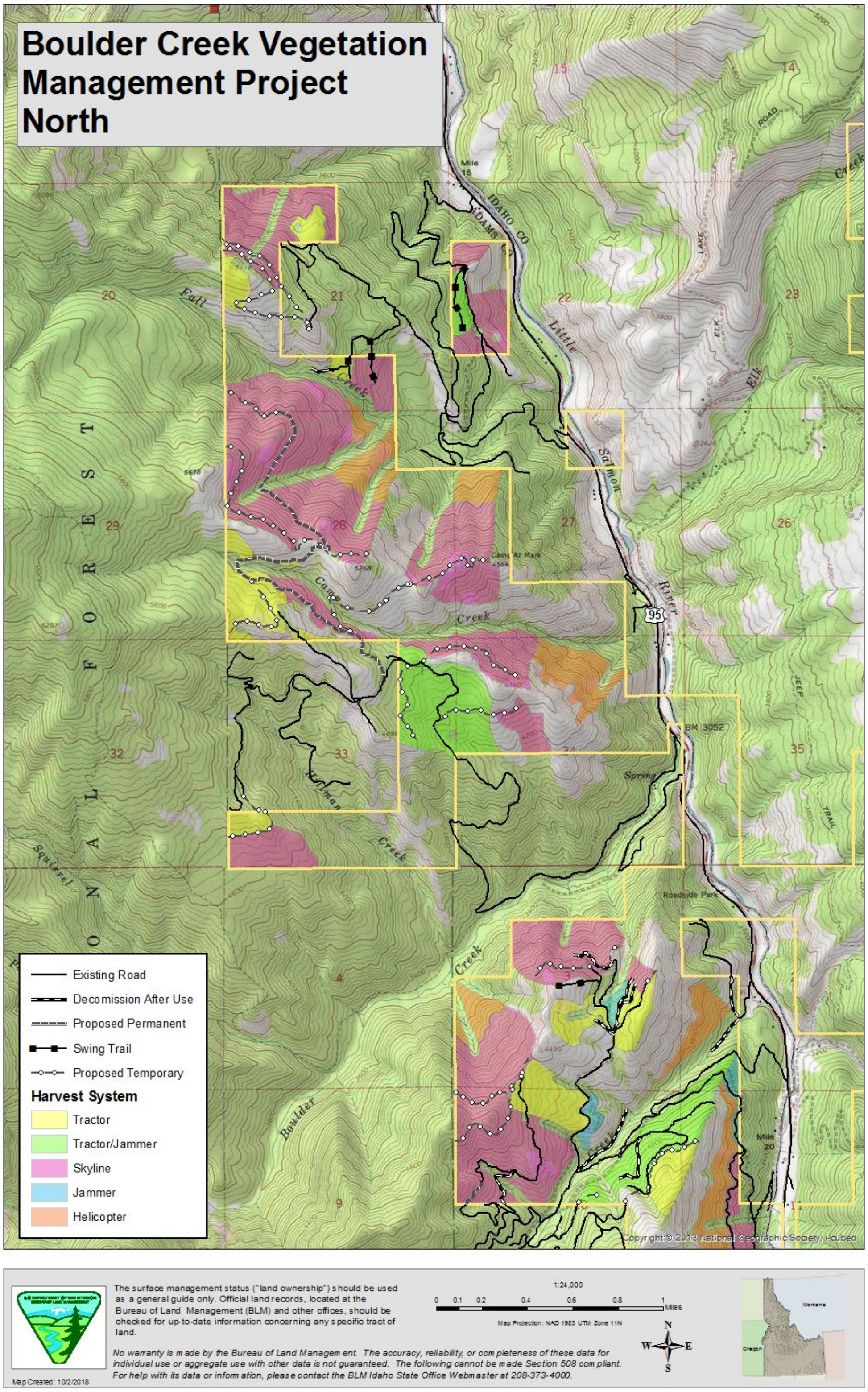

Figure 1. Map of Proposed Action North Zone by Harvest Types.

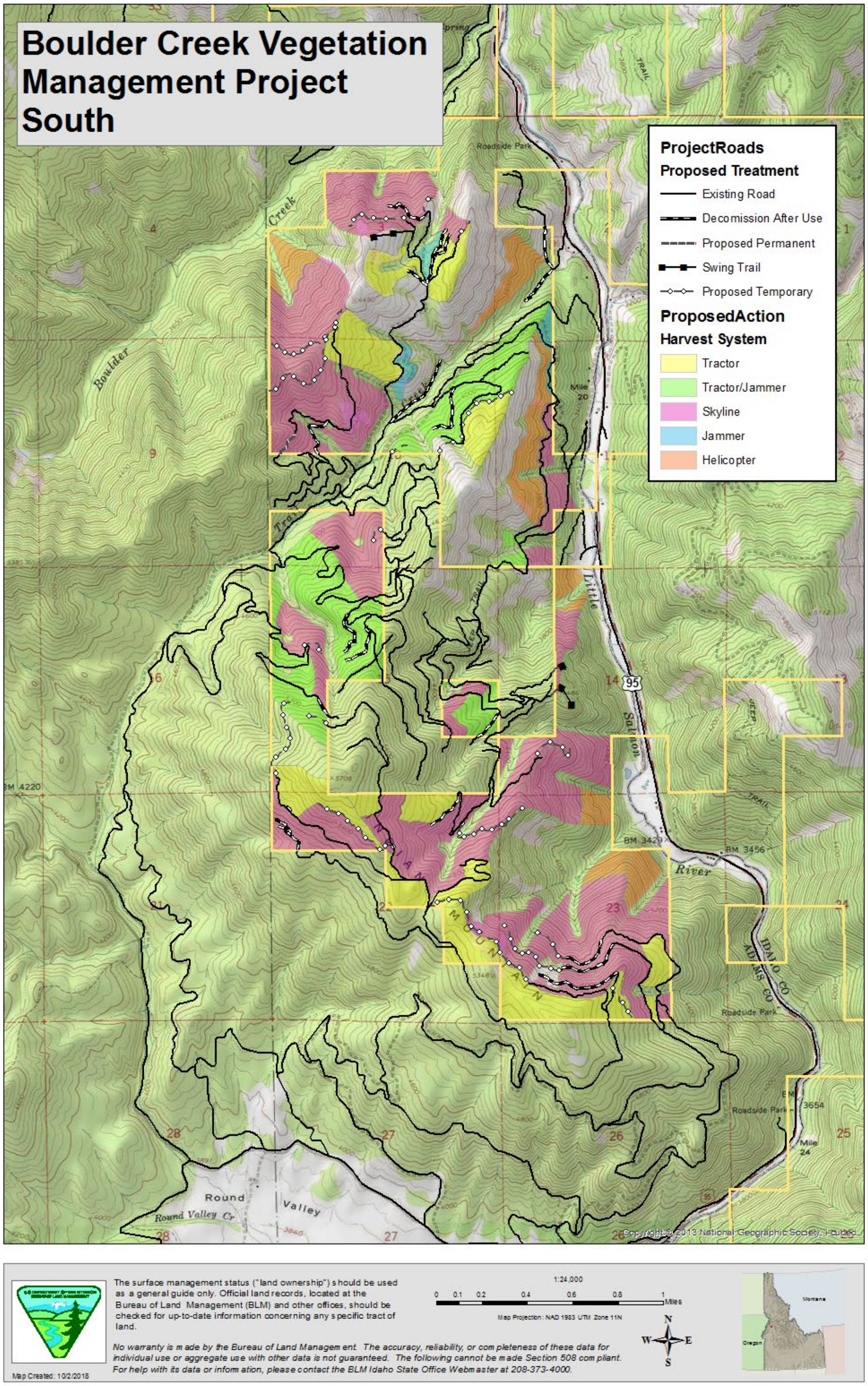

Figure 2. Map of Proposed Action South Zone by Harvest Types.

The BLM proposes timber harvest and thinning by mechanical treatment on approximately 2,458 acres, prescribed burning on 3,408 acres, construction of 2.41 miles of permanent roads, construction of 11.52 miles of temporary roads, decommissioning of 5.53 miles of road, and 1.45 miles of road storage (Table 1).

Table 1. Summary of Boulder Creek Vegetation Management Project Proposed Treatments by Acres.

Mechanical Treatments (Acres)	
Non-Commercial	164
Improvement Thinning	1,622
Even Aged	559
Uneven-aged	82
TOTAL Proposed Mechanical Treatments	2,427
Harvest Methods (Acres)	
Jammer	25
Skyline	1,416
Tractor	386
Tractor/Jammer	370
Helicopter	230
Proposed Roads/Treatments (Miles)	
Permanent Road Constructed	2.41
Temporary Road Constructed	11.52
Swing Trail Constructed	0.71
Road Decommissioning	5.53
Road Storage	1.45
Drainage Upgrade/Repair	1-5
Prescribed Burning (Acres)	
Prescribed Burning of Slash Piles	666
Broadcast Burning of Timber Harvest Slash	1,852
Broadcast Burning of Areas not Within Timber Harvest Units	890
Prescribed Burning Total	3,408

The BLM anticipates that vegetation treatments and temporary road construction would be completed south of Boulder Creek (South Zone) in the first 5 years. All post-project work in the South Zone including road decommissioning, prescribed burning, and planting would be completed within 3 years after timber harvest. All vegetation treatments and road construction north of Boulder Creek (North Zone) would start in 2023 or 2024 and would be completed in 4 to 5 years. North Zone post project work including road decommissioning, burning, planting, etc. would be completed 3 years after timber harvest. Road closure, road storage, road decommissioning, weed treatments, and prescribed burning would occur in both the North Zone and South Zone throughout the 12-year project lifespan. Helicopter landings would be located at several locations and would not be located in Riparian Conservation Areas (RCAs). Helicopter landings would occur in: Fall Creek (1); Camp Creek (1); Boulder Creek (1); and Little Salmon River (2). All project design measures for herbicide treatments would be in accord with the previous consultation that has been completed with NMFS (NMFS 2011-05959). No broadcast spraying would occur and all herbicide applications would be by spot treatments only.

The proposed action includes the construction of permanent and temporary roads within RCAs and stream/spring crossings with the construction of 1,478 feet of permanent and 1,690 feet of temporary roads in RCAs, and seven stream crossings (Table 2). Permanent roads in RCAs would be constructed only in the Fall Creek (580 feet with one stream crossing) and Camp Creek (898 feet with one crossing) subwatersheds; both do not contain ESA-listed fish species. Temporary RCA road construction would occur in the Little Salmon River Face (845 feet with four crossings) and Camp Creek (845 feet with one crossing). A total of 4,171 feet of road decommissioning within RCAs would occur under the proposed action, with the highest amount (3,854 feet) occurring in Trail Creek and 317 feet within the Little Salmon face drainages (Table 2). Only one stream crossing has been identified as part of the proposed decommissioning in the Trail Creek watershed which is 0.8 miles upstream from known occupied or designated critical habitat for steelhead and spring/summer Chinook salmon.

Table 2. Miles of Propose Road Related Actions by Subwatersheds.

Proposed Road Actions	Little Salmon River Face Drainages	Fall Creek	Camp Creek	Boulder Creek	Trail Creek	Round Valley Creek	Project Area Total
Permanent Road	0.0	0.91	1.30	0.07	0.13	0.0	2.41
Temporary Road	4.06	1.30	1.52	2.35	1.83	0.45	11.52
Swing Trail	0.31	0.21	0.0	0.19	0.0	0.0	0.71
Road Decommissioning (Culvert Removal)	1.42	0.10	0	0.70	2.48 (1)	0.82	5.52
Road Storage	0.71	0.21	0.0	0.0	0.53	0.0	1.45
Culvert Replacement	1	0	0	0	0	0	1
Gravel/Rock Stream Crossings and Approaches	19	1	2	3	13	0	39

Table 3 shows all crossings/approaches that occur within the project boundary and also shows road mileage (2.7 miles) that occur within 600 feet of designated critical habitat, the number of stream crossings, and the duration of haul. Table 3 also shows the types of roads, mileage of roads, and stream crossings, associated with haul for this project.

Table 3. Miles of Road within Riparian Conservation Areas and adjacent to Critical Habitat.

Watershed	Road Surface Type	Road Miles Within RCA	Stream Crossings		Duration of Haul
		Steelhead & Salmon Critical Habitat	Fish Bearing	Non-Fish Bearing	
L. Salmon R. Face Drainages	Native	0.1	0	19	4 years
Fall Creek	Native	0.0	0	1 T	3 years
Camp Creek	Native	0.0	0	1 T 1 P	4 years
Boulder Creek	Gravel	1.3	0	3	3 years
Boulder Creek	Native	0.0	0	3	4 years
Trail Creek	Gravel	0.9	2	1	4 years
Trail Creek	Native	0.4	2	11	4 years
TOTAL	---	2.7	4	40	---

For those areas that are adjacent to designated critical habitat or known occupied habitat for both ESA-listed fish species, a buffer of 600 feet was applied to determine proximity to project activities. Crossings within or upstream 600 feet of designated critical habitat and/or streams occupied by steelhead or salmon were identified and include one intermittent crossing on the Little Salmon River face drainages, 6 existing stream crossings (four fish-bearing and two non-fish-bearing) on Trail Creek, and three existing intermittent stream crossings for Boulder Creek.

Road activities that occur within RCAs that are adjacent to streams occupied by ESA-listed fish or designated critical habitat include the following: (1) Boulder Creek access road maintenance (1.3-mile); (2) Little Salmon River access road maintenance (0.1-mile); (3) Trail Creek access road maintenance (1.85 miles); and (4) Road decommissioning (abandonment or full/partial obliteration) of 0.7-mile of road in Trail Creek. One instream work project is proposed to occur within 600-feet of ESA-listed fish occupied or designated critical habitat (Trail Creek – non-fish-bearing stream ford decommissioning). No new road construction, culvert removals, or culvert installations would occur adjacent to or within streams occupied by ESA-listed fish or designated critical habitat.

Herbicide treatments would occur along proposed temporary and permanent roads, along haul roads, and landings. This would result in an additional three acres of new herbicide treatments occurring annually during the life of the project in the Little Salmon River face drainages, Boulder Creek watershed, and Trail Creek watershed (9 acres). Fall Creek and Camp Creek would have up to 2 acres each of new herbicide treatments annually during the life of the project. It is estimated that less than 10 to 15 percent of the total new additional herbicide treatments would occur annually in RCAs (up to 2 acres).

<u>Minimization Measures</u>

General

- Employ dust abatement measures, such as water or magnesium chloride, where dust from timber haul routes is likely to impact private property. Standard design measures (summarized below) for magnesium chloride use will be followed. Dust abatement measures will likely be necessary along road segments through private property adjacent to the Highway 95 corridor. These include Fall Creek Road, Hillman Basin Road, roads in the Trail Creek area, and Smokey Boulder Road.

- Dust palliatives, such as magnesium chloride, will not be applied while it is raining. Where practicable, treatment will not occur unless weather forecasts indicate that there will be three clear days following application. Dust palliatives, when applied, will remain on the road surface and will not go over the road edge. Where possible a 1-foot buffer zone on the edge of the gravel or native surface road will be used if the road width allows. Vehicles and machinery used to apply dust palliatives will carry adequate spill protection equipment and kits during application.

Soils and Water Resources

- Landslide prone areas will be further delineated in the field and will be excluded during unit and new road layout. They will receive a 100-foot (or greater when warranted) slope distance buffer.

- Modify, via site specific mitigation measure(s), timber harvest methods or temporary road construction/location in areas of moderate to high risk landslide hazard to protect slope stability. Examples include: buffer and avoid high risk landslide prone areas; modify basal area retention guides in harvest units as needed (leave more trees in designated sensitive areas such as draw bottoms); require partial suspension on cable logging; construct and apply mulch or slash on yarding corridors where bare soil is exposed; and manage tractor logging activities to limit detrimental soil disturbance.

- Field verification for areas at risk for landslides may utilize a combination of methods and indicators while conducting new road and project layout and surveys over the entire project area. Field surveys conducted during project layout will also identify areas that may need to be avoided or buffered from soil and vegetation disturbance to prevent adverse soil and vegetation disturbance within landslide prone areas.

- Landslide prone areas of concern and indicators may use one or more indicators and may include, but not be limited to, the following: past landslide locations; and obvious soil movement areas (curved and buttressed tree boles, soil creep, tension cracks, and irregular-surfaced ground in steep areas). Other potential indicators of landslide prone areas include: steep (over 60 percent), concave slopes, hydrophytic vegetation, super saturated soils/springs/seeps on steep slopes, steep areas where water may be channeled, slumps, draws, and basins.

- To aid in field verification of sensitive areas that may be landslide prone, a variety of mapping, surveys, modeling and Geographic Information System analysis may also be utilized to identify potential landslide prone areas and focus field verification efforts in sensitive areas. This would potentially include land type mapping, soil surveys and mapping, slope mapping, SINMAP modeling, aerial photos, LIDAR surveying technology, and other field indicators discussed above. Drainages that have a large amount of the vegetative cover removed from timber harvest or wildfire (such as increased equivalent clearcut area [ECA]) and high road densities also have increased risk of landslides or debris torrents, particularly if these roads, timber harvest, and wildfire areas occur on steep and landslide prone land types.

- Restrict activities when soils are wet to prevent resource damage (indicators include excessive rutting, soil displacement, and erosion).

- Reduce road surface erosion by rocking the approach and departure of stream crossings and roads within RCAs as needed. Priority stream crossings and roads that will be rocked/graveled (minimum of 100 feet each side of stream crossing) include the following: (1) Perennial stream crossings on existing roads; and (2) new permanent roads and temporary road construction crossing perennial streams. All existing and temporary road construction crossing intermittent streams will be rocked/graveled a minimum of 50 feet each side of the approaches. On site risk evaluations (e.g., steep approaches, erosive soils, etc.) will result in increases of road segments that are rock/graveled.

- Roads used for access within RCAs will be improved to reduce adverse erosion/sediment and will include such actions as improved drainage and graveling as needed.

- Prepare and implement a Spill Prevention Control and Countermeasures Plan (SPPC) that incorporates the rules and requirements of the Idaho Forest Practices Act Section 60, Use of Chemicals and Petroleum Products; and U.S. Department of Transportation rules for fuel haul and temporary storage; and additional direction as applicable.

- Erosion control measures including removal of log culverts and construction of temporary cross drains, drainage ditches, dips, water bars, or berms will be required on all temporary roads before operations cease annually.

- All temporary roads will be constructed and then obliterated and decommissioned within a minimum of three operating seasons after timber harvest is completed, which will include the following measures: (1) Obliteration and decommissioning will include recontouring, decompaction, and the application of woody material onto the decompacted surface to provide for soil productivity and limit erosion potential; (2) cut/fill slopes and crossings will be reshaped to natural contours; (3) available slash and coarse wood material will be applied to the re-contoured surface, (4) natural drainage patterns of the area will be maintained wherever practical; (5) temporary roads left open over winter will be winterized using appropriate soil stabilization methods which can include seeding, mulching, slash coverage, filter windrows, outsloping, or extra waterbarring; and (6) as needed, public motorized access to newly constructed temporary roads will be gated, barricaded, and signed to restrict public motorized access.

- Existing roads that will be decommissioned will be partially or fully obliterated and re-contoured. Culverts will be removed and drainage crossings will be restored to stable conditions. Roads will be obliterated and decommissioned within a minimum of three operating seasons after timber harvest is completed, which will include the following measures: (1) Decommissioning will include re-contouring, de-compaction, and the application of wood material onto the de-compacted surface to provide for soil productivity and limit erosion potential; (2) cut/fill road slopes and stream crossings will be reshaped to natural contours; (3) available slash and coarse wood material (>3 inches diameter) will be applied to the re-contoured surface; (4) natural drainage patterns of the area will be maintained wherever practical; and (5) appropriate soil stabilization methods will be implemented. Decommissioned roads will be taken off the designated route list and Cottonwood Field Office travel system and no future motorized road use will occur.

- Cable corridors that are at risk for adverse erosion or active erosion occurring, the following measures will be implemented as needed to insure that channelized flows do not occur and no erosion reaches RCAs: seeding, mulching, waterbars, and placement of large woody debris (LWD).

- Roads that are identified to be abandoned will be naturally stabilized and have been determined to be not needed for future long term management. These roads are closed to public motorized use and are in a stable condition and are not experiencing adverse active erosion/sediment or adverse hydrologic effects. No administrative or public vehicle use will be authorized on these roads. An inspection of the road has determined that discountable erosion/sediment is attributed to this road and no additional restoration measures are needed. Abandoned roads will be taken off the designated route list and Cottonwood Field Office travel system and no future motorized road use or maintenance will occur.

- Roads identified for road storage will be available for use on future projects. Road storage includes the deep ripping, placement of LWD, seeding with desirable vegetation, and insuring that proper road drainage is occurring to minimize adverse erosion or sediment. These roads currently are not open for public motorized use, and as needed road closure barriers and signing will be implemented. Culverts that are undersized, non-functional, or at risk for failure will be removed (not replaced) in places where routine road inspection or maintenance will not occur and no motorized vehicle use is anticipated in the near future (>15+ years).

Aquatic and Riparian Habitat

- No timber harvest or thinning will occur within RCAs.

- Road maintenance and temporary or new road construction will utilize design measures to minimize erosion and sediment delivery to streams, with focus on actions occurring within RCAs. Special erosion control measures for new temporary and permanent road construction within RCAs includes rocking and graveling stream crossings, slash filter windrows, seeding, mulching, and sediment barriers. Where appropriate; outsloping roads, rolling dips, and water bars will be considered for improved road drainage. Stream crossings (new road construction) will receive special attention for erosion control measures.

- Management activities within RCAs will be conducted in accordance with the Approved Cottonwood Resource Management Plan (RMP).

- In the event an unknown seep, spring, or watercourse is discovered, apply RCA buffers.

- Apply RMP guidance to landslide prone areas; and streamside and wetland RCAs.

- Prohibit fuel storage, equipment maintenance, or fueling within RCAs. Selected fuel storage and maintenance sites will be located in areas that are not in high risk areas for potential overland flow, drainage or spills reaching streams, riparian habitats, or wetlands.

- Fuel storage for helicopters will include containment for 125 percent of fuel storage tank and spill kits will be available on site.

- Fuel storage and maintenance areas for vehicles and equipment will not occur in RCAs and spill kits will be available on site.

- Limit prescribed burning to low enough severity to insure adequate duff retention to limit surface erosion. Low severity under burning will occur on high landslide hazard areas and RCAs. Prescribed fire will not be ignited within a RCA, but may back into these areas under conditions where fire intensity will be low and burning will not result in extensive reduction in canopy cover or exposure of bare soil. Only the minimum necessary hand fire lines are allowed within RCAs.

- Any water withdrawals for dust abatement from fish-bearing streams will be properly screened and screen openings will not exceed 3/32-inch and approach velocity will not exceed 0.33 feet per second. The 2011 NMFS fish screen criteria will be utilized for all water pumping activities. Undercut banks shall not be exposed and connected flow at and below pump location shall be maintained. No more than 20 percent of stream flow shall be pumped. No instream coffer dam construction for water withdrawal will be authorized that will impair juvenile and adult fish upstream or downstream fish passage. Prior to any water withdrawal occurring in a fish-bearing stream the site will be approved by a Fisheries Biologist. No temporary road construction will be authorized to provide vehicle access to a stream for water withdrawals.

- Prohibit log or helicopter landings within RCAs. Selected log or helicopter landings will be located in areas that are not in high risk areas for potential overland flow, drainage or spills reaching streams, riparian habitats, or wetlands.

- Herbicide application occurring within the RCAs would be spot treatments of invasive species only and would be in accord with the 2011 Idaho Cottonwood BLM programmatic weed control program, Biological Assessment and Biological Opinions received from NMFS and USFWS. No broadcast spraying would occur and all herbicide applications would be spot treatments only.

- Implement restoration actions within BLM-designated restoration watersheds, which includes Trail Creek and Boulder Creek to promote watershed and aquatic habitat objectives. Priority actions will include decommissioning of roads within the watersheds.

<u>Monitoring</u>

- The BLM will conduct monitoring to determine effectiveness of the proposed treatments, environmental design features, and impacts to affected resources during and following implementation.

- Post-project monitoring of RCAs after prescribed burning to determine effects to riparian habitats and stream channels.
  Monitor effectiveness of road decommissioning and road closures.

- New road construction routes, steep sloped areas proposed for cable logging (skyline), and other sensitive areas where soil and vegetation disturbance occurs will be monitored for active erosion. If active erosion is found, measures will be implemented to reduce adverse erosion.

- Monitoring will be conducted during the life of the project after events where high potential for erosion would occur (i.e., high precipitation events, rain on snow, spring run-off, etc.) to determine if active erosion/sediment is occurring from areas that had vegetation/soil disturbance (e.g., roads, harvest units, prescribed burning, landings, etc.). If adverse erosion noted or channelized flows occurring the appropriate actions would be taken to ensure that such erosion/sediment is not reaching RCAs or live waters. Erosion control measures could include as needed the appropriate actions identified for the proposed project and environmental design measures section.

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 provides 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 Opinion includes both a jeopardy analysis and/or an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of" a listed species, which is "to engage in an action that 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 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This Opinion relies on the regulatory 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 Snake River spring/summer Chinook salmon and Snake River Basin steelhead use the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced those terms 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 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:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.
- Evaluate cumulative effects.
- 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.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide 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' current "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 essential PBFs that help to form that conservation value. Table 4 indicates the relevant legal rules and regulations for the subject species.

Table 4. Most recent listing status, status of critical habitat designations and protective regulations, and relevant Federal Register decision notices for ESA-listed species considered in this Opinion.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon *(Oncorhynchus tshawytscha)*			
Snake River spring/summer-run	T 6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Steelhead (*O. mykiss*)			
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Note: Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered.

2.2.1 Status of the Species

This section describes the present condition of the Snake River spring/summer Chinook salmon evolutionarily significant unit (ESU), and the Snake River Basin steelhead distinct population segment (DPS). NMFS expresses the status of a salmonid ESU or DPS in terms of likelihood of persistence over 100 years (or risk of extinction over 100 years). NMFS uses McElhaney et al.'s (2000) description of a viable salmonid population (VSP) that defines "viable" as less than a 5 percent risk of extinction within 100 years and "highly viable" as less than a 1 percent risk of extinction within 100 years. A third category, "maintained," represents a less than 25 percent risk within 100 years (moderate risk of extinction). To be considered viable an ESU or DPS should have multiple viable populations so that a single catastrophic event is less likely to cause the ESU/DPS to become extinct, and so that the ESU/DPS may function as a metapopulation that can sustain population-level extinction and recolonization processes (ICTRT 2007). The risk level of the ESU/DPS is built up from the aggregate risk levels of the individual populations and major population groups (MPGs) that make up the ESU/DPS.

Attributes associated with a viable salmonid population, or VSP, are: (1) Abundance (number of adult spawners in natural production areas), (2) productivity (adult progeny per parent), (3) spatial structure, and (4) diversity. A VSP needs sufficient levels of these four population attributes in order to: safeguard the genetic diversity of the listed ESU or DPS; enhance its capacity to adapt to various environmental conditions; and allow it to become self-sustaining in the natural environment (ICTRT 2007). These viability attributes are influenced by survival, behavior, and experiences throughout the entire salmonid life cycle, characteristics that are influenced in turn by habitat and other environmental and anthropogenic conditions. The present risk faced by the ESU/DPS informs NMFS' determination of whether additional risk will appreciably reduce the likelihood that the ESU/DPS will survive or recover in the wild.

2.2.1.1 Snake River Spring/Summer Chinook Salmon

The Snake River spring/summer Chinook salmon ESU was listed as threatened on April 22, 1992 (57 FR 14653). This ESU occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Several factors led to NMFS' conclusion that Snake River spring/summer Chinook were threatened: (1) Abundance of naturally produced Snake River spring and summer Chinook runs had dropped to a small fraction of historical levels; (2) short term projections were for a continued downward trend in abundance; (3) hydroelectric development on the Snake and Columbia Rivers continued to disrupt Chinook runs through altered flow regimes and impacts on estuarine habitats; and (4) habitat degradation existed throughout the region, along with risks associated with the use of outside hatchery stocks in particular areas (Good et al. 2005). On May 26, 2016, in the agency's most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

Life History. Snake River spring/summer Chinook salmon are characterized by their return times. Runs classified as spring Chinook salmon are counted at Bonneville Dam beginning in early March and ending the first week of June; summer runs are those Chinook adults that pass Bonneville Dam from June through August. Returning adults will hold in deep mainstem and tributary pools until late summer, when they move up into tributary areas and spawn. In general, spring-run type Chinook salmon tend to spawn in higher-elevation reaches of major Snake River tributaries in mid- through late August; and summer-run Chinook salmon tend to spawn lower in Snake River tributaries in late August and September (although the spawning areas of the two runs may overlap).

Spring/summer Chinook salmon generally follow a "stream-type" life history characterized by rearing for a full year in the spawning habitat tributary stream and migrating in early to mid-spring as age-1 smolts (Healey 1991). Eggs are deposited in late summer and early fall, incubate over the following winter, and hatch in late winter and early spring of the following year. Juveniles rear through the summer, and most overwinter and migrate to sea in the spring of their second year of life. Depending on the tributary and the specific habitat conditions, juveniles may migrate extensively from natal reaches into alternative summer-rearing or overwintering areas. Snake River spring/summer Chinook salmon return from the ocean to spawn primarily as 4- and 5-year-old fish, after 2 to 3 years in the ocean. A small fraction of the fish return as 3-year-old "jacks," heavily predominated by males (Good et al. 2005).

Spatial Structure and Diversity. The Snake River ESU includes all naturally spawning populations of spring/summer Chinook in the mainstem Snake River (below Hells Canyon Dam) and in the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins (57 FR 23458), as well as the progeny of 15 artificial propagation programs (70 FR 37160). The hatchery programs include the South Fork Salmon River (McCall Hatchery), Johnson Creek, Lemhi River, Pahsimeroi River, East Fork Salmon River, West Fork Yankee Fork Salmon River, Upper Salmon River (Sawtooth Hatchery), Tucannon River (conventional and captive broodstock programs), Lostine River, Catherine Creek, Lookingglass Creek, Upper Grande Ronde River, Imnaha River, and Big Sheep Creek programs. The historical Snake River ESU likely also included populations in the Clearwater River drainage and extended above the Hells Canyon Dam complex.

Within the Snake River ESU, the Interior Columbia Technical Recovery Team (ICTRT) identified 28 extant and 4 extirpated or functionally extirpated populations of spring/summer-run Chinook salmon, listed in Table 5 (ICTRT 2003; McClure et al. 2005). The ICTRT aggregated these populations into five MPGs: Lower Snake River, Grande Ronde/Imnaha Rivers, South Fork Salmon River, Middle Fork Salmon River, and Upper Salmon River. For each population, Table 5 shows the current risk ratings that the ICTRT assigned to the four parameters of a viable salmonid population (spatial structure, diversity, abundance, and productivity).

Spatial structure risk is low to moderate for most populations in this ESU (NWFSC 2015) and is generally not preventing the recovery of the species. Spring/summer Chinook salmon spawners are distributed throughout the ESU albeit at very low numbers. Diversity risk, on the other hand, is somewhat higher, driving the moderate and high combined spatial structure/diversity risks shown in Table 5 for some populations. Several populations have a high proportion of hatchery-origin spawners—particularly in the Grande Ronde, Lower Snake, and South Fork Salmon MPGs—and diversity risk will need to be lowered in multiple populations in order for the ESU to recover (ICTRT 2007, ICTRT 2010, NWFSC 2015).

Abundance and Productivity. Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/summer Chinook salmon in some years (Matthews and Waples 1991), yet in 1994 and 1995, fewer than 2,000 naturally produced adults returned to the Snake River (ODFW and WDFW 2019). From the mid-1990s and the early 2000s, the population increased dramatically and peaked in 2001 at 45,273 naturally produced adult returns. Since 2001, the numbers have fluctuated between 32,324 (2003) and 4,425 (2017), and the trend for the most recent 5 years (2014–2018) has been generally downward (ODFW and WDFW 2019). Although most populations in this ESU have increased in abundance since listing, 27 of the 28 extant populations remain at high risk of extinction due to low abundance/productivity, with one population (Chamberlin Creek) at moderate risk of extinction (NWFSC 2015). All currently extant populations of Snake River spring/summer Chinook salmon will likely have to increase in abundance and productivity in order for the ESU to recover.

Table 5. Summary of viable salmonid population parameter risks and overall current status for each population in the Snake River spring/summer Chinook salmon ESU (NWFSC 2015).

MPG	Population	VSP Risk Parameter		Overall Viability Rating
		Abundance/ Productivity	Spatial Structure/ Diversity	
South Fork Salmon River (Idaho)	Little Salmon River	*Insf. data*	Low	High Risk
	South Fork Salmon River mainstem	High	Moderate	High Risk
	Secesh River	High	Low	High Risk
	East Fork South Fork Salmon River	High	Low	High Risk
Middle Fork Salmon River	Chamberlain Creek	Moderate	Low	Maintained
	Middle Fork Salmon River below Indian Creek	*Insf. data*	Moderate	High Risk
	Big Creek	High	Moderate	High Risk
	Camas Creek	High	Moderate	High Risk

MPG	Population	VSP Risk Parameter		Overall Viability Rating
		Abundance/ Productivity	Spatial Structure/ Diversity	
(Idaho)	Loon Creek	High	Moderate	High Risk
	Middle Fork Salmon River above Indian Creek	High	Moderate	High Risk
	Sulphur Creek	High	Moderate	High Risk
	Bear Valley Creek	High	Low	High Risk
	Marsh Creek	High	Low	High Risk
Upper Salmon River (Idaho)	North Fork Salmon River	*Insf. data*	Low	High Risk
	Lemhi River	High	High	High Risk
	Salmon River Lower Mainstem	High	Low	High Risk
	Pahsimeroi River	High	High	High Risk
	East Fork Salmon River	High	High	High Risk
	Yankee Fork Salmon River	High	High	High Risk
	Valley Creek	High	Moderate	High Risk
	Salmon River Upper Mainstem	High	Low	High Risk
	Panther Creek			***Extirpated***
Lower Snake (Washington)	Tucannon River	High	Moderate	High Risk
	Asotin Creek			***Extirpated***
Grande Ronde and Imnaha Rivers (Oregon/ Washington)	Wenaha River	High	Moderate	High Risk
	Lostine/Wallowa River	High	Moderate	High Risk
	Minam River	High	Moderate	High Risk
	Catherine Creek	High	Moderate	High Risk
	Upper Grande Ronde River	High	High	High Risk
	Imnaha River	High	Moderate	High Risk
	Lookingglass Creek			***Extirpated***
	Big Sheep Creek			***Extirpated***

Spring/summer Chinook salmon use the mainstem Little Salmon River for migration and rearing; and some of its tributary streams are used for spawning and rearing. With regard to project area streams, Boulder Creek has documented spawning and juvenile rearing by spring/summer Chinook salmon. The lower reach of Trail Creek could potentially be utilized by spring/summer Chinook salmon for juvenile rearing but the species has not been documented within Trail Creek.

2.2.1.2 Snake River Basin Steelhead

The Snake River Basin steelhead was listed as a threatened ESU on August 18, 1997 (62 FR 43937), with a revised listing as a distinct population segment (DPS) on January 5, 2006 (71 FR 834). This DPS occupies the Snake River basin, which drains portions of southeastern Washington, northeastern Oregon, and north/central Idaho. Reasons for the decline of this species include substantial modification of the seaward migration corridor by hydroelectric power development on the mainstem Snake and Columbia Rivers, and widespread habitat degradation and reduced streamflows throughout the Snake River basin (Good et al. 2005). Another major concern for the species is the threat to genetic integrity from past and present hatchery practices, and the high proportion of hatchery fish in the aggregate run of Snake River Basin steelhead over Lower Granite Dam (Good et al. 2005; Ford 2011). On May 26, 2016, in the agency's most recent 5-year review for Pacific salmon and steelhead, NMFS concluded that the species should remain listed as threatened (81 FR 33468).

Life History. Adult Snake River Basin steelhead enter the Columbia River from late June to October to begin their migration inland. After holding over the winter in larger rivers in the Snake River basin, steelhead disperse into smaller tributaries to spawn from March through May. Earlier dispersal occurs at lower elevations and later dispersal occurs at higher elevations. Juveniles emerge from the gravels in 4 to 8 weeks, and move into shallow, low-velocity areas in side channels and along channel margins to escape high velocities and predators (Everest and Chapman 1972). Juvenile steelhead then progressively move toward deeper water as they grow in size (Bjornn and Rieser 1991). Juveniles typically reside in fresh water for 1 to 3 years, although this species displays a wide diversity of life histories. Smolts migrate downstream during spring runoff, which occurs from March to mid-June depending on elevation, and typically spend 1 to 2 years in the ocean.

Spatial Structure and Diversity. This species includes all naturally-spawning steelhead populations below natural and manmade impassable barriers in streams in the Snake River basin of southeast Washington, northeast Oregon, and Idaho, as well as the progeny of six artificial propagation programs (71 FR 834). The hatchery programs include Dworshak National Fish Hatchery, Lolo Creek, North Fork Clearwater River, East Fork Salmon River, Tucannon River, and the Little Sheep Creek/Imnaha River steelhead hatchery programs. The Snake River Basin steelhead listing does not include resident forms of *O. mykiss* (rainbow trout) co-occurring with steelhead.

The ICTRT identified 24 extant populations within this DPS, organized into five MPGs (ICTRT 2003). The ICTRT also identified a number of potential historical populations associated with watersheds above the Hells Canyon Dam complex on the mainstem Snake River, a barrier to anadromous migration. The five MPGs with extant populations are the Clearwater River, Salmon River, Grande Ronde River, Imnaha River, and Lower Snake River. In the Clearwater River, the historic North Fork population was blocked from accessing spawning and rearing habitat by Dworshak Dam. Current steelhead distribution extends throughout the DPS, such that spatial structure risk is generally low. For each population in the DPS, Table 6 shows the current risk ratings for the parameters of a viable salmonid population (spatial structure, diversity, abundance, and productivity).

The Snake River Basin DPS steelhead exhibit a diversity of life-history strategies, including variations in fresh water and ocean residence times. Traditionally, fisheries managers have classified Snake River Basin steelhead into two groups, A-run and B-run, based on ocean age at return, adult size at return, and migration timing. A-run steelhead predominantly spend 1-year in the ocean; B-run steelhead are larger with most individuals returning after 2 years in the ocean. New information shows that most Snake River populations support a mixture of the two run types, with the highest percentage of B-run fish in the upper Clearwater River and the South Fork Salmon River; moderate percentages of B-run fish in the Middle Fork Salmon River; and very low percentages of B-run fish in the Upper Salmon River, Grande Ronde River, and Lower Snake River (NWFSC 2015). Maintaining life history diversity is important for the recovery of the species.

Diversity risk for populations in the DPS is either moderate or low. Large numbers of hatchery steelhead are released in the Snake River, and the relative proportion of hatchery adults in natural spawning areas near major hatchery release sites remains uncertain. Moderate diversity risks for some populations are thus driven by the high proportion of hatchery fish on natural spawning grounds and the uncertainty regarding these estimates (NWFSC 2015). Reductions in hatchery-related diversity risks would increase the likelihood of these populations reaching viable status.

Abundance and Productivity. Historical estimates of steelhead production for the entire Snake River basin are not available, but the basin is believed to have supported more than half the total steelhead production from the Columbia River basin (Mallet 1974, as cited in Good et al. 2005). The Clearwater River drainage alone may have historically produced 40,000 to 60,000 adults (Ecovista et al. 2003), and historical harvest data suggests that steelhead production in the Salmon River was likely higher than in the Clearwater (Hauck 1953). In contrast, at the time of listing in 1997, the 5-year geomean abundance for natural-origin steelhead passing Lower Granite Dam, which includes all but one population in the DPS, was 11,462 adults (Ford 2011). Abundance began to increase in the early 2000s, with the single year count and the 5-year geomean both peaking in 2015 at 45,789 and 34,179, respectively (ODFW and WDFW 2019). Since 2015, the numbers have declined steadily with only 10,717 natural-origin adult returns counted in 2018 (ODFW and WDFW 2019). Even with the recent decline, the 5-year geomean abundance for natural-origin adult returns was 23,100 in 2018 (ODFW and WDFW 2019) which is more than twice the number at listing and substantially greater than the 5-year geomean of 18,847 tabulated in the most recent status review (i.e., Ford 2011).

Population-specific abundance estimates exist for some but not all populations. Of the populations for which we have data, three (Joseph Creek, Upper Grande Ronde, and Lower Clearwater) are meeting minimum abundance/productivity thresholds and several more have likely increased in abundance enough to reach moderate risk. Despite these recent increases in abundance, the status of many of the individual populations remains uncertain, and four out of the five MPGs are not meeting viability objectives (NWFSC 2015). In order for the species to recover, more populations will need to reach viable status through increases in abundance and productivity. The Salmon River steelhead MPG, which includes the Little Salmon River population, does not meet the MPG-level viability criteria.

Table 6. Summary of viable salmonid population parameter risks and overall current status for each population in the Snake River Basin steelhead DPS (NWFSC 2015). Risk ratings with "?" are based on limited or provisional data series.

MPG	Population	VSP Risk Parameter		Overall Viability Rating
		Abundance/ Productivity	Spatial Structure/ Diversity	
Lower Snake River	Tucannon River	High?	Moderate	High Risk?
	Asotin Creek	Moderate?	Moderate	Maintained?
Grande Ronde River	Lower Grande Ronde	N/A	Moderate	Maintained?
	Joseph Creek	Very Low	Low	**Highly Viable**
	Wallowa River	N/A	Low	Maintained?
	Upper Grande Ronde	Low	Moderate	**Viable**
Imnaha River	Imnaha River	Moderate?	Moderate	Maintained?
Clearwater River	Lower Mainstem Clearwater River*	Moderate?	Low	Maintained?
	South Fork Clearwater River	High?	Moderate	High Risk?
	Lolo Creek	High?	Moderate	High Risk?

MPG	Population	VSP Risk Parameter		Overall Viability Rating
		Abundance/ Productivity		
(Idaho)	Selway River	Moderate?	Low	Maintained?
	Lochsa River	Moderate?	Low	Maintained?
	North Fork Clearwater River			*Extirpated*
Salmon River (Idaho)	Little Salmon River	Moderate?	Moderate	Maintained?
	South Fork Salmon River	Moderate?	Low	Maintained?
	Secesh River	Moderate?	Low	Maintained?
	Chamberlain Creek	Moderate?	Low	Maintained?
	Lower Middle Fork Salmon R.	Moderate?	Low	Maintained?
	Upper Middle Fork Salmon R.	Moderate?	Low	Maintained?
	Panther Creek	Moderate?	High	High Risk?
	North Fork Salmon River	Moderate?	Moderate	Maintained?
	Lemhi River	Moderate?	Moderate	Maintained?
	Pahsimeroi River	Moderate?	Moderate	Maintained?
	East Fork Salmon River	Moderate?	Moderate	Maintained?
	Upper Mainstem Salmon R.	Moderate?	Moderate	Maintained?
Hells Canyon	Hells Canyon Tributaries			*Extirpated*

*Current abundance/productivity estimates for the Lower Clearwater Mainstem population exceed minimum thresholds for viability, but the population is assigned moderate risk for abundance/productivity due to the high uncertainty associated with the estimate.

Steelhead use the Little Salmon River as a juvenile and adult migration corridor, for adult over-wintering, and for juvenile rearing habitat. A limited amount of spawning presently occurs in the Little Salmon River tributaries. Tributary streams providing suitable and accessible stream habitat within the subbasin are used by steelhead for spawning and/or juvenile rearing. Regarding project area streams, Boulder Creek and Trail Creek provide documented spawning and early rearing habitat for steelhead.

2.2.2 Status of Critical Habitat for Both Species

In evaluating the condition of designated critical habitat, NMFS examines the condition and trends of PBFs which are essential to the conservation of the ESA-listed species because they support one or more life stages of the species. Proper function of these PBFs is necessary to support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, and the growth and development of juvenile fish. Modification of PBFs may affect freshwater spawning, rearing or migration in the action area. Generally speaking, sites required to support one or more life stages of the ESA-listed species (i.e., sites for spawning, rearing, migration, and foraging) contain PBFs essential to the conservation of the listed species (e.g., spawning gravels, water quality and quantity, side channels, or food) (Table 7).

Table 7. Types of sites, essential physical and biological features, and the species life stage each PBF supports.

Site		
Snake River Basin Steelhead[a]		
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
	Water quantity & floodplain connectivity to form and maintain physical habitat conditions	Juvenile growth and mobility

Site	Essential Physical and Biological Features	Species Life Stage
Freshwater rearing	Water quality and forage[b]	Juvenile development
	Natural cover[c]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, and natural cover[c]	Juvenile and adult mobility and survival
Snake River Spring/Summer Chinook Salmon		
Spawning & Juvenile Rearing	Spawning gravel, water quality and quantity, cover/shelter (Chinook only), food, riparian vegetation, space (Chinook only), water temperature and access (sockeye only)	Juvenile and adult
Migration	Substrate, water quality and quantity, water temperature, water velocity, cover/shelter, food[d], riparian vegetation, space, safe passage	Juvenile and adult

[a] Additional PBFs pertaining to estuarine, nearshore, and offshore marine areas have also been described for Snake River steelhead and Middle Columbia steelhead. These PBFs will not be affected by the proposed action and have therefore not been described in this Opinion.
[b] Forage includes aquatic invertebrate and fish species that support growth and maturation.
[c] Natural cover includes shade, large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
[d] Food applies to juvenile migration only.

Table 8 describes the geographical extent within the Snake River of critical habitat for the ESA-listed salmon and steelhead species considered in this Opinion. Critical habitat includes the stream channel and water column with the lateral extent defined by the ordinary high-water line, or the bankfull elevation where the ordinary high-water line is not defined. In addition, critical habitat for the spring/summer Chinook salmon includes the adjacent riparian zone, which is defined as the area within 300 feet of the line of high water of a stream channel or from the shoreline of standing body of water (58 FR 68543). The riparian zone is critical because it provides shade, streambank stability, organic matter input, and regulation of sediment, nutrients, and chemicals.

Table 8. Geographical extent of designated critical habitat within the Snake River for ESA-listed salmon and steelhead.

ESU/DPS	Designation	Geographical Extent of Critical Habitat
Snake River spring/summer Chinook salmon	58 FR 68543; December 28, 1993. 64 FR 57399; October 25, 1999.	All Snake River reaches upstream to Hells Canyon Dam; all river reaches presently or historically accessible to Snake River spring/summer Chinook salmon within the Salmon River basin; and all river reaches presently or historically accessible to Snake River spring/summer Chinook salmon within the Hells Canyon, Imnaha, Lower Grande Ronde, Upper Grande Ronde, Lower Snake-Asotin, Lower Snake-Tucannon, and Wallowa subbasins.
Snake River Basin steelhead	70 FR 52630; September 2, 2005	Specific stream reaches are designated within the Lower Snake, Salmon, and Clearwater River basins. Table 21 in the Federal Register details habitat areas within the DPS's geographical range that are excluded from critical habitat designation.

Spawning and rearing habitat quality in tributary streams in the Snake River varies from excellent in wilderness and roadless areas to poor in areas subject to intensive human land uses (NMFS 2015; NMFS 2017). Critical habitat throughout much of the Interior Columbia (which includes the Snake River and the Middle Columbia River) has been degraded by intensive 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 streamflows, impaired water quality, and reduction of habitat complexity are common problems for critical habitat in non-wilderness areas. Human land use practices throughout the basin have caused streams to become straighter, wider, and shallower, thereby reducing rearing habitat and increasing water temperature fluctuations.

In many stream reaches designated as critical habitat in the Snake River basin, streamflows are substantially reduced by water diversions (NMFS 2015; NMFS 2017). Withdrawal of water, particularly during low-flow periods that commonly overlap with agricultural withdrawals, often increases summer stream temperatures, blocks fish migration, strands fish, and alters sediment transport (Spence et al. 1996). Reduced tributary streamflow has been identified as a major limiting factor for Snake River spring/summer Chinook and Snake River Basin steelhead in particular (NMFS 2017).

Many stream reaches designated as critical habitat for these species are listed on the CWA 303(d) list for impaired water quality, such as elevated water temperature (IDEQ 2011). Many areas that were historically suitable rearing and spawning habitat are now unsuitable due to high summer stream temperatures, such as some stream reaches in the Upper Grande Ronde. Removal of riparian vegetation, alteration of natural stream morphology, and withdrawal of water for agricultural or municipal use all contribute to elevated stream temperatures. Water quality in some spawning and rearing areas in the Snake River has also been impaired by high levels of sedimentation and by heavy metal contamination from mine waste (IDEQ and EPA 2003; IDEQ 2001).

The construction and operation of water storage and hydropower projects in the Columbia River basin, including the run-of-river dams on the mainstem lower Snake and lower Columbia Rivers, have altered biological and physical attributes of the mainstem migration corridor. These alterations have affected juvenile migrants to a much larger extent than adult migrants. However, changing temperature patterns have created passage challenges for summer migrating adults in recent years, requiring new structural and operational solutions (i.e., cold water pumps and exit "showers" for ladders at Lower Granite and Lower Monumental dams). Actions taken since 1995 that have reduced negative effects of the hydrosystem on juvenile and adult migrants including:

- Minimizing winter drafts (for flood risk management and power generation) to increase flows during peak spring passage;

- Releasing water from storage to increase summer flows;

- Releasing water from Dworshak Dam to reduce peak summer temperatures in the lower Snake River;

- Constructing juvenile bypass systems to divert smolts, steelhead kelts, and adults that fall back over the projects away from turbine units;

- Providing spill at each of the mainstem dams for smolts, steelhead kelts, and adults that fall back over the projects;

- Constructing "surface passage" structures to improve passage for smolts, steelhead kelts, and adults falling back over the projects; and

- Maintaining and improving adult fishway facilities to improve migration passage for adult salmon and steelhead.

The Little Salmon River, Boulder Creek, and Trail Creek has designated critical habitat for both species.

<u>2.2.3 Climate Change Implications for ESA-listed Species and their Critical Habitat</u>

Climate change is one factor affecting the rangewide status of Snake River Basin steelhead and aquatic habitat, including designated critical habitat for Snake River Basin steelhead and essential fish habitat for Pacific salmon. The United States Global Change Research Program reports average warming of about 1.3°F from 1895 to 2011, and projects an increase in average annual temperature of 3.3°F to 9.7°F by 2070 to 2099 (USGCRP 2014). Climate change has negative implications for designated critical habitats in the Pacific Northwest (Climate Impacts Group 2004; Scheuerell and Williams 2005; Zabel et al. 2006; ISAB 2007).

According to the Independent Scientific Advisory Board (ISAB), those effects pose the following impacts into the future:

- 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, watersheds will see their runoff diminished earlier in the season, resulting in lower stream flows in the June through September period. Winter/early spring river flows in general and peak river flows are likely to increase due to more precipitation falling as rain rather than snow; and

- 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, premature emergence of fry, and increased competition among species.

Climate change is predicted to cause a variety of impacts to Pacific salmon and their ecosystems (Mote et al. 2003; Crozier et al. 2008a; Martins et al. 2012; Wainwright and Weitkamp 2013). The complex life cycles of anadromous fishes, including steelhead, 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 between interconnected terrestrial/freshwater, estuarine, nearshore, and ocean environments.

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

- Direct effects of increased water temperatures on fish physiology;
- Temperature-induced changes to stream flow patterns;
- Alterations to freshwater, estuarine, and marine food webs; and
- Changes in estuarine and ocean productivity.

While all habitats used by Pacific salmon and steelhead will be affected, the impacts and certainty of the change vary by habitat type. Some effects (e.g., increasing temperature) affect salmon and steelhead at all life stages in all habitats, while others are habitat-specific, such as stream-flow variation in freshwater, sea-level rise in estuaries, and upwelling in the ocean. How climate change will affect each stock or population of steelhead also varies widely depending on the level or extent of change, the rate of change, and the unique life-history characteristics of different natural populations (Crozier et al. 2008b). For example, a few weeks' difference in migration timing can have large differences in the thermal regime experienced by migrating fish (Martins et al. 2011).

Temperature Effects

Like most fishes, steelhead are poikilotherms (cold-blooded animals); therefore, increasing temperatures in all habitats can have pronounced effects on their physiology, growth, and development rates (see review by Whitney et al. 2016). Increases in water temperatures beyond their thermal optima will likely be detrimental through a variety of processes, including increased metabolic rates (and therefore food demand), decreased disease resistance, increased physiological stress, and reduced reproductive success. All of these processes are likely to reduce survival (Beechie et al. 2013; Wainwright and Weitkamp 2013; Whitney et al. 2016).

By contrast, increased temperatures at ranges well below thermal optima (i.e., when the water is cold) can increase growth and development rates. Examples of this include accelerated emergence timing during egg incubation stages, or increased growth rates during fry stages (Crozier et al. 2008a; Martins et al. 2011). Temperature is also an important behavioral cue for migration (Sykes et al. 2009), and elevated temperatures may result in earlier-than-normal migration timing. While there are situations or stocks where this acceleration in processes or behaviors is beneficial, there are also others where it is detrimental (Martins et al. 2012; Whitney et al. 2016).

Freshwater Effects

Climate change is predicted to increase the intensity of storms, reduce winter snow pack at low and middle elevations, and increase snowpack at high elevations in northern areas. Middle and lower-elevation streams will have larger fall/winter flood events and lower late-summer flows, while higher elevations may have higher minimum flows. How these changes will affect freshwater ecosystems largely depends on their specific characteristics and location, which vary at fine spatial scales (Crozier et al. 2008b; Martins et al. 2012). For example, within a relatively small geographic area (the Salmon River basin in Idaho), survival for some Chinook salmon populations was shown to be determined largely by temperature, while in others it was determined by flow (Crozier and Zabel 2006). The largest driver of climate-induced decline in salmon populations is projected to be the impact of increased winter peak flows, which increase scour of the streambed and can thus destroy salmon eggs (Battin et al. 2007). Steelhead will tend to be somewhat less affected than salmon by that change in timing of peak flow, given the later timed and shorter duration of steelhead egg incubation in stream substrates.

Certain steelhead populations inhabiting regions that are already near or exceeding thermal maxima will be most affected by further increases in temperature and, perhaps, the rate of the increases. The effects of altered flow are less clear and likely to be basin-specific (Crozier et al. 2008b; Beechie et al. 2013). However, river flow is already becoming more variable in many rivers, and is believed to negatively affect anadromous fish survival more than other environmental parameters (Ward et al. 2015). It is likely this increasingly variable flow is detrimental to multiple salmon and steelhead populations, and likely multiple other freshwater fish species in the Columbia River basin as well.

Stream ecosystems will likely change in response to climate change in ways that are difficult to predict (Lynch et al. 2016). Changes in stream temperature and flow regimes will likely lead to shifts in the distributions of native species and provide "invasion opportunities" for exotic species. This will result in novel species interactions, including predator-prey dynamics, where juvenile native species may be either predators or prey (Lynch et al. 2016; Rehage and Blanchard 2016). How juvenile native species will fare as part of "hybrid food webs," which are constructed from natives, native invaders, and exotic species, is difficult to predict (Naiman et al. 2012).

Estuarine Effects

In estuarine environments, the two big concerns associated with climate change are rates of sea level rise and water temperature warming (Wainwright and Weitkamp 2013; Limburg et al. 2016). Estuaries will be affected directly by sea-level rise: as sea level rises, terrestrial habitats will be flooded and tidal wetlands will be submerged (Kirwan et al. 2010; Wainwright and Weitkamp 2013; Limburg et al. 2016). The net effect on wetland habitats depends on whether rates of sea-level rise are sufficiently slow that the rates of marsh plant growth and sedimentation can compensate (Kirwan et al. 2010).

Due to land mass subsidence, sea-level rise will affect some areas more than others, with the largest effects expected for the lowlands, like southern Vancouver Island and central Washington coastal areas (Verdonck 2006; Lemmen et al. 2016). The widespread presence of dikes in Pacific Northwest estuaries will restrict inland estuary expansion as sea levels rise, likely resulting in a near-term loss of wetland habitats for salmon and steelhead (Wainwright and Weitkamp 2013). Sea-level rise will also result in greater intrusion of marine water into estuaries, resulting in an overall increase in salinity, which will also contribute to changes in estuarine floral and faunal communities (Kennedy 1990). While not all anadromous fish species are highly reliant on estuaries for rearing, extended estuarine use may be important in some populations (Jones et al. 2014), especially if stream habitats are degraded and become less productive. Preliminary data indicate that some Snake River Basin steelhead smolts are feeding and actively growing as they migrate between Bonneville Dam and the ocean (Beckman 2018).

Marine Effects

In marine waters, increasing temperatures are associated with observed and predicted poleward range expansions of fish and invertebrates in both the Atlantic and Pacific Oceans (Lucey and Nye 2010; Asch 2015; Cheung et al. 2015). Rapid poleward species shifts in distribution in response to anomalously warm ocean temperatures have been well documented in recent years, confirming this expectation at short time scales. Range extensions were documented in many species from southern California to Alaska during unusually warm water associated with "the blob" in 2014 and 2015 (Bond et al. 2015; Di Lorenzo and Mantua 2016) and past strong El Niño events (Pearcy 2002; Fisher et al. 2015).

Non-native species benefit from these extreme conditions to increase their distributions. Green crab recruitment increased in Washington and Oregon waters during winters with warm surface waters, including 2014 (Yamada et al. 2015). Similarly, Humboldt squid dramatically expanded their range during warm years of 2004–09 (Litz et al. 2011). The frequency of extreme conditions, such as those associated with El Niño events or "blobs" is predicted to increase in the future (Di Lorenzo and Mantua 2016).

Expected changes to marine ecosystems due to increased temperature, altered productivity, or acidification will have large ecological implications through mismatches of co-evolved species and unpredictable trophic effects (Cheung et al. 2015; Rehage and Blanchard 2016). These effects will certainly occur, but predicting the composition or outcomes of future trophic interactions is not possible with current models.

Wind-driven upwelling is responsible for the extremely high productivity in the California Current ecosystem (Bograd et al. 2009; Peterson et al. 2014). Minor changes to the timing, intensity, or duration of upwelling, or the depth of water-column stratification, can have dramatic effects on the productivity of the ecosystem (Black et al. 2015; Peterson et al. 2014). Current projections for changes to upwelling are mixed: some climate models show upwelling unchanged, but others predict that upwelling will be delayed in spring, and more intense during summer (Rykaczewski et al. 2015). Should the timing and intensity of upwelling change in the future, it may result in a mismatch between the onset of spring ecosystem productivity and the timing of steelhead entering the ocean, and a shift toward food webs with a strong sub-tropical component (Bakun et al. 2015).

Columbia River anadromous fish also use coastal areas of British Columbia and Alaska and midocean marine habitats in the Gulf of Alaska, although their fine-scale distribution and marine ecology during this period are poorly understood (Morris et al. 2007; Pearcy and McKinnell 2007). Increases in temperature in Alaskan marine waters have generally been associated with increases in productivity and salmon survival (Mantua et al. 1997; Martins et al. 2012), perhaps because baseline temperatures have generally been below thermal optima for salmon growth and survival (Gargett 1997). Warm ocean temperatures in the Gulf of Alaska are also associated with intensified downwelling and increased coastal stratification, which may result in increased food availability to juvenile salmon along the coast (Hollowed et al. 2009; Martins et al. 2012). Predicted increases in freshwater discharge in British Columbia and Alaska may influence coastal current patterns (Foreman et al. 2014), but the effects on coastal ecosystems are poorly understood.

In addition to becoming warmer, the world's oceans are becoming more acidic as increased atmospheric COR2R is absorbed by water. The North Pacific is already acidic compared to other oceans, making it particularly susceptible to further increases in acidification (Lemmen et al. 2016). Laboratory and field studies of ocean acidification show it has the greatest effects on invertebrates with calcium-carbonate shells, and relatively little direct influence on finfish; see reviews by Haigh et al. (2015) and Mathis et al. (2015). Consequently, the largest impact of ocean acidification on salmon will likely be its influence on marine food webs, especially its effects on lower trophic levels, which are largely composed of invertebrates (Haigh et al. 2015; Mathis et al. 2015). Marine invertebrates fill a critical gap between freshwater prey and larval and juvenile marine fishes, supporting juvenile salmon growth during the important early-ocean residence period (Daly et al. 2009, 2014).

Uncertainty in Climate Predictions

There is considerable uncertainty in the predicted effects of climate change on the globe as a whole, and on the Pacific Northwest in particular, and there is also the question of indirect effects of climate change and whether human "climate refugees" will move into the range of salmon and steelhead, increasing stresses on their respective habitats (Dalton et al. 2013; Poesch et al. 2016).

Many of the effects of climate change (e.g., increased temperature, altered flow, coastal productivity, etc.) will have direct impacts on the food webs that species rely on in freshwater, estuarine, and marine habitats to grow and survive. Such ecological effects are extremely difficult to predict even in fairly simple systems, and minor differences in life-history characteristics among stocks of salmon may lead to large differences in their response (e.g., Crozier et al. 2008b; Martins et al. 2011, 2012). This means it is likely that there will be "winners and losers," meaning some steelhead populations may enjoy different degrees or levels of benefit from climate change while others will suffer varying levels of harm.

Climate change is expected to impact anadromous fish during all stages of their complex life cycle. In addition to the direct effects of rising temperatures, indirect effects include alterations in stream-flow patterns in freshwater and changes to food webs in freshwater, estuarine, and marine habitats. There is high certainty that predicted physical and chemical changes will occur; however, the ability to predict bio-ecological changes to fish or food webs in response to these physical/chemical changes is extremely limited, leading to considerable uncertainty.

Summary

The status of Snake River Basin steelhead is also likely to be affected by climate change. Climate change is expected to impact Pacific Northwest anadromous fish during all stages of their complex life cycle. In addition to the direct effects of rising temperatures, indirect effects include alterations in stream-flow patterns in freshwater and changes to food webs in freshwater, estuarine, and marine habitats. There is high certainty that predicted physical and chemical changes will occur; however, the ability to predict bio-ecological changes to fish or food webs in response to these physical/chemical changes is extremely limited, leading to considerable uncertainty. As we continue to deal with a changing climate, management actions may help alleviate some of the potential adverse effects (e.g., hatcheries serving as a genetic reserve and source of abundance along with natural populations, and increased riparian vegetation to control water temperatures).

Climate change is expected to make recovery targets for steelhead populations more difficult to achieve. Climate change is expected to alter critical habitat by generally increasing temperature and peak flows and decreasing base flows. Although changes will not be spatially homogenous, effects of climate change are expected to decrease the capacity of critical habitat to support successful spawning, rearing, and migration. Habitat action can address the adverse impacts of climate change on salmon and steelhead. 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 ameliorate stream temperature increases, and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

The timeframe for implementing the proposed action will occur while climate change-related effects are expected to become more evident in this and other watersheds within the range of the Snake River Basin steelhead DPS. Climate change may increase the risk of large rain-on-snow (ROS) runoff events (Crozier 2013) which could increase erosion on roads.

2.3. Action Area

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

For consultation purposes, the action area is comprised of two Little Salmon River subbasin watersheds: Boulder Creek and Trail Creek as well as some small drainages (face drainages) along the Little Salmon River. The action area also includes upland areas associated with the project that could create consequences that may result in changes in habitat conditions that affect

ESA-listed species or their designated critical habitat. The action area also includes haul roads projected to be used by this project and all associated stream crossings along these haul roads that may deposit sediment.

It is important to note that project area streams Fall Creek, Camp Creek, and Round Valley Creek do not contain ESA-listed fish species. Both Fall Creek and Camp Creek are known to have fish barriers at the confluence with Little Salmon River. Round Valley Creek on BLM-managed lands is not adjacent to any streams and are along the ridge tops. These three Creeks will not be included in our analysis.

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).

NMFS describes the environmental baseline in terms of the biological requirements for habitat features and processes necessary to support all life stages of each ESA-listed species within the action area. The Snake River basin steelhead and spring/summer Chinook salmon considered in this Opinion reside in or migrate through the action area. Thus, for this action area, the biological requirements for steelhead and spring/summer Chinook salmon are the habitat characteristics that support successful completion of spawning, rearing, and migration.

The Little Salmon River subbasin includes a total of 372,500 acres. The Little Salmon River runs north through west-central Idaho for 4 miles and flows into the main Salmon River at river mile 86.7 at Riggins, Idaho. Stream discharge of the Little Salmon River ranges from a high of 12,600 cubic feet per second (cfs) (1974) during spring runoff to less than 90 cfs (1989) during baseflow (USGS 2006). The upper half of the watershed is characterized by a broad valley surrounded by forested mountain slopes while the lower half flows through a steep and narrow canyon with an existing fish barrier at river mile 24.
Listed ESA fish species are known to occur along the Little Salmon River, Boulder Creek, and Trail Creek. Little Salmon River face drainages occur within two 6th code Hydrologic Unit Codes (HUCs) – Elk Creek – Little Salmon River and Round Valley Creek Little Salmon River. For this project the Little Salmon River-Face drainages are small unnamed intermittent tributaries/drainages that flow from the west into the Little Salmon River and are not known to be used by fish due to their size and stream gradients.

Our analysis will focus on project related actions and areas within uplands areas and riparian areas that may cause negative effects to both salmon and steelhead and their habitats. The BLM analysis and NMFS analysis will also assume that all federal projects that have undergone section 7 ESA consultation have been completed. Habitat and environmental conditions identified in the environmental baseline assume that previously consulted upon Forest Service projects such as the Payette National Forest Boulder Creek Landscape Restoration Project have been completed. This Forest Service project has not been completed but is ongoing.

Critical habitat has been designated within the Little Salmon River, Boulder Creek, and Trail Creek for both salmon and steelhead. Critical habitat has been designated for Snake River Basin steelhead along the Little Salmon River, along Boulder Creek, and along Trail Creek up to 2.4 miles to a natural barrier. Based on draft maps and a review of the Intrinsic Potential for Snake River spring/summer Chinook salmon we have determined that, within the action area, critical habitat also occurs along the Little Salmon, the main stem of Boulder Creek, and the main stem of Trail Creek up to 2.4 miles to a natural barrier.

The Little Salmon River Face drainages and tributaries to both Boulder Creek and Trail Creek were not considered part of designated Snake River spring/summer Chinook salmon critical habitat due to certain natural barriers (a natural barrier has been identified at mile 2.4 on Trail Creek) and steep gradients that likely exclude present and historic access, as identified by the NMFS Intrinsic Potential model. The NMFS Intrinsic Potential model is used to identify suitable habitat for particular fish species including spring/summer Chinook salmon. The Intrinsic Potential habitat model when applied to the action area identified suitable habitat within the mainstem of both Boulder Creek, Trail Creek, and the Little Salmon River. No tributaries for these three creeks within the action area were identified as suitable habitat.

Table 9. Watersheds and Sub-watersheds within the Project Area.

Sub-watershed	Area (acres)	Project Acres Within Watershed	Percent of Watershed
Little Salmon River Face Drainages	3,738 (5.8 sq. mi.)	3,738 acres	N/A
Boulder Creek	25,145 acres (39.3 sq. mi.)	1,528 acres	6.1%
Trail Creek	1,524 acres (2.4 sq. mi.)	1,088 acres	71.4%

Road density in the Little Salmon River subbasin varies from very low in the Rapid River drainage (0 to less than 0.5 road mi/mi^2) to very high (>7–8 road mi/mi^2). The ECA is an indicator which expresses, as a percentage of an entire watershed, the degree to which regenerating forest stands are hydrologically similar to clearcuts, relative to the hydrologic status of the original stands. Table 10 below summarizes road density and ECA within the analysis area watersheds and project area.

Table 10. Watershed Conditions – Road Density and ECA.

Subwatershed	Area (mi^2)	Miles of Road	Total Road Density (mi/mi^2)	RCA Miles of Road	RCA Road Density (mi/mi^2)	ECA4
Little Salmon River – Face Drainages	5.8	22.9	4.4	1.1	2.5	13%
Boulder Creek	39.3	63.9	1.7	18.7	1.9	14%

Subwatershed	Area (mi^2)	Miles of Road	Total Road Density (mi/mi^2)	RCA Miles of Road	RCA Road Density (mi/mi^2)	ECA4
Trail Creek	2.4	18.5	7.8	2.1	5.5	14%

Refer to the following Table 11 for a summary of substrate monitoring (deposited sediment) evaluated at permanent monitoring stations (2015–2017) for the Little Salmon River, Boulder Creek, and Trail Creek.

Table 11. Summary of Deposited Sediment for Boulder Creek and Trail Creek

Stream/River	Monitoring Station Location	Cobble Embeddedness	Percent Fines By Depth Spawning Gravels (% Less 6.3 mm)	Percent Surface Fines
Boulder Creek	SM 0.5	38%	23%	6%
Trail Creek	SM 0.3	43%	21%	16%

Cobble embeddedness levels in Boulder Creek and Trail Creek are resulting in suboptimal conditions for winter rearing habitat, primarily by limiting available habitat for juvenile fish using interstitial space that occurs in stream bottom substrate. No data are available for the Little Salmon face drainages.

The surface erosion potential for the baseline conditions (and with adding the proposed treatments, as discussed in the Effects section below) was estimated using the Water Erosion Prediction Project (WEPP) computer model. Several Forest Service WEPP online interface tools were used as a means to compare sediment delivery from physical disturbances such as road construction and decommissioning, timber harvesting, and prescribed burning. The WEPP model is a physically based soil erosion model that provides estimates of soil erosion and sediment yield considering site-specific information about soil texture, climate, ground cover, and topographic settings (Elliot et al. 2000). The following Table 12 summarizes baseline sediment yields.

Table 12. WEPP Estimated Base Sediment Yield (% Over Natural).

Subwatershed	Watershed Area(mi^2)	Background Sediment (% Over Natural)
Little Salmon River (Face Drainages)	5.8	11.6
Boulder Creek	39.3	5.3
Trail Creek	2.4	14.1

Little Salmon River face drainages occur within two 6th code HUCs – Elk Creek – Little Salmon River and Round Valley Creek Little Salmon River. The Face drainages contain intermittent streams that are not known to be used by ESA-listed fish species but ESA-listed fish may be present downstream in the Little Salmon River at the mouths of these tributaries.

Boulder Creek

The Boulder Creek watershed includes a total of approximately 25,145 acres and flows into the Little Salmon River at river mile 17.1. A total of 729 acres of BLM lands occur within the watershed, and the project area is within the lower portion of the drainage. Other land ownerships within the watershed include Forest Service (23,617 acres) and private lands (799 acres). Mainstem Boulder Creek does not flow across BLM lands, however, tributary non-fish-bearing intermittent and perennial stream segments flow across BLM lands in the watershed. Elevations within the watershed range from 3,040 feet at the mouth to 8,038 feet at the lookout on Pollock Mountain.

Surface geology of the watershed is mixed, with granitics, transitional zones of metamorphosed granitic rocks, and basalts. There are five landtype associations within the Boulder Creek watershed (BLM 2000): (1) Glacial Headlands – 5.1 percent; (2) Periglacial Uplands and Mountain Slopes – 28 percent; (3) Fluvial Mountain Slopes and Steep Canyons – 28.9 percent; (4) Alluvial Lands – 8.9 percent; and (5) Structurally Controlled Volcanic Lands – 29.1 percent.

Common riparian species include subalpine fir, Engelmann spruce, grand fir, alder, prickly current, dogwood, syringa, willow, sweet-scented bedstraw, beadlily, starry solomon-plume, twisted stalk, lady fern, monkshood, meadowrue, and miner's lettuce depending on elevation, aspect, and canopy cover. High coverages of mosses and liverworts occur on rocks and stream banks.

Boulder Creek is a fourth-order stream comprising A, B, and C channel types. A-type channels have gradients greater than 4 percent and have entrenched channels. B-type channels generally have gradients from 2.0 to 4.0 percent and have moderately entrenched channels. C-type channels generally have gradients less than 2.0 percent and have slightly entrenched channels.

Boulder Creek has a road density of 3.1 miles of road per square mile. The RCA road density is 3.4 miles of road per square mile. Existing sediment rate for Boulder Creek is 5.6 percent over natural. The ECA for Boulder Creek is 13 percent. Table 13 below summarizes fish habitat conditions in lower Boulder Creek, within the action area. All habitat conditions are higher than estimated natural levels, cobble embeddedness and spawning gravel are 16 percentage points and 4 percentage points higher than expected natural conditions.

Table 13. Habitat Analysis for Boulder Creek (Reach 1, Stream Miles 0.00 – 1.7).

Habitat Potential	Cobble Embed.	Spawning Gravels %<6.3	Pool Rif. Ratio	Summer Temp. C°	Active Debris & Pot. Debris 100m.	Pool Qual.	Instream Cover	Bank Cover	Bank Stab.
Natural	<22%	<19%	1:4	<=16	25+/60+	5.0	11%+	5%+	95%+
Exist.	38%	23%	1:10	16-17	1/25	4.0	10%	3%	99%
%Nat.	60%	80%	70%	80%	60%/70%	80%	90%	80%	100%

Boulder Creek has designated critical habitat for Snake River spring/summer Chinook salmon and Snake River basin steelhead. Critical habitat extends from the confluence of the Little Salmon River upstream for approximately 16 miles and also occurs in nine of its tributaries. The footprint of this project is adjacent to approximately 1.8 miles of designated critical habitat (all outside of BLM-managed lands, refer to Figure 1) near the confluence with the Little Salmon River for both steelhead and spring/summer Chinook salmon.

Trail Creek

The Trail Creek watershed includes a total of 1,788 acres and flows into the Little Salmon River at river mile 19.2. A total of 853 acres of BLM lands occur within the watershed. Other land ownerships within the watershed include Forest Service (436 acres) and private lands (235 acres). Elevations within the watershed range from 3,140 feet at the mouth to 5,708 feet at the top of Indian Mountain. Trail Creek is a third-order stream comprised of A channel types.

The surface geology in the drainage includes volcanics and borders on the Idaho batholith (border zone). The border zone consists of granitic rocks, granitic gneisses, schists, quartzites and other metamorphic rocks. Soil textures are medium to coarse and are generally highly erodible. The volcanics consist of various basalt formations. Basalt produces a medium to fine textured soil with low to medium erodibility. The soils in the narrow, v-shaped drainage bottoms are very deep, somewhat poorly drained, and formed in mixed alluvium. Surface erosion hazards are moderately low for the stream bottom areas.

Common riparian species include subalpine fir, Engelmann spruce, grand fir, Douglas-fir, alder, prickly current, dogwood, syringa, snowberry, willow, sedges, sweet-scented bedstraw, beadlily, starry solomon-plume, twisted stalk, lady fern, monkshood, meadowrue, and miner's lettuce depending on elevation, aspect, and canopy cover. Cottonwood and alder are prevalent in the reach between the Little Salmon River and Highway 95.

Average riparian width is 15 meters. Vegetation and soil trends are stable. Stable barks are 90 percent or above for all stream reaches. Overall, the riparian area is in proper functioning condition with a static trend. The BLM has a greenline monitoring station located at stream mile 1.3. Recent monitoring found 100 percent of the vegetation was rated as good for providing streambank stability and 99 percent of the streambanks were stable. Dependent on the stream reach, the majority of the riparian vegetation is in late or mid seral successional status.

Trail Creek is a third order stream and average stream gradient is 3 percent to 15percent, with an average gradient of 8 percent. The dominant Rosgen channel type is A3 and A3+. Table 14 below summarizes Trail Creek fish habitat parameters.

Trail Creek has a road density of 7.8 miles of road per square mile (18.5 road miles). Then RCA road density is 5.5 miles of road per square mile. Existing sediment rate for Trail Creek is 14.1 percent over natural. The ECA for Trail Creek is 14 percent. Habitat conditions for Trail Creek are provided in Table 14. All habitat conditions are higher than estimated natural levels, cobble embeddedness and spawning gravel are 21 percentage points and 2 percentage points higher than expected natural conditions.

Table 14. Habitat Analysis for Trail Creek (Reaches 1–4, Stream Miles 0.00–2.9)

Habitat Potential	Cobble Embed.	Spawning Gravels %<6.3	Pool Rif. Ratio	Summer Temp. C°	Active Debris & Pot. Debris 100 m.	Pool Qual.	Instream Cover	Bank Cover	Bank Stab.
Natural	<22%	<19%	1:4	<=16	25+/60+	5.0	11%+	5%+	95%+
Exist.	43%	21%	1:10	16-17	1-16/16-42	3	5 – 20%	2%	95%+
%Nat.	60%	80%	60%	80%	60%/70%	70%	70%	80%	100%

Trail Creek provides spawning and rearing habitat for Snake River basin steelhead and possibly Snake River spring/summer Chinook salmon. No known occurrence or documentation of spring/summer Chinook salmon exists for the Trail Creek drainage. There is the potential habitat for young of the year spring/summer Chinook salmon to utilize the mouth area or lower reach for rearing. In Trail Creek there is designated critical habitat for spring/summer Chinook salmon and steelhead for approximately 2.4 miles upstream to a natural barrier from the confluence with the Little Salmon River. This section of Trail Creek occurs on BLM managed lands.

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).

2.5.1 Effects on ESA-listed Species

This section describes the effects of vegetation management activities on individual fish in the Little Salmon River, Boulder Creek, and Trail Creek watershed. This section also evaluates the consequences of those effects on the viability of Snake River basin steelhead at the Little Salmon River population, Salmon River MPG and Snake River basin ESU scales, and Snake River spring/summer Chinook salmon at the Little Salmon River population, South Fork Salmon MPG, and the Snake River ESU scales. The proposed project involves timber harvest, prescribed fire, existing road repair, road construction, and road use.

Both Snake River Basin steelhead and Snake River spring/summer Chinook salmon are known to occur in the Little Salmon River and Boulder Creek. Trail Creek is only known to have Snake River Basin steelhead present, whereas spring/summer Chinook salmon have not been documented within the Trail Creek watershed; however, since no natural barriers are present, we assume that Chinook salmon occur in Trail Creek. Within the action area, designated critical habitat is occurs in the Little Salmon River, Boulder Creek, and Trail Creek watersheds. (Effects on critical habitat are discussed in Section 2.5.2, below.)

The proposed action has effects to both steelhead and spring/summer Chinook salmon due to the following: (1) Turbidity; (2) deposited sediment; (3) streamflow alteration; and (4) chemical contamination. These potential effects are described in more detail below and will be generally similar for both species but will be experienced in more places by steelhead than salmon, given the wider distribution of steelhead within the action area.

2.5.1.1 Turbidity

Suspended sediment can affect fish through a variety of direct pathways: abrasion (Servizi and Martens 1992), gill trauma (Bash et al. 2001), behavioral effects such as gill flaring, coughing, and avoidance (Berg and Northcote 1985; Bisson and Bilby 1982; Servizi and Martens 1992; Sigler et al. 1984), interference with olfaction and chemosensory ability (Wenger and McCormick 2013), and changes in plasma glucose levels (Servizi and Martens 1987). These effects of suspended sediment on salmonids generally decrease with sediment particle size and increase with particle concentration and duration of exposure (Bisson and Bilby 1982; Gregory and Northcote 1993; Servizi and Martens 1987, Newcombe and Jensen 1996). The severity of sediment effects is also affected by physical factors such as particle hardness and shape, water velocity, and effects on visibility (Bash et al. 2001). Although increased amounts of suspended sediment cause numerous adverse effects on fish and their environment, salmonids are relatively tolerant of low to moderate levels of suspended sediment. Gregory and Northcote (1993) have shown that moderate levels of turbidity (35 to 150 nephelometric turbidity units [NTU]) can accelerate foraging rates among juvenile Chinook salmon, likely because of reduced vulnerability to predators (camouflaging effect).

Salmon and steelhead tend to avoid suspended sediment above certain concentrations. Avoidance behavior can mitigate adverse effects when fish are capable of moving to an area with lower concentrations of suspended sediment. To avoid turbid areas, salmonids may move laterally (Servizi and Martens 1992) or downstream (McLeay et al. 1987). Avoidance of turbid water may begin as turbidities approach 30 NTU (Sigler et al. 1984; Lloyd 1987). Servizi and Martens (1992) noted a threshold for the onset of avoidance at 37 NTU (300 milligrams per Liter [mg/L] total suspended sediment). However, Berg and Northcote (1985) provide evidence that juvenile coho salmon did not avoid moderate turbidity increases when background levels were low, but exhibited significant avoidance when turbidity exceeded a threshold that was relatively high.

Other proposed activities that may generate turbidity in fish-bearing streams include road reconditioning, reconstruction, and decommissioning, and log haul. Sediment BMPs (gravelling at stream crossings, improved drainage, and surface gravelling) should reduce sediment delivery from road surfaces and ditches to streams. With these sediment reduction measures at and near stream crossings, road work and road use is expected to generate less turbidity than from direct streambed disturbance or rewatering of isolated work areas. In general, sediment mobilization from road work areas to streams would occur during high water events when stream turbidity is high and added sediment from roads blends with this background turbidity.

2.5.1.2 Deposited Sediment

All freshwater life stages of both steelhead and Chinook salmon will be present at various times for the duration of the project. The proposed action has the potential to affect spawning and rearing through increasing sediment deposition in stream substrates.

Proposed harvest, burning, and road activities disturb soils or road prisms which makes fine sediment more available for transport from hillslopes and road prisms to streams. These proposed activities can deliver sediment through the common pathway of soil disturbance, increased surface erosion and transport during precipitation events, and delivery of fine sediment (<2-millimeter diameter) to action area streams. Once delivered to streams, fine sediments are suspended and transported, then begin to deposit in a graded pattern with larger particles settling out first and smaller particles settling out farther downstream (Foltz et al. 2008); this excess fine sediment can cause harm to both species.

This deposited sediment analysis starts with an overview of possible effects from excess fine sediment to fish, and then steps through proposed harvest, burning, and road related actions, and their mitigation measures which are designed to minimize short term impacts from these proposed activities and improve long term sediment levels in the action area.

When suspended sediment settles out of suspension, it can cause detrimental effects on spawning and rearing habitats by filling interstitial spaces between gravel particles (Anderson et al. 1996; Suttle et al. 2004). Sedimentation can: (1) Bury salmonid eggs or smother embryos; (2) destroy or alter prey habitat; and (3) destroy or alter spawning and rearing habitat (Spence et al. 1996). Excessive sedimentation can reduce the flow of water and supply of oxygen to eggs and alevins in redds. This can decrease egg survival, decrease fry emergence rates (Bash et al. 2001; Cederholm and Reid 1987; Chapman 1988), delay development of alevins (Everest et al. 1987), reduce growth and cause premature hatching and emergence (Birtwell 1999), and cause a loss of summer rearing and overwintering cover for juveniles (Bjornn et al. 1977; Griffith and Smith 1993; Hillman et al. 1987). Through the implementation of BMPs there is little potential for sediment delivery to streams from timber harvest and prescribed burning, but there is a greater potential for delivery from road work and road use (Brown et al. 2013) because road-generated sediment can enter streams directly at stream crossings.

Sediment Modeling

The BLM conducted a WEPP modeling, which indicated that there would be an increase over base sediment yield during the project, but 5 years following completion of the project, overall sediment yield would return to near pre-project conditions. Five or more years post-project, project components such as road construction add to sediment yield, whereas road obliteration and drainage improvement components decrease sediment yield. With both types of activities and effects occurring, the model-estimated overall sediment yield shows little change from pre-project to five years post-project.

Timber Harvest

The BLM proposes timber harvest and thinning of vegetation on 2,458 acres with the majority of treatments identified as commercial thinning.

Sediment delivery to streams from timber harvest areas will be minimized with implementation of the following BMPs: (1) Apply Idaho Cottonwood BLM RMP RCA buffers; (2) no vegetation treatments within RCAs, including landslide prone areas; (3) in the event an unknown seep, spring, or watercourse is discovered, apply RCA buffers; (4) helicopter landings will not be located in RCAs; and (5) for cable corridors that are at risk for harmful erosion or active erosion occurring additional measures (seeding, mulching, installation of water bars, and/or placement of LWD) will be implemented as needed to insure that channelized flows do not occur and no erosion reaches RCAs. The BLM also proposes monitoring that would be conducted during the project to focus after storm events where high potential for erosion could occur to determine if active erosion/sediment is occurring from areas that had vegetation/soil disturbance. If the BLM detects "adverse erosion" they will implement appropriate actions to ensure that such erosion/sediment is not reaching RCAs or live waters.

The RMP RCA buffers are similar to PACFISH buffers and should be effective at preventing action-generated sediment delivery to streams. In addition, there will be no harvest in and along landslide prone areas, thus timber harvest should not increase the risk of mass wasting from landslide prone slopes. With implementation of these BMPs and BLM RMP/PACFISH buffers, NMFS does not expect fine sediment from harvest areas to be delivered to streams and deposited in substrates in concentrations that would impair the function of substrates or be harmful to either species.

Prescribed Fire Treatments

Project actions include prescribed and pile burning. There are 4,625 acres of prescribed burning to reduce fuels and improve forest health.

Prescribed fire effects from this project are expected to be similar to those observed by Bêche et al. (2005) and Arkle and Pilliod (2010). Bêche et al. (2005) found that sediment was not affected and macroinvertebrates communities recovered in watershed streams a year after prescribed fire (with ignition in riparian areas) of low to moderate intensity. For 3 years following a prescribed burn in ponderosa pine forest, Arkle and Pilliod (2010) found no detectable changes in sediment, riparian or stream habitats, macroinvertebrates, and fish.

The most important prescribed fire BMPs for minimizing the risk of moderate to high severity burns and sediment delivery include no ignition in RCAs and low intensity burning. With implementation of the BMPs and design features, sediment delivery increases, and thus effects to stream substrate and both fish species, are expected to be negligible from prescribed burning.

Roads

Haul

Forest roads have significant potential to increase erosion and sedimentation (Patric 1976; Swift and Burns 1999; Aust and Blinn 2004; Grace 2005). Roads can alter hillslope hydrology by creating compact and less permeable surfaces (Megahan 1972), decreasing infiltration (Grace 2005), and increasing drainage networks with road surfaces and ditches (Wemple et al. 1996; Croke et al. 2001; Croke and Mockler 2001; Jackson et al. 2005), thus resulting in increased overland flow, erosion, and sedimentation during rain events. Erosion rates or yield, have been shown in monitoring and research studies to be higher from roads and log landings than from adjacent harvested and undisturbed areas (Yoho 1980; Rothwell 1983). Sediment yield is the amount of sediment produced or passing a point from an area or feature, sediment delivery is the amount of sediment reaching a stream (Luce et al. 2001). Controls on sediment yield from roads include road slope and length, surface material/condition, soil texture, and vegetative cover (Luce et al. 2001), with surface condition being affected by traffic and maintenance levels (Luce and Black 2001) and delivery being dependent on precipitation duration and intensity.

Road use related to haul activity will be a source of sediment for the duration of the project. There are 2.7 miles of roads within RCAs that are within 600 feet of known occupied habitat. There are a total of 10 stream crossings that are within 600 feet of known occupied habitat: four crossings are over fish-bearing perennial streams all of which are on Trail Creek. There are two crossings that are identified as non-fish-bearing (both on Trail Creek) and four crossings (one on Little Salmon face drainages and three on Boulder Creek) that occur over intermittent streams.

During reconstruction and reconditioning, ground or road surface disturbing activities will increase bare soil area and make more fine sediment available for transport with only a portion being delivered in the short term. An analysis from road replacement or removal projects from the Nez Perce Clearwater National Forest (A. Connor, NPCNF hydrologist, unpublished data 2014) show that there were spikes in turbidity and results show that turbidity spikes extended between 100 and 600 feet downstream, 50 percent of the spikes exceeded 50 NTU, with a maximum of 250 NTU, for less than 2 hours. Expected temporary effects of up to 2 hours would have included behavioral effects such as volitional movement and/or reduced or increased feeding, and physiological effects including coughing. A 600-foot limit is the distance that NMFS expects project-generated sediment in streams to become indistinguishable from background levels of instream sediment. Although sediment yield will increase with an increase in bare soil area, most of the mobilized sediment will not be delivered to streams, in part because of the position of the work in the drainage network and also from application of BMPs such as sediment control devices and stabilizing bare soil areas by replanting vegetation.

Log haul can generate sediment as a result of road surface erosion and dust. Where ditch lines terminate at stream crossings, generated sediment can be delivered to streams. Large amounts of haul, or hauling in wet conditions, can cause rutting of roads. Ruts are channels that can route water and sediment past crossdrains or outsloped sections of road to stream crossings. This rutting can also accumulate flow which accelerates erosion of fine sediments from the road surface and adds more fine sediment to streams.

Important BMPs that will reduce the potential for sediment delivery from the road system are the application of surface aggregate gravel materials and/or outsloping during reconstruction. Gravel will be applied to: (1) Perennial stream crossings on existing roads; (2) new permanent and temporary road construction crossing perennial streams; (3) existing and temporary road construction crossing intermittent streams; and (4) other road sections where and when needed during haul. Road preparation and conditions will be inspected continuously during haul, with increased inspections after wet weather. Short term sedimentation from a gravel application is caused by road surface disturbance and may last through the first winter. Added gravel at stream crossings and other sections will help mitigate the sediment production from substantial increases in haul traffic and will help provide long term reductions of road surface fine sediment from the most problematic existing road segments involved with this project. The BLM has proposed to monitor haul road condition for damage (adverse erosion/sediment) and implement measures to reduce potential damage. There are 10 haul road stream crossings where ESA-listed fish species are present or in close proximity. We anticipate that adverse effects from road damage sediment delivery are unlikely to extend further downstream than the 600-foot stream section below the crossings.

Considering those factors and the general location of stream crossings, overlapping sales, and extended time of haul, NMFS expects the majority of sediment effects from haul to be small and detectable in stream substrates a maximum of 600 feet below each of the 10 source sites. Within this distance, NMFS expects only minor, and temporary (days to months) deposition of fine sediment in substrates which could cause behavioral effects to fish in the reaches below the ten crossings. The behavioral effects would likely be minor and may include fish moving upstream or downstream into areas with lesser levels of substrate sediment and associated greater abundance of invertebrate prey. Appreciable fine sediment accumulations below haul crossings are expected to be transported downstream in the next high water, resulting in more diffuse sediment resettling and likely undetectable effects in substrates farther downstream.

Road Construction

Temporary road construction will be the primary source of erosion and sediment production in the short term. The action will result in 2.4 miles of permanent roads and 11.5 miles of temporary roads. There will be 1,178 feet of permanent and 1,690 feet of temporary roads constructed within RCAs. Temporary roads will be obliterated within 3 years of harvest. Obliteration includes recontouring, decompaction, addition of woody material for soil productivity, and erosion protection. Temporary roads within RCAs are proposed in both the Little Salmon face drainages and Camp Creek (Camp Creek does not contain ESA-listed fish species or their designated critical habitat). There will be temporary road construction outside of RCAs in Boulder Creek (2.35 miles), Trail Creek (1.83 miles) and Little Salmon face drainages (4.06 miles). New permanent roads within RCAs are being proposed for the project but occur in drainages (Fall and Camp Creeks) that do not contain ESA-listed fish species. There will be permanent road construction outside of RCA in both Boulder Creek (0.07 miles) and Trail Creek (0.13 miles). Special erosion control measures for road construction within RCAs includes rocking and graveling stream crossings, slash filter windrows, seeding, mulching, and sediment barriers (e.g., sediment fences and/or straw baffles). Due to the crossing locations being well more than 600 feet upstream of where the species occur, the proposed BMPs likely limiting construction effects to no more than 600 feet below crossings, and the short time the temporary roads will be on the landscape, the road construction is not expected to create short term pulses or long term chronic inputs of sediment that would alter salmon and steelhead habitat or adversely affect the fish.

Road Decommissioning and Road Storage

Road decommissioning and road storage are ground-disturbing activities that result in short term increase in sediment yield but which reduce long term chronic sediment delivery and landslide risk (Switalski et al. 2004). Ripping and recontouring alleviates most of the risks resulting from concentrated flow including gullying, mass wasting, and increases in peak flows (Luce et al. 2001). However, the unconsolidated material that results from ripping and recontouring retains some risk of failure, especially on lower slope locations (Madej 2001). In addition, channel adjustment (erosion) may occur following crossing removals, with erosion risk increasing with drainage area, stream gradient, and the volume of fill removed (Madej 2001). As with all ground disturbing decommissioning activities, rapid regrowth of vegetation (Foltz et al. 2008), and in particular tall trees for recontoured slopes, is essential for the success of the decommissioning (Luce et al. 2001). Where soil organic matter is lacking following decommissioning, soil amendments and/or plantings are recommended (Luce et al. 2001).

Decommissioning of roads will result in a minor and short term (1–2 years) increase in sediment delivery to streams. Most of the decommissioning will occur within Trail Creek (2.5 miles of the project total of 5.5 miles) and 0.7 miles of that will be in RHCAs adjacent to streams within 600 feet of known occupied steelhead habitat. The project does not, however, involve any culvert removals within 600 feet of where the fish occur. For the road decommissioning within RCAs, the sediment-interception BMPs are expected to be largely effective in avoiding delivery. Where delivery to streams occurs, the amounts will likely be small and the effects on stream substrate not appreciable. There will be 0.7 miles decommissioned (outside of RCAs) in Boulder Creek and 1.4 miles (mostly outside RCAs) in the Little Salmon face drainages. The remaining 0.9 miles of decommissioning would occur in watersheds that do not contain ESA-listed fish. Some sites on the road sections to be decommissioned apparently are present sources of chronic sediment delivery; and below those locations, reductions in fine sediment content in downstream substrates may be evident in 1 to 2 years and continue into the long term. On larger scales, studies have linked increased road density to increased sediment delivery (Luce et al. 2001), reduced fish abundance (Eaglin and Hubert 1993), and limited fish occurrence (Dunham and Rieman 1999). Reduction in density of road and stream crossings is expected to have the opposite effect. Proposed road decommissioning is expected to have a short term, small negative effect but a small long term benefit on stream substrate condition within the Little Salmon River watershed.

Road storage will result in similar effects to decommissioning. Road storage includes the rehabilitation and stabilization of roads to minimize erosion and sediment; these roads would be available for use in the future. Road storage includes the deep ripping, placement of LWD, seeding with desirable vegetation, and insuring that proper road drainage is occurring to minimize harmful erosion or sediment. These roads currently are not open for public motorized use. As needed, road closure barriers and signing will be implemented. Culverts that are undersized, non-functional, or at risk for failure would be removed because routine road inspection or maintenance would not occur and no motorized vehicle use is anticipated in the near future (>15+ years). Road storage is proposed for 1.4 miles of roads in the Little Salmon face drainages and 0.5 miles of roads in Trail Creek. Proposed road storage is expected to have temporary benefits as these roads may be re-opened for use in the future.

Deposited Sediment Summary

Harvest, burning, road work, and haul will all cause soil disturbance making sediment more available for short term sediment delivery to streams over the period of this action and a few years beyond until soils and road surfaces stabilize. Any fine sediment delivered to streams will decrease the utility of substrates until the fine sediment clears through successive high flows. The WEPP modeling predicted increases in sediment yield the first year but after 5 years following completion of the project impacts would slightly decrease below existing conditions due to road decommissioning and drainage improvements along some remaining roads. Sediment analysis in this Opinion focuses on BMPs that will minimize sources of sediment delivery from project actions. Past effectiveness monitoring shows that RMP RCA buffering, which is similar to PACFISH buffers and which the BLM has incorporated into their revised RMP, is effective at preventing sediment delivery from harvest and prescribed burn treatment areas. In addition, burning is restricted to times and conditions that are likely to result in low intensity with minimal impact to riparian areas.

Roads with active erosion affecting water quality or aquatic habitats will be addressed during the life of the project. Stream reaches in or near a sale boundary are likely to have increases in short term sediment delivery for the duration of haul and a couple of years following haul. However, improved graveling where needed and armoring approaches at stream crossings would limit the amount of road surface draining to streams. There are 10 haul route crossings over streams with (or near) listed ESA fish species, with most project haul crossings not involving streams that have or could have salmon or steelhead. In addition, expected monitoring of active haul routes will insure damaged roads with the potential for, or active, sediment delivery will be addressed in a timely manner.

The localized temporary minor adverse effects (e.g., fish movement to less affected nearby habitat) from sediment generated by road preparation and haul at or immediately below those 10 sites will be greatest at the subwatershed scale (e.g., area of active harvest units and haul routes). At this scale, there will be no passage barriers and fish are free to seek more suitable habitat near these localized areas. In summary, increased sediment delivery from the proposed action is likely to occur and due to the conservation measures included in the proposed action, the amount of any such increase in sediment delivery is expected to be small. In the stream reaches adjacent to road reconstruction and road use where ESA-listed fish may be present, these individuals may experience minor adverse effects from increased sedimentation.

The suite of protective measures described as part of the proposed action include maintaining a RCA buffer, not igniting in riparian areas, avoiding land slide prone areas, restricting activities when soils are wet, identifying and addressing harmful erosion particularly near stream crossings, and armoring stream crossings. Those measures and others described in the BA will minimize sediment effects from the proposed action.

2.5.1.3 Changes to Streamflow

Equivalent Clearcut Area

Water yield can increase after loss of mature trees through harvest or wildfire and the consequent reduction in transpiration and precipitation interception. Depending on the size, orientation, and total area of canopy removal in a given drainage, removal of forest canopy can often result in an increase in snowpack and alteration of snow melt rates and timing of peak runoff (Storck et al. 2002, Winkler et al. 2005). Increased water yields may be associated with an increased probability of larger than average peak flow events, which could lead to increased channel and bank adjustment through scour, bedload movement, or redistribution of sediment in depositional areas. These depositional areas have lower stream gradients which include spawning and rearing areas. The BLM analyzed the potential of the proposed actions to affect water yield and this is discussed below.

Past harvest, wildfire, and roads were included in the BLM ECA analysis and existing roads are considered as permanent openings when estimating ECA. The analysis takes a simple snapshot in time with the assumption that all project activities are implemented in 1-year. The ECA predictions are used to compare alternatives. Lower ECA generally indicates a higher likelihood that stream channels are in balance with their flow regime. An ECA value of less than roughly 15 percent indicates favorable conditions in this regard. An ECA value of 15 to 30 percent indicates a moderate potential for a channel-flow regime imbalance. A value greater than 30 percent is considered low (poor) condition (NMFS 1998). Similarly, a statistically significant increase in stream flow is generally not measurable until at least 20 to 30 percent of a watershed's forest cover is removed (MacDonald and Stednick 2003).

The ECA would increase as a result of implementation of the proposed action: Little Salmon face drainages 9 percent, Boulder Creek 2 percent, and Trail Creek 9 percent. Road decommissioning and soil restoration contribute to a reduction in compaction, thus improving infiltration and reducing surface runoff. Removal of forest canopy by timber harvest, road construction, or natural processes (such as wildfire) can affect the quantity and timing of stream flow.

The modest ECA increases with implementation of the proposed action in the drainages with steelhead and/or salmon are not expected to result in appreciable increases in peak flow. Therefore, project-induced ECA effects are not likely to cause increased channel scour and sediment deposition. Existing ECA and post-project ECA for the subwatersheds within the project and analysis area are summarized in Table 15.

Table 15. Summary of ECA Effects from Implementation of Proposed Action

Subwatershed	Watershed Area (mi^2)	Existing	Proposed Action
Project Area – Little Salmon River Face Drainages	5.8	13%	22%
Boulder Creek	39.3	13%[3]	15%
Trail Creek	2.4	14%	23%

There would be no large openings created by the proposed treatments, therefore, changes to snow accumulation patterns, snowmelt rates, and flow regime should be minor. Without ECA changes sufficient to result in detectable changes to peak flows, channel erosion and downstream sedimentation are not expected to change appreciably from baseline conditions. Current subwatershed ECAs are below the threshold of 20–25 percent, where detectable increases in peak flow and associated channel changes may occur as a result of increased water yield. Therefore, the proposed action's effects on ECA are not anticipated to impact to channel flow or steelhead or salmon.

Water Pumping

Water pumping in the action area streams may be necessary for providing water for dust abatement. The procedures and BMPs for water pumping include: (a) Any water withdrawals for dust abatement from fish-bearing streams would be properly screened and screen openings would not exceed 3/32-inch and approach velocity would not exceed 0.33 feet per second. NMFS fish screen criteria (NMFS 2011) will be utilized for all water pumping activities; (b) undercut banks shall not be exposed and connected flow at and below pump location shall be maintained; (c) no more than 20 percent of stream flow shall be pumped; (d) no instream coffer dam construction for water withdrawal would be authorized that would impair juvenile and adult fish upstream or downstream fish passage; and (e) prior to any water withdrawal occurring in a fish-bearing stream the site would be approved by a Fisheries Biologist.

Streamflows are a critical part of fish habitat and fish viability. Reducing streamflow can adversely affect the amount and quality of habitat accessible, reduce food availability and forage opportunities, and adversely affect water quality. This, in turn, can affect the growth, survival, and productivity of both steelhead and salmon. Reducing flow could eliminate access of juvenile salmonids to important habitat types such as undercut banks and tributary streams (Brusven et al. 1986; Raleigh et al. 1986). Similarly, reducing the volume of water in streams would reduce the quantity and quality of prey and would limit foraging opportunities and foraging efficiency of salmonids (Boulton 2003; Davidson et al. 2010; Harvey et al. 2006; Nislow et al. 2004; Stanley et al. 1994). In addition to adverse impacts to habitat and forage, reductions in streamflow can adversely impact water quality by increasing summer water temperatures (Arismendi et al. 2012; Rothwell and Moulton 2001).

The equipment used to remove water from a stream or pond will meet NMFS screening criteria. NMFS criteria specify screen mesh size, and maximum intake, velocities covering intake hoses or other intake devices. With application of NMFS screening criteria, fish are unlikely to be adversely affected by the use of intake hoses.

2.5.1.4 Chemical Contamination

Implementation of the proposed action will expose water within the harvest area to chemical contamination. Fuels and lubricants, magnesium chloride ($MgCl_2$) for dust abatement, and herbicides will be used in riparian areas and there is a risk that these chemicals will be released into waterways.

Fuel and Lubricants

Petroleum-based products (e.g., fuel, oil, and some hydraulic fluids) contain poly-cyclic aromatic hydrocarbons, which can cause lethal or chronic sublethal effects to aquatic organisms (Neff 1985). These products are moderately to highly toxic to salmonids, depending on concentrations and exposure time. Free oil and emulsions can adhere to gills and interfere with respiration, and heavy concentrations of oil can suffocate fish. Evaporation, sedimentation, microbial degradation, and hydrology act to determine the fate of fuels entering fresh water (Saha and Konar 1986). Ethylene glycol (the primary ingredient in antifreeze) has been shown to result in sublethal effects to rainbow trout at concentrations of 20,400 mg/L (Staples et al. 2001). Brake fluid is also a mixture of glycols and glycol ethers, and has about the same toxicity as antifreeze.

Construction machinery will be used near streams with fuel stored outside of RCAs but there will be no helicopter landings within RCAs. Logging equipment and fuel will be stored outside of RCAs at sites with a low potential for overland flow, drainage or spills reaching riparian habitats, streams or wetlands. Accidental spills or leaks of fuel, lubricants, hydraulic fluid, and similar contaminants could occur in an RCA (including roadways near stream crossings) or directly into the water. With the BMPs for spill prevention, equipment cleaning, spill kits, maintenance of equipment to avoid and reduce fuel and oil leaks, and other provisions of the timber sale contract, the risk of spills reaching live water is very unlikely; and the amounts of fuel delivered from equipment leakage will be very small and likely inconsequential to salmon and steelhead.

Dust Abatement

The BLM may use $MgCl_2$, for dust abatement on haul routes through private lands. If soil surfaces and the dust abatement chemicals are not bound together well, which does occur with chlorides, or if a heavy rain occurs, road sediment treated with $MgCl_2$ can be carried by overland flow into ditches and streams. Sedimentation and uptake of soil particles by aquatic organisms could adversely affect those species if sufficient numbers of treated particles have significant and mobile concentrations of hazardous compounds. Chloride concentrations as low as 40 parts per million have been found to be toxic to trout, and concentrations up to 10,000 mg/L have been found to be toxic to other fish species (Foley et al. 1996 in Piechota et al. 2004; and Golden 1991, in Piechota et al. 2004). Salt concentrations greater than 1,800 mg/L have been found to kill daphnia and crustaceans, and 920 mg/L of calcium chloride has been found to be toxic to daphnia (Anderson 1984; Sanders and Addo, 1993, in Piechota et al. 2004). Magnesium chloride for dust abatement can also affect roadside vegetation. In a study in Colorado, (Goodrich et al. 2008), some severely damaged vegetation occurred along most roads regardless of maintenance or $MgCl_2$ treatment procedures; however, a higher occurrence of severe damage was observed on many roadside species along roads treated with $MgCl_2$. The study also linked vegetation effects or lack thereof to the sloped position from the road to the vegetation. More vegetation damage occurred where road slope directed runoff containing the abatement chemical.

The BMPs to reduce potential impacts from chemical contamination from the use of $MgCl_2$ include: (a) Not applying chemicals while raining; (b) where practicable, not applying dust palliatives unless a 3-day forecast indicates there will be clear weather; (c) when applied, chemicals will remain on the road surface and will not go over the road edge; (d) where possible a 1-foot buffer zone on the edge of the gravel or native surface road will be used if the road width allows; and (e) vehicles and machinery used to apply chemicals will carry adequate spill protection equipment and kits during application.

Those measures will help reduce the likelihood and amount of $MgCl_2$ introduced into streams. Even with those standards and road designs in place, dust abatement chemicals could enter the stream and affect invertebrate production and food supply for steelhead or salmon at and immediately downstream from stream crossings where the chemicals are applied. However, any effects would likely be minimal as the project would only have $MgCl_2$ treatment along active haul routes which is a subset of haul roads and have a low likelihood of interacting with live water. NMFS assumes that movement of $MgCl_2$ would likely only occur during rainstorms, at which time the concentration of $MgCl_2$ would be diluted by the additional flows. For those reasons, $MgCl_2$ usage for this action is unlikely to cause harm to steelhead or salmon.

Herbicides

Herbicides can potentially enter water through direct spray, spray drift, wind-blown soils, surface water runoff, and movement through soils. The suite of precautionary measures in the proposed action is likely to keep herbicides from reaching water in an appreciable amount in the vast majority of circumstances by controlling the mechanisms that enable chemicals to reach stream channels. Some studies and additional monitoring results from Campbell (2004; 2012) indicate that herbicides used in a forest or rangeland appear to reach water in undetectable or low amounts, even with application methods that do not include many of the precautionary measures in the proposed action. However, accidental oversprays and rain events shortly after herbicides are applied are circumstances where herbicides could reach the water in amounts that affect listed fish or other aquatic organisms.

Herbicide application occurring are anticipated to be spot treatments by hand application following measures identified with the Cottonwood FO programmatic weed control program. Conservation measures identified include: (a) A certified applicator will oversee all spray projects; (b) a spill cleanup kit will be available whenever herbicides are transported or stored; (c) a spill contingency plan will be developed prior to all herbicide applications; (d) herbicide applications will only treat the minimum area necessary for the control of noxious weeds; (e) prior to and during application, weather conditions will be monitored periodically by trained personnel at spray sites and herbicides will not be applied for adverse weather conditions; (f) no more than 600 acres would be treated in any 6th HUC; and (g) as needed dyes will also be used for monitoring of spray application in sensitive areas

In spite of best efforts to minimize water contamination from the proposed action, herbicides cannot be kept entirely out of the water in all circumstances. All of the herbicides used in the proposed action can be transported to streams by runoff, which is the most likely source of contamination. It is anticipated that increased total acreage of spot treatments occurring within RCAs from new road construction and along existing roads would be no more than 2 acres. Increased spot treatments along roads and skid trails outside of RCAs would total approximately no more than 12 acres. These treatments would primarily occur during project implementation and no more than 2 years after disturbance and would occur over 6-year period. Since application of herbicides will be by hand, follow the described BMPs, and affect only a small proportion of area during the duration of this project, fish are unlikely to be adversely affected.

2.5.1.5 Species Effects Summary

Proposed RMP RCA buffers are anticipated to be effective at preventing sediment delivery from hillslope erosion in harvest units and areas of prescribed fire. Applying proposed RCA no-harvest buffers to landslide prone areas ensures that harvest will not increase the risk of landslides originating from these areas. Helicopter landings and swing trails will be located outside of RCAs with no connection to the stream network or pathway for sediment delivery; additionally, any of these areas cleared for the project will be obliterated after use to avoid becoming long term sediment sources.

There are currently 2.7 miles of haul roads that are within 600 feet of occupied steelhead or Chinook salmon habitat, or their designated critical habitat. There are four stream crossings, all in the Trail Creek drainage, that intersect with occupied steelhead or Chinook salmon habitat. These road segments and stream crossings will likely add sediment into the system and may result in temporary adverse effects to individual fish by reducing substrate functions for cover and invertebrates/food supply for salmon and steelhead. Sediment is likely to be delivered to streams at a portion of these crossings; the amount would depend on the road configuration at each site. Project generated delivery is most likely to occur particularly during periods of rain and will affect the portions of subwatersheds where haul are active during different periods of the 12-year project. The potential inputs of sediment at stream crossings and along stream-adjacent sections of road will be reduced as improvements will be implemented when harmful erosion/sediment occurs.

Road decommissioning will remove 4.6 miles of roads within the project area and these roads overlap streams that contain ESA-listed fish species. The majority of decommissioning will occur in Trail Creek (2.48 miles) and the Little Salmon River Face Drainages (1.42 miles). This will likely create small pulses of sediment that will flush from the stream system in approximately 2 years. Long term, the road decommissioning activities should provide small benefits by eliminating chronic sediment sources and reducing the road density. NMFS expects that road upgrades for this project will be maintained and will produce an added long term benefit to stream substrate function for steelhead spawning and rearing within the Little Salmon watershed.

The ECA modeling shows that proposed actions may increase ECA 2 to 9 percent depending on subwatershed. Since these ECA changes are not sufficient to result in detectable changes to peak flows, channel erosion and downstream sedimentation are not expected to change appreciably from baseline conditions. Based on this information, appreciable effects to water yield, peak flow, and channel erosion from project actions are not expected.

There is no harvest in RCAs and we anticipate that stream shading will not likely be affected by harvest, therefore the proposed action will not affect water temperature.

Water will be withdrawn from streams for dust abatement and dust palliatives such as magnesium chloride will be applied to haul routes on private lands. NMFS screening criteria and pumping BMPs will also be applied. Because of these minimization measures and infrequent use, water withdrawals are not expected to change flow conditions and would not result in adverse effects to steelhead or salmon.

Helicopter refueling and servicing, and fuel storage will occur in designated landing areas outside of RCAs. These areas will have no connection to the stream network. Implementation of additional SPCC plans further reduce the risk of spill or contamination of action area waters. The risk of fuel spills will be minimized through locating helicopter landings outside of RCAs where they are disconnected from the stream network, implementation of the spill prevention plan, availability of spill kits, and low risk of truck fuel spill into streams. Because of these minimization measures we do not expect adverse effects to either salmon or steelhead from fuel spills.

The application of herbicide would be for spot treatment only. Any application within RCAs would be by hand application and spot treatment and there will be no broadcast application for this project. Areas that would be applied on an annual basis would be relatively small. Because of these minimization measures we do not expect adverse effects to either salmon or steelhead from the use of herbicides for this project.

2.5.2 Effects on Critical Habitat

The action area contains designated critical habitat for Snake River Basin steelhead and Snake River spring/summer Chinook salmon. The proposed action has the potential to affect the following PBFs of designated critical habitat (Table 7): (1) Water quality; (2) water quantity; (3) substrate; (4) forage; and (5) natural cover/shelter. Any modification of these PBFs may affect freshwater spawning, rearing, or migration in the action area. Proper function of these PBFs is necessary to support successful adult and juvenile migration, adult holding, spawning, rearing, and the growth and development of juvenile fish.

2.5.2.1 Water Quality

As described in the Species Effect section, road reconditioning, reconstruction, and decommissioning, and increased road use are expected to generate periodic turbidity pulses. The intensity and duration of these turbidity pulses will be minimized by implementing numerous BMPs. Sediment delivery and turbidity from road reconstruction and road use is expected to be even more limited in concentration and extent, particularly with implementation of road improvements, gravelling and sediment control structures to reduce and contain erosion near stream crossings, and monitoring to address active erosion.

The proposed action involves the storage and use of petroleum products and the use of equipment and vehicles in RCAs. In addition, the higher amount of road use creates a greater potential for fuel spills near streams. As described in the Species Effects section, adverse effects from these activities are expected to be very unlikely; and the amounts of fuel delivered from equipment leakage will be very small and likely inconsequential to salmon and steelhead.

Dust palliatives such as magnesium chloride would be applied on roads to control dust. Proper application of the chemicals as required by BLM personnel and contractors, as well as road work that directs sediment and other road-related chemicals away from streams, will help keep dust palliatives from entering streams at levels harmful to the water quality PBF in the action area.

Stream crossing hardening may cause brief periods of turbidity and sediment deposition. None of the crossings with the potential for hardening occur within known occupied or designated critical habitat. Any turbidity caused by these activities would be brief and of low intensity without impairing the function of the water quality PBF.

Considering the information summarized above and described in more detail in the species effects section, the proposed action is not expected to impair the function and conservation value of the water quality PBF within the action area.

2.5.2.2 Water Quantity

The proposed action has the potential to alter streamflow through the removal of forest cover and water withdrawals for prescribed fire and by for dust abatement on roads. Effects of peak flow increases from forest cover removal are not expected to be of sufficient magnitude to greatly alter the water quantity PBF in steelhead or salmon critical habitat in the action area. The proposed action is authorizing the withdrawal of water to control road dust. These withdrawals are expected to be infrequent and are expected to remove only a small portion of the total volume of water at any given time. In addition, a fish biologist will designate the locations for water withdrawals to maintain streamflow. Because the flow reductions will be small, infrequent, and temporary, they are not expected to appreciably alter the water quantity PBF in critical habitat in the action area.

In summary, the proposed action is not expected to change the function or conservation value of the water quantity PBF in the action area to more than a minimal amount for a short time period.

2.5.2.3 Substrate

Increased sediment yield and delivery to streams in the action area is expected to occur in the short term. Although soil erosion from timber harvest activities and prescribed burning will increase, sediment delivery to streams from those activities should be effectively avoided or reduced to very small amounts through implementation of BLM RMP buffers (which are similar to PACFISH buffers) and other sediment control BMPs.

This action is most likely to affect sediment delivery and stream substrate conditions through activities involving roads. Road work and increased road traffic will add to road-generated sediment movement in the short term. Road BMPs including outsloping, gravelling, sediment control measures, and dust abatement, along with monitoring/response to address harmful erosion, are expected to minimize new sediment inputs and reduce existing sediment delivery from roads to streams.

Data are not available to determine the extent to which the action's reduction in existing sediment deliveries from roads will offset new inputs of sediment from reconstruction and road use near streams. Precipitation events, road preparation, and road decommissioning will cause sediment delivery and deposition directly downstream of nearby stream crossings in the action area. Sediment that is delivered to streams is expected to settle out on substrate in localized low velocity areas within a short distance downstream of stream crossings. There are ten crossings on main haul routes that intersect or are within 600 feet of steelhead and salmon critical habitat and 2.7 miles of road are adjacent; therefore, detectable road sediment effects on the substrate PBF will be limited.

In the short term, the fine sediment will move downstream (in <1- to 4-year intervals) becoming more diffuse before settling in the next depositional reach or leaving the watershed. The areas of harvest activity and road work are somewhat separated in space and time, such that both sediment additions from new activities (to the extent that these are not minimized or offset on site). Because of that distribution of activity effects, and the minimization of effects at the sources and delivery points as noted above, substrate conditions are not expected to change appreciably in the short term.

Certain levels of ECA increases can affect peak flow detectably and can cause channel scour that would affect stream substrate. The change in ECAs are not likely to result in increases in moderate peak flows that would initiate consequential channel scour. Because thinning treatments have a consistent effect on ECA throughout the harvest units, and thinning coverage is greater around lower order streams, flow and scour effects are expected to be similar to but scaled up for first and second order streams as for third order streams. This scour would cause fine sediment to move downstream into critical habitat in third or greater order reaches. This sediment is expected to be of limited quantity and dispersed in time and space in designated critical habitat. As a result, there will likely only be minor adverse effects to the substrate PBF and conservation value of critical habitat for the duration of the project.

Stream crossing hardening may cause brief periods of turbidity and sediment deposition although none of the stream crossings intersect with steelhead or salmon designated critical habitat. Any turbidity and sediment deposition caused by these activities would be brief and of low intensity without impairing the function of the substrate PBF.

In the long term, the proposed action is expected to reduce the sediment yield and delivery to streams in the action area as a result of road improvements and road decommissioning. In summary, possible short term additions of sediment to stream substrates are expected to result in small, localized effects to the function of the substrate PBF, and project actions are expected to somewhat improve the function and conservation value of the substrate PBF in the long term in the action area.

2.5.2.4 Forage

Macroinvertebrate forage may be affected by fine sediment deposited in substrates and may also be affected by road dust abatement chemicals that enter the stream.

The project may generate sediment pulses below stream crossings in the short term. Project road improvements and BMPs are expected to offset to some extent, and otherwise substantially minimize sediment deliveries such that effects on stream substrate are expected to be small, localized, and temporary. In a study with moderate levels of sediment increase from road improvements in a headwater stream drainage, little change in biomass of invertebrates was found (Kreutzweiser et al. 2005). Also, because sediment deposition may be localized, insect drift through the affected areas may be similar to unaffected areas (Bjornn et al. 1977).

Road construction and reconstruction BMPs to address active erosion and $MgCl_2$ application techniques favoring chemical penetration into the road surface will tend to limit the instream concentration of $MgCl_2$ and limit its effects on invertebrates to small areas near the crossings. Therefore, fine sediment deposition and dust abatement chemical effects to the forage PBF are expected to be small, localized, and temporary.

The removal of vegetation in the riparian area can reduce the amount of terrestrial habitat for insects near the stream environment. Very little riparian vegetation will be killed or removed during roadwork or prescribed fire activities. Following this work, bare soil areas will be revegetated. In addition, prescribed fire will only be allowed to back into the riparian areas. For these reasons, any effects to riparian vegetation and associated insects from the proposed action are not expected to reach levels that will adversely affect the forage PBF. The action as a whole is not expected to change the function or conservation value of the forage PBF in the action area more than minimally.

2.5.2.5 Natural Cover/Shelter

The proposed action has the potential to affect channel and riparian indicators that contribute to natural cover/shelter. Channel indicators include pool frequency and quality, width/depth ratio, and off-channel habitat. Sediment and channel adjustments from stream crossing replacement or removal may cause short term effects to stream cover.

Sediment introductions from this work will be minimized through implementation of project BMPs. Sediment pulses are not expected to be of sufficient magnitude to cause geomorphic changes to the stream or fill pools and gravels. Therefore, no changes are expected to pool frequency and quality, channel width-to-depth ratios, and off-channel habitats at the local and watershed scales. Because project effects to channel structure and associated cover for both steelhead and salmon are likely to be minor and short term, the project is not expected to reduce the conservation value of the cover PBF at the local to watershed scales.

Prescribed fires that back into RCAs are expected to result in little tree mortality; however, if trees are killed, they will become more readily recruitable as LWD to streams. Arkle and Pilliod (2010) found no effect on LWD after prescribed fire (with no direct ignition in RCAs) in a ponderosa pine forest. Road activities in RCAs will result in limited, if any, tree removal. Considering the very limited areas that will be impacted coupled with the limited amount of existing or potential future LWD that could be removed, the proposed action is expected to have a minimal effect on LWD recruitment and related instream cover/shelter in the action area. In summary, project actions are not expected to have adverse effects on the natural cover and shelter PBF in the action area.

2.5.2.6 Climate Change

Project actions that last more than 10 years may cause adverse effects that are amplified by climate change. Although all timber sales will be sold within 10 years, implementation of the harvest may extend beyond 10 years with continued prescribed burning and decommissioning of temporary roads. In addition, prescribed burning may continue for over 10 years. Climate change is predicted to change water temperatures, precipitation patterns, and snow runoff timing.

Change in precipitation patterns, or an increase in ROS (Leung et al. 2004; Musselman et al. 2018) events has potential to amplify effects of the project. With each year of the project, the chance of an ROS event increases. Road obliteration and prescribed burning will continue to create bare soil areas in a mosaic of small patches. These areas have a greater chance of erosion and consequent sediment delivery than vegetated areas. An increase in the frequency of ROS would increase the risk of erosion in the bare soil areas. However, as discussed above, project-related cleared or burned areas are expected to revegetate within 3 years after timber harvest and BLM RMP buffers would leave riparian areas vegetated and capable of filtering eroded sediment from burn areas. If eroded sediment from these patches were delivered to streams, it would likely be to a small number of streams in the action area and be transported out of the action area during the powerful high flows associated with ROS events. During an ROS event, temporary roads do not have a considerable risk of sliding resulting in sediment delivery because they are located on or near ridge tops and have no direct connection to the stream network.

Climate change could increase the frequency of ROS events and increase water temperatures in the action area. The ROS events are not expected to amplify project-related effects because bare soil areas are transient in time, and thus sediment erosion and delivery, are limited to small isolated areas at any given point in time.

2.5.3 Summary of Effects on Steelhead and Salmon and Critical Habitat

The action will have localized adverse effects on fish and habitat in the short term. Localized, short term increases in deposition of sediment on substrates below stream crossings and stream reaches adjacent to haul routes may result in harm of fish through direct exposure, displacement from current habitat, and reduction in stream functions that can affect fish growth and survival. Other modes of effects from exposure to toxins, visual and noise disturbance, prescribed fire, water drafting, ECA-related changes to streamflow (water quantity), and stream temperature changes are expected to be minor and not likely to result in harm to steelhead and salmon.

This action will result in small, temporary decreases in the condition of critical habitat PBFs within the action area in the short term, and will slightly improve the condition of some PBFs in the long term. The action involves increased application of $MgCl_2$ to roads and an increase in road use and chemical contaminants through the movement of vehicles containing fuels and other toxic chemicals through the action area creating a risk of chemical contamination of streams. Truck, equipment, and haul BMPs, and actions that will reduce road connectivity to streams will minimize the risk and amount of those effects on the water quality PBF in the action area.

Project-related sediment mobilization and inputs will reduce water quality temporarily. Sediment inputs from road related work, and from haul may also reduce stream substrate condition in areas below stream crossings. In addition, ECA increases may have minor influences on moderate peak flows leading to some scour in a small number of stream reaches with consequent minor downstream sediment deposition. These sediment impairments would continue for the time period between implementation of the activity (road reconstruction near streams or heavy road use at stream crossings), and the time road surfaces stabilize 1 to 2 years later. In the longer term, sediment delivery should be reduced and substrate PBF conditions improved through road decommissioning and addressing existing sediment sources on roads. Effects on the forage, natural cover/shelter, and water quantity PBFs are expected to be very small and not likely to change the condition of those PBFs in the action area.

Climate change could increase the frequency of ROS events and increase water temperatures in the action area. The ROS events are not expected to greatly amplify project-related effects because bare soil areas are transient in time, and thus sediment erosion and delivery, are limited to small isolated areas at any given point in time.

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).

The population of Idaho County increased by 1.5 percent and Adams County increased by 6.8 percent (U.S. Census Bureau 2019) between 2010 to 2018. The primary potential for adverse cumulative effects is associated with increased development leading to water withdrawals, riparian impacts, and pollution. Timber harvest, livestock grazing, and agriculture are certain to continue. The future effects of these actions will likely cause a small increase in effects which are similar to past effects described in this document under Section 2.4 Environmental Baseline. Thus, NMFS assumes that future private and state actions will continue at approximately the same rate, or slightly increase with population increases.

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.

These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2). A review of the risks posed to Snake River basin steelhead, Snake River spring/summer Chinook salmon, and their designated critical habitat from implementation of the Project is summarized as follows:

Many individual populations of Snake River Basin steelhead and Snake River spring/summer Chinook salmon are not meeting recovery plan abundance and productivity targets. For steelhead, the Little Salmon River population is currently at moderate risk for abundance and productivity, and moderate risk for spatial structure and diversity (NMFS 2017). The Salmon River steelhead MPG, which includes the Little Salmon River population, does not meet the MPG-level viability criteria. For Snake River spring/summer Chinook salmon, the Little Salmon River population is currently at a high risk for abundance and productivity, and a low risk for spatial structure and diversity (NMFS 2017). The South Fork Salmon River spring/summer Chinook salmon MPG, which includes the Little Salmon River population, does not meet the MPG-level viability criteria. Given the status of those and the other MPGs, the steelhead DPS and the spring/summer Chinook salmon ESU remain well below recovery criteria, the species remain threatened, and are likely to become endangered.

Objectives for habitat indicators such as water temperature, ECA, cobble embeddedness, and water temperature are met in some subwatersheds or some portions of subwatersheds. Road densities within the subwatersheds and within RCAs are considered high (1.7 miles per square miles [mi/mi^2]–7.8 mi/mi^2). Baseline substrate conditions in both the Trail Creek and Boulder Creek watersheds are currently impaired. Baseline substrate conditions for the Little Salmon River which contains Trail Creek, Boulder Creek, and the Little Salmon face drainages are currently moderate for the watershed as a whole.

The 12-year timeframe for implementing the proposed action will occur while climate change related effects are expected to become more evident in this and other watersheds within the range of the both Snake River Basin steelhead and Snake River spring/summer Chinook salmon. Climate change may increase the risk of large ROS runoff events which could increase erosion on roads. Climate change is predicted to increase summer water temperatures which would decrease suitable summer rearing habitat.

The most likely climate effect combining with project effects would be an increase in rain on snow events that would cause excess erosion to bare soil areas resulting in increased sediment delivery to streams. This effect is likely to be minor as road work will be completed in the early stages of the project, harvest will be completed in 12 years, and harvest and landscape burning will be staggered in time so vegetative recovery will limit the amount of bare soil areas at any given point in time.

We anticipate that the project will generate additional sediment in small quantities to a small number of areas involving the listed fish and critical habitat within the project area. The amount of sediment is restricted to stream crossings or segments of stream adjacent roads during haul activities. NMFS believes that the BMPs will be effective in reducing project sediment delivery into streams, as well as reducing sediment delivery in the future after project activities are completed. Timber harvest and yarding activities, the use of BLM RMP buffers, exclusion of landslide prone areas from harvest, and other measures to avoid creating channelized flow to streams are expected to minimize any fine sediment delivered to streams from these activities to immeasurable levels.

The proposed action is expected to have minor effects on fish habitat in the Little Salmon River drainage over the life of the project. The Snake River Salmon and Steelhead Recovery Plan has noted that substrate sedimentation is one of the primary limiting factors for both Snake River Basin steelhead and Snake River spring/summer Chinook salmon. Project measures include standard BMPs to keep sediment delivery and substrate effects small but sediment delivery would most likely occur at the four stream crossings as well as along the 2.7 miles of road on both Trail Creek and Boulder Creek that occur within RCAs. We anticipate that sediment at these points would travel no more than 600 feet downstream. Beyond 600 feet, effects will be delayed and attenuated depending on distance downstream from crossings. Active haul roads will be monitored regularly and after wet periods to insure damage to the road, or road drainage system, is repaired quickly. The reduction in substrate functions such as forage production and overwintering cover are likely to adversely affect a small number fish and subsequently a small proportion of the both the salmon and steelhead population in the Little Salmon River. Similarly, the proposed action is will result in short term negative effects to the substrate PBF but this PBF is expected to slightly improve those conditions in the long term.

At this time, there are no known future foreseeable harvest or other major ground disturbing activities on State and private lands. In general, cumulative effects are expected to continue at a level similar to what is currently occurring. Cumulative effects are not expected to substantially increase or exacerbate project effects during the 12-year implementation of the proposed action. Ongoing recreational activities and development in the action area will likely increase only slightly.

Because the effects of the action will not be substantial enough to negatively influence VSP criteria at the population scale, the viability of the MPGs and ESU/DPS are also not expected to be reduced for both species. The action is thus unlikely to appreciably reduce the likelihood of the survival and recovery of Snake River Basin steelhead and Snake River spring/summer Chinook salmon.

The condition of PBFs for Snake River Basin steelhead and Snake River spring/summer Chinook salmon vary widely throughout the range of designated critical habitat. This is often a reflection of the degree of development within a given area. Large-scale impacts within the designation include intensive 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. Designated critical habitat for both species occurs in the Little Salmon River, Boulder Creek, and Trail Creek and will be affected by the proposed action. Any turbidity caused by these activities would be brief and of low intensity without impairing the function of the water quality PBF. Project related flow reductions will be small, infrequent, and temporary, they are not expected to appreciably alter the water quantity PBF in critical habitat in the action area. Possible short term additions of sediment to stream substrates are expected to result in small, localized effects to the function of the substrate PBF, and project actions are expected to somewhat improve the function and conservation value of the substrate PBF in the long term in the action area. Any effects to riparian vegetation and associated insects from the proposed action are not expected to reach levels that will adversely affect the forage PBF. Due to the very limited areas that will be impacted coupled with the limited amount of existing or potential future LWD that could be removed, the proposed action is expected to have a minimal effect on LWD recruitment and related instream cover/shelter in the action area.

Considering the potential effects of the proposed action with the status of critical habitat, baseline condition, potential effects of climate change, and cumulative effects in the action area, NMFS concludes that the proposed action is not expected to appreciably reduce the conservation value of critical habitat in the short term, and may increase the long term conservation value of critical habitat in the Little Salmon River watershed. Because the conservation value of critical habitat in the Little Salmon watershed will not be reduced, the conservation value of designated critical habitat at the designation scale will also not be reduced.

2.8. Conclusion

After reviewing the current status of the listed species and their designated critical habitats, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' Opinion that the proposed action is not likely to jeopardize the continued existence of Snake River basin steelhead and Snake River spring/summer Chinook salmon or to destroy or adversely modify their 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 incidental take is reasonably certain to occur as follows:

(1) Harm of steelhead and spring/summer Chinook salmon from sedimentation of substrate below stream crossings and road use for timber haul.

Non-lethal take will likely occur in the form of harm and harassment from sediment. NMFS believes this will happen because Snake River Basin steelhead and Snake River spring/summer chinook are present in the action area hand will experience harm as a result of the action. Measuring the number of steelhead and Chinook salmon actually harmed or harassed, once fish are exposed to suspended sediment, is not possible because the harm is likely to be sublethal and undetectable. The number of fish that could be present in the area is highly variable which further makes it difficult to determine how many fish might be affected. Because it is not possible to clearly defining the number of fish that could be affected by the proposed action, surrogate measures of take are necessary to establish a limit to the take exempted by this portion of the take statement. For these reasons, the best surrogate measure for incidental take is whether gullies or rills have formed on disturbed soils during these weather events and such gullies or rills appear to have reached streams. As described above, these types of weather events are rare, generally occurring only once every few years. Even in the case of this type of weather event, it would be unusual for overland sediment flow to reach the river channels. However, such events are unpredictable in nature therefore for the purposes of limiting take NMFS will consider one incident of sediment delivery from areas affected by the proposed action to constitute the upper limit on authorized take. More than one occurrence of sediment delivery to any stream in the action area evidenced by the existence of rills or gullies appearing to reach the stream in a single year, would likely exceed the amount of take anticipated and would necessitate a review of the effects analysis contained in the Opinion above. The best time to monitor for this occurrence would be shortly after the weather event has occurred.

The extent of take allowed in this Opinion would be exceeded if:

(1) More than once in a year, in any unit that has been disturbed by project activities, there is evidence of rills or gullies that have delivered sediment to stream channels during a weather-related event.

The authorized take includes only take caused by the proposed action within the action area as defined in this Opinion. The extent of take is the threshold for reinitiating consultation. Should any of these limits be exceeded, the reinitiation provisions of this Opinion apply.

2.9.2 Effect of the 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.

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 BLM and COE (for those measures relevant to the CWA section 404 permit) shall comply with the following RPMs:

1. Minimize the potential for sediment delivery into streams resulting from road preparation and haul.

2. Ensure completion of a monitoring and reporting program to confirm that the terms and conditions in this ITS were effective in avoiding and minimizing incidental take from permitted activities and ensuring incidental take is not exceeded.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the BLM and COE must comply with them in order to implement the RPMs (50 CFR 402.14). The BLM and COE have 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 incidental take statement (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. To implement RPM 1, the BLM and COE (for those measures relevant to the CWA section 404 permit) shall ensure that:

    a. The proposed action, including all described conservation measures and BMPs, will be implemented as described in the BA and proposed action section of this Opinion.

    b. Sediment sources on reconstructed roads and haul routes will be addressed and eliminated or minimized prior to log haul activities. Correction of these sediment sources will be field verified through implementation monitoring prior to haul.

    c. All motorized equipment and vehicles used in or near the stream or riparian areas are cleaned of external oil, grease, dirt and mud; and repair leaks prior to arriving at the project site.

    d. In the event of any hazardous materials spill that occurs and hazardous materials are detected as leaking into streams the BLM shall contact NMFS within 48 hours.

2. To implement RPM 2 (monitoring and reporting), the BLM and COE (as relevant to the CWA section 404 permit) shall ensure that:

a. Monitor units and skid trails with disturbed soils for any evidence of gullies or rills which have delivered sediment to stream channels and inspect active haul routes with a focus on stream crossings for erosion. This monitoring will be completed within 1-week after any major weather-related event, which includes events such as ROS, heavy rainfall, and fast winter snow melt. The BLM will keep a log of identified needed repairs and compliance times. If there are no incidences of repair, this will be noted in the annual report. Log entries will be summarized, in table or text format, and submitted in the Project annual report.

b. Post-project reports summarizing the results of all monitoring shall be submitted to NMFS by December 31 annually. The annual project reports shall also include a statement on whether all the terms and conditions of this Opinion were successfully implemented. These annual project reports shall include amount of roads that have been decommissioned and/or put in storage the amount of temporary roads that have been obliterated.

c. Inspect abandoned roads and if there are locations determined to be stream crossings, these stream crossings will be removed and will be stabilized by installing grade controls and reshaping the former stream crossing to match surrounding channels and streambanks.

d. The post-project reports shall be submitted electronically to: NMFSWCR.SRBO@noaa.gov. Hard copy submittals may be sent to the following address:

    National Marine Fisheries Service
    Attn: Ken Troyer
    800 Park Boulevard
    Plaza IV, Suite 220
    Boise, Idaho 83712-7743

e. NOTICE: If a steelhead or salmon becomes sick, injured, or killed as a result of project-related activities, and if the fish would not benefit from rescue, the finder should leave the fish alone, make note of any circumstances likely causing the death or injury, location and number of fish involved, and take photographs, if possible. If the fish in question appears capable of recovering if rescued, photograph the fish (if possible), transport the fish to a suitable location, and record the information described above. Adult fish should generally not be disturbed unless circumstances arise where an adult fish is obviously injured or killed by proposed activities, or some unnatural cause. The finder must contact NMFS Law Enforcement at (206) 526-6133 as soon as possible. The finder may be asked to carry out instructions provided by Law Enforcement to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

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 the 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).

1. To mitigate the effects of climate change on ESA-listed salmonids, the BLM and COE should follow recommendations by the ISAB (2007) to plan now for future climate conditions by implementing protective tributary, mainstem, and estuarine habitat measures; as well as protective hydropower mitigation measures. In particular, implement measures to protect or restore riparian buffers, wetlands, and floodplains; remove stream barriers; and to ensure late summer and fall tributary stream flows.

2. To mitigate the effects of sediment within the Snake River Basin Steelhead Salmon River MPG and the Snake River spring/summer Chinook salmon South Fork Salmon River MPG, consider conducting additional sediment modeling within specific watersheds or areas of concern. Consider using models that would assist in future restoration actions.

3. To promote recovery of Snake River salmon and steelhead, consider BLM involvement on other efforts to assist in prioritizing and ultimately implementing restoration projects that provide the best conservation value for salmon and steelhead in the Salmon River watershed.

Please notify NMFS if the BLM or COE carry out any of these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit listed species or their designated critical habitats.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Boulder Creek Vegetation Management Project.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service 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. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." 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) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by the BLM and descriptions of EFH for Pacific coast salmon contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) (PFMC 2014), including Amendment 18 (79 FR 75449) and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

The PFMC designated EFH in the State of Idaho for the freshwater stages of Chinook salmon (PFMC 1998) and for coho salmon (Amendment 18). The action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of Chinook salmon.

3.2. Adverse Effects on Essential Fish Habitat

Based on the information provided in the BA and the analysis of effects presented in the ESA portion of this document, NMFS concludes that the proposed action will have the following adverse effects on EFH designated for Chinook and coho salmon: (1) Increased sediment affecting stream substrate in a few areas below haul route crossings of streams with salmon EFH.

3.3. Essential Fish Habitat Conservation Recommendations

The BLM and COE should ensure that:

1) The proposed action, including all described conservation measures and BMPs, will be implemented as described in the BA and proposed action section of this Opinion.

2) NMFS is contacted within 48 hours of any Project log truck accident that occurs within 50 feet of moving water or is leaking fuels or other toxic chemicals into streams.

3) Sediment sources on reconstructed roads and haul routes would be addressed and eliminated or minimized prior to log haul activities for each of the planned timber sales.

4) All motorized equipment and vehicles used in or near a stream or riparian areas are cleaned of external oil, grease, dirt and mud; and repair leaks prior to arriving at the project site.

5) Contractors shall maintain all equipment operating in the action area in good repair and free of abnormal leakage of lubricants, fuel, coolants, and hydraulic fluid.

3.4. Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, BLM must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. 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, minimizing, mitigating, or otherwise 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 BLM and COE 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 document are the BLM, its representatives, its contractors, and the COE. Individual copies of this Opinion were provided to the United States Fish and Wildlife Service and the Nez Perce Tribe. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. 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 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.

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