INSTITUTIONAL REPOSITORY
SUBMISSION COVER PAGE

Project Title:

McKenzie-Beverly and McKenzie-Leavenworth Transmission Lines Project

☑Biological Opinion
☐Concurrence Letter

Consultation Conducted By:

Interior Columbia Basin Area Office, West Coast Region, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

Series Name and Number:

National Marine Fisheries Service Biological Opinion NMFS-BO-[WCRO-2019-02035]
Consultation Tracking Number

Digital Object Identifier (DOI URL):

https://doi.org/10.25923/792p-h710

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 97232-1274

NMFS Tracking Number: WCRO-2019-02035

February 10, 2020

Jeffery Rivera
District Ranger
Wenatchee River Ranger District
Okanogan–Wenatchee National Forest
600 Sherbourne Street
Leavenworth, WA 98826

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the McKenzie–Beverly and McKenzie–Leavenworth Transmission Lines Project.

Dear Mr. Rivera:

Thank you for your letter of July 26, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (U.S.C 1531 et seq.) for the McKenzie–Beverly and McKenzie–Leavenworth Transmission Lines Project (Project). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

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

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

As required by Section 7 of the ESA, NMFS provided an incidental take statement (ITS) with the opinion. The ITS describes a reasonable and prudent measure (RPM) NMFS considers necessary or appropriate to minimize incidental take associated with these actions. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements that the federal agency and any person who performs the action must comply with to carry out the 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 pursuant to section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA), and includes one Conservation Recommendation to avoid, minimize, or otherwise offset potential adverse effects on EFH. This Conservation Recommendation is identical to the ESA Term and Condition. Section 305(b)(4)(B) of the MSA requires federal agencies provide a detailed written response to NMFS within 30 days after receiving this recommendation.

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

Sincerely,

Michael P. Tehan

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

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

McKenzie–Beverly and McKenzie–Leavenworth Transmission Lines Project

NMFS Consultation Number: WCRO-2019-02035

Action Agency: U.S. Forest Service, Okanogan–Wenatchee National Forest

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Adversely Affect Critical Habitat?	Is Action Likely to Destroy of Adversely Modify Critical Habitat?
Upper Columbia River spring-run Chinook Salmon	Endangered	Yes	No	No	No
Upper Columbia River steelhead	Threatened	Yes	No	No	No

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

Consultation conducted by: National Marine Fisheries Service, West Coast Region

Issued by: Michael P. Tehan

Michael P. Tehan
Assistant Regional Administrator

Date: February 10, 2020

TABLE OF CONTENTS

LIST OF TABLES iii
ACRONYM GLOSSARY iv
1. INTRODUCTION 1
1.1 Background 1
1.2 Consultation History 1
1.3 Proposed Federal Action 4
1.3.1 Conservation Measures 9
1.3.2 Activities Related to the Proposed Action that have Separate Section 7(A)(2) Coverage 9
2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT 9
2.1 Analytical Approach 10
2.2 Rangewide Status of the Species and Critical Habitat 11
2.2.1 Status of the Species 11
2.2.2 Status of Critical Habitat 17
2.2.3 Climate Change 19
2.3 Action Area 20
2.4 Environmental Baseline 21
2.4.1 Wenatchee Subbasin 21
2.5 Effects of the Action 24
2.5.1 Fish Exposure 25
2.5.2 Effects to Species 26
2.5.3 Effects on Critical Habitat 29
2.6 Cumulative Effects 31
2.7 Integration and Synthesis 31
2.8 Conclusion 34
2.9 Incidental Take Statement 34
2.9.1 Amount or Extent of Take 34
2.9.2 Effect of Take 35
2.9.3 Reasonable and Prudent Measures 35
2.9.4 Terms and Conditions 35
2.10 Conservation Recommendations 36
2.11 Reinitiation of Consultation 36
3. MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE 36
3.1 Essential Fish Habitat Affected by the Project 37
3.2 Adverse Effects to Essential Fish Habitat 37

3.3 Essential Fish Habitat Conservation Recommendations 37
3.4 Statutory Response Requirement 38
3.5 Supplemental Consultation 38
4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW . 38
4.1 Utility 38
4.2 Integrity 39
4.3 Objectivity 39
5. REFERENCES 40

LIST OF TABLES

Table 1. Elements of the McKenzie–Beverly and McKenzie–Leavenworth Transmission Lines. 5

Table 2. Suite of Access Types for Transmission Line Maintenance Activities. 6

Table 3. Summary of Existing and Proposed Access. 7

Table 4. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register (FR) decision notices for ESA-listed species considered in this consultation. Listing status: 'T' means listed as threatened; 'E' means listed as endangered. 12

Table 5. Summary of the Upper Columbia River spring-run Chinook salmon population status and Interior Columbia Basin Technical Recovery Team viability criteria. 13

Table 6. Estimate of hatchery origin spawning escapement for Upper Columbia River spring-run Chinook salmon populations. 14

Table 7. Matrix used to assess the status of Upper Columbia River spring-run Chinook salmon populations across Viable Salmonid Population parameters or attributes. ... 14

Table 8. Summary of the Upper Columbia River steelhead population status and Interior Columbia Basin Technical Recovery Team viability criteria. 15

Table 9. Estimate of hatchery origin spawning escapement for Upper Columbia River steelhead populations. 16

Table 10. Matrix used to assess the status of Upper Columbia River steelhead populations across Viable Salmonid Population parameters or attributes. 16

Table 11. Physical and biological features of critical habitats designated for ESA-listed salmon and steelhead species considered in this opinion. 18

Table 12. Overview of the Environmental Baseline Conditions in the Wenatchee River Watershed. 23

Table 13. Overview of the Environmental Baseline Conditions in the Nason Creek Watershed. 24

ACRONYM GLOSSARY

ARBO II	Aquatic Restoration Biological Opinion II
ACS	Aquatic Conservation Strategy
ATV	All-Terrain Vehicle
BA	Biological Assessment
BMP	Best Management Practices
CFR	Code of Federal Regulations
CHART	Critical Habitat Review Team
Chelan PUD	Public Utility District No. 1 of Chelan County
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture Okanogan–Wenatchee National Forest
FR	Federal Register
FSR	Forest System Road
HEA	Habitat Equivalency Analysis
HUC	Hydrologic Unit Code
ICTRT	Interior Columbia Basin Technical Recovery Team
IDT	Interdisciplinary Team
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
kV	Kilovolt
ML	Maintenance Level
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NFH	National Fish Hatchery
NFS	National Forest System
NMFS	National Marine Fisheries Service
NWFP	Northwest Forest Plan
OLMR	Overland Maintenance Route
Opinion	Biological Opinion
PBF	Physical and Biological Feature
PCE	Primary Constituent Element
PE	Project Element
Project	McKenzie–Beverly Transmission Line Project
Reclamation	Bureau of Reclamation

RM	River Mile
ROD	Record of Decision
ROW	Right of Way
RPM	Reasonable and Prudent Measure
RTT	Regional Technical Team
SUP	Special Use Permit
UCR	Upper Columbia River
U.S.C.	United States Code
VSP	Viable Salmonid Population
WRRD	Wenatchee River Ranger District
WUI	Wildland Urban Interface

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 USC 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 Columbia Basin Branch field office in Ellensburg, Washington.

1.2 Consultation History

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

- December 31, 2001: The Special Use Permit (SUP) for operation and maintenance of the McKenzie–Beverly transmission line issued by the U.S. Department of Agriculture Okanogan–Wenatchee National Forest (Forest Service) to the Chelan County Public Utility District (Chelan PUD) expired.

- 2012–2013: In the summer of 2012, The Chelan PUD identified two poles in the Deadhorse Canyon project area requiring repair and access via a new route. In the winter of 2013, the Forest Service granted emergency access to Chelan PUD to temporarily repair a damaged pole and utilize access roads to the pole in Deadhorse Canyon.

- August 15, 2013: The Level 1 Team, and Forest Service and Chelan PUD personnel reviewed draft biological assessments (BAs) for the McKenzie–Beverly Transmission Line SUP Renewal and Deadhorse Canyon Powerline Access Road Project discussed the chronology of the planning effort to reissue the SUP. The Chelan PUD expressed urgency in getting three damaged poles replaced prior to inclement fall weather. The Forest Service determined they could not meet Chelan PUD's deadline for construction, under ESA and Forest Service planning rules.

- May 19, 2014: The Level 1 Team reviewed and discussed the revised (post Deadhorse emergency actions) BAs. NMFS suggested that the following recommendations be included in the effects analysis: (1) the entire McKenzie–Beverly transmission line (e.g., portions that cross private land and/or are included in easements) be included in the project; (2) pole access roads be added to the Forest Service system of roads; and (3) additional information to describe the existing condition of Chelan PUD access roads and poles located in standing water be provided.

- February 17, 2015: The Chelan PUD submitted to NMFS and the Forest Service a BA prepared by Chelan PUD for the McKenzie–Beverly Transmission Line SUP. Neither the Forest Service nor Chelan PUD submitted a request for consultation with the BA. NMFS reviewed the BA and found it insufficient; however, because requests to initiate consultation were not submitted, NMFS did not formally respond to the BA.

- August 11, 2015: NMFS, the Forest Service, and Chelan PUD met to discuss expanding the scope of the action to include more transmission line operation and maintenance activities in the SUP; the scope of the environmental baseline; and whether the Forest Service could include non-Forest Service land in their National Environmental Policy Act environmental analysis and decision making.

- January 26, 2016: Conference call with the Level 1 Team and Forest Service biologists to discuss non-federal maintenance activities on the transmission line, clarify what is considered the environmental baseline, and inclusion of distribution lines associated with the transmission line. The Forest Service decided not to include the transmission line on private lands or the associated distribution lines in the analysis for the renewal of the SUP for the operation and maintenance of the McKenzie–Beverly transmission line.

- July 25, 2017: Pre-level 1 Team meeting with the Forest Service, Chelan PUD, and Chelan PUD's environmental contractor (Anchor QEA). NMFS provided feedback on the effects determination and made several suggestions to be included in the BA including: (1) consistency in road definitions to aid analysis; (2) analysis needs to include a determination of consistency with Northwest Forest Plan (NWFP) and Aquatic Conservation Strategy (ACS) objectives; and (3) consistency between the wildlife and fisheries BAs.

- December 7, 2017: The Level 1 Team reviewed the draft fisheries BA and concluded that the Project was not consistent with NWFP standards to meet ACS objectives, and recommended that the Forest Service incorporate mitigation into the proposed action to meet these standards.

- March 12, 2018: The Chelan PUD hosted a conference call with NMFS and their environmental consultant to preview proposed Habitat Equivalency Analysis (HEA) used to determine mitigation package for NWFP consistency.

- March 15, 2018: Level 1 Team met with Forest Service, Chelan PUD, and consultant to review HEA outputs and proposed mitigation. Refinements to the model were suggested resulting in a need for additional mitigation.

- March–June 2018: Ongoing discussions between NMFS and Chelan PUD in completing a mitigation package.

- October 11, 2018: The Forest Service sent a revised fisheries BA with a letter to NMFS requesting consultation. NMFS responded via email on October 31, 2018, requesting additional information and clarification on the proposed action to complete consultation. Items specifically requested included: (1) an agreed-upon aquatic environmental baseline; (2) an effects analysis for implementing the mitigation package; and (3) additional analysis for the access routes, specifically adding unauthorized roads to the Forest Service road system.

- December 3, 2018: NMFS discussed the mitigation package with the Forest Service and Chelan PUD in a conference call. The Forest Service and Chelan PUD sought mitigation credit for actions that had already undergone section 7 consultation, specifically revegetation of the powerline easement located in the floodplain of Nason Creek. NMFS rejected this proposal, as it had already been included as 5 acres of mitigation for the removal of spotted owl critical habitat in the 2015 consultation. Additionally, the powerline relocation action and easement planting had already occurred, and the action was incorporated into the environmental baseline for the SUP Renewal.

- January 29, 2019: Via email, NMFS and Chelan PUD reached agreement on a satisfactory mitigation package.

- On March 12, 2019: NMFS sent an ESA-consultation closeout letter to the Forest Service because NMFS did not receive the information requested from the October 31, 2018 letter.

- On March 13, 2019: A conference call held between Chelan PUD and NMFS regarding an approach in updating the BA.

- April 17, 2019: The Forest Service sent a fisheries BA accompanied by a letter from the Forest Service requesting consultation on the proposed reissuance of the McKenzie–Beverly Transmission Line SUP. After review, NMFS sent an insufficiency letter to the Forest Service on May 10, 2019, stating that many of the issues identified in the October 31, 2018 email had not been addressed or resolved. Specifically, the agreed upon mitigation package was not incorporated into the effects analyses in the fisheries BA, nor in the ACS consistency statement. NMFS proposed a meeting with the Forest Service to resolve the issues with the BA.

  On June 24, 2019: NMFS sent an ESA-consultation closeout letter to the Forest Service because NMFS did not receive the information requested from the May 10, 2019 letter.

- July 18, 2019: NMFS, the Forest Service, and Chelan PUD met to finalize the fisheries BA and supporting documentation, including the SUP operating plan.

- July 26, 2019: NMFS received a revised fisheries BA from the Forest Service and consultation was initiated on this date.

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). For purposes of this consultation, the Forest Service proposes to issue a 30-year SUP to Chelan PUD for operation and maintenance of the McKenzie–Beverly and McKenzie–Leavenworth transmission lines (both 115 kV), as defined in the SUP and Operating Plan (U.S. Forest Service 2019b). The SUP will cover transmission line maintenance on portions of the line that cross National Forest System lands (outside of easements) and road access across Forest Service lands. In addition, this opinion includes Chelan PUD's watershed restoration actions that help improve watershed conditions in Nason Creek. This ESA-consultation does not cover transmission line operation and maintenance on private lands, easements, or any Chelan PUD emergency actions on Forest Service lands. The transmission lines are located within the Wenatchee subbasin (Wenatchee River and Nason Creek fifth-field watershed Hydrologic Unit Codes [HUC5 1702001107 and 1702001102, respectively]).

The effects of power generation from Rock Island Dam are addressed under Chelan PUD's Federal Energy Regulatory Commission (FERC) license. ESA-coverage for Rock Island Dam is provided by NMFS 2004 biological opinion on FERC's approval of the Proposed Anadromous Fish Agreement and Habitat Conservation Plan License Amendment for the Rock Island Hydroelectric Project License (FERC No.943), NOAA Fisheries Consultation No. F/NWR/2003/01580.

The McKenzie–Beverly transmission line was completed in 1931 and runs from Rock Island Dam to the summit of Stevens Pass. The McKenzie–Leavenworth transmission line was built in the 1970s to add additional capacity for loads in the Leavenworth area. The McKenzie–Beverly transmission line is 66 miles long and the McKenzie–Leavenworth transmission line is 32 miles long. Both transmission lines begin at the McKenzie Switchyard near Rock Island Dam and travel along the same 100-foot utility corridor. However, the McKenzie–Leavenworth transmission line ends just outside of the city of Leavenworth, while the McKenzie–Beverly transmission line continues up to the summit of Stevens Pass in Chelan County, Washington. Table 1 identifies specific elements of the transmission lines.

Table 1. Elements of the McKenzie–Beverly and McKenzie–Leavenworth Transmission Lines.

Ownership	Miles	Number of Structures[1]
McKenzie–Beverly Line (Wenatchee to Stevens Pass summit)	66	660
McKenzie–Beverly Line on Private	46	481
McKenzie–Beverly Line within Forest Service administrative boundary (total)	20	179
McKenzie–Beverly Line under easement	6	53
McKenzie–Beverly Line under Special Use Permit	14	126
McKenzie–Leavenworth Line (Wenatchee to Leavenworth)	32	254
McKenzie–Leavenworth Line on Private	31	241
McKenzie–Leavenworth within the Forest Service administrative boundary (total)	1	13
McKenzie–Leavenworth Line under Special Use Permit	1	13

[1] There are minor discrepancies between Chelan PUD 2015 and the Project biological assessment that may be attributed to pole upgrades since 2015. A structure may consist of one or three poles.

Within the Forest Service's administrative boundary, approximately 6 miles of the transmission line are located within easements owned by Chelan PUD and approximately 14 miles are located within a 100-foot-wide right of way (ROW) managed via the SUP issued by the Forest Service. Approximately 30 transmission structures are located on private land within the Forest Service administrative boundary and are accessed across Forest Service lands. Approximately 1 mile of the McKenzie–Leavenworth transmission line crosses lands managed by the Forest Service, is located wholly within the 100-foot-wide ROW, and uses the same access routes for operation and maintenance as the McKenzie–Beverly line. Throughout this opinion, we refer to both the McKenzie–Beverly and McKenzie–Leavenworth transmission lines singularly as the McKenzie–Beverly transmission line.

The proposed action includes a range of activities that will allow Chelan PUD to operate and maintain the utility structures to ensure predictable, consistent and reliable electric service to their customers. NMFS breaks these activities down into the following project elements (PEs):

PE 1 - Transmission line inspection: includes annual inspections conducted from the air by helicopter, or ground patrols by foot, ATV, or truck. Inspections typically occur in the spring, but may also occur throughout the year, if needed.

PE 2 - Transmission line maintenance and repair: includes repair, maintenance and stabilization of transmission poles (cross-arms, braces, insulators, guy wires, and wire conductors), and working pads and staging areas. Maintenance and repair activities are scheduled and coordinated annually with the Forest Service. For the purpose of analysis and estimating the potential amount of transmission line repair and maintenance that could occur over the duration of the SUP, the Forest Service estimates Chelan PUD will replace all structures during the life of the 30-year permit (approximately seven per year). However, over the last 14 years, Chelan PUD has replaced an average of four structures per year. Depending on site constraints (e.g., access, terrain) and/or weather conditions, maintenance activities for a single structure may take from 1 day to approximately 2 weeks to complete. Repair and maintenance crews may use pickup

trucks, bucket trucks, rubber-tired backhoes, line trucks, digger derricks, excavators, bulldozers, snowcats, all-terrain vehicles, or other similar equipment.

PE 3 - Vegetation Management: includes top and side cutting and pruning of trees and tree branches, cutting down hazard trees, mowing vegetation growing under the overhead transmission lines, mowing vegetation growing into access roads, and managing slash from these activities by chipping, piling, or lopping and scattering. All of these actions will occur within the ROW with the exception of cutting hazard trees, which could take place adjacent to the ROW, if there is potential for damage to the transmission line. Typical equipment used for vegetation management includes trailer-mounted wood chippers, mower cutting heads on excavators or bobcats, log skidders/log loaders, rubber-tired or track-mounted telescoping tree pruners, helicopters with heli-saws, 400-gallon water trailers for fire suppression/prevention, and chainsaws. The duration of vegetation management activities is variable and similar to PE 2, from 2 days up to 2 weeks; and will occur in the snow-free period between early May and late November.

PE 4 - Access: includes use and maintenance of both Forest Service and Chelan PUD-permitted roads to conduct inspection, and maintenance and repair activities (described in PE 1 through PE 3). On lands administered by the Forest Service, Chelan PUD will use Forest System Roads or Chelan PUD-permitted roads. Table 2 describes the access types and how often use occurs.

Table 2. Suite of Access Types for Transmission Line Maintenance Activities.

Type of Access/Staging	Description	Occurrence
Existing road	Existing roads (Chelan PUD-permitted and Forest System Roads)[1] that provide direct access to maintenance locations.	Frequent (i.e., annual use) and infrequent (i.e., a few times over the life of the permit) road use to 148 (69%) structures are provided by existing roads.
Overland access	Road facilities are not in place, but terrain and site conditions allow for access to maintenance locations with minor vegetation clearing.	4.3 miles of routes to 47 (22%) structures permitted to Chelan PUD via overland access.

[1] A Chelan PUD-permitted road is an existing road not included in the Forest Service transportation atlas or database and not maintained as part of the road system. A Forest System Road is defined as a road wholly or partly within or adjacent to, and serving National Forest System Lands that the Forest Service determines are necessary for the protection, administration, and use and development of Forest resources (36 CFR 212.1). The Forest Service assigns operational maintenance levels (MLs) to the system roads. Roads authorized by a legally documented ROW held by a state, county, or local public road authority are not included in the Forest Road System (36 CFR 212.1). Maintenance level 1 roads are closed to motor vehicle use. Maintenance level 2 roads are maintained for high-clearance vehicles while ML 2A roads are closed to the public but can be used for special purposes, such as a permittee. ML 3, 4, and 5 roads are maintained for passage by standard passenger cars during the normal season of use.

Type of Access/Staging	Description	Occurrence
New access	New Chelan PUD-permitted routes constructed from existing Forest Service road or other approved access route, roadway or highway. Routes constructed when structure maintenance needed.	Nineteen (9%) structures will require new access. Forest Service approval of alignment is required. Once constructed, these roads will receive infrequent use.
Winter access	Access to maintenance locations provided over snow or frozen ground.	Access to 13 (6%) of the 47 structures described for overland access could be provided over snow.

To accomplish PE 1 through PE 4, the proposed action includes changes to the Forest Service transportation atlas and database as detailed in Table 3. In summary, the proposed action will increase access from overland routes (4.3 miles), create new access routes (2.0 miles), and administratively add unauthorized routes to the Forest Service transportation atlas. Specifically, 15.4 miles of unauthorized roads will be converted to 1 mile of ML 2 and 14.4 miles of Chelan PUD-permitted roads. The existing 7.8 miles of ML 1 roads will be converted to 1.8 miles of ML 2, 2.5 miles of ML 2A, and 3.5 miles of Chelan PUD-permitted roads. The existing 10.2 miles of ML 2 roads will be maintained as ML 2 (6.2 miles), converted to ML 2A (2.5 miles), or converted to Chelan PUD-permitted roads (1.6 miles).

Table 3. Summary of Existing and Proposed Access.

Road Designation		Existing Condition (Miles)	Proposed Action (Miles)
National Forest System	Unauthorized	15.4	0
	ML 1	7.8	0
	ML 2	10.2	8.9
	ML 2A	0	5.0
Subtotal National Forest System Roads		18.0	13.9
Chelan PUD Permitted Use	Frequent Use	0	2.1
	Infrequent Use	0	17.4
	Overland Access	0	4.3
	New Access Route	0	2.0
Subtotal Chelan PUD-permitted use		0	25.8
Total all Roads		33.4	39.7

The 25.8 miles of access routes permitted to Chelan PUD will not be part of the Forest Service road system and will not be open to public use. Chelan PUD will maintain all Chelan PUD-permitted roads based on the frequency of use as described below:

- Frequent use: These roads will be open for use by Chelan PUD utilizing high-clearance vehicles on an annual basis. Several segments are trunk roads leading to a series of transmission structures or to infrequently used roads. Road inspections will occur when used for access to structures, and maintenance will occur when needed to avoid road and resource damage (e.g., culverts cleaned, road surface shaped to shed water, water bars restored).

- Infrequent use: The Chelan PUD will use these roads intermittently. There is no requirement for Chelan PUD to close these roads to public use. The Chelan PUD will not physically block new access routes, as Chelan PUD will not construct these routes to accommodate passenger vehicles. Following use, road maintenance will be performed if needed to avoid road and resource damage (road surface shaped to shed water, water bars restored), and such roads will be allowed to revegetate until needed. The Chelan PUD will inspect infrequently used roads 4 to 6 years after use to ensure the effectiveness of hydrologic closure. No further inspection or maintenance will occur unless a failure is imminent or if Chelan PUD crews observe significant damage while performing work in the area.

The Chelan PUD will conduct minor maintenance (e.g., grading, clearing minor soil slumps, rock and tree fall, and filling ruts) on Forest Service ML 2 and ML 2A roads permitted for their use, in order to facilitate access to their structures. ML 2 roads are open to public use; ML 2A roads are ML 2 roads that are restricted to administrative and permitted use only and closed to the public via a gate.

PE 5 - Watershed Restoration: includes actions that reduce road-related sediment and increase stream shade and riparian vegetation. Some activities that are necessary for the operation and maintenance of transmission lines will continue to cause unavoidable effects to ESA-listed fish and their habitat over the 30-year life of the SUP. As a result, Chelan PUD developed a plan to address unavoidable impacts caused by maintenance activities for the McKenzie–Beverly transmission line.

The Chelan PUD used the HEA model to assist in developing and evaluating project impact on the loss of ecological functions in Nason Creek and Wenatchee River watersheds, Chelan PUD has committed to implementing the following actions within 8 years, but will likely complete them within 2 years after the final decision notice.

1. Non-System Forest Road Decommissioning
    - The Chelan PUD will fund the decommissioning of 8.0 miles of road in the Butcher Creek area of Nason Creek.
    - The Chelan PUD will fund the decommissioning of 1.2 miles of road in the Kahler Block of Nason Creek.

2. Dispersed Site Decommissioning
    - The Chelan PUD will decommission a dispersed recreation site within the Nason Creek Watershed. This action will include blocking vehicle access to the site and replanting 0.34 acres of understory vegetation with native trees and shrubs.

3. Upper White Pine Riparian Restoration
    - The Chelan PUD will plant native vegetation along 3 acres of unused transmission line corridor located near Nason Creek.

NMFS considers the proposed action to include:

- Use and maintenance of Forest Service and Chelan PUD-permitted roads used for project activities (PE 4).
- Transmission line inspection (PE 1) and vegetation management (PE 3) on Forest Service administered lands.
- Repair, replacement, and maintenance of structures located on Forest Service administered lands (PE 2).
- Watershed restoration activities (PE 5).

1.3.1 Conservation Measures

The proposed action includes a list of best management practices (BMPs) and minimization measures that the Forest Service or Chelan PUD will employ to avoid or minimize potential environmental impacts and project effects on ESA-listed species and their designated critical habitats during implementation of the operation and maintenance plan under the SUP (Fisheries Project BA, pages 22–27).

1.3.2 Activities Related to the Proposed Action that have Separate Section 7(A)(2) Coverage

Noxious Weed Control

Invasive plant treatments may be necessary within the transmission line ROW resulting from Chelan PUD management actions. Invasive plant treatments, including use of herbicides, will be consistent with project design features described in the Final Environmental Impact Statement (FEIS) for Site-specific Invasive Plant Management on the Okanogan–Wenatchee National Forest (USDA Forest Service 2016) and its Record of Decision (ROD) (USDA Forest Service 2017:35-44). The FEIS and ROD include a range of prevention and treatment tools including manual, mechanical, biological, cultural, and herbicide methods. They also include a system for responding rapidly to new invaders and populations. NMFS completed ESA consultation for the invasive plant treatments through the Programmatic Biological Opinion for Aquatic Restoration activities in the States of Oregon, Washington, and portions of California, Idaho, and Nevada (ARBO II) (NMFS reference NWR-2013-9664). Therefore, all invasive plant treatments required by this Project that are within Riparian Reserves, will be consistent with ARBO II design and implementation criteria. As required by ARBO II, the Forest Service will submit a pre-notification notice for proposed treatments and conducts an annual meeting with NMFS. Therefore, NMFS will not complete an analysis of the effects of weed control to ESA-listed species and designated critical habitat in this opinion. This does not constitute a segmentation of the effects of the subject action. Rather, the weed control within the footprint of the proposed action was considered in the context of landscape-level actions implemented by the Forest Service.

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

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of

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

2.1 Analytical Approach

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

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

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

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

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

1. Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
2. Evaluate the environmental baseline of the species and critical habitat.
3. Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.
4. Evaluate cumulative effects.

5. In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species; or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
6. If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2 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' "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.

2.2.1 Status of the Species

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

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

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

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

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

The summary that follows describe the status of the ESA-listed species and their designated critical habitats that are considered in this opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, are in the listing regulations and critical habitat designations published in the Federal Register (FR) (Table 4) and in the most recent 5-year status review (National Marine Fisheries Service 2016a), as well as applicable recovery plans and 5-year status reports. These additional documents are incorporated by reference (National Marine Fisheries Service 2011a; National Marine Fisheries Service 2016b; Upper Columbia Salmon Recovery Board 2007).

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

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
Upper Columbia River spring-run	Revised E 6/28/2005; 70 FR 37160 Originally E 3/24/1999; 64 FR 14308	9/02/2005; 70 FR 52630	ESA section 9 applies
Steelhead (*O. mykiss*)			
Upper Columbia River	Revised T 1/05/2006; 71 FR 834 Original E 8/18/1997; 62 FR 43937	9/02/2005; 70 FR 52630	2/01/2006; 71 FR 5178

Upper Columbia River Spring-run Chinook Salmon

On March 24, 1999, NMFS listed Upper Columbia River (UCR) spring-run Chinook salmon as an endangered species (64 FR 14308) and their endangered status was reaffirmed on May 26, 2016 (81 FR 33468). The evolutionarily significant unit (ESU) includes all naturally-spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam, excluding the Okanogan River (64 FR 14208). Three populations of UCR spring-run Chinook salmon are

included in this ESU: The Wenatchee, Entiat, and Methow. Six artificial propagation programs are included in this ESU: The Twisp River, Chewuch River, Methow Composite, Winthrop National Fish Hatchery (NFH), Chiwawa River, and White River spring-run Chinook hatchery programs.

Upper Columbia River spring-run Chinook salmon exhibit stream-type life history strategies. Adults begin returning from the ocean in the early spring, with the run into the Columbia River peaking in mid-May. They then enter UCR tributaries from April through July, where they hold until spawning occurs in the late summer, peaking in mid to late August. Juvenile spring-run Chinook salmon spend a year in freshwater before migrating to the ocean. Most UCR spring-run Chinook salmon return as adults after 2 or 3 years in the ocean.

Abundance and Productivity. Both abundance and productivity characteristics remain at "high" risk for each of the three populations in this ESU (Table 5). The most recent 10-year (2009 to 2018) geometric mean abundance of adult natural origin spawners has increased for two of the three populations relative to the levels for the 1999 to 2008 series, but the estimates remain well below the minimum abundance targets for recovery. Estimated productivity (returns-per-spawner) was on average about the same in the current period and the previous period. This indicates that UCR spring-run Chinook salmon populations are not replacing themselves. Increases in natural origin abundance relative to the extremely low spawning levels observed in the mid-1990s are encouraging; however, average productivity levels remain extremely low. Possible contributing factors include density dependent effects, differences in spawning distribution relative to habitat quality, and reduced fitness of hatchery-origin spawners. Overall, the combinations of current abundance and productivity for each population result in a "high" risk rating.

Table 5. Summary of the Upper Columbia River spring-run Chinook salmon population status and Interior Columbia Basin Technical Recovery Team viability criteria.

Population	Abundance and Productivity Metrics				Spatial Structure and Diversity Metrics			Rating
	Abundance Threshold	Natural Spawning Abundance 2009–2018*	Productivity (returns-per-spawner) 2005–2014	Integrated Abundance/ Productivity Risk	Natural Process Risk	Diversity Risk	Integrated Spatial Structure/ Diversity Risk	Overall Viability Rating
Wenatchee	2000	630	0.60	High	Low	High	High	High Risk
Methow	2000	379	0.46	High	Low	High	High	High Risk
Entiat	500	193	0.94	High	Moderate	High	High	High Risk

*WDFW SaSi wild salmonid population website, accessed 2019

Spatial Structure and Diversity. The integrated spatial structure and diversity risk ratings for all three populations in this ESU are at "high" risk. The spatial processes component is "low" for the Wenatchee River and Methow River populations and "moderate" for the Entiat River (loss of production in the lower section increases effective distance to other populations). All three of the

populations in this ESU are at "high" risk for diversity, driven primarily by chronically high proportions of hatchery-origin spawners of 26 to 76 percent (Table 6) in natural spawning areas and lack of genetic diversity among the natural-origin spawners (Ford 2011; National Marine Fisheries Service 2014; Northwest Fisheries Science Center 2015). This effect is particularly high in the Wenatchee and Methow populations with hatchery spawners composing 66 percent and 76 percent respectively (National Marine Fisheries Service 2014). The high proportion of hatchery spawners reflects the large increase in releases from the directed supplementation programs in those two drainages. The hatchery supplementation program in the Entiat was discontinued in 2007 and hatchery fish on the spawning grounds in the Entiat have declined in recent years.

Table 6. Estimate of hatchery origin spawning escapement for Upper Columbia River spring-run Chinook salmon populations.

Population	% Hatchery Origin (5-year average)		
	2000 to 2004	2005 to 2009	2010 to 2014
Wenatchee	46	76	65
Entiat	44	53	26
Methow	84	73	76

The UCR spring-run Chinook salmon ESU is not currently meeting the viability criteria (adapted from the Interior Columbia Basin Technical Recovery Team (ICTRT)) in the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan, and remains at a high risk of extinction (Ford 2011; National Marine Fisheries Service 2011a; Northwest Fisheries Science Center 2015), see Table 7.

Table 7. Matrix used to assess the status of Upper Columbia River spring-run Chinook salmon populations across Viable Salmonid Population parameters or attributes.

		Risk Rating for Spatial Diversity			
		Very Low	Low	Moderate	High
Risk Rating for Abundance/Productivity	Very Low (<1%)	High Viable	Highly Viable	Viable	Maintained
	Low (1–5%)	Viable	Viable	Viable	Maintained
	Moderate (6–25%)	Maintained	Maintained	Maintained	High Risk
	High (>25%)	High Risk	High Risk	High Risk	High Risk ***Wenatchee Entiat Methow***

Upper Columbia River Steelhead

The UCR steelhead Distinct Population Segment (DPS) was listed as endangered on August 18, 1997 (62 FR 43937), and their status was upgraded to threatened on January 5, 2006 (71 FR 834). The threatened status was reaffirmed on May 26, 2016 (81 FR 33468). The UCR steelhead DPS includes all naturally-spawned populations of steelhead in streams in the Columbia River

Basin upstream from the Yakima River, Washington, to the United States–Canada border (62 FR 43937). There are four populations of UCR steelhead included in this DPS: the Wenatchee, Entiat, Methow, and Okanogan. Six artificial propagation programs are considered part of the DPS: the Wenatchee River, Wells Hatchery in the Methow and Okanogan rivers, Winthrop NFH, Omak Creek, and the Ringold steelhead hatchery programs.

The life-history pattern of steelhead in the Upper Columbia is complex (Peven et al. 1994). Adults return to the Columbia River in the late summer and early fall. Unlike spring-run Chinook salmon, most steelhead do not move up quickly to tributary spawning streams. A portion of the returning run overwinters in the mainstem reservoirs, passing over the UCR dams in April and May of the following year. Spawning occurs in the late spring. Juvenile steelhead generally spends 1 to 3 years rearing in freshwater before migrating to the ocean, but have been documented spending up to 7 years in freshwater before migrating. Most adult steelhead return to the Upper Columbia after 1 or 2 years at sea.

Abundance and Productivity. Both abundance and productivity characteristics remain at "high" risk for three of the four populations in this DPS (Table 8). Although, UCR steelhead populations have increased in natural origin abundance in recent years, productivity levels remain low, except for the Wenatchee population. The proportions of hatchery origin returns in natural spawning areas remain extremely high across the DPS, especially in the Methow and Okanogan river populations, 76 percent and 87 percent respectively (National Marine Fisheries Service 2014; Northwest Fisheries Science Center 2015). During 2017 and 2018, adult wild steelhead returns sharply declined. Poor ocean conditions that included some of the highest temperatures recorded in the Pacific Ocean were a significant factor.

Table 8. Summary of the Upper Columbia River steelhead population status and Interior Columbia Basin Technical Recovery Team viability criteria.

	Abundance and Productivity Metrics				**Spatial Structure and Diversity Metrics**			**Rating**
Population	**Minimum Abundance Target**	**Natural Spawning Abundance 2005–2018***	**Productivity (returns-per-spawner) 2005–2014**	**Integrated Abundance/ Productivity Risk**	**Natural Process Risk**	**Diversity Risk**	**Integrated Spatial Structure/ Diversity Risk**	**Overall Viability Rating**
Wenatchee	1000	931	1.207	Low	Low	High	High	Maintained
Methow	1000	738	0.371	High	Low	High	High	High Risk
Entiat	500	140	0.434	High	Moderate	High	High	High Risk
Okanogan	500	227	0.154	High	High	High	High	High Risk

*WDFW SaSi wild salmonid population website, accessed 2019

Spatial Structure and Diversity. The integrated spatial structure and diversity risk ratings for all four populations of UCR steelhead are at "high" risk. These ratings are largely driven by chronic high levels of hatchery spawners of 42 to 87 percent (Table 9) within natural spawning areas and lack of genetic diversity among the populations. The relative effectiveness of hatchery origin spawners and the long-term impact on productivity of high levels of hatchery contribution to natural spawning are key uncertainties for these populations (Ford 2011; National Marine Fisheries Service 2014; Northwest Fisheries Science Center 2015).

Table 9. Estimate of hatchery origin spawning escapement for Upper Columbia River steelhead populations.

Population	% Hatchery Origin (5-year average)		
	2000 to 2004	2005 to 2009	2010 to 2014
Wenatchee	66	62	42
Entiat	76	76	69
Methow	89	85	76
Okanogan	94	91	87

The UCR steelhead DPS is not currently meeting the viability criteria (adapted from the ICTRT) of the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan. Overall, the viability of the UCR steelhead DPS has likely improved somewhat since the last status review, but the DPS is still in a condition that, but for continued hatchery supplementation, places it at "high" risk of extinction (Ford 2011; Northwest Fisheries Science Center 2015) in the next 100 years (Table 10).

Table 10. Matrix used to assess the status of Upper Columbia River steelhead populations across Viable Salmonid Population parameters or attributes.

Risk Rating for Abundance/Productivity	Risk Rating for Spatial Diversity			
	Very Low	Low	Moderate	High
Very Low (<1%)	High Viable	Highly Viable	Viable	Maintained
Low (1–5%)	Viable	Viable	Viable	Maintained ***Wenatchee***
Moderate (6–25%)	Maintained	Maintained	Maintained	High Risk
High (>25%)	High Risk	High Risk	High Risk	High Risk ***Entiat Methow Okanogan***

Limiting factors for both UCR species. UCR spring-run Chinook salmon ESU and UCR steelhead DPS, continue to experience many problems that limit their productivity, and hence the ability to recover to a non-threatened level. The most significant factors limiting productivity of these species include: (1) mainstem Columbia River hydropower adverse effects (i.e., modified hydrograph, increase in lentic conditions/decrease in riverine conditions—passage barriers, stream temperature, dissolved oxygen problems, and invasive species); (2) riparian degradation and large wood recruitment; (3) altered floodplain connectivity and function; (4) altered channel structure and complexity; (5) reduced streamflow; (6) hatchery-related adverse effects; and (7) predation and competition (National Marine Fisheries Service 2011b).

Recovery Plan. In 2007, NMFS adopted a recovery plan for UCR spring-run Chinook salmon and UCR steelhead that was developed by the Upper Columbia Salmon Recovery Board. The Upper Columbia Salmon Recovery Plan's overall goal is "to achieve recovery and delisting of spring Chinook salmon and steelhead by ensuring the long-term persistence and viable

populations of naturally-produced fish distributed across their native range." The recovery plan outlined specific recovery actions that were intended to reduce threats associated with land and water management activities in the Upper Columbia Basin. These actions were to address primary threats associated with population abundance, productivity, spatial structure, and diversity. Some of these actions were specific to actions included in the proposed action such as improving road maintenance to reduce fine sediment recruitment to the stream, improving water quality, improving habitat diversity and quantity by restoring riparian habitat, and removing or replacing barriers to fish passage. In addition, the UCR Regional Technical Team (RTT) further refined and expanded on these actions in their 2014 Biological Strategy to include universal actions that include protecting and restoring riparian areas and addressing road-related sediment and other road-related issues. They also recommended that the Forest should complete an inventory of their road system and reduce their road system to what is reasonably maintainable given existing budgets. The RTT went further to address fifth-field (HUC5) actions to address limiting factors for ESA-listed fish, with an example being in Nason Creek, where they recommended restoration of riparian conditions and reduction of sediment as high priority actions.

Summary. Although the abundance of both spring-run Chinook salmon and steelhead in the Upper Columbia has increased, the improvement has been minor, and none of the populations have achieved the recovery criteria established in their respective recovery plans. In addition, all but one population for both species remain at high risk in their overall viability rating and risk of extinction (National Marine Fisheries Service 2011a; National Marine Fisheries Service 2016b; Northwest Fisheries Science Center 2015).

2.2.2 Status of Critical Habitat

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

For salmon and steelhead, NMFS ranked watersheds within designated critical habitat at the scale of the HUC5 in terms of the conservation value they provide to the listed species they support. The conservation rankings are high, medium, or low. To determine the conservation value of each watershed to species viability, NMFS' Critical Habitat Review Teams (CHARTs) evaluated:

- The quantity and quality of habitat features (e.g., spawning gravels, wood and water condition, side channels).
- The relationship of the area compared to other areas within the species' range.
- The significance of the population occupying that area to the species' viability criteria.

Thus, even a location that has poor quality habitat could be ranked as a high conservation value, if it were essential due to factors such as limited availability (e.g., one of a very few spawning areas), a unique contribution of the population it served (e.g., a population at the extreme end of

geographic distribution), or the fact that it serves another important role (e.g., obligate area for migration to upstream spawning areas).

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

Table 11. Physical and biological features of critical habitats designated for ESA-listed salmon and steelhead species considered in this opinion.

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

The PBFs of freshwater spawning and incubation sites include water flow, water quality, and temperature conditions. They also include suitable substrate for spawning and incubation, as well as migratory access for adults and juveniles (Table 4). These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.

The PBFs of freshwater migration corridors associated with spawning and incubation sites include water flow, water quality, and temperature conditions supporting larval and adult mobility, abundant prey items supporting larval feeding after yolk sac depletion, and free passage (no obstructions) for adults and juveniles. These features are essential to conservation

because they allow adult fish to swim upstream to reach spawning areas and they allow larval fish to proceed downstream and reach the ocean.

Interior Columbia Recovery Domain

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

Many stream reaches designated as critical habitat in the Interior Columbia Recovery Domain are over-allocated, with more allocated water rights than existing streamflow conditions can support. Withdrawal of water, particularly during low-flow periods that commonly overlap with agricultural withdrawals, often increases summer stream temperatures, blocks fish migration, strand fish, and alters sediment transport (Spence et al. 1996). High stream temperatures and reduced tributary stream flow has been identified as a major limiting factor for both UCR spring-run Chinook salmon and UCR steelhead in this area (Upper Columbia Regional Technical Team 2014; Upper Columbia Salmon Recovery Board 2007).

Despite these degraded habitat conditions, the HUCs that have been identified as critical habitat for this species are largely ranked as having high conservation value. Conservation value reflects several factors, including: (1) how important the area is for various life history stages, (2) how necessary the area is to access other vital areas of habitat, and (3) the relative importance of the populations the area supports relative to the overall viability of the ESU and DPS. The Nason Creek Watershed is ranked as having high conservation value. The CHART noted that this area is a high value spawning, rearing, and migration area for both ESA-listed species.

2.2.3 Climate Change

Climate change has negative implications for salmon, steelhead, and their designated critical habitat in the Pacific Northwest (Independent Scientific Advisory Board 2007; Northwest Fisheries Science Center 2015; Scheuerell and Williams 2005; Zabel et al. 2006). Average annual Northwest air temperatures have increased by approximately 1ºC since 1900, or about 50 percent more than the global average over the same period (Independent Scientific Advisory Board 2007). The latest climate models project a warming of 0.1ºC to 0.6ºC per decade over the next century.

Climate change affects salmon, steelhead, and their habitat throughout the Interior Columbia Basin. Several studies have demonstrated that climate change has the potential to affect ecosystems in nearly all tributaries throughout the region (Battin et al. 2007; Independent Scientific Advisory Board 2007). While the intensity of effects will vary by region (Independent

Scientific Advisory Board 2007), climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature). As climate change alters the structure and distribution of rainfall, snowpack, and glaciations, each factor will in turn alter riverine hydrographs. Given the increasing certainty that climate change is occurring and is accelerating (Battin et al. 2007), NMFS anticipates salmonid habitats will be affected. Climate and hydrology models project significant reductions in both total snow pack and low-elevation snow pack in the Pacific Northwest over the next 50 years (Mote and Salathé 2009), changes that will shrink the extent of the snowmelt-dominated habitat available to salmon. Such changes may restrict our ability to conserve diverse salmon life histories.

The Independent Scientific Advisory Board (ISAB) identified a number of effects climate change would have on Columbia Basin salmon. A few of these include: (1) water temperature increases, and depletion of cold water habitat that could reduce the amount of suitable salmon habitat by about 22 percent by the year 2090 in Washington State; (2) variations in precipitation that may alter the seasonal hydrograph and modify shallow mainstem rearing habitat; and (3) earlier snowmelt and higher spring flows with warmer temperatures that may cause spring Chinook salmon and steelhead yearlings to smolt and emigrate to the ocean earlier in the spring (Crozier et al. 2010; Independent Scientific Advisory Board 2007; O'Neal 2002). In addition, climate impacts in one life stage influence life history traits in the next life stage, and can be negative across multiple life stages (Healey 2011; Wade et al. 2013; Wainwright and Weitkamp 2013).

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

In summary, climate change will likely make recovery targets for these salmon and steelhead populations more difficult to achieve. However, habitat restoration actions can ameliorate the adverse impacts of climate change on salmon and steelhead. Examples include: (1) restoring connections to historical floodplains and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters; (2) protecting and restoring riparian vegetation to reduce stream temperature; (3) retiring irrigation water diversions; and (4) purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; Independent Scientific Advisory Board 2007).

2.3 Action Area

"Action area" means all areas affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). For this consultation, the action area includes the McKenzie–Beverly and McKenzie–Leavenworth ROW and the access routes used for operations and maintenance of both transmission lines on National Forest lands. The action area for this analysis includes the affected Wenatchee River and Nason Creek watersheds.

Upper Columbia River spring-run Chinook salmon and UCR steelhead use the action area, which is designated critical habitat for both species. This area supports rearing, migration, and spawning for both species. The action area is also designated as EFH for Chinook salmon and coho salmon (Pacific Fishery Management Council 2014).

2.4 Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of state or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

2.4.1 Wenatchee Subbasin

The Wenatchee Subbasin is approximately 1,371 square miles (877,440 acres), with 230 miles of major streams and rivers. The headwaters of the Wenatchee Subbasin originate in the Cascade Mountain range as the Little Wenatchee and White Rivers. These rivers flow into Lake Wenatchee, the source of the Wenatchee River. The Wenatchee Subbasin is further divided into five watersheds, of which the Wenatchee River and Nason Creek are two of them.

The land uses in the rural areas of the subbasin are primarily forest management, orchard production, scattered residences, lodging facilities, agricultural support facilities, and small home-based industries. Highways, railroads and roads also comprise a significant portion of the land area. Over 80 percent of the area encompassed by the subbasin is in public ownership, the majority under federal land management. A significant portion of the forest in the upper subbasin is congressionally-designated wilderness area.

Wenatchee River Watershed
The Wenatchee River Watershed encompasses the Wenatchee River, flowing southeasterly from its origination at the mouth of Lake Wenatchee River Mile (RM) 54.2, to its junction with the Columbia River at the city of Wenatchee (Columbia River RM 468.4). The Wenatchee River Watershed encompasses approximately 203,088 acres and is comprised of seven subwatersheds. The transmission line only travels through five of them; Nahahum Canyon, Olalla Canyon, Derby Canyon, Chumstick Creek, and Beaver Creek.

Nahahum, Olalla, and Derby Canyon Subwatersheds. The mainstem lower Wenatchee River valley bottom and tributary valley bottoms in Nahahum, Olalla, and Derby Canyon are primarily privately owned and have been altered by roads, railroads, utility corridors, orchards, and grazing. National Forest lands are located on upper hillslopes and in the headwaters of intermittent first and second order tributaries. Upslope riparian areas in the headwaters and

tributaries are altered by many road stream crossings, grazing, and past logging practices. Riparian vegetation is patchy in these subwatersheds.

Chumstick Creek Subwatershed. Chumstick Creek is a tributary to the lower Wenatchee River that enters near the city of Leavenworth. The majority of the Chumstick subwatershed is privately owned, with scattered sections of Forest Service lands within the upper reaches of tributary streams including Sunitsch Canyon. Riparian disturbance is common and widespread throughout Chumstick Creek and its tributaries. Roads, railroad tracks, transmission lines, rural and urban development have channelized the main valley bottom and tributary streams, reducing the width of the riparian zone. High road densities alter upslope riparian areas in tributaries, and previous logging practices affect sediment and flow regimes. Thin, coarse-textured soils and bedrock exposures result in little subsurface storage of precipitation. Summer base flows tend to be low and intermittent in tributaries, and stream temperatures tend to be high. Rain on snow events and high intensity storms can cause stream scouring and the combination of topographic relief, drainage density, and soil composition allow surface erosion with high fine sediment delivery.

Beaver Creek Subwatershed. The Deadhorse Canyon area of the subwatershed (River Road from Plain to Tumwater Canyon, RM 39.2 to 35.6) is relatively undeveloped with the exception of a few private inholdings, the Burlington Northern Santa Fe Railway, the McKenzie–Beverly line, and the main access road (River Road). The Wenatchee River in this area has cut through remnant glacial deposits, creating and abandoning alluvial terraces that partially constrain the river. Watershed analysis for the upper Wenatchee River Watershed (U.S. Forest Service 1999) indicates that the sediment delivery hazard for most all soil types is moderate to high. Recent pebble counts and ocular estimates calculated that the primary bed substrate in the Upper Wenatchee River was gravel and cobble with lesser amounts of boulder, bedrock, and sand (Interfluve 2012).

Aquatic Conditions in the Wenatchee River Watershed

In the Wenatchee River Watershed, most aquatic indicators are not functioning properly (see Table 12). Valley and floodplain development as well as high road densities have negatively affected water quality and instream habitat conditions. Stream channel confinement by roads, railroads, municipalities, and other infrastructure or development restricts migration of the Wenatchee River, Beaver Creek, Chumstick Creek, Eagle Creek and Derby Creek; a critical process for large wood input, side channel formation, pool development, wetland formation and maintenance, riparian function and development, and temperature regulation.

Furthermore, habitat diversity is impacted by reduced flood energy diffusion, reduced channel length, reduced off-channel refugia, and reduced channel resiliency to extreme flood events. Passage barriers, water quality and instream flow limit adult fish passage and connectivity; temperature, sediment, channel dynamics, and watershed conditions reduce the quality of spawning and rearing habitat. Perhaps the greatest risk to juvenile abundance is the isolation and reduced passage into oxbows, wetlands, side channels, and other key habitats.

Table 12. Overview of the Environmental Baseline Conditions in the Wenatchee River Watershed.

Diagnostic/Pathway Indicators	Baseline Environmental Conditions
Temperature	Functioning At Risk
Sediment/Turbidity	Not Properly Functioning
Chemical Contamination/Nutrients	Not Properly Functioning- Lower Wenatchee Functioning at Risk –Upper Wenatchee
Physical Barriers	Not Properly Functioning- Lower Wenatchee Functioning at Risk –Upper Wenatchee
Substrate Embeddedness	Not Properly Functioning
Large Woody Debris	Not Properly Functioning
Pool Frequency/Quality	Not Properly Functioning
Off-channel Habitat	Functioning At Risk
Refugia	Functioning At Risk
Width/Depth Ratio	Functioning At Risk
Stream Bank Condition	Functioning At Risk
Floodplain Connectivity	Not Properly Functioning
Change in Peak/Base Flows	Functioning At Risk
Increase in Drainage Network	Not Properly Functioning
Road Density and Location	Not Properly Functioning
Disturbance History	Not Properly Functioning
Riparian Conservation Areas	Not Properly Functioning
Disturbance Regime	Functioning At Risk
Integration	Not Properly Functioning

Nason Creek Watershed

The Nason Creek Watershed is approximately 69,000 acres in size. Nason Creek runs from the Cascade Crest near Stevens Pass to the Wenatchee River just downstream of Lake Wenatchee (Wenatchee RM 53.6). Elevations in the watershed range from 1,880 feet at the confluence with the Wenatchee River to 4,240 feet in the headwaters. The watershed is comprised of three subwatersheds: Lower Nason Creek, Upper Nason Creek, and Whitepine Creek. Only Upper and Lower Nason Creek subwatersheds occur in the action area.

Much of the land in the Nason Creek Watershed is federally owned, of which 51 percent is non-designated forest and 21 percent is part of the Alpine Lakes Wilderness Area. Roughly, 22 percent (14,000 of 69,000 acres) of the subwatershed is privately held in mixed uses including rural homes, a golf course, small businesses, and industrial timberlands. The lower 15 miles, along with Kahler and Coulter Creek subdrainages, are mostly privately owned.

The Burlington Northern Railroad was constructed along Nason Creek in the 1890's, and State Highway 207 parallels Nason Creek from its confluence with the Wenatchee River upstream to U.S. Highway 2. The U.S. Highway 2 parallels the remainder of Nason Creek to its headwaters near Stevens Pass. Two powerline corridors are also located within the Nason Creek Watershed: the Bonneville Power Administration and the Chelan County Public Utility District.

Aquatic Habitat in Nason Creek Watershed

Habitat in the Nason Creek Watershed has been severely impacted by human activities and most habitat indicators are not properly functioning, see Table 13. The most severely impacted part of

the watershed is the lower 15 miles of the mainstem. This reach contains the majority of the Chinook salmon and steelhead spawning habitat in the watershed; and is a key corridor for connectivity of smaller subdrainages.

Extensive human activity in the watershed has altered much of the upslope; has altered the physical form of the mainstem; and has altered inputs to stream channels, including the hydrograph (abundance and timing of flows), sediment budget, and large wood recruitment. Habitat impacts are greatest in the lower subwatershed and decrease moving upstream. Stream temperatures for all of Nason Creek are listed by the Washington State Department of Ecology as being impaired. Potential causes include loss of riparian cover. High road densities occur in the lower Nason Creek subwatershed, as well as portions of the Gill, Roaring, and Coulter Creek tributaries. Bridges, small levees, and the power and transmission line corridors also affect physical processes. Many of these activities have effects on habitat indicators such as stream temperature, sediment, channel dynamics, and watershed conditions. Perhaps the greatest risk to juvenile abundance is the isolation and reduced passage into oxbows, wetlands, side channels, and other key habitats from constructed features (roads and railroads) in floodplain and riparian areas.

Table 13. Overview of the Environmental Baseline Conditions in the Nason Creek Watershed.

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

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).

To begin our analysis of effects, we typically deconstruct projects into separate PEs that trigger different impact mechanisms or stressors. NMFS characterizes the proposed action as consisting of five PEs (see Project Description above and the Project BA (U.S. Forest Service 2019a) for details):

1) Transmission line inspection
2) Transmission line maintenance, repair, and staging
3) Vegetation Management
4) Access
5) Watershed Restoration

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

2.5.1 Fish Exposure

Wenatchee River Watershed

The Wenatchee River is an important migration, rearing, and spawning corridor for UCR spring-run Chinook salmon and UCR steelhead, and is designated as critical habitat for both species. However, all of the proposed actions that occur in the Wenatchee River Watershed occur too far away from ESA-listed fish or their critical habitat. The amount of vegetation removal from ROW management or sediment produced from road use is too small to rise to the level of adverse effects to either species or their habitat. For example, the transmission line crosses over the Wenatchee River but is high enough that Chelan PUD does very little, if any, vegetation management. Another example is in Sunitsch Canyon Creek, where both vegetation and road use could lead to an increase in sediment delivery. However, in this case, the majority of the road is an open public road and it would be impossible to delineate the effects from a couple of line maintenance vehicle trips a year from other public traffic on the road. In addition, there is a fish passage barrier at the bottom of Sunitsch Creek, over a mile away from proposed activities. Therefore, in the Wenatchee River Watershed, we feel the effects to ESA-listed fish and their critical habitat are likely to be very small and not expected to cause harm or harassment.

Nason Creek Watershed

Nason Creek provides important spawning, rearing and migration areas for both spring-run Chinook salmon and steelhead and is designated critical habitat up to RM 21 for steelhead and to RM 15.4 for spring-run Chinook salmon. Nason Creek is identified as a major spawning area for both species in the Recovery Plan. The transmission line is expected to have adverse effects on fish and habitat indicators from road and vegetation management in both Lower Nason Creek and Upper Nason Creek subwatersheds. In the Nason Creek Watershed as a whole, the proposed action will perpetuate existing poor vegetation conditions across 48.6 acres and use and maintain 21 miles of road. These activities are expected to affect stream temperature, sediment delivery, and large wood recruitment, which will have adverse effects on ESA-listed fish and their critical

habitat. In addition, the proposed action includes a suite of watershed restoration actions that will improve habitat conditions in Nason Creek.

2.5.2 Effects to Species

The McKenzie–Beverly Transmission Line ROW and access roads cross or run parallel to Nason Creek, which is occupied by both steelhead and spring-run Chinook salmon and includes designated critical habitat. There are also locations where the transmission line or access roads cross streams or run parallel to streams that are not occupied, but are close enough that proposed actions could cause negative effects to riparian vegetation or cause sediment delivery to occupied habitat in Nason Creek. NMFS expects the proposed action to cause adverse effects to both ESA-listed species from vegetation management and road use and maintenance. The proposed action also includes watershed restoration actions that will have beneficial effects on both ESA-listed species and their critical habitat. The restoration actions are not expected to cause any adverse effects during implementation, if implemented as proposed.

Vegetation Management
Vegetation management within the transmission line ROW has been occurring since 1931 and includes hazard tree cutting, tree pruning, and removal of vegetation growing under the transmission line. Within the ROW, vegetation has generally been allowed to grow up to a maximum of 20 feet before re-treating (mowing to less than 1 foot in height), which precludes trees from growing to a size at which they might provide significant riparian functions. Vegetation under the transmission line ROW will continue to be managed for the life of the re-issued SUP (30 years). The total ROW length on Forest Service lands in the Nason Creek Watershed is approximately 4 miles, encompassing 48.6 acres within the Forest Service land allocation of riparian reserve[2] out of approximately 6,200 acres of riparian reserve in the Nason Creek Watershed. The maintenance of vegetation in the ROW will keep vegetation low to the ground. Of the 48.6 acres of transmission line ROW, approximately 23 acres are associated with critical habitat for UCR steelhead and UCR spring-run Chinook salmon. Continued maintenance of the ROW maintains poor riparian habitat conditions along these 23 acres of critical habitat for the life of the SUP, and will maintain these 23 acres in a state that prevents them from contributing stream shade, forage, or large wood for ESA-listed fish in Nason Creek for the foreseeable future. However, as described below, the watershed restoration actions will help improve watershed conditions in Nason Creek and offset a portion of the vegetation management element by planting 2.4 acres of riparian habitat, decommissioning 9.2 miles of road, and restoring a recreation site.

Road use and Management
The road use and management element includes activities such as road use, access route construction, road maintenance, construction of working pads, and staging areas. Many of these activities have a high probability of delivering sediment to the stream network. The Forest

[2] Riparian Reserves include those portions of a watershed directly coupled to streams and rivers, that is, the portions of a watershed required for maintaining hydrologic, geomorphic, and ecologic processes that directly affect standing and flowing waterbodies such as lakes and ponds, wetlands, streams, stream processes, and fish habitats. They vary in width from 100 to 300 feet from each edge of an active stream channel.

Service is permitting Chelan PUD to use 23 miles of road in the Nason Creek Watershed. These roads cross steelhead critical habitat in two locations in the Upper Nason Creek subwatershed and other perennial streams at five locations. Since these stream-road intersections provide a direct connection between road and stream networks, there is a high potential for increased sediment delivery to streams at these locations, especially if the road has a roadside drainage ditch that concentrates road-related runoff.

The Chelan PUD will manage and maintain 12.5 miles of the 23 miles permitted, as described in the operations and maintenance plan, which includes constructing water bars, rolling dips, and road shaping where needed. These actions will be completed when transmission line maintenance work is needed, and then the roads will be allowed to naturally recover, until they are needed again. Most Chelan PUD-permitted roads will not be designed for public use; road prism width will be minimized (typically less than 15 feet). Once work is completed, there will be no regular maintenance performed unless field crews identify major road issues needing correction. The Forest Service will continue to maintain their system roads (12.5 miles) consistent with existing and ongoing budgets and staffing.

All roads within the project area represent a potential erosion source (bare soil) that contributes sediment to the stream network. The link between unpaved roads and increased fine sediment delivery into streams has been well established over the past 3 decades (Croke and Mockler 2001; Madej 2001; Montgomery 1994; Reid and Dunne 1984; Spence et al. 1996). The effects of roads range from chronic and long-term contributions of fine sediment into streams to catastrophic mass failures of road cuts and fills during large storms (Gucinski et al. 2001). Road surface erosion rates are primarily a function of storm intensity, surfacing material, road slope, and traffic level (Bilby et al. 1989; MacDonald et al. 2001; Reid et al. 1981). The direct effects of roads, such as increased sedimentation and increased risk of slides and debris flows, are much affected by road design and placement on the landscape (Gucinski et al. 2001). For all types of surface erosion, sediment delivery to streams is through direct surface water connections such as ditches, rills, or gullies (Bilby et al. 1989; Croke and Mockler 2001).

The proposed action will permit Chelan PUD to use the existing unauthorized road system (which is in the process of being permitted) and transfer some road maintenance responsibility over to Chelan PUD. The action also authorizes road use and road maintenance (blading, ditch cleanout, installing drainage dips, and brushing) to allow vehicular access to transmission poles. The use and maintenance of 23 miles of road is likely to contribute additional sediment to the stream system above baseline levels. These road activities will disturb road surfaces and/or soils connected to or in proximity to streams (in some cases), with a high probability of delivering sediment to the stream network and occupied fish habitat.

Sediment delivery from road construction and the road network is expected to be limited to rainfall events that produce overland flow or runoff, which could be significant in certain storm events. Sediment production and delivery will be minimized as much as possible through implementation of various conservation measures. In general, most construction activities are expected to be short (1 to 2 weeks) at any given transmission tower, or a day or two for road maintenance. The only long-term source of potential sediment production and delivery includes

the ongoing use and maintenance of the road system, which will produce chronic sediment input over 30 years. Many of the roads will be retained in a primitive state, which means some vegetation is expected to be present on the road surface, but this will likely take time to establish after each use. The quantity of sediment delivered to streams is expected to vary over the life of the SUP, with roads receiving the most frequent and/or recent use delivering the most sediment in any given year.

The exposure of juvenile salmon and steelhead to periodic pulses of turbidity and chronic sediment input will likely elicit responses from a relatively small number of fish exposed to road-related runoff events. An increase in suspended sediments (turbidity) and deposition of fine sediments can adversely affect fish and filter feeding macro-invertebrates downstream from the proposed action. At moderate levels, turbidity has the potential to reduce primary and secondary productivity; at higher levels, turbidity may interfere with feeding and may injure and even kill juvenile fish (Berg and Northcote 1985; Spence et al. 1996). However, Bjornn and Reiser (1991) found that adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that may be experienced during storm and snowmelt runoff episodes. Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects caused by turbidity (Newcombe and Jensen 1996). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such seasonal high pulse exposures. However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Servizi and Martens 1991). In a review of 80 published reports of fish responses to suspended sediment in streams and estuaries, Newcombe and Jensen (1996) documented increasing severity of ill effects with increases in dose (concentration multiplied by exposure duration).

However, the most critical life stage that will experience pulses of turbidity and fine sediment deposition from project activities are incubating eggs. Fine sediment deposition may clog substrate interstices and thereby diminish intragravel flows. In addition, fine sediments may act as a physical barrier to fry emergence (Redding et al. 1987). Eggs deposited in gravel with a high percentage of fine sediment have a lower survival to emergence (Spence et al. 1996). Steelhead eggs are in the gravel from mid-March to late June and spring-run Chinook salmon are in the gravel from mid-August to mid-March. We expect both short-term pulses and long-term chronic sediment delivery that increases levels of turbidity and resulting levels of fine sediment deposition in spawning gravels in Nason Creek, where high levels of fine sediment already exist. We expect increased levels of turbidity to correspond to rainfall events where roadside ditches deliver road-related sediments into the stream, creating turbid conditions; in this situation, we expect juveniles to move into less turbid areas, if available. We also expect occasional pulses of instream substrate deposition as a result of ground-disturbing activities (e.g., road construction, road blading) of the proposed action. These activities are expected to be relatively small (less than 1 mile of road work) and short-term (1 to 2 weeks) where the delivery of sediment remains localized, only affecting small areas (downstream of the sediment receiving portion) of Nason Creek. We expect some areas of Nason Creek will have elevated (over baseline) plumes of turbidity and localized areas of fine sediment deposition in spawning gravels that could occur during egg incubation. However, these effects are expected to be infrequent, occurring only

periodically (every few years) over the life of the 30-year SUP during road construction, road maintenance, and transmission tower repair. In addition, as described below, the watershed restoration actions will reduce both short-term and long-term road-related sediment delivery in the Nason Creek Watershed, providing a net decrease in sediment delivery.

Watershed Restoration
The Chelan PUD has proposed a number of watershed restoration actions to help improve habitat conditions and offset the effects of the action that are directly related to the use and maintenance of the transmission line in the Nason Creek Watershed. They plan to decommission 9.2 miles of road, restore a dispersed recreation site, and plant vegetation on 2.4 acres of riparian area. These projects together will improve stream shade, restore hydrologic processes, reduce the delivery of sediment, and increase soil infiltration capacity, among others. These improvements are expected to deliver benefits to the Nason Creek Watershed that will have long-term benefits beyond the life of the SUP. The decommissioning and restoration of 9.2 miles of road is expected to reduce road-related sediment delivery and restore the drainage network by eliminating road ditches, cross-drains, and culverts. The Chelan PUD has committed to implementing these projects within 1 to 2 years once a decision notice is signed. If restoration work is completed in a timely manner (1 to 2 years), the beneficial effects of the proposed action are expected to achieve a net reduction in levels of sediment delivery within the action area. In addition, we do not expect the restoration activities to have any adverse effects to ESA-listed fish or their habitat during implementation, if implemented as proposed.

2.5.3 Effects on Critical Habitat

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

1. Freshwater spawning sites
    a. Substrate - The proposed action will cause small pulses of suspended sediment and fine sediment deposition during road use and maintenance actions. These pulses should last for the duration of the roadwork (1 to 2 weeks) and a short time after (months) and then return to baseline levels. The road system as a whole is expected to continue chronically delivering fine sediment input, which will likely be slightly increased by some elements of the proposed action. However, the watershed restoration actions are expected to provide an overall net decrease in fine sediment delivery to spawning areas in the Nason Creek Watershed, when completed within 1 to 2 years.
    b. Water quality - The proposed action will cause short-term (hours to weeks) pulses of suspended sediment from road use and maintenance activities after rain events. The action will also maintain the existing levels of vegetation along the ROW, which prevent riparian vegetation from producing stream shade, forage, or large wood. The watershed restoration actions will decrease fine sediment contribution from decommissioning 9.2 miles of road and restore infiltration at a dispersed

recreation site along Nason Creek. In addition, the 2.4 acres of vegetation planting and dispersed recreation site restoration will over time (more than 20 years) improve stream shade.

c. Water quantity - The proposed action is not expected to reduce water quantities.

2. Freshwater rearing sites

   a. Floodplain connectivity - The proposed action will not reduce floodplain connectivity.
   b. Forage - The proposed action will cause a slight decrease in forage from pulses of increased sediment from road use and maintenance and by maintaining the existing low level of vegetation in the ROW. The watershed restoration component will restore 2.4 acres of vegetation along Nason Creek and restore a dispersed recreation site, which will contribute additional forage into the stream.
   c. Natural cover – Maintaining existing vegetation levels across 23 acres of ROW will prevent riparian vegetation growth and natural cover. The watershed restoration component will restore 2.4 acres of vegetation along Nason Creek and restore a dispersed recreation site, which will increase natural cover over time.
   d. Water quality - The proposed action will cause short-term (hours to weeks) pulses of suspended sediment from road use and maintenance activities after rain events. The action will also maintain the existing levels of vegetation along the ROW, which prevent riparian vegetation from producing stream shade, forage, or large wood. The watershed restoration actions will decrease fine sediment contribution from decommissioning 9.2 miles of road and restore infiltration at a dispersed recreation site along Nason Creek. In addition, the 2.4 acres of vegetation planting and dispersed recreation site restoration will over time (more than 20 years) improve stream shade.
   e. Water quantity - The proposed action is not expected to reduce water quantities.

3. Freshwater migration corridors

   a. Free of artificial obstruction - The proposed action will not create any artificial obstruction.
   b. Natural cover – Maintaining existing vegetation levels across 23 acres of ROW will prevent riparian vegetation growth and natural cover. The watershed restoration component will restore 2.4 acres of vegetation along Nason Creek and restore a dispersed recreation site, which will increase natural cover over time.
   c. Water quality - The proposed action will cause short-term (hours to weeks) pulses of suspended sediment from road use and maintenance activities after rain events. The action will also maintain the existing levels of vegetation along the ROW, which prevent riparian vegetation from producing stream shade, forage, or large wood. The watershed restoration actions will decrease fine sediment contribution from decommissioning 9.2 miles of road and restore infiltration at a dispersed recreation site along Nason Creek. In addition, the 2.4 acres of vegetation planting and dispersed recreation site restoration will over time (more than 20 years) improve stream shade.
   d. Water quantity - The proposed action is not expected to reduce water quantities.

2.6 Cumulative Effects

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

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

NMFS searched for information on future state, tribal, local, or private actions that were reasonably certain to occur in the action area. Non-federal lands interspersed within the action area include private timberlands, lands managed by the Washington State Department of Fish and Wildlife and Department of Natural Resources, lands managed by private and non-governmental organizations, and various small private lot ownerships. NMFS is aware of only a few actions that may occur in the Nason Creek Watershed that might have some bearing on ESA-listed fish. The Western River Conservancy purchased 3,714 acres in the Nason Ridge area from Weyerhaeuser. They are currently looking to transfer the land to a long-term steward, such as the Forest Service or Chelan County. The Chelan-Douglas Land Trust is also active in the Nason Creek Watershed purchasing private land. It is likely that they will purchase a few parcels over the next 30 years and preserve the land. However, these types of actions are likely to be conservation-minded and restorative, and NMFS does not see these types of land purchases or transfers as something that would negatively affect ESA-listed species or their habitat. For this description of cumulative effects, NMFS assumes that other future non-federal activities in the area of the proposed action will continue into the future at present or slightly increased intensities. Other actions that occur across the action area either are on federal land or require some type of federal permit, which will require some type of future ESA consultation. In addition, most future state or tribal actions would likely have some form of federal funding or authorization and would be reviewed by NMFS.

2.7 Integration and Synthesis

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

The status of UCR spring-run Chinook salmon and UCR steelhead are driven by the high risk of extinction from low abundance, productivity, spatial structure, and diversity for all of their component populations. The ICTRT (2005) noted a high viability risk for all UCR spring-run Chinook salmon and UCR steelhead populations. These species are not meeting the five recovery criteria as outlined in the Recovery Plan (Upper Columbia Salmon Recovery Board 2007).

The information presented in the environmental baseline section (Section 2.4) details that the habitat quality in both the Wenatchee River and Nason Creek watersheds are generally not functioning properly. The Forest and environs have been highly modified outside of wilderness by timber management, road building, railroads, transmission lines, recreation, and other activities. Reduced summer stream flows, impaired water quality, and reduction of habitat complexity are common problems in some developed areas outside of Forest Service lands.

As noted in Section 2.2, climate change is likely to affect all three species covered in this opinion. The ISAB identified a number of effects climate change would have on Columbia Basin salmon. A few of these include: (1) water temperature increases, and depletion of cold water habitat that could reduce the amount of suitable salmon habitat; (2) variations in precipitation that may alter the seasonal hydrograph and modify shallow mainstem rearing habitat; and (3) earlier snowmelt and higher spring flows with warmer temperatures that may cause steelhead yearlings to smolt and emigrate to the ocean earlier in the spring (Independent Scientific Advisory Board 2007; O'Neal 2002). Specifically on the Okanogan–Wenatchee National Forest (Gaines et al. 2012), recommendations included protecting cold-water areas, restoring beavers, restoring fish passage, and reducing the impacts of roads on riparian habitats, water quality, water quantity, and flow regimes. Climate change is expected to make recovery targets for these salmon populations more difficult to achieve. However, habitat restoration actions can at least partially address the adverse impacts of climate change on salmon.

As previously described, high sediment levels in Nason Creek will continue to adversely affect incubating eggs and embryos of both species. Sediment levels may be slightly higher as a result of the action for a year or two. However, the net effect of the action to survival to emergence is expected to be slightly positive for both species the year after restoration actions are implemented, and remain positive for the duration of the action.

All baseline conditions in the Nason Creek Watershed are largely functioning at risk or functioning at unacceptable risk (see Table 13). The proposed action has both adverse effects and beneficial effects to ESA-listed fish and critical habitat. The operations and maintenance of the transmission line will maintain 23 acres of vegetation in its existing state, which maintains stream temperature, forage, and large wood in a degraded state. The road use and maintenance portion will create localized pulses of fine sediment delivery to the Nason Creek Watershed. These pulses are expected to be infrequent, occurring periodically (every few years) over the life of the 30-year SUP during road construction, road maintenance, and transmission tower repair. However, Chelan PUD proposed a suite of mitigation actions that will improve watershed conditions in Nason Creek, where adverse effects would otherwise occur.

These mitigation actions include decommissioning 9.2 miles of road, restoring 0.34 acres of compacted recreation site, and planting 3 acres of riparian vegetation. These actions will help reduce sedimentation as soon as road decommissioning projects are completed (within 2 years) and offset increases of fine sediment delivery from the operation and maintenance of the transmission line. The restoration projects will also improve stream shade, forage, and increase large wood over time as restored areas revegetate. Considering the existing condition of the environmental baseline (which also includes effects associated with state and private activities that are not expected to substantially change in the future), NMFS has determined that the lethal and sublethal effects of the proposed action coupled with the expected benefit of the restoration actions should not appreciably reduce the likelihood of survival, nor will it appreciably reduce the likelihood of recovery of the UCR spring-run Chinook salmon or UCR steelhead populations. Because the adverse effects of the proposed action will be fully offset by restoration actions and together are not expected to be substantial enough to negatively influence VSP criteria at the population scale, the viability of the Major Population Groups and ESU/DPS are also not expected to be reduced.

Designated critical habitat for UCR spring-run Chinook salmon and UCR steelhead occurs within the action area. Information in Sections 2.2 and 2.4 describes the status of critical habitat across the species' range and the environmental baseline conditions of the action area, respectively. General speaking, the condition of critical habitat is not functioning appropriately. Some sections of land in the action area are privately owned and have been impacted by logging and urbanization. Limiting factors include impaired physical habitat and water quality, reduced water quantity, and degraded riparian conditions. Climate change will likely result in a generally negative trend for stream temperature. As described in Section 2.6, cumulative effects in the action are likely to continue to have similar influences as they do today, and as was reflected in the environmental baseline.

Based on our analysis, adverse effects from the proposed action will cause both short-term and long-term (localized) habitat degradation, but will include positive effects from restoration actions that include both short-term and long-term benefits in the quality and function of PBFs in the action area. The quality of the PBFs at the watershed scale is not likely to decline as a result of the proposed action, due to the minor intensity and localized nature of effects from increased sediment and maintaining existing riparian conditions across 23 acres out of approximately 6,200 acres of riparian reserve. The watershed restoration actions will have both short-term and long-term beneficial effects on the Nason Creek Watershed as a whole by reducing sediment inputs and improving riparian vegetation. The road-decommissioning portion of the restoration actions is expected to reduce sediment delivery to Nason Creek beginning in year three of the proposed action and it will continue to do so through the life of the action. Because of this, critical habitat will remain functional or retain the ability for its PBFs to become functionally established and serve the intended conservation role for the species. Therefore, the effects of the action will not render the habitat within the affected watersheds unusable or incapable of supporting migration, spawning, or rearing. Because the action will not appreciably diminish the value of designated or proposed critical habitat at the action area scale, it will also not appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of UCR spring-run Chinook salmon or UCR steelhead or 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 biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

- Injury to ESA-listed fish from maintaining existing riparian conditions across 48.6 acres of riparian vegetation of which 23 acres is adjacent to critical habitat.
- Injury to ESA-listed fish and incubating eggs from increased sediment and turbidity in Nason Creek.

The distribution and abundance of fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. In this case, there is no way to count or observe the number of fish exposed to the effects of the proposed action over the period of time during which these effects will occur (30 years). In such circumstances, NMFS cannot provide an amount of take that would be caused by the proposed action, and instead uses an indicator of the extent of take.

The indicator for the extent of take from increases in sediment and turbidity is the number of miles of Forest Service roads used as part of the action that could deliver sediment to streams during road use and maintenance, minus the sediment reduction achieved by decommissioning roads and the recreation site. These indicators are proportional to the effects from road use and maintenance because sediment delivery to streams generally corresponds to the amount of soil

exposure, particularly roads. Thus, the extent of take indicator that will be used as a reinitiation trigger for this pathway is 23 miles of road use in the Nason Creek Watershed, provided 9.2 miles of road are decommissioned and 0.34 acres of recreation site are rehabilitated within 3 years.

The indicator for the extent of take from reduced stream shade, forage, and large wood is the total number of acres of ROW adjacent to critical habitat. These indicators are proportional to the effects from vegetation management because, where the ROW is adjacent to critical habitat, there will be reductions in shade, forage, and large wood. Thus, the extent of take indicator that will be used as the reinitiation trigger for this pathway is the number of acres of ROW adjacent to critical habitat (23 acres), provided 2.4 acres of riparian habitat are also restored as proposed.

Although the surrogates are largely coextensive with the proposed action, they nevertheless function as effective reinitiation triggers, because they can be measured and monitored as part of the ROW and road system. If at any time the level or method of take exempted from take prohibitions and quantified in this opinion is exceeded, reinitiation of consultation will be required.

2.9.2 Effect of Take

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

2.9.3 Reasonable and Prudent Measures

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

The Forest Service shall:

1. Complete monitoring and reporting to confirm that the take exemption for the proposed action is not exceeded.

2.9.4 Terms and Conditions

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

1. The following term and condition implements RPM 1:
    a. Monitoring. The Forest Service shall develop and carry out an annual monitoring plan to collect the following information:

i. A list of the ML 2A and Chelan PUD-permitted roads used during the year, including any work completed on the roads and BMPs implemented.
ii. An assessment of unauthorized use of permitted roads in riparian reserves adjacent to critical habitat in the Nason Creek Watershed. If unauthorized use is occurring, the Forest Service will take actions to prevent future unauthorized use.
iii. Completed restoration actions, including location, actions taken, and BMPs implemented.

b. Reporting. Submit each annual monitoring report to NMFS by December 31 each year, at the address below:

National Marine Fisheries Service
Columbia Basin Branch
Attn: McKenzie–Beverly WCRO-2019-02035
304 South Water Street, Suite 201
Ellensburg, WA 98926

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). NMFS is not recommending any conservation measures as part of this consultation.

2.11 Reinitiation of Consultation

This concludes formal consultation for the McKenzie–Beverly and McKenzie–Leavenworth Transmission Lines Project.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the federal agency or by NMFS where discretionary federal agency involvement or control over the action has been retained or is authorized by law and if: (1) the amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

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

Section 305(b) of the MSA directs federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. 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 Forest Service and descriptions of EFH for Pacific coast salmon (Pacific Fishery Management Council 2014) contained in the fishery management plans developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed action and action area are described in the BA and this opinion. The project area includes habitat which has been designated as EFH for various life stages of Chinook salmon (*O. tshawytscha*), and coho salmon (*O. kisutch*).

3.2 Adverse Effects to Essential Fish Habitat

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

NMFS concludes that the proposed action will have adverse effects on EFH designated for Pacific Coast salmon in freshwater habitats where Forest Service program activities occur. Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document (Section 2.4), we conclude that the proposed action will have the following adverse effects on EFH for Pacific Coast salmon.

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

- Freshwater EFH quantity and quality, including salmon spawning habitat will be reduced from increased sedimentation/substrate embeddedness at the site scale.
- Freshwater EFH quality, including salmon spawning habitat will be reduced from decreased forage and large wood at the site scale.

3.3 Essential Fish Habitat Conservation Recommendations

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

1. The Forest Service should follow Term and Condition #1 above (Section 2.9.4) in the ESA portion of this document to monitor resource damage and road use.

Fully implementing these EFH recommendations would protect, by avoiding or minimizing adverse effects described in section 3.2 above.

3.4 Statutory Response Requirement

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

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the Forest Service and Chelan PUD. Other interested users could include potential users of the Okanogan–Wenatchee National Forest as well as people interested in the conservation of UCR spring-run Chinook salmon and UCR steelhead. Individual copies of this opinion were provided to the

Forest Service. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/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 the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

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

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

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

5. REFERENCES

Battin, J., and coauthors. 2007. Projected impacts of climate change on salmon habitat restoration. Proceedings of the National Academy of Sciences of the United States of America 104(16):6720-6725.

Berg, L., and T. G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. Canadian Journal of Fisheries and Aquatic Sciences 42:1410-1417.

Bilby, R. E., K. Sullivan, and S. H. Duncan. 1989. The Generation and Fate of Road-Surface Sediment in Forested Watersheds in Southwestern Washington. Forest Science 35(2):453-468.

Bjornn, T. C., and D. W. Reiser. 1991. Habitat requirement of salmonids in streams. Pages 83-137 *in* Influences of forest and rangeland management on salmonids fishes and their habitats. American Fisheries Society.

Croke, J., and S. Mockler. 2001. Gully initiation and road-to-stream linkage in a forested catchment, southeastern Australia. Earth Surface Processes and Landforms 26(2):205-217.

Crozier, L. G., R. W. Zabel, E. E. Hockersmith, and S. Achord. 2010. Interacting effects of density and temperature on body size in multiple populations of Chinook salmon. Journal of Animal Ecology 79(2):342-349.

Ford, M. J. 2011. Status review update for Pacific Salmon and Steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle.

Gaines, W. L., D. W. Peterson, C. A. Thomas, and R. J. Harrod. 2012. Adaptations to Climate Change: Colville and Okanogan–Wenatchee National Forests. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Gucinski, H., M. H. Brookes, M. J. Furniss, and R. R. Ziemer. 2001. Forest roads: A synthesis of scientific information. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, PNW-GTR-509, Portland, Oregon.

Healey, M. 2011. The cumulative impacts of climate change on Fraser River sockeye salmon (*Oncorhynchus nerka*) and implications for management (vol 68, pg 718, 2011). Canadian Journal of Fisheries and Aquatic Sciences 68(5):953-953.

Independent Scientific Advisory Board. 2007. Climate change impacts on Columbia River Basin fish and wildlife, Portland, Oregon.

Interfluve. 2012. Upper Wenatchee River stream corridor assessment and habitat restoration strategy. Yakama Nation Fisheries.

Interior Columbia Basin Technical Recovery Team. 2005. Viability criteria for application to Interior Columbia Basin salmonid ESUs. Northwest Fisheries Science Center.

MacDonald, L. H., R. W. Sampson, and D. M. Anderson. 2001. Runoff and road erosion at the plot and road segment scales, St. John, U.S. Virgin Islands. Earth Surface Processes and Landforms 26(3):251-272.

Madej, M. A. 2001. Development of channel organization and roughness following sediment pulses in single-thread, gravel bed rivers. Water Resources Research 37(8):2259-2272.

McElhany, P., M. H. Ruckelshaus, M. J. Ford, T. C. Wainwright, and E. P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. U.S. Department of Congress, NOAA Technical Memorandum NMFS-NWFSC-42.

Montgomery, D. R. 1994. Road surface drainage, channel initiation, and slope instability. Water Resources Research 30(6):1925-1932.

Mote, P. W., and E. P. Salathé. 2009. Future climate in the Pacific Northwest. Climate Impacts Group, University of Washington, Seattle.

National Marine Fisheries Service. 2009. Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan. National Marine Fisheries Service, Northwest Region.

National Marine Fisheries Service. 2011a. 5-Year Review: Summary & Evaluation of Upper Columbia River Steelhead Upper Columbia River Spring-run Chinook, Portland, Oregon.

National Marine Fisheries Service. 2011b. 2011 Report to Congress, Pacific Coastal Salmon Recovery Fund 2000-2010. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle.

National Marine Fisheries Service. 2014. Consultation on Remand for Operation of the Federal Columbia River Power System, Portland, Oregon.

National Marine Fisheries Service. 2016a. 2016 5-Year Review: Summary & Evaluation of Middle Columbia River Steelhead.

National Marine Fisheries Service. 2016b. 2016 5-Year Review: Summary & Evaluation of Upper Columbia River Steelhead and Upper Columbia River Spring-run Chinook Salmon. National Marine Fisheries Service West Coast Region, Portland, Oregon.

Newcombe, C. P., and J. O. T. Jensen. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management 16:693-727.

Northwest Fisheries Science Center. 2015. Status Review Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Pacific Northwest. NOAA, Northwest Fisheries Science Center.

O'Neal, K. 2002. Effects of Global Warming on Trout and Salmon in U.S. Streams. Defenders of Wildlife, Washington, D.C.

Pacific Fishery Management Council. 2014. Pacific Coast Salmon Management Plan Appendix A: Identification and description of essential fish habitat, adverse impacts, and recommended conservation measures for salmon, Portland, Oregon.

Peven, C. M., R. R. Whitney, and K. R. Williams. 1994. Age and length of steelhead smolts from the Mid-Columbia River Basin, Washington. North American Journal of Fisheries Management 14:77-86.

Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. Physiological effects on coho salmon and steelhead of exposure to suspended solids. Transactions of the American Fisheries Society 116:737-744.

Reid, L. M., and T. Dunne. 1984. Sediment production from forest road surfaces. Water Resources Research 20(11):1753-1761.

Reid, L. M., T. Dunne, and C. J. Cederholm. 1981. Application of sediment budget studies to the evaluation of logging road impact. Journal of Hydrology: New Zealand 20:49-62.

Scheuerell, M. D., and J. G. Williams. 2005. Forecasting climate-induced changes in the survival of Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*). Fisheries Oceanography 14(6):448-457.

Servizi, J. A., and D. W. Martens. 1991. Effect of temperature, season, and fish size on acute lethal suspended sediments to coho salmon (*Oncorhynchus kisutch*). Canadian Journal of Fisheries and Aquatic Science 48:493-497.

Spence, B. C., G. A. Lomnicky, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. ManTech Environmental Research Services Corporation, Corvallis, Oregon.

U.S. Forest Service. 1999. Mainstem Wenatchee River Watershed Assessment.

U.S. Forest Service. 2019a. Fisheries Biological Assessment For the re-issuance of the McKenzie–Beverly Transmission Line Special Use Permit.

U.S. Forest Service. 2019b. McKenzie–Beverly 115kV Transmission Line Operating Plan, Wenatchee, Washington.

Upper Columbia Regional Technical Team. 2014. A Biological Strategy to protect and Restore Salmonid Habitat in the Upper Columbia Region, Wenatchee, Washington.

Upper Columbia Salmon Recovery Board. 2007. Upper Columbia spring Chinook salmon and steelhead recovery plan.

Wade, A. A., and coauthors. 2013. Steelhead vulnerability to climate change in the Pacific Northwest. Journal of Applied Ecology 50(5):1093-1104.

Wainwright, T. C., and L. A. Weitkamp. 2013. Effects of Climate Change on Oregon Coast Coho Salmon: Habitat and Life-Cycle Interactions. Northwest Science 87(3):219-242.

Wissmar, R. C., and coauthors. 1994. Ecological health of river basins in forested regions of Eastern Washington and Oregon. U.S. Department of Agriculture, Forest Service, PNW-GTR-326.

Zabel, R. W., M. D. Scheuerell, M. M. McClure, and J. G. Williams. 2006. The interplay between climate variability and density dependence in the population viability of Chinook salmon. Conservation Biology 20(1):190-200.