INSTITUTIONAL REPOSITORY
SUBMISSION COVER PAGE

Project Title:

1-90 Snoqualmie Pass East Project, Phase 3-4, Stampede Pass to Easton

☑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-2019-00360]
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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

Refer to NMFS No.: WCRO-2019-00360

October 15, 2019

Daniel M. Mathis, P.E.
Division Administrator
Federal Highway Administration, WA Division
711 S. Capitol Way, Suite 501
Olympia, WA 98501-1284

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the I-90 Snoqualmie Pass East Project, Phase 3-4, Stampede Pass to Easton; (HUC 170300010304) Stampede Creek–Yakima River; (HUC 170300010306) Little Creek–Yakima River.

Dear Mr. Mathis:

Thank you for your letter of April 9, 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) (16 U.S.C. 1531 et seq.) for the I-90 Snoqualmie Pass East Project, Phase 3 and 4 from Stampede Pass to Easton in Kittitas County, Washington.

In this biological opinion (opinion), NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of ESA-listed Middle Columbia River steelhead (*Oncorhynchus mykiss*) or result in the destruction or adverse modification of its designated critical habitat.

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

Our essential fish habitat (EFH) analysis includes one conservation recommendation to avoid, minimize, or otherwise offset potential adverse effects to EFH. If your response is inconsistent with the EFH conservation recommendation, the U.S. Army Corps of Engineers must explain

why, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly note if you accept the conservation recommendation.

Please contact Diane Driscoll of the Columbia Basin Branch at (509) 962-8911 x 809 or diane.driscoll@noaa.gov, if you have any questions concerning this section 7 consultation or require additional information.

Sincerely,

for 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 for the I-90 Snoqualmie Pass East Project, Phase 3-4, Stampede Pass to Easton; (HUCs 170300010304 Stampede Creek–Yakima River; 170300010306 Little Creek-Yakima River

NMFS Consultation Number: WCRO-2019-00360

Action Agency: U.S. Department of Transportation

Affected Species and Determinations:

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

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

Issued By:

for Michael P. Tehan
Assistant Regional Administrator

Date: 10/15/2019

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ACRONYM GLOSSARY

BA	Biological Assessment
BMP	Best Management Practice
CABS	Compost-Amended Biofiltration Swales
CEA	Connectivity Emphasis Area
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHART	Critical Habitat Analytical Review Team
CLC	Cascade Land Conservancy
CMA	calcium magnesium acetate
County	Kittitas County
CWU	Central Washington University
dbh	diameter at breast height
DPS	Distinct Population Segment
DQA	Data Quality Act
EB	Eastbound
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FHWA	Federal Highway Administration
FR	Federal Register
ft^2	square feet
gpm	gallons per minute
HCZ	Hydrologic Connectivity Zone
HPA	Hydraulic Project Approval
HUC	Hydrologic Unit Code
I-90 SPE	Interstate-90 Snoqualmie Pass East Project
ICTRT	Interior Columbia Basin Technical Recovery Team
IDT	Interdisciplinary Team
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
LWD	Large Woody Debris
MCR	Middle Columbia River
MDT	Mitigation Development Team
MPG	Major Population Group
MSA	Magnuson–Stevens Fishery Conservation and Management Act
NLAA	Not Likely To Adversely Affect
NMFS	National Marine Fisheries Service
NTU	Nephelometric Turbidity Unit
OHWM	Ordinary High Water Mark
opinion	Biological Opinion
OWNF	Okanogan–Wenatchee National Forest
PBF	Physical and Biological Feature

PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
Reclamation	Bureau of Reclamation
RM	River Mile
RPM	Reasonable and Prudent Measure
SPCC	Spill Prevention, Control and Countermeasures
SPE	Snoqualmie Pass East
SSSD	Steep-Slope Stormwater Dispersion
TESC	Temporary Erosion and Sediment Control
U.S.C.	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VSP	Viable Salmonid Population
WB	Westbound
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WDOE	Washington State Department of Ecology
WSDOT	Washington State Department of Transportation
YN	Confederated Tribes and Bands of the Yakama Nation

1.0 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) (16 U.S.C. 1531 et seq.), and its implementing regulations at 50 CFR 402.

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 (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). A complete record of this consultation is on file at the Columbia Basin Branch field office in Ellensburg, Washington.

Updates to the regulations governing interagency consultation (50 CFR part 402) will become effective on October 28, 2019 [84 FR 44976]. Because this consultation was pending and will be completed prior to that time, we are applying the previous regulations to the consultation. However, as the preamble to the final rule adopting the new regulations noted, "[t]his final rule does not lower or raise the bar on section 7 consultations, and it does not alter what is required or analyzed during a consultation. Instead, it improves clarity and consistency, streamlines consultations, and codifies existing practice." Thus, the updated regulations would not be expected to alter our analysis.

1.2 Consultation History

In 1999, the Washington State Department of Transportation (WSDOT) and the Federal Highway Administration (FHWA) formed an Interdisciplinary Team (IDT) to assist in developing design alternatives for the Interstate-90 Snoqualmie Pass East (I-90 SPE) project. The IDT has included NMFS, U.S. Fish and Wildlife (USFWS), the Okanogan–Wenatchee National Forest (OWNF), Washington State Parks, the Washington Departments of Fish and Wildlife (WDFW), Ecology (WDOE), Natural Resources (WDNR), the U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers, Bureau of Reclamation (Reclamation), Kittitas County (County), Cascade Land Conservancy (CLC), and Central Washington University (CWU).

As part of that collaborative process, NMFS agreed to consult on the project in phases because the IDT presented an opportunity to consider the environmental consequences of the whole project even though designs for the entire 15 miles lacked sufficient detail to enable consultation on the entire project. The IDT met monthly for several years and now meets quarterly to discuss the ongoing project and the proposed designs for Phase 3-4 and provide technical assistance to FHWA regarding current construction and the development of a biological assessment (BA) for future actions.

Consistent with ESA collaborative consultation strategy approved by NMFS, FHWA and WSDOT have continued to reinitiate consultation with NMFS in response to design change and/or modification in ESA-listing status. The FHWA initiated consultation with NMFS for the effects of Phase 1 and 2 of the I-90 SPE project on listed species and designated critical habitats on January 11, 2008, and September 6, 2014, for Phase 3A. NMFS completed informal consultation for Phase 1 and 2 NWR-2008-134 on April 7, 2008, and Phase 3A WCR-2014-1508 on October 8, 2014, for effects to the Middle Columbia River (MCR) steelhead distinct population segment (DPS) and its designated critical habitat.

On April 4, 2019, FHWA submitted a BA and request for informal consultation on Phases 3 and 4 (Phase 3-4). Phase 3-4 incorporates construction activities from milepost (MP) 62 (Stampede Pass) to MP 70.3 (Easton) in Kittitas County, Washington. The FHWA determined that the proposed action was "not likely to adversely affect" (NLAA) MCR steelhead or its critical habitat. After reviewing the BA, NMFS informed FHWA on April 29, 2019, that we could not agree with an NLAA determination and that, with FHWA agreement, NMFS would initiate formal consultation. FHWA agreed with NMFS' determination. Consultation initiated on April 29, 2019.

1.3 Proposed 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). "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). No interrelated actions or interdependent actions were identified for the proposed action.

The FHWA proposes partially funding WSDOT for Phase 3-4 of the I-90 SPE project. The project includes 8.3 miles of highway improvement including adding an additional lane in each direction, replacing the Kachess River Bridges at river mile (RM) 0.23 and 0.27, and the modification of stream crossings on eight tributaries to the Yakima River as shown in Table 1. The Kachess River is a tributary to the Yakima River entering at RM 203.5 upstream of the Easton Dam at RM 202.5. The left-bank tributaries included in this project (some of which are fish bearing) enter the Yakima River upstream of RM 205.

Of the eight tributary crossing structures that will be replaced (Table 1), five are on fish-bearing streams and the other three tributaries are non-fish-bearing. All of the tributary structures are located at least 530 yards away from the mainstem Yakima River and will be conducted in such a manner and at such time that NMFS does not anticipate any affects to the mainstem Yakima River. Therefore, this opinion will only discuss the five fish bearing tributaries and the Kachess River.

Table 1. Bridge and culvert designs for eight left bank tributaries of the Yakima River above Easton Dam and the Kachess River Bridges for Phase 3-4 of the Interstate-90 (I-90) Snoqualmie Pass East Project (FHWA 2019).

Tributary Name and Fish Presence	**Existing Condition**	**Modified Phase 3-4 Design[1]**
Toll Creek MP 64.1 Fish-bearing	4-ft concrete pipe. (980 ft^2 footprint). Not fish passable.	20-ft x 250-ft single box culvert. (5000 ft^2 footprint). Fish passable. Will remove the existing pipe and add fish passage.
Unnamed Creek MP 64.4 (NEW) Not fish-bearing	2-ft concrete pipe. (280 ft^2 footprint). Not fish passable.	8-ft x 205-ft single box culvert. (1,640 ft^2 footprint). Fish passable. Will replace existing pipe with a larger culvert incorporating an engineered channel.
Cedar Creek MP 64.6 Fish-bearing	4-ft box culvert. (620 ft^2 footprint). Not fish passable.	25-ft x 217-ft bridge. (5,425 ft^2 footprint). Fish passable. Replaces culvert with free-span bridge, thereby restoring channel to natural conditions.
Unnamed Creek MP 65.1 Fish-bearing	4-ft box culvert with metal insert. (580 ft^2 footprint). Not fish passable.	14-ft x 265-ft single box culvert. (3,710 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Telephone Creek MP 65.6 Fish-bearing	5-ft x 4-ft box culvert. (850 ft^2 footprint). Not fish passable.	20-ft x 130-ft bridge. (2,600 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Hudson Creek MP 66.6 Fish-bearing	4-ft box culvert. (660 ft^2 footprint). Not fish passable.	100-ft x 162-ft bridge. (16,200 ft^2 footprint). Replaces culvert with free-span bridge, thereby restoring channel to natural conditions.
Unnamed Creek MP 66.8 (NEW) Not fish-bearing	2-ft culvert. (290 ft^2 footprint). Not fish passable.	12-ft x 260-ft single box culvert. (3,120 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Unnamed Creek MP 67.8 (NEW) Not fish-bearing	2-ft culvert. (730 ft^2 footprint). Not fish passable.	13-ft x 200-ft single box culvert. (2,600 ft^2 footprint). Fish passable. Will replace existing culvert with a larger culvert incorporating an engineered channel.
Replacement of eastbound and westbound I-90 Kachess River Bridges	When complete, both bridges will clear-span the river, supported by spread footings installed above the 500-year flood elevation	

[1] All culvert replacements will include a full-width streambed mix, allowing for potential fish use across the entire culvert footprint.

The replacement of the Kachess River Bridges immediately north of the Easton Dam pool is the only action that will occur adjacent to the Yakima River. However, this work area will be above the normal pool elevation at the time of disturbance. The remaining bridge and culvert replacements will occur on the left-bank tributaries within 530 yards of the Yakima River at the closest point and in most areas over 1,000 yards from the Yakima River.

Worksite Isolation and Fish Removal/Exclusion

For all fish-bearing waters, work area isolation and fish capture and removal protocols shall follow those outlined in WSDOT's Fish Exclusion Protocols and Standards (2012). Implementation will be planned and directed by a WSDOT biologist, or qualified biologist under contract to WSDOT, possessing all necessary knowledge, training, and experience. Electrofishing will not be used. All individuals participating in fish capture and removal operations shall have the training, knowledge, skills, and ability to ensure safe handling of fish, and to ensure the safety of staff conducting the operations. The directing biologist will use his/her best professional judgment in deciding what sequence of activities is likely to minimize fish stress or injury (including stranding).

If pumps are used to temporarily bypass water or to dewater residual pools or cofferdams, pump intakes shall be screened to prevent aquatic life from entering the intake. Fish screens or guards shall comply with Washington State law (RCW 77.57.010 and 77.57.070), with guidelines prescribed by NMFS, and any more stringent requirements contained in the Hydraulic Project Approval (HPA) or General HPA issued by the WDFW.

Methods for safe capture and removal of fish from the isolated work area are described below. These methods are given in order of preference. At most locations, a combination of methods will be necessary.

1. Use only dip nets and seines composed of soft (non-abrasive) nylon material.
2. The operations shall confirm success of fish capture and removal before completely dewatering or commencing with other work within the isolated work area; the operations shall conduct a minimum of two complete passes without capture using electrofishing equipment.
3. Do not hold ESA-listed fish in containers for more than 10 minutes, unless those containers are dark-colored, lidded, and fitted with a portable aerator.
4. Every attempt will be made to release ESA-listed specimens first.

Seining shall be the preferred method for fish capture. Other methods shall be used when seining is not possible, or when/after attempts at seining have proven ineffective. Seines, once pursed, should remain partially in the water while fish are removed with dip nets. Seines with a "bag" minimize handling stress and are preferred. Seines with a bag are also preferred where obstructions make access to the water (or deployment/retrieval of the seine) difficult.

Baited Minnow Traps are typically used before and in conjunction with seining. Traps may be left in the isolated work area overnight. Traps shall be inspected at least four times daily to

remove captured fish and thereby minimize predation within the trap. Traps will be checked more frequently if temperatures are in excess of 59°F.

Dip Nets shall be used in conjunction with seining. This method is particularly effective when employed during gradual dewatering or flow diversion. Once netted, fish shall remain partially in water until transferred to a bucket, cooler, or holding tank. Dip nets that retain a volume of water ("sanctuary nets") are preferred.

Connecting Rod Snakes may be used to flush fish out of stream crossing structures (i.e., culverts). Connecting rod snakes are composed of wood sections approximately 3 feet in length.

WSDOT will ensure that fish handling is the minimum necessary to remove fish from the isolated work area. WSDOT will conduct fish capture and removal operations in a manner that minimizes the amount and duration of handling. The operations shall maintain captured fish in water to the maximum extent possible during seining/netting, handling, and transfer for release. The directing biologist shall maintain accurate records of the operations, including: fish species, number, age/size class estimate, condition at release, and release location. Fish will not be sampled or anesthetized. The operations shall ensure that captured fish are held in water of suitable quality to ensure their safety. The directing biologist shall ensure that conditions in the holding containers are monitored frequently and operations adjusted appropriately to minimize fish stress. Fish shall not be held in containers for more than 10 minutes, unless those containers are dark-colored, lidded, and fitted with a portable aerator; small coolers meeting this description are preferred over buckets.

Culvert Replacement and Installation

All existing stream crossings of fish-bearing streams will be upgraded to either a longer span bridge or an oversized bottomless culvert. All bottomless culverts will be built on small shafts or spread footings and will be designed in accordance the WDFW Water Crossing Design Guidelines (Barnard et al. 2013). The bottomless clear span designs will use natural substrate materials. Prior to the construction of culvert installations and replacements, road easements and construction limits will be marked, erosion and sediment controls will be installed, and fish will be removed from the affected portion of the creek when in-water construction is required. In areas where existing culverts will be replaced, an excavator or backhoe will be used to excavate current road fill to an elevation necessary to place the new culvert. If culverts are placed on new alignments, the culvert will be placed concurrently with constructing the roadbed.

All construction will take place in the dry either during the times when flow is absent, or by constructing a temporary diversion dam at the upstream limit of the work area and piping the flow past the culvert work. Once the fish have been removed, a small diversion is typically constructed upstream of the work site using a combination of ecology blocks, sandbags with heavy plastic sheeting, or aqua-barriers. A flexible pipe or hose can be incorporated into the dam and run through one of the culverts where it will terminate at a controlled splash area downstream of the work area. A temporary sediment fence may be installed downstream of the

hose outlet in order to retain turbid water and sediment that may be generated. The system will be designed for gravity flow and will be large enough to convey debris and flows expected during the construction period. If pumping is necessary, the pump will be fitted with mesh screens to prevent aquatic life from entering the intake hose.

The contractor will place new creek bed material prior to culvert placement. Using specifications from WDFW, this material is normally composed of washed, rounded, well-graded mix with gravels ranging in size from 0.25 inches to 5.0 inches sized for the slope and discharge and containing appropriate fine material to seal the streambed. After placing the culvert, the contractor will reintroduce the stream into the channel in a slow controlled fashion. The contractor will use a process known as "ramping" to prevent excessive erosion, siltation, or scour of the stream channel. A WSDOT engineer will observe and control the ramping process. After flow is fully restored to the channel, all material used in the temporary bypass will be removed from the site and the site restored to natural conditions.

Using the construction methods described above will substantially minimize disturbance to riparian areas. Disturbed banks will be seeded or planted with a diverse assemblage of native plants adapted to riparian areas. The contractor will restore any disturbed portions of creek beds beyond the immediate culvert replacement area to natural channel conditions.

The contractor will need to dewater and isolate approximately 6,144 square feet (ft^2) total of stream channel area in the five fish-bearing streams of the Yakima River tributaries and the Kachess River Bridge (site footprints range from 648 ft^2 to 1,060 ft^2). Qualified biologists in accordance with the 2012 WSDOT Fish Exclusion Protocols and Standards will conduct isolation of the work area, fish removal, and release of fish.

CEAs and HCZs

Separate from culverts and bridges for defined perennial streams in the action area, the I-90 SPE includes a number of specific ecologic connectivity features, named Connectivity Emphasis Areas (CEAs). Most of these relate to improving the hydrologic connectivity in streams and wetland areas crossed by the highway with a few emphasizing only wildlife. The Mitigation Development Team (MDT), a multi-agency team of biologists and hydrologists, identified the important CEAs and Hydrologic Connectivity Zones (HCZs) throughout the 8.3-mile project area. HCZs are geographic zones where connections between groundwater and surface water play an important role in maintaining natural flow paths that transmit water, sediment and nutrients in support of aquatic organisms and sustaining streamflow. The MDT then collaborated with design engineers to identify the locations and types of structures needed to meet the ecological goals unique to each CEA. The result is a project with six CEAs that include five HCZs identified within boundaries of the Phase 3-4 of I-90 SPE. The CEAs include the construction of several wildlife crossing structures, HCZs and over-sized bridges to increase the permeability of the corridor, connect important habitats, and promote terrestrial and aquatic ecological connectivity. WSDOT identified five HCZs in the Phase 3-4 project area where I-90 divides wetlands, alluvial fans, seepage zones and important aquifer recharge areas where either

small culverts or permeable road fill will be installed to improve groundwater flow under the highway.

In areas where new culverts or bridges will be installed, highway fill materials will be removed and habitat and hydrology will be restored beneath these structures. All connectivity structures will include natural substrates. The contractor will incorporate habitat elements, or "legacy structures," such as logs, root wads, and rocks within and around connectivity structures where practicable, and will use native vegetation in areas under bridge spans and on wildlife overcrossings.

Kachess River Bridges

The design for Phase 3-4 includes replacing and widening both the eastbound (EB) and westbound (WB) bridges, but relocating the WB bridge into the existing median, precluding the need for a temporary detour bridge. The existing EB bridge is 99 feet long and the WB bridge is 150 feet long. The new bridges will be lengthened to 240 feet long each and widened to add a third lane. Relocation of the WB bridge will require work below the OHWM in the Easton Dam pool to remove the four west side piers. Pier removal is scheduled during low pool elevation (October through March), when the piers are normally above the wetted edge of the pool and thus normally in a dewatered area of the pool. The contractor will remove four pier columns, each 4 feet in diameter, with a total disturbed area below the OHWM of approximately 50 ft^2. When complete, both bridges will clear-span the river, supported by spread footings installed above the 500-year flood elevation. By widening both bridges, there will be an increase in aquatic shading from 9,462 ft^2 (existing bridges) to 12,533 ft^2.

Riparian Vegetation Impacts

The Kachess River reach in which work will occur includes banks that are artificially straightened and armored with rock. Within the median, woody vegetation is limited to several shrubs less than 5 feet tall (hardhack–*Spiraea douglasii*) and one small conifer [less than 4-inch diameter at breast height (dbh)] rooted above the OHWM. Total woody cover within the median is estimated at 200 ft^2. The former WB alignment will be restored with native, riparian vegetation.

Impervious Surface

Construction of Phase 3-4 of the I-90 SPE corridor will result in a net impervious surface increase of approximately 34 acres over 8.3 miles, an increase of 35 percent. The increased impervious surface will require additional and corresponding winter operations and maintenance resources such as sand and chemical ant-icing/deicing compounds to manage the added impervious surface in the winter.

Traction Sand and Deicer

WSDOT currently uses chloride based FreezGard™ and IceSlicer™ as their anti-icer and deicer respectively. FreezGard™ is composed of a 30 percent liquid magnesium chloride solution and is applied at a rate of 20 to 25 gallons per lane mile. IceSlicer™ is a pelletized deicing product composed of sodium chloride, potassium chloride, magnesium chloride and trace minerals. WSDOT uses a 10-to-1 or 5-to-1 ratio of sand to IceSlicer™, with FreezGard™ added to help it spread more evenly over the roads.

Stormwater

WSDOT will include engineered stormwater treatment for all new and replaced impervious surfaces using stormwater treatment performance standards tied to state and federal permit requirements in treating 100 percent of stormwater runoff for the project, following the most current version of the WSDOT Highway Runoff Manual (2019). WSDOT will provide on-site treatment and off-site stormwater mitigation for any locations where on-site treatment is not possible due to physical constraints. Depending on location, WSDOT will use the following treatment methods: onsite stormwater treatment including natural or engineered dispersion areas, media filter drains, compost-amended biofiltration swales (CABS), continuous inflow CABS, or vegetated filter strips. Construction or installation of stormwater treatment will not require disturbance of any waterbody within the action area.

Water Withdrawal

A peak daily total water use of 40,000 gallons is required for Phase 3-4 construction activities, wetland mitigation site watering, and watering of other plant establishment areas. This daily water withdrawal rate is equivalent to 0.06 cubic feet per second (cfs), or 27 gallons per minute (gpm). To address this need throughout the project limits, the contractor will use an existing well at the Crystal Springs Sno-Park or surface water withdrawn from the Yakima or Kachess Rivers.[1]

> ***Crystal Springs Sno-Park Well.*** This well is located on a terrace of alpine glacial drift on the south side of the Yakima River. The terrace lies approximately 30 to 40 feet above the floodplain.
>
> ***Kachess River.*** The contractor will withdraw water from the Kachess River at the I-90 Bridge with best management practices (BMPs) in place to avoid and minimize effects to fish. Reclamation controls flows in the Kachess River by releases from the Kachess Reservoir. Kachess River flows are lowest in May and June when the river drops to as low as 30 cfs. Flows increase in the early irrigation season (July–August) to 300 to 600 cfs, and up to 1,200 cfs and greater in September and October to continue meeting irrigation demands in the lower Yakima Basin when Keechelus Reservoir releases are reduced to protect spring-run Chinook salmon redds.

1 The assumption is that water will be withdrawn from only one source at a time, which is a worst-case scenario.

Yakima River. Water will be withdrawn from the Yakima River at the Stampede Pass Road Bridge with BMPs in place to minimize effects to fish. Flows in this reach of the Yakima River are driven by releases from the Keechelus Reservoir. The Yakima River flow below Crystal Springs is greatest during irrigation releases in July and August, ranging from 500 to 1,200 cfs. Keechelus Reservoir releases are reduced in September and October to 80 to 120 cfs to prevent spring-run Chinook salmon from spawning higher along channel margins where they would likely be left dry in the winter.

Due to the location of the project and necessary winter shut-downs, construction activities can only occur from April through October. For the purposes of this document, "construction season" refers to the 7-month window from April 1 to October 31. Work may start later and/or end earlier depending on weather conditions. It will be necessary for some work to occur 24 hours a day, seven days a week, due to the weather-shortened construction seasons. The in-water work window for fish-bearing streams in this location is generally July 16 through September 30.

Construction Sequencing

Phase 3 - (2020–2021)

- Construct WB Kachess River Bridge and minor roadway work near the Kachess River Bridge.

Phase 3 - (2021–2023)

- Construct permanent EB highway alignment and partial WB alignment, which includes:
    - EB portions of culverts at Cedar Creek, Telephone Creek, Hudson Creek, and Unnamed Creeks at MPs 65.1 and 67.8.
    - EB portion of the Hudson Creek CEA Bridge (Unnamed Creek 67.1).
- EB bridge over Kachess River.

Phase 3 - (2024–2025)

- Completion of the WB portion of HCZs (small culverts).
- Structure construction, including:
    - Completion of culverts at Cedar Creek, Telephone Creek, Hudson Creek, and Unnamed Creek 65.1.
    - Completion of the Hudson Creek CEA Bridge (Unnamed Creek 67.1).

Phase 4 - (2027–2028)

- Structure construction, including:
    - WB portion of the Toll Creek culvert.
    - WB Bonnie Creek Bridge.
    - WB Swamp Creek Bridge.
    - WB Wildlife Connectivity Bridge at MP 62.5.
    - WB Unnamed Creek 63.7 Bridge.
    - WB portion of Unnamed Creek 64.4 Culvert.

Phase 4 - Stage 3 (2028–2029)

- Structure construction, including:
    - Toll Creek Culvert (EB portion).
    - EB Bonnie Creek Bridge.
    - EB Swamp Creek Bridge.
    - EB Wildlife Connectivity Bridge at MP 62.5.
    - EB Unnamed Creek 63.7 Bridge.
    - EB Unnamed Creek 64.4 Culvert (EB portion).

Phase 4 - Stage 4 (2029)

- Minor traffic shifts to complete tie-ins.

Best Management Practices and Minimization Measures

The FHWA will ensure that the contractor complies will the following BMPs and minimization measures:

Minimization Measures

- A Temporary Erosion and Sediment Control (TESC) Plan will be developed and implemented. The BMPs in the plan will control sediments from all vegetation removal and ground-disturbing activities.
- FHWA will require inspections of all temporary and permanent erosion and sedimentation control measures on a regular basis, and maintenance and repair will occur to assure continued performance of their intended function.
- The contractor will inspect construction equipment daily to ensure there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products.
- For activities involving concrete, a concrete truck chute cleanout area shall be established to properly contain wash water. The cleanout area will be located in a WSDOT pre-approved location where infiltration of wash water will occur.
- No paving, chip sealing, or stripe painting will occur during periods of rain or wet weather.
- A Spill Prevention, Control and Countermeasures (SPCC) Plan will be approved and implemented. When practicable, all equipment fueling and maintenance will occur more than 300 feet from the nearest wetland, ditch, or flowing or standing water. (Fueling large cranes, pile drivers, and drill rigs over 300 feet away may not be practicable.)
- The contractor will not place crossovers for facilitating traffic movement in sensitive areas, such as wetlands.
- FHWA will ensure that the project and all stormwater BMPs, are designed and constructed in accordance with WSDOT's Highway Runoff Manual (WSDOT 2019) in order to minimize water quantity and quality impacts from freeway construction and operation. The selection of BMPs will meet or exceed water treatment requirements under Ecology standards and EPA Clean Water Act requirements.
- FHWA will ensure there is a stormwater construction plan to contain and treat stormwater generated during construction activities.

Access/Clearing and Grading/Cut and Fill

- FHWA will ensure that staging, processing, and stockpiling areas are not sited in environmentally sensitive aquatic resource areas.
- Any site selected by the contractor for staging, stockpiling, and materials processing, etc. will be subject to review and approval of FHWA.
- Boundaries of clearing limits associated with site access and construction will be clearly marked and fenced to prevent ground disturbance outside the limits.
- No tree removal will occur on U.S. Forest Service (USFS) lands without prior approval by the USFS.
- Vegetation will be grubbed only from areas undergoing permanent alteration. No grubbing will occur in areas slated for temporary impacts.
- FHWA will require restoration of all temporarily disturbed areas to pre-project conditions.
- The contractor will minimize removal of riparian vegetation to the greatest extent possible. Where possible, the contractor will mow or cut vegetation close to the ground without removing or disturbing root systems. Where clearing is unavoidable, the contractor will replant disturbed areas with appropriate native vegetation. Any revegetation will be coordinated with WSDOT biologists and landscape architects.
- Temporary storage of excavated materials will not occur within the 100-year floodplain between November 1 and May 1.
- Construction equipment will be equipped with adequate mufflers, intake silencers, and engine enclosures to meet current standards for noise reduction. Construction equipment will be equipped with spark arrestors and will meet current standards of the USFS Fire Management Office on USFS land.
- All stored material will be stabilized to prevent erosion or possible impacts to any aquatic area.
- FHWA will ensure that stormwater BMPs are sited in environmentally sensitive areas or where disturbance of mature vegetation is required to construct the BMP.

Bridges and Culverts

- FHWA will design clear-span bridges wherever possible to eliminate stream channel impacts and provide maximum habitat gain.
- All bottomless culverts will be built on small shafts or spread footings and will be designed in accordance with the WDFW Water Crossings Design Guidelines (Barnard et al. 2013). The bottomless clear-span designs will use natural substrate materials.
- Accumulations of bird feces, debris, road grit, and sand will be removed to the greatest extent possible prior to removing the existing bridges.
- FHWA will remove bridge footings in their entirety where possible. Where bridge footings are not removed, the piers will be cut off approximately 2 feet below ground surface and backfilled with clean native streambed material.
- FHWA will ensure that the contractor pumps sediment-laden water generated during construction of bridge piers or footings to an upland site to infiltrate prior to returning to

surface waters. If discharge to an upland site is not feasible, the contractor will pump the water to holding tanks and haul the water to an upland area for dispersion.
- Bridge construction will be conducted from the banks or temporary work platforms. Construction equipment will be kept out of aquatic resources as much as possible.
- Bridge abutments and piers will be built outside the OHWM, and will be designed to provide wildlife crossing opportunities.
- FHWA will approve all contractor demolition plans for all bridges. At no time will any material be allowed to enter the water during demolition.

In-water Work

- The WDFW will use the Hydraulic Project Approval process to determine seasonal restrictions (work windows) that the contractor will follow to avoid or minimize potential impacts to listed or proposed species. The site specific in-water work window will be agreed upon by the USFWS and NMFS.
- Any in-water work necessary at stream crossings will only occur during the appropriate work windows with BMPs in place to minimize impacts.
- During any in-water work at stream crossings, if necessary, the contractor will isolate the work area by diverting flows around the construction area. At no time will work inhibit the passage of any adult or juvenile salmonid species.
- If pumps are necessary to maintain flow and passage around work areas, inlets will be covered with screening that meets NMFS' criteria.
- Any equipment used over or in-water will use non-petroleum based lubricants, such as vegetable oil instead of hydraulic fluid, and will be "diapered" with absorbent pads.
- All concrete used in aquatic areas will either be poured in the dry or within confined waters not connected to surface waters, and will be allowed to cure 7 days before contact with surface water.
- Prior to starting in-water work on bridges and culverts, fish will be removed as per WSDOT guidance (2012) and the worksite isolated, if necessary, to prevent fish from re-entering during the construction activities. To avoid lethal effects, electrofishing will not occur, only seining and removal with sanctuary nets.
- Water will be reintroduced to isolated stream channels slowly and in a controlled fashion. The contractor will use a process known as "ramping" to prevent excessive erosion, siltation, or scour of the stream channel.
- If lights are used over or adjacent to any aquatic area they will be pointed away from the water and sighted so the least amount of light possible covers aquatic areas.

Conservation Measures

- As described before, conservation measures are specific measures or activities that promote the conservation of listed species. Several of these were identified as part of the IDT and MDT process.
- The project was designed with 14 CEAs identified throughout the 8.3-mile corridor. These CEAs include the construction of several wildlife crossing structures and nine HCZs, which increase the permeability of the corridor, connect important habitats, and promote normal ecological processes and hydrologic connectivity.

- Where possible, restoration adjacent to and below bridge structures will target local habitats and species to facilitate effective ecological connectivity.
- FHWA will ensure that all mitigation and restoration sites will be monitored for several years post-construction to ensure success and that regulatory requirements are being met.
- Disturbed stream banks will be seeded or planted with a diverse assemblage of native plants adapted to riparian areas. Any disturbed portions of the creek bed beyond the immediate culvert replacement area will be restored to natural channel conditions.
- If large trees, logs, or rootwads are removed, they will be retained where possible and placed in adjacent forested areas or incorporated into crossing structures.
- FHWA will ensure wildlife exclusion and guide fencing will be used to enhance the effectiveness of crossing structures. The contractor will use fencing with vertical retaining walls, natural topographic barriers, boulder fields, and other measures to form a continuous integrated system.
- FHWA will require a monitoring and adaptive management plan to ensure the success of the connectivity enhancements throughout the project.
- To provide crossings for smaller species, FHWA will place small and medium-sized culverts approximately every 600 feet throughout the project corridor.
- FHWA will require the use of WSDOT's Integrated Vegetation Management program to ensure practices minimize noxious weed occurrence consistent with USFS directives. Reducing or eliminating herbicide use at crossing structures will enhance use by smaller species.
- On bridges of 120-feet or less, the use of vertical retaining walls will maximize effectiveness as a crossing structure and maximize connected habitats.

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

2.1 Analytical Approach

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

CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. As described in the Federal Register (FR), such alterations may include, but are not limited to, those that alter the physical and biological features (PBFs) essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

The designation of critical habitat for MCR steelhead uses the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace this term with PBFs. The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

- Identify the range-wide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors by: (1) reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2 Range-wide Status of the Species and Critical Habitat

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

the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

2.2.1 Status of the Species

The status of MCR steelhead 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 condition of critical habitat throughout the designated area is determined by the current function of the essential PBFs that help to form that conservation value.

The MCR steelhead DPS was listed as threatened on March 25, 1999 (64 FR 14517) and its threatened status was recently reaffirmed on May 26, 2016 (81 FR 33468). The DPS includes all naturally-spawning populations of steelhead using tributaries upstream and exclusive of the Wind River, Washington, and the Hood River, Oregon, excluding the Upper Columbia River and its tributaries (upstream of the Yakima River) and the Snake River. The Interior Columbia Technical Recovery Team (ICTRT 2007) identified 20 populations in four major population groups (Eastern Cascades, John Day River, the Umatilla River/Walla Walla drainages, and the Yakima River). Three of these populations are extinct: the White Salmon and Crooked River populations in the Eastern Cascades Major Population Group (MPG), and the Willow Creek population in the Umatilla River/Walla Walla MPG. Seven artificial propagation programs are considered part of the DPS: the Touchet River Endemic, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River, and the Deschutes River steelhead hatchery programs. Major watersheds within this DPS include the Klickitat, Fifteen Mile, Deschutes, John Day, Umatilla, Yakima, and Walla Walla River Basins. NMFS has defined the steelhead DPSs to include only the anadromous members of this species (70 FR 67130).

The ICTRT recommends having multiple viable populations to make a DPS less likely to become extinct from a single catastrophic event (ICTRT 2007; Spence et al. 1996). NMFS expresses the status of a DPS in terms of the status and extinction risk of its individual populations, relying on McElhaney et al.'s (2000) description of a viable salmonid population. The four parameters used to evaluate the viability of a salmonid population are abundance, productivity, spatial structure, and diversity. The recovery plan for MCR steelhead (NMFS 2009) describes these four parameters in detail, and the parameter values needed for persistence of individual populations and for recovery of the DPS. Only one MPG, the Yakima River MPG, and only one population within the Yakima River MPG, the Upper Yakima River, will be exposed to the effects of the proposed action.

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

Limiting Factors. The major factors limiting recovery of the MCR steelhead DPS include: (1) Mainstem Columbia River hydropower system mortality, (2) degraded tributary habitat, (3) reduced streamflow in tributaries, (4) impaired passage in tributaries, (5) hatchery-related effects, (6) predation/competition/disease, and (7) ocean conditions (Daly and Brodeur 2015; NMFS 2009; NWFSC 2015).

Abundance and Productivity. According to the most recent 5-year status review (2010 to 2014 data), 7 of 15 populations are currently above the minimum abundance thresholds identified by the ICTRT (NWFSC 2015). There are insufficient data to identify 5-year abundances for the Klickitat River and Rock Creek. Total escapement and natural-origin escapements for all five John Day populations increased relative to Ford's (Ford 2011) prior 5-year review. Total spawning escapements have increased in the most recent brood cycle for all three populations in the Umatilla–Walla Walla MPG as well. In the Eastern Cascades MPG, total escapement and natural-origin escapements for two of three populations have increased since the previous 5-year review.

The proposed action will take place within the Yakima River Basin MPG boundaries and will affect the Upper Yakima River population. The MCR Steelhead Recovery Plan (NMFS 2009) characterized five MCR steelhead populations as being at high risk of extinction in terms of abundance based on 1995 to 2004 spawner numbers. One of those high-risk populations is the Upper Yakima population. In the NWFSC 2015 Status Review, the abundance, productivity, and spatial structure risk was considered moderate while the genetic diversity risk remained high resulting in an overall high risk viability rating. Table 2 presents recent spawner abundance.

Table 2. Abundance and Abundance Thresholds for Yakima River Major Population Group populations of Middle Columbia River Steelhead (NWFSC 2015).

Population	Interior Columbia Basin Technical Recovery Team Minimum Abundance Threshold	Natural Spawner Abundance 2005–2014
Satus Creek	1,000	1,127
Toppenish Creek	500	516
Naches River	1,500	1,244
Upper Yakima River	500	246

Spatial Structure and Diversity. The NWFSC (2015) reported no change in the integrated spatial structure and diversity risk for all 17 MCR steelhead populations relative to the previous status review by Ford (2011). Two populations are ranked at low risk, 14 at moderate risk, and one with a high risk of extinction based on spatial structure and diversity criteria, the Upper Yakima River. Within the Yakima River MPG, Satus and Toppenish Creeks, and the Naches River are at moderate risk of extinction, while the Yakima Upper Mainstem population is characterized as high risk.

Biological Risk Summary. The NWFSC (2015) reported that there have been improvements in the viability ratings for some of the component populations, but the MCR steelhead DPS is not currently meeting the viability criteria described in the Mid-Columbia Steelhead Recovery Plan.

Natural origin returns to the majority of populations in two of the four MPGs in this DPS increased modestly relative to the levels reported in the previous 5-year review. Abundance estimates for two of three populations with sufficient data in the remaining two MPGs (Eastside Cascades and Umatilla–Walla Walla) were marginally lower. Updated information indicates that stray levels into the John Day River populations have deceased in recent years. Out-of-basin hatchery stray proportions, although reduced, remain high in spawning reaches within the Deschutes River Basin populations. In general, the majority of population level viability ratings remained unchanged from prior reviews for each MPG within the DPS (NWFSC 2015). For the Yakima River MPG, the NWFSC (2015) gave overall viability ratings of Viable for the Satus and Toppenish Creek populations, Moderate for the Naches River population, and High Risk for the Upper Yakima River population.

Climate Change. Another factor affecting the range-wide status of MCR steelhead and aquatic habitat in the Columbia River Basin is climate change. Climate change has negative implications for salmon, steelhead, and their designated critical habitat in the Pacific Northwest (ISAB 2007; NWFSC 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 (ISAB 2007). The latest climate models project a warming of 0.1ºC to 0.6ºC per decade over the next century.

Climate change affects salmonids 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 (ISAB 2007). While the intensity of effects will vary by region, climate change is generally expected to alter aquatic habitat (water yield, peak flows, and stream temperature) (Battin et al. 2007; ISAB 2007). 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 salmonid 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. 2019; Crozier et al. 2010; ISAB 2007; O'Neal 2002). In addition, climate impacts in one life stage generally affect body size and timing in the next life stage and can be negative across multiple life stages (Healey 2011; Wade et al. 2013; Wainwright and Weitkamp 2013).

In summary, climate change is expected to make recovery targets for these salmon populations more difficult to achieve. However, habitat restoration action can act to reduce some of the

adverse impacts of climate change on salmon. Examples include restoring connections to historical floodplains, and freshwater and estuarine habitats to provide fish refugia and areas to store excess floodwaters; protecting and restoring riparian vegetation to ameliorate stream temperature increases; and purchasing or applying easements to lands that provide important cold water or refuge habitat (Battin et al. 2007; ISAB 2007).

2.2.2 Range-wide Status of Critical Habitat

Table 3 below, summarizes the critical habitat for MCR steelhead using information on the status of critical habitat for MCR steelhead described in the recovery plan for the species (NMFS 2009), incorporated by reference here. NMFS designated those habitats presently occupied by a particular species and containing PBFs that are essential to support one or more of the life stages of steelhead. The PBFs of freshwater migration, spawning and rearing sites include migratory access for adults and juveniles, water flow, water quality, temperature conditions, and suitable substrate for spawning and incubation, as well as cover, forage and floodplain connectivity for rearing. The current ability of these features to function properly varies across the landscape from poor in areas of high industrial or agricultural development to excellent in headwater wilderness areas (NMFS 2005; Spence et al. 1996; Wissmar et al. 1994).

Table 3. Critical habitat, designation date, Federal Register (FR) citation, and status summary for critical habitat considered in this opinion.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Middle Columbia River steelhead	9/02/05 (70 FR 52630)	Irrigation withdrawals, over-allocation of flows, removal of riparian vegetation, wetland draining and conversion, livestock grazing, dredging, road construction and maintenance, logging, mining, and, to a limited extent, urbanization have reduced tributary stream flows, impaired passage in tributaries, increased sediment delivery to stream channels, altered stream morphology (i.e., channel modifications and diking), degraded water quality, and generally degraded critical habitat throughout much of the Interior Columbia Recovery Domain. Critical habitat in the action area is primarily affected by flow regulation from Kacheluss and Kachess dams, Interstate-90, and historic logging. The action area for this project is contained within the Upper Yakima River watershed, which provides 39.8 miles of freshwater spawning/rearing physical and biological features (PBFs), and 8.2 miles of migration/presence PBFs (NMFS 2005). The Critical Habitat Analytical Review Team (CHART) concluded the Upper Yakima River has a moderate-high conservation value because the PBFs in this watershed support one of four demographically independent populations in the Yakima River Major Population Group. CHART also noted that the additional areas upstream of Cle Elum, Kachess and Kacheluss dams may be essential for distinct population segment conservation.

The mainstem Yakima River and the Kachess River in the action area are both designated MCR steelhead critical habitat. At Easton Dam, either hydraulic or operational conditions or a combination of both affect the fish ladder and compromise access to both waterways during the

timing of MCR steelhead adult upstream migration. However, there is both spawning and rearing habitat upstream of Easton Dam for steelhead that are able to gain access.

The freshwater PBFs present in the action area relevant to this consultation are primarily for spawning and rearing with a lesser emphasis on migration, as listed below in Table 4.

Table 4. Critical habitat physical and biological features (PBFs) relevant to this consultation.

PBF Site	PBF Characteristics	Species Life Stage
Freshwater spawning	Water quality, water quantity, substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity, floodplain connectivity	Juvenile growth and mobility
	Water quality, forage	Juvenile development
	Natural cover	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, natural cover	Juvenile and adult mobility and survival

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

- Minimizing winter drafts (for flood risk management and power generation) to save water for augmenting spring flows during the peak juvenile passage period (water quantity).
- Releasing additional water from storage to augment flows for juvenile and adult summer migrants (water quantity).
- Releasing water from Dworshak Dam to reduce peak summer temperatures in the lower Snake River (water quality).
- Constructing juvenile bypass systems and "surface passage" structures, and providing spill at the run-of-river dams to divert smolts, steelhead kelts, and adult salmon falling back downstream away from turbine units (safe passage).
- Maintaining and improving the ladders used by adult salmon and steelhead (safe passage).

As discussed above, another factor affecting the range-wide status of MCR steelhead critical habitat in the Columbia River Basin is climate change. Several studies have revealed that climate change has the potential to affect ecosystems in nearly all tributaries throughout the state (Battin et al. 2007; ISAB 2007; Mote et al. 2014). While the intensity of effects will vary by region (ISAB 2007), most models project warmer air temperatures, increases in winter precipitation, and decreases in summer precipitation (Luce et al. 2013). Warmer air temperatures will lead to

more precipitation falling as rain rather than snow. As the snow pack diminishes, seasonal hydrology will shift to more frequent and severe early large storms, changing streamflow timing and increasing peak river flows, which may limit salmonid survival (Luce et al. 2013; Mantua et al. 2009). The largest driver of climate-induced decline in salmonid populations is likely to be the impact of increased winter peak flows, which scour the streambed and destroy salmonid eggs (Battin et al. 2007).

Higher water temperatures and lower spawning flows are all likely to decrease the function of MCR steelhead spawning and rearing PBF across the region. As harmful warm water temperatures become more widespread, juvenile salmonids may increasingly rely on confluences of colder tributaries or other areas of cold-water refugia (Mantua et al. 2009). Such changes are likely to make it more challenging to conserve diverse salmonid life histories, as the stream-type salmonid life history appears to be dependent on a diminishing habitat (Beechie et al. 2006).

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 purposes of this consultation, the action area includes the five named and unnamed left bank fish-bearing tributaries of the Yakima River upstream of Easton Dam at RM 202.5 (listed in Table 1) and approximately 0.27 miles of the lower Kachess River as it enters the Easton Dam pool. The I-90 SPE does not cross the Yakima River in the action area and work sites on the tributaries are at least 500 yards upstream from the Yakima River. In the Kachess River, the action area extends from the Easton Dam pool upstream approximately 0.27 miles to just upstream of the WB Kachess River Bridge. The action area on each of the tributaries includes the footprint of each crossing structure (see Table 1) plus the stream channel approximately 25 feet upstream and a maximum of 300 feet downstream for water quality effects. For each tributary the action area will also include the streambanks and riparian area 30 feet upstream and downstream of the new culvert or bridge and landward 20 feet on each bank from the OHWM, as well as any newly accessible stream areas upstream of the new stream crossings which will all be on United States Forest Service (USFS) land. Using the site-specific footprint for each crossing in Table 1 plus an estimated 2,400 ft^2 of area around each worksite NMFS conservatively estimates a total of approximately 18,144 ft^2 of area will be disturbed over five tributaries and the Kachess River Bridge abutment.

This is a very conservative estimate as most crossing sites will be accessed from the existing road bed and will not require disturbance of existing streambanks or riparian areas. The extent of the action area is based on the estimated extent of riparian, streambank and streambed disturbance from culvert removal, streambed stabilization, pier removal (Kachess River), and the extent of ground disturbance in riparian areas associated with access and construction in these areas.

2.4 Environmental Baseline

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 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The Yakima and Kachess Rivers upstream of Easton Dam are both designated MCR steelhead critical habitat but the five fish-bearing tributaries to the Yakima River that are involved in the proposed action are not. However, all the fish-accessible streams in the action area have the potential to provide some level of rearing habitat for juveniles and if the habitat conditions are appropriate they could also provide adult spawning habitat. Within the action area, streams that are accessible to fish and provide appropriate habitat conditions could be used by adults for spawning and juvenile steelhead for rearing from the Yakima Upper Mainstem population.

Transportation routes typically occupy floodplain areas and shorelines that would otherwise be accessible and provide much needed steelhead rearing habitat. However, in this case the highway is far enough away from the Yakima River for most of the 8.3 miles of the proposed action that the potentially adverse effects to fish-bearing waters are passage (new culverts or bridges in fish-bearing streams), water quality (discharging pollution from developed sites), water quantity (water withdrawal during construction), altering both surface and groundwater exchange (hydrologic connectivity), and increased impervious surface.

In the action area, I-90 runs east to west across a landscape that slopes from north to south with the Yakima River on the south side of I-90 receiving all the drainage from the higher elevations on the north side of I-90. Although culverts were installed during the original construction of the highway for defined perennial streams, all the culverts are undersized and the highway blocked the movement of groundwater and some surface water (wetlands) down the slope from north to south. The MDT for the I-90 SPE also identified locations in the project corridor where wildlife movement patterns and areas for protecting aquatic habitat processes overlapped. An emphasis was placed on improving ecological connectivity in wetlands, riparian habitats, floodplains, streams, upland forests, unique habitats (such as talus), and old growth forests. The MDT called these areas CEAs. In addition, associated with the CEAs, the MDT identified HCZs, areas not necessarily located at stream crossings, where moving water under the roadway is important. They are typically located adjacent to wetlands, seeps, springs, or other visible signs of water that presently collect on the north side of the highway instead of continuing their natural movement downslope toward the Yakima River. Within each CEA, WSDOT has designed and targeted connectivity structures such as bridges and culverts in a variety of sizes and shapes to meet the specific objectives of that CEA. These connectivity structures range from small bottomless culverts to long bridges and wildlife overcrossings. With the exception of the wildlife overcrossings, all the connectivity structures will function to reconnect and restore hydrologic flows, nutrient cycling and water quality, all indirect benefits to fish habitat.

A large portion of the river and stream miles upstream of Easton Dam is within lands administered by the OWNF, WSDOT and WDNR. From Keechelus Dam to Easton Dam, the

Yakima River floodplain function is excellent, with a braided, meandering channel and numerous side channels (Haring 2001). The river has complex in-channel structure and an intact riparian corridor with little encroaching development. However, flow regulation, historic logging in the watersheds, and the existing I-90 freeway, including undersized culverts and bridges, have all affected the aquatic habitats upstream of Easton Dam. The Kachess River extends upstream of the Easton Dam pool approximately 1 mile before reaching the Kachess Dam. The Yakima River extends upstream of the Easton Dam pool approximately 12 miles before reaching the Keechelus Dam. There is approximately 20 miles of suitable MCR steelhead aquatic habitat in the mainstem and tributaries to the Yakima River upstream of Easton Dam pool and within the OWNF. Of the five fish-bearing tributaries to the Yakima River that will have passage structures modified, all five existing structures are currently fish passage barriers, the project will remove all five barriers and establish either an engineered channel or a natural channel to provide future passage.

Streamflow in the Yakima and Kachess Rivers is highly regulated to provide irrigation flows throughout the entire Yakima River Subbasin. Adequate flows are necessary for migrating adult steelhead to pass upstream to spawning areas, provide rearing habitat, and facilitate smolt emigration to marine environments. Flows also affect other habitat parameters like temperature, riparian vegetation, and food supply. In an unregulated condition, snowmelt-driven discharge peaks would dominate the flows in the Yakima Basin in May or June that then decline to ground-water-driven base flows in August and September. Late autumn rainfall and minor snowmelt would augment summer base flow, with Chinook winds or rain on snow events causing occasional winter high water flow episodes. Steelhead are adapted to these natural seasonal flow patterns, which maintained a variety of habitats and facilitated migratory behavior. Management of water storage and delivery systems in the Yakima Basin has significantly altered this flow pattern. Now winter and spring runoff from the upper Yakima, Kachess (both in the action area), Cle Elum, Tieton and Bumping rivers is captured in storage reservoirs and is used to meet summer irrigation needs in accordance with yearly entitlements. These operations result in stream flows across the basin that are often out of phase with the life-history requirements of native salmonids (Fast et al. 1991; Stanford et al. 2002) and riparian species such as cottonwoods (Jamieson and Braatne 2001). The most significant changes in flow regimes are the creation of: (1) unnaturally low flows, (2) unnaturally high flows, (3) rapidly changing flow levels, (4) return flows, and 5) altered sediment and wood transport.

There is some evidence that Easton dam hinders adult steelhead passage. Radio telemetry studies (Karp et al. 2009), have documented a few Upper Yakima steelhead approaching Easton Dam, and none passing the dam. However, these studies involved small numbers of fish over a few years. Furthermore, spring-run Chinook salmon regularly ascend the fish ladder at the dam; this indicates that under some conditions (possibly operational or hydraulic conditions that occur more often when spring-run Chinook salmon migrate), Easton Dam is passable to adult salmonids. Therefore, for the purposes of this analysis, NMFS will assume that steelhead pass the dam and thus further assume that Lake Easton, the Keechelus Reach of the Yakima River where the aforementioned tributaries enter, and the lower Kachess River are occupied by steelhead.

2.5 Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

The I-90 SPE corridor is the main east-west transportation corridor across Washington State, and as such carries high volumes of interstate commerce. The proposed action is the final phase of a 15-mile-long, multi-year project designed to meet future traffic demands and improve public safety. The proposed action will not in and of itself increase traffic on the I-90 corridor. Because the surrounding landscape is primarily USFS, WSDOT, and WDNR with only small privately owned parcels, it is unlikely that there will be any development in or near the action area associated with the improved highway in the action area.

2.5.1 Effects on Species

As stated above, NMFS assumes that MCR steelhead occupy the lower Kachess River, the Yakima River and five of its tributaries upstream of Easton Dam where in-water work would occur. It is also possible that MCR steelhead would spawn in the action area but steelhead spawning and emergence take place prior to the in-water work window. All in-water work in fish-bearing streams will occur in the approved construction window, July 16 to September 30, which will avoid effects to adults or incubating embryos.

During the in-water work windows, steelhead juveniles of at least two age classes may be present and rearing in the action area. The use of BMPs to isolate and protect existing channels will prevent any material from entering a stream during removal of the existing or construction of new structures. The exception to this is the Kachess River Bridge where the contractor will isolate a limited area below the OHWM where the existing piers are located but removal will take place during low pool when the isolated area is already dewatered.

Worksite Isolation and Fish Removal

Worksite isolation and fish removal and exclusion actions during the in-water work window are intended to avoid and minimize effects of the in-water construction to salmonids. Fish handling, capture, collection and seining may injure fish and can include stress-related phenomena. Stress approaching or exceeding the physiological tolerance limits of individual fish impairs reproductive success, growth, and resistance to disease (Barton et al. 1986; Bonga 1997; Contreras-Sánchez et al. 1998; Schreck et al. 2001; Sigismondi and Weber 1988).

The total area expected to be dewatered and require fish salvage in the five fish-bearing streams is 6,144 ft^2. As discussed above, MCR steelhead access to the action area is limited but NMFS assumes juvenile MCR steelhead occupy the action area. To estimate the number of juvenile steelhead potentially exposed to work site isolation, we used average juvenile steelhead density values in average habitat from Mullan et al. (1992) of 12.3 per 1076.4 ft^2. Thus, NMFS would

expect up to 70 total juvenile MCR steelhead to be in the five fish-bearing streams that will require fish salvage. NMFS conservatively estimates that at least 50 percent of the juveniles encountered (35) will vacate the site of their own volition when herded with seines and at least 50 percent of the remaining 35 juveniles will be salvaged and relocated. WSDOT's previous salvage records during other phases of the I-90 SPE project indicate that the mortality rate for salvaged fish has been less than 1.5 percent. Assuming the salvaging techniques and protocols remain the same and the mortality rate of salvaged fish remains constant, NMFS does not expect more than one salvaged juvenile MCR steelhead to die as a result of salvage. The last 18 juveniles that fail to vacate the area or may hide among the substrate or undercut banks and will be injured or killed after the area is dewatered and actions within the channel begin. Thus, we estimate that as many as 19 juvenile MCR steelhead will die, the majority of which will be age zero fish.

Using life stage equivalents from Quinn (2005), the injury or death of up to 19 juvenile steelhead does not accrue to the loss of one adult steelhead, even if all the fish were from the same brood year.

Water Quality/Suspended Sediments

Construction activities related to the removal and replacement of bridges and culverts will disturb streambank and riverbed sediments, increasing the likelihood of temporary increases in suspended sediments in each of the five tributaries during or immediately after construction. Because the closest tributary worksite is approximately 530 yards upstream of the Yakima River, NMFS does not believe suspended sediments will affect the Yakima River itself. However, in the five fish-bearing tributaries, construction-related increases in sedimentation and siltation above the background level could potentially affect fish species and their habitat by reducing juvenile survival, interfering with feeding activities, and reducing primary and secondary productivity. The magnitude of potential effects on fish depends on the timing and extent of sediment loading and flow in the stream before, during, and immediately following construction.

Temporary increases in suspended sediment concentrations have highly variable effects on fish, ranging from behavioral effects including alarm reactions and avoidance responses to sublethal effects including reduced feeding and physiological stress (Newcombe and Jensen 1996). Juvenile salmonids often avoid streams that are chronically turbid (Lloyd 1987) or move laterally or downstream to avoid turbidity plumes (Sigler et al. 1984). Several studies have documented active avoidance of turbid areas by juvenile and adult salmonids (Lloyd et al. 1987; Servizi and Martens 1992; Sigler et al. 1984). The severity of effect of suspended sediment increases as a function of the sediment concentration and exposure time, or dose (Bash et al. 2001; Newcombe and Jensen 1996). Sigler et al. (1984) found that prolonged exposure to turbidities between 25 and 50 Nephelometric Turbidity Units (NTU) resulted in reduced growth and increased emigration rates of juvenile coho salmon and steelhead compared to controls. These findings are generally attributed to reductions in the ability of salmon to see and capture prey in turbid water (Waters 1995). Chronic exposure to high turbidity and suspended sediment may also affect growth and survival by impairing respiratory function, reducing tolerance to disease and contaminants, and causing physiological stress (Waters 1995). Berg and Northcote (1985)

observed changes in social and foraging behavior and increased gill flaring (an indicator of stress) in juvenile coho salmon at moderate turbidity (30–60 NTU). In this study, after turbidity was reduced to lower levels (0–20 NTU), behavior quickly returned to normal.

Although NMFS expects all fish in the area to be mobile enough to avoid the spatially and temporally-limited turbidity, elevated turbidity levels could result in conditions that will affect the behavior of some MCR steelhead. During periods of turbidity, fish in close proximity to the origination point are likely to display avoidance behaviors. If avoidance behavior displaces fish from preferred rearing habitat, it can result in greater expenditure of energy, greater exposure to predators, and greater competition for holding areas and suitable prey base. Individual fish that encounter increased turbidity or sediment concentrations will likely move away from affected areas into more suitable surrounding habitat. In-water work will only occur from July 16 to September 30 when flows in tributaries are lowest, but flows in the Yakima River are high. Thus if young fish were forced to flee as far downstream as the Yakima River they could experience very high flows. However, we expect the turbidity generated as flow returns to stream channels will not be sufficient to drive juveniles hundreds of yards downstream to the Yakima. NMFS does not expect turbidity to result in any injury or mortality or appreciably alter survival or fitness of any of those fish within the action area.

Stormwater

The 8.3 mile I-90 SPE footprint within the action area does not currently include any engineered stormwater treatment. Therefore, because construction of Phase 3-4 will treat all stormwater, NMFS expects an overall pollutant load reduction in the tributaries and the mainstem Yakima and Kachess Rivers. WSDOT will provide on-site treatment and off-site stormwater mitigation for locations where on-site treatment is not possible due to physical constraints. The proposed action will incorporate onsite stormwater treatment including natural or engineered dispersion areas, media filter drains, continuous inflow CABS, or vegetated filter strips depending on location. In addition, WSDOT is collaborating with the USFS to determine where federally-managed lands adjacent to the project footprint may serve as steep-slope stormwater dispersion (SSSD) areas. The use of SSSD will minimize impacts to forested areas or aquatic resources that would otherwise be converted to stormwater treatment facilities. NMFS believes that the overall improvement in engineered stormwater treatment, from no stormwater treatment to full treatment, will benefit all aquatic species and their habitats in the action area.

Traction Sand and Deicer

The primary deicers used today are sodium chloride (NaCl), calcium chloride ($CaCl_2$), magnesium chloride ($MgCl_2$), and calcium magnesium acetate (CMA). These compounds are sold under trade names such as IceBan™ ($CaCl_2$), IceSlicer™ (NaCl, KCl, $MgCl_2$), FreezGard™ ($MgCl_2$) and M-50™ ($MgCl_2$), and are being used in place of traditional salts (i.e., sodium chloride) to deice roads. The benefits of using alternatives to sodium chloride are less corrosion and less damage to plants, soil, and organisms. Alternative deicers also require less volume applied to be effective over the traditional sand and/or salt application.

The WSDOT Hyak Maintenance Facility (the relevant facility to this consultation) currently uses FreezGard™ and IceSlicer™ as their anti-icer and deicer, respectively. FreezGard™ is a liquid magnesium chloride solution (30%) with a corrosion inhibitor, and is applied to the roads at a rate of 20 to 25 gallons per lane mile before a freeze occurs. IceSlicer™ is a pelletized deicing product "composed of naturally occurring complex chlorides and 60+ trace minerals". It is mixed with liquid FreezGard™ to make a wet application; this also adds corrosion protection, as IceSlicer™ does not have corrosion inhibitors. When the roads become covered in snow and ice, the maintenance facilities apply a 10:1 or 5:1 ratio of sand to IceSlicer™, with FreezGard™ added to the mix to help it spread out more evenly over the roads. In summary, the primary anti-icers and deicers used in the project area are chloride-based substances ($CaCl_2$, NaCl, KCl, and $MgCl_2$).

A study of anti-icer and deicer products with similar chemical compositions (IceBan™ $CaCl_2$) was conducted in Peshastin Creek, Washington and Bear Creek, Oregon (National Academies of Sciences 2004). In Peshastin Creek, WSDOT determined that the chloride concentrations increased during the earliest stages of spring melt. However, the chloride concentrations measured were far less than the minimum chloride concentration considered toxic to aquatic biota. The study determined that the biochemical oxygen demand (BOD) in Bear Creek did not increase and there were no discernible increases in calcium concentrations in the creek due to the highway application of IceBan™ as an anti-icer. It is reasonable to conclude that the results in the action area will be similar.

In the aforementioned study, IceBan™ was applied at an average rate of 35 gallons per lane mile, whereas WSDOT will apply anti and deicing chemicals at rates of 20 to 25 gallons per lane mile. As noted earlier, the proposed action includes substantial infrastructure to handle and treat stormwater. The results of IceBan™ study, in the context of the robust stormwater treatment associated with the proposed action, suggests that MCR steelhead will not experience significant effects from the use of anti-icers and deicers.

Historically, WSDOT has used traction sand extensively along the project corridor. Traction sand can negatively affect receiving water bodies. Sand that is transported in stormwater runoff and snowmelt to nearby receiving water may smother important fish and invertebrate habitat. The addition of engineered stormwater treatment along the entire 8.3 miles will prevent almost all sand from being carried into receiving waters. The plow spray arising from the additional impervious surface would not be significant because the increase in impervious surface would be distributed along the 8.3-mile length of Phase 3-4, and with the exception of a few hundred feet of bridge surfaces the plow spray would not directly enter any waterbody. Overall, NMFS does not believe the use of anti-icer, deicer, or sand treatments on the existing or new impervious surface area will result in any measurable adverse effect to aquatic life in the action area.

Forage

The proposed actions in the five fish-bearing tributaries and the lower Kachess River will have a temporary negative effect on benthic macroinvertebrates by disturbing approximately 6,144 ft^2 of streambed over the five streams. The area to be disturbed in the Kachess River will be above the pool elevation at the time of disturbance and restored before the pool refills. Once the existing

structures, including the piers in the Kachess River are removed any newly available or newly constructed streambed area will, for at least a few weeks, provide fewer macroinvertebrate prey items than adjacent areas. However, forage species will begin to colonize the areas immediately after project completion via drift and migration (Fowler 2004; Herrmann et al. 2012). Given the size of the disturbed area, the amount of available local habitat, and the short-term nature of the action, NMFS expects short-term (from several days up to a few weeks) localized reduced productivity followed by a return to pre-project conditions such that effects to fish from reduced forage are not expected to be more than minimal.

Passage

Five of the tributaries to the Yakima River upstream of Easton Dam are fish-bearing and currently have undersized culverts that block passage. All new tributary structures will provide passage when construction is completed. NMFS does not expect the construction effects from the proposed action to appreciably reduce the suitability of the action area for migration because passage is not currently available, spawning, and rearing habitat will only be temporarily and minimally affected by construction with a full return of function post-project. NMFS expects an improvement in habitat availability post-construction when passage is available on all fish-bearing streams.

Water Withdrawal for Construction

A peak daily total water use of 40,000 gallons is required for Phase 3-4 construction activities, wetland mitigation site watering, and watering of other plant establishment areas. This daily water withdrawal rate is equivalent to 0.12 cfs, or 54 gpm. To address this need throughout the project limits, the contractor will use an existing well at the Crystal Springs Sno-Park and surface water will be withdrawn from the Yakima and Kachess Rivers. The use of BMPs including appropriately sized pumps will avoid harm to instream fish or other aquatic organisms. NMFS does not believe the quantity of water withdrawn, up to 0.2 percent of the lowest flows, will have any effect on ESA-listed species in the rivers or streams in the action area.

Relevance of Effects on Individual Fish to Salmonid Population Viability

NMFS assesses the importance of habitat effects in the action area on individual fish and the population by examining the relevance of those effects to the characteristics of VSPs. The characteristics of VSPs are sufficient abundance, population growth rate (productivity), spatial structure, and diversity. While these characteristics are generally described as unique components of population dynamics, each characteristic exerts significant influence on the others. Declining abundance, for example, can reduce the spatial structure component of a population and, when habitats are less varied, then diversity among the population declines.

The 5-year geometric mean of natural spawners for the Upper Yakima River population has been estimated from 1992 through 2014 and has varied from a low of 53 when the fish were listed in 1999 (Ford et al. 2010), to a high of 246 for 2010 to 2014 (NWFSC 2015). The current NMFS threshold for viability for this population is 1,500 spawners. Reaching that objective is hindered primarily by actions and conditions that occur throughout the subbasin. NMFS does not expect

the proposed action to impede the attainment of viability goals, both in terms of the short-term construction disturbance and the long-term operation and maintenance of the upgraded transportation corridor. There will be long-term beneficial effects from installation of engineered stormwater treatment, the replacement of undersized culverts on fish-bearing streams and improvements in overall hydrologic connectivity that is currently absent.

The MCR steelhead juveniles that may rear in the action area, and adults that may be able to access the area for spawning are important for increasing abundance within the MPG and therefore the DPS. However, the death or injury of up to 18 juvenile *Oncorhynchus mykiss* from the Upper Yakima River will be small when considered at the population scale. Therefore, the proposed one-time action will have only minimal effect on the abundance within the Upper Yakima River population of MCR steelhead, and thus the effects to the MPG will be even smaller.

2.5.2 Effects on Critical Habitat

Critical habitat within the action area is only designated in the mainstem Yakima and Kachess Rivers, not in the tributaries where most of the proposed actions will occur. In addition, because all of the Yakima River tributary action sites are at least 530 yards from the mainstem, NMFS does not believe those tributary actions will affect critical habitat in the Yakima River. Therefore, the only critical habitat likely to be affected by the proposed action is the lower Kachess River. The Kachess River has an associated combination of physical and biological features essential for rearing and migrating steelhead. The critical habitat PBFs most likely to be affected by the proposed action are water quantity and riparian vegetation.

The PBFs of freshwater spawning and rearing sites and migration corridors include substrate, water quality and quantity for spawning, floodplain connectivity, water quality and quantity including temperature conditions supporting juvenile and adult mobility, abundant prey items supporting juvenile feeding, cover generally associated with complex habitat, and free passage (no obstructions) for adults and juveniles. These features are essential to conservation because they allow adult fish to reach upstream spawning areas and they allow juvenile fish to rear in and near natal streams for at least 1 to 2 years before proceeding downstream and to the ocean.

Designated critical habitat within the action area consists of good to very good quality freshwater spawning, rearing and migration PBFs in the lower Kachess River. Although there is a great deal of anthropomorphic disturbance in the watershed, the overall quantity and quality of critical habitat in the action area is very good in many areas. The essential elements of PBFs temporarily affected by the proposed action in the lower Kachess River are water quantity and riparian vegetation, both of which support adult and juvenile survival, growth, and mobility.

Water Quantity

A peak daily total water use of 40,000 gallons is required for Phase 3-4 construction activities, wetland mitigation site watering, and watering of other plant establishment areas. This daily water withdrawal rate is equivalent to 0.12 cfs, or 54 gpm. To address this need throughout the project limits, the contractor will use an existing well at the Crystal Springs Sno-Park and surface water will be withdrawn from the Yakima and Kachess Rivers (only one source will be used at a time).

- ***Crystal Springs Sno-Park Well.*** This well is located on a terrace of alpine glacial drift on the south side of the Yakima River. The terrace lies approximately 30 to 40 feet above the floodplain.

- ***Kachess River.*** The contractor will withdraw water from the Kachess River at the I-90 Bridge with BMPs in place to avoid adverse effects to fish. Reclamation controls flows in the Kachess River by releases from the Kachess Reservoir. Kachess River flows are lowest in May and June when the river drops to as low as 30 cfs. Flows increase in the early irrigation season (July–August) to 300 to 600 cfs, and up to 1,200 cfs and greater in September and October to meet irrigation demands in the lower Yakima Basin when Keechelus Reservoir releases are reduced to protect salmon redds.

- ***Yakima River.*** The contractor will withdraw water from the Yakima River at the Stampede Pass Road Bridge with BMPs in place to avoid adverse effects to fish. Reclamation controls flows in the Yakima River by releases from the Keechelus Reservoir. The Yakima River flow below Crystal Springs is greatest during irrigation releases in July and August, ranging from 500 to 1,200 cfs. Keechelus Reservoir releases are reduced in September and October to 80 to 120 cfs to minimize scour of salmon redds in the Yakima River above Easton.

NMFS does not believe the withdrawal of up to 0.12 cfs from either the Crystal Springs Sno-Park Well, the Kachess River or the Yakima River even during their lowest flows of 30 to 80 cfs will result in any measurable affect to flows or habitat within the channel.

Riparian Vegetation Impacts

Relocation of the WB Kachess River Bridge will require disturbance of approximately 200 ft^2 of riparian vegetation within the existing median. Existing woody vegetation is limited to several shrubs less than 5 feet tall (hardhack–*Spiraea douglasii*) and one small conifer (less than 4-inch dbh). The former WB alignment will be restored with native, riparian vegetation, thereby improving the riparian cover baseline in the long term.

The replacement of three undersized culverts with large bridges will require revegetation with native trees, shrubs and grasses in the median and to the extent practicable beneath the bridges. Elements of a more natural habitat improve the functionality of these structures and open their use to a wider range of species. Vegetation and woody debris also supply organic matter to water

and soils, provide habitat for decomposer and soil organisms, and aid in moisture retention during dry periods.

Relevance of Effects on Physical or Biological Features to Conservation Value

As described above, the proposed actions in the lower Kachess River will have a short-term negative effect on riparian vegetation. NMFS does not expect these effects from the proposed action to result in any reduction in the suitability of the action area for spawning or rearing or as a migration corridor, as habitat conditions will be slightly improved over the long-term. In sum, the proposed action will not appreciably alter the conservation value of designated critical habitat for MCR steelhead.

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). 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.

The majority of the action area is on federal property (USFS) or is surrounded by federal and state property and is therefore subject to consultation for future actions. 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).

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 because 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). NMFS takes into account the status of the species and critical habitat (Section 2.2), to formulate the agency's 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 for the conservation of the species.

The MCR steelhead DPS is unviable because only six populations are viable, seven are at moderate risk and four are at high risk of extinction. The DPS cannot achieve viability without significant improvements in abundance, productivity, and diversity for the moderate and high risk populations. The Yakima Upper Mainstem population of MCR steelhead are present in the action area. The Yakima Upper Mainstem is among those populations most at risk in the DPS. Despite increased abundance in recent years, the Yakima Upper Mainstem population is short of

recovery goals for both abundance and productivity. Outside the action area, urban development, logging, grazing, power generation, and agriculture have all resulted in the loss of important spawning and rearing habitat, and the loss or degradation of migration corridors. Within the action area, the regulation of flows by Reclamation from Keechelus and Kachess Reservoirs reduce habitat quality and the associated dams and undersized culverts in the freeway block access to spawning and rearing areas.

The proposed action will reduce abundance in the short term; specifically those juvenile fish killed or injured (resulting in death later) by in-water work. Based upon densities described above, NMFS estimates that up to 19 steelhead juveniles will be killed or injured during construction. All killed and injured fish would be from the Yakima Upper Mainstem population. Even assuming a very high juvenile-to-adult survival rate of 2 percent, 19 juvenile steelhead are expected to produce not more than one adult steelhead. In the context of the Yakima Upper Mainstem most recent mean abundance estimate of 246 spawners, the expected injury or death of these fish from direct construction impacts is not expected to meaningfully affect adult returns.

Direct effects include temporarily dewatering a total of 6,144 ft^2 of benthic habitat in fish-bearing streams (individual areas range from 648 ft^2 to 1040 ft^2 in the five fish-bearing streams), which will reduce food availability for juvenile salmonids in the immediate area and downstream for the three non-fish-bearing streams. However, the affected benthic area is small relative to the overall benthic area available for juvenile foraging in the tributaries and the mainstem Yakima River and recolonization in the tributaries will begin within a few days. Temporarily reducing food availability at this scale is not likely to reduce growth or survival, for juvenile steelhead.

The removal of fish passage barriers in five fish-bearing streams and the improved floodplain connectivity, groundwater-surface water interaction, movement of sediments and LWD will increase the amount of and improve the quality of available habitat. The proposed replanting of the former WB Kachess Bridge site will be an improvement over existing conditions. As plantings mature and restore at least some of the lost function over time in that location, every generation of steelhead into the foreseeable future will experience improved habitat at the site.

The limited effects to critical habitat include a temporary loss of 200 ft^2 of riparian habitat adjacent to the Kachess River that will be replaced as well as an improvement in hydrologic processes by removing the bridge pier from below the OHWM.

The proposed action will increase the impervious surface by approximately 34 acres over 8.3 miles, a 35 percent increase over the existing footprint of the freeway. The increase is primarily the result of:

- adding an additional lane in each direction.
- realigning WB lanes to parallel the existing EB lanes from MP 67.5 to 69.5.
- widening medians to improve safety, increase snow storage, and allow for improved stormwater capture and infiltration.
- enlarging slope stabilization areas.

Most of the action area is USFS land and road density and impervious surface on USFS land within the Upper Yakima Mainstem watersheds is high at 3.8 miles per square miles. The USFS is in the process of reducing road density on USFS land near the I-90 SPE project with more than 100 miles of road in the Upper Yakima currently in progress for closure. Overall, the increased impervious surface on non-federal land, along with the improvements in stormwater treatment, passage, stream and floodplain function are not likely to degrade or interfere with the functions of MCR steelhead critical habitat for migration, spawning or rearing.

In sum, the proposed action will improve groundwater–surface water interaction, stream and floodplain structure and function and increase access to high quality habitat immediately. Given the context of an action area that is somewhat degraded but still retains high levels of floodplain connectivity because of its location on USFS land, the adverse effects of the proposed action are not expected to appreciably diminish the likelihood that MCR steelhead will survive and recover.

Summary

For all the reasons described in the preceding paragraphs of this section, the proposed action will not appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction or distribution nor will the proposed action reduce the value of designated critical habitat 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, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of MCR steelhead, or destroy or adversely modify their designated critical habitat.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

In the opinion, NMFS determined that incidental take of MCR steelhead is reasonably certain to occur due to exposure to mechanical injury and to reduced benthic productivity and riparian vegetation. Only the juvenile life stages will be adversely affected. We estimate that up to 19 juvenile steelhead will be injured or killed by construction activity.

Where possible, NMFS has estimated the number of fish that are likely to be in the action area that could be harmed by the proposed action. However, NMFS is not always able to precisely quantify and track the amount or number of individuals that are expected to be incidentally taken (injure, harm, kill, etc.) per species because of each mechanism of take. The difficulty is because of the variability and uncertainty associated with the response of listed species to the effects of the proposed action, the varying population size of each species, annual variations in the timing of spawning and migration, individual habitat use within the action area, and difficulty in observing injured or dead fish. However, it is possible to estimate the extent of incidental take by designating as ecological surrogates those elements of the project that are expected to result in incidental take, that are more predictable and/or measurable, with the ability to monitor those surrogates to determine the extent of take that is occurring. Ecological surrogates are project elements that are expected to result in take and are somewhat predictable and/or measurable. Ecological surrogates can be monitored to approximate the level of take that occurs. Ecological surrogates for construction effects are described below. In the opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

- Direct Effects

  Incidental take is expected to occur from construction-related effects in the form of injury or death of listed species. Worksite isolation and salvage for the removal of the existing culverts may injure or kill fish when salvaged or when the area is dewatered. The total area to be dewatered in the five fish-bearing streams is approximately 6,144 ft^2. Fish density estimates indicate that up to 19 total MCR steelhead juveniles may be affected by worksite isolation. If the FHWA exceeds the 19 juvenile steelhead captured, injured or killed when salvaging fish from the isolated streambeds, or exceeds the 6,144 ft^2 streambed footprint in the five fish-bearing streams, or 18,144 ft^2 total disturbed area over the five fish-bearing streams, the project will be considered to have exceeded anticipated take levels, thus requiring the WSDOT to cease operations and coordinate with FHWA and NMFS within 24 hours on ways to reduce the amount of take down to anticipated levels.

- Increased Sedimentation and Turbidity

  The analysis of the effects of the project anticipates that the mixing zone for turbidity levels produced by removal of undersized culverts and installation of new culverts and a bridge will not exceed WDOE state water quality standards and shall comply with the most restrictive combination of the following:

a. Not extend in a downstream direction for a distance from the discharge point(s) greater than 100 feet plus the depth of water over the discharge point(s), or extend upstream for a distance of over 100 feet.
b. Not affect greater than 25 percent of the flow.
c. Not occupy greater than 25 percent of the width of the water body.

If turbidity exceeds these standards, and construction activities fail to halt and adjust work to return to acceptable levels, the project will be considered to have exceeded anticipated take levels, thus requiring WSDOT to cease operations and coordinate with FHWA and NMFS within 24 hours on ways to reduce the amount of take down to anticipated levels.

- Alteration of Habitat

The ecological surrogate for incidental take associated with the action is the disturbance of approximately 6,144 ft^2 of streambed in the five tributaries and up to 200 ft^2 of riparian vegetation associated with the realignment of the WB Kachess River Bridge the effects of which have been analyzed in this opinion.

Anticipated incidental take will be exceeded if the numbers of individual fish or the ecological surrogates described in the sections above are not met, the project is not implemented as described in the BA, all minimization measures and BMPs are not implemented as described in the BA (including successful completion of monitoring and reporting criteria), or the project is not implemented in compliance with the terms and conditions of this ITS. If the number of fish harmed is exceeded or these ecological surrogates are not met and maintained, the proposed action will be considered to have exceeded anticipated take levels, thus requiring WSDOT to cease and coordinate with FHWA and NMFS within 24 hours on ways to reduce the amount of take down to anticipated levels.

2.9.2 Effect of the Take

In the opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species, 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 measures described below are non-discretionary, and the FHWA must ensure they are undertaken by WSDOT so that they become binding conditions of any contracts or permits, as appropriate, for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this ITS. If the FHWA (1) fails to assume and implement the terms and conditions or (2) fails to require its contractor(s) to adhere to the terms and conditions

of the ITS through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the FHWA must report the progress of the action and its impact on the species to NMFS as specified in the ITS [50 CFR§402.14(i)(3)].

1) Measures shall be taken to minimize the mobilization of in-channel sediments, the introduction of sediments to streams, and turbidity plumes.
2) Measures shall be taken to revegetate temporarily impacted areas below and above the OHWM with native plants, shrubs and trees.
3) FHWA shall monitor and report on the amount or extent of incidental take.

2.9.4 Terms and Conditions

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

1) The following terms and conditions implement RPM 1: Measures shall be taken to minimize the mobilization of in-channel sediments, the introduction of sediments to the streams or river and turbidity plumes.
    a. Minimization measures described in the BA and BMPs shall be implemented to prevent sediment incursion into the active channel and reduce the mobilization of sediments in the channel.
    b. Water discharged into the Yakima River tributaries, the Yakima River, the Kachess River or any associated wetland during construction will be filtered with a filter bag, diverted to a settling tank, upland, or infiltration area, and/or treated in a manner to ensure that discharges conform to the water quality requirements of the state water quality standards or waste discharge permit.
    c. Monitoring to ensure turbidity does not exceed the most restrictive combination of the following:
        i. Not extend in a downstream direction for a distance from the discharge point(s) greater than 100 feet plus the depth of water over the discharge point(s), or extend upstream for a distance of over 100 feet;
        ii. Not utilize greater than 25 percent of the flow; and
        iii. Not occupy greater than 25 percent of the width of the water body.

    If turbidity exceeds these standards, construction activities will need to halt and adjust work to return to acceptable levels.

        iv. Use an appropriate and regularly calibrated turbidity meter.
        v. Collect background turbidity levels at an undisturbed location approximately 100 feet upstream of point of disturbance prior to expected turbidity pulse.

vi. Turbidity samples will be taken every morning and mid-day approximately 50 or 100 feet (dependent on flow) downstream of disturbance point during expected periods of turbidity (during placement or removal). If the average exceeds state standards and is documented to exceed standards for more than 2 hours, work will cease until numbers decline to state standards. If necessary additional BMPs may be implemented to reduce turbidity levels as quickly as possible.

2) The following terms and conditions implement RPM 2: Measures shall be taken to revegetate impacted areas below and above the OHWM with native plants, shrubs and trees.

   a. Plants placed on-site shall be irrigated and maintained for 3 years.
   b. Where possible, revegetation will include trees to provide shade and inputs to the river in the future.
   c. The removal of existing riparian and native vegetation shall be minimized to the maximum extent practicable.

3) The following terms and conditions implement RPM 3: FHWA shall monitor and report on the amount or extent of incidental take.
   a. FHWA shall provide a report of Project activities to NMFS by December 31 of each construction year.
   b. The report shall include Project schedules, Project completions, and details regarding Project implementation for each given year.
   c. This report shall include a summary description of in-water constraint activities, avoidance and minimization measures taken (including sound attenuation), and any observed take incidents.
   d. FHWA shall visually monitor the river in the action area during operations for any affected fish, including, but not limited to, MCR steelhead. Observation of affected fish shall be reported to NMFS by telephone at (509) 962-8911, by FAX at (509) 962-8544, via email to the contact person identified in the transmittal letter for this opinion or at the address given below, within 24 hours of the incident. Operations shall be halted immediately until FHWA coordinates with NMFS to determine the cause of the incident and whether any additional protective measures are necessary to protect listed salmonids. Any protective measures that are determined necessary to protect listed salmonids shall be implemented as soon as practicable within hours of the incident.

      Affected fish are defined as:
      i. Dead or moribund fish at the water surface;
      ii. Showing signs of erratic swimming behavior or other obvious signs of distress;
      iii. Gasping at the water surface; or
      iv. Showing signs of other unusual behavior.

A follow-up written notification shall also be submitted to NMFS Law Enforcement at (206) 526-6133 or (800) 853-1964, through the contact person identified in the transmittal letter for this opinion, or through the NMFS Columbia Basin Branch Office. Information provided should include the date, time, and location that the carcass or injured specimen was found, a color photograph, the cause of injury or death, if known, and the name and affiliation of the person who found the specimen. Any dead specimen(s) shall be placed in a cooler with ice and held for pickup by NMFS personnel or an individual designated by NMFS to do so.

Updates and reports required by these terms and conditions shall be submitted to NMFS Interior Columbia Basin Area Office, Columbia Basin Branch at:

Attention: Diane Driscoll (WCRO-2019-00360)
National Marine Fisheries Service
Columbia Basin Branch
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 the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

(1) FHWA and the WSDOT should work cooperatively with other state and federal agencies, the County, private landowners, governments, CWU, CLC, Confederated Tribes and Bands of the Yakama Nation (YN) and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid habitat restoration projects within the Yakima River Watershed.

2.11 Reinitiation of Consultation

This concludes formal consultation for Phase 3-4 of the I-90 SPE Project. Reinitiation of formal consultation is required 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 agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action (50 CFR 402.16).

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

Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA) directs federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect essential fish habitat (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 in the BA and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plan developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

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

3.2 Adverse Effects on 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 temporary adverse effects on EFH designated for Pacific Coast salmon in freshwater habitats where the proposed action occurs. 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.

Sedimentation and Turbidity:

- degraded water quality
- reduction in aquatic macroinvertebrate production

Vegetation Removal:

- short-term loss of natural shade cover in one area of the project

3.3 Essential Fish Habitat Conservation Recommendations

The following are EFH conservation recommendations for the Project:

1) The FHWA should continue to work cooperatively with other state and federal agencies, private landowners, governments, and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid restoration projects within the Yakima River Basin. EFH would benefit from implementation of restoration projects that include (1) complex channels and floodplain habitats, (2) thermal refugia, and (3) functional riparian vegetation.

Fully implementing the EFH conservation recommendation above would protect EFH for Pacific coast salmon by avoiding or minimizing the adverse effects described in Section 3.2.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, FHWA must provide a detailed response in writing to NMFS within 30 days after receiving an EFH conservation recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH conservation recommendations, unless NMFS and the federal agency have agreed to use alternative timeframes for the federal agency response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations, the federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(1)]. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

The FHWA 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)].

4.0 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (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 FHWA, WSDOT, OWNF, Reclamation, YN, and the County. Other interested users could include landowners in Cle Elum and Roslyn, Washington, as well as people interested in the conservation of MCR steelhead. Individual copies of this opinion were provided to the FHWA and WSDOT. 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, if applicable) contain more background on information sources and quality.

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

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

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