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

Refer to NMFS No.:
WCRO-2019-00420

September 10, 2019

William D. Abadie
Chief, Regulatory Branch
U.S. Army Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the 5th to Kinsman Road Extension Project Coffee Lake Creek (HUC 170900070402), Clackamas County, Oregon (Corps No.: NWP-2019-115)

Dear Mr. Abadie:

Thank you for your letter dated April 30, 2019, requesting initiation of consultation with the National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.), and essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA)(16 U.S.C. 1855(b)) on the effects of authorizing the construction of two bridges over Coffee Lake Creek, and associated multiuse transportation infrastructure elements and improvements.

In this opinion, NMFS concludes the proposed action is not likely to jeopardize the continued existence of all 13 ESA listed salmon species, southern green sturgeon, or eulachon; nor is it likely to result in the destruction or adverse modification of designated critical habitats. As required by section 7 of the ESA, NMFS is providing an incidental take statement with the opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal action agency must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. The conservation recommendations are a subset of the ESA take statement's terms and conditions.

Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations. If the response is inconsistent with the EFH conservation recommendations, the Federal action agency must explain why the recommendations will not be followed, including the scientific 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, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

Please contact Kate Wells in the Willamette Branch of the Oregon Washington Coastal Office, at 503-230-5437 or Kathleen.Wells@noaa.gov if you have any questions concerning this section 7 consultation, or if you require additional information.

Sincerely,

Kim W. Kratz, Ph.D
Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Jessica Menichino (Corps)
Steve Adams (City of Wilsonville)

bcc: K.Wells, M. Liverman

pdfs sent to:

William Abadie
william.d.abadie@usace.army.mil

Jessica Menichino (Corps)

Steve Adams (City of Wilsonville)

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

5th to Kinsman Road Extension with Two New Bridge Crossings of Coffee Lake Creek
City of Wilsonville, Clackamas County, Oregon
(Corps No.: NWP-2019-115)

NMFS Consultation Number: WCRO-2019-00420

Action Agency: U.S. Army Corps of Engineers, Portland District

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Upper Willamette River Chinook salmon	T	Yes	No	Yes	No
Upper Willamette River steelhead	T	Yes	No	Yes	No
Lower Columbia River Chinook salmon	T	Yes	No	Yes	No
Upper Columbia River spring-run Chinook salmon	E	Yes	No	Yes	No
Snake River spring/summer run Chinook salmon	T	Yes	No	Yes	No
Snake River fall-run Chinook salmon	T	Yes	No	Yes	No
Columbia River chum salmon	T	Yes	No	Yes	No
Lower Columbia River coho salmon	T	Yes	No	Yes	No
Snake River sockeye salmon	E	Yes	No	Yes	No
Lower Columbia River steelhead	T	Yes	No	Yes	No
Middle Columbia River steelhead	T	Yes	No	Yes	No
Upper Columbia River steelhead	T	Yes	No	Yes	No
Snake River Basin steelhead	T	Yes	No	Yes	No
Southern DPS green sturgeon	T	Yes	No	Yes	No
Southern DPS eulachon	T	Yes	No	Yes	No

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

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

Issued By:

Administrator
Oregon Washington Coastal Office

Date: September 10, 2019

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1. INTRODUCTION

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

1.1 Background

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

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). A complete record of this consultation is on file at the Oregon Washington Coastal Office, Portland, Oregon.

1.2 Consultation History

The U.S. Army Corps of Engineers, Portland District (Corps), submitted a biological assessment (BA) dated April 30, 2019, for the proposed federal action of issuing a Clean Water Act (CWA) permit under section 404 for permanent fill into water of the U.S., which would allow for construction of the proposed action as described below.

The Corps determined the proposed action may adversely affect Upper Willamette River (UWR) Chinook salmon, UWR Steelhead, and their designated critical habitats due to reduction in water quality caused by the effects of construction, including new impervious surfaces, and stormwater runoff from those surfaces. Prior to this submittal, the Corps and the project applicant met with NMFS staff on site on October 11, 2017, to determine the applicability of SLOPES for meeting ESA section 7 consultation requirements for the proposed action. NMFS determined SLOPES does not apply in this scenario as the programmatic ESA section 7 consultation instrument does not cover new bridge construction. Subsequent to the site visit and meeting, the applicant developed the subject BA, which the Corps has submitted for NMFS review. NMFS determined the information provided was sufficient to initiate consultation on May 3, 2019.

1.3 Proposed Federal Action

“Action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910). “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). There are no interdependent or interrelated actions associated with the proposed action.

The proposed federal action for which this consultation has been initiated is the Corps’ issuance of a CWA 404 permit for permanent and temporary fill within 0.15 acre below the ordinary high water mark for Coffee Lake Creek as necessary to complete the proposed action.

The City of Wilsonville (City) has identified the need alleviate traffic congestion on Boones Ferry Road in their Capital Improvement Plan. The proposed action is born from an alternatives analysis, which carries forward the preferred alignment option as presented to the Corps for 404 permitting and ESA section 7 consultation. If permitted, the action would:

- Provide an alternative connection to the existing residence and businesses in the Old Town Neighborhood located between the railroad and Interstate 5.
- Relieve traffic congestion at the intersection of Wilsonville Road and Boones Ferry Road.
- Provide better emergency services from the Tualatin Valley Fire and Rescue (TVF&R) station located on Kinsman Road to the Old Town Neighborhood.

Development would include construction of approximately 2,700 linear ft of new roadway, and two bridge crossings over Coffee Lake Creek, while also extending the Ice Age Tonquin pedestrian bike trail by 1,900 ft. The proposed action will provide infrastructure and roadway improvements for approximately 650 linear ft of SW Boones Ferry Road between 5th Street and Bailey Street. Stormwater management is included in these improvements as water quality treatment and detention, and upgrades to the conveyance system.

The proposed action will extend south from the current southern terminus of SW Kinsman Road, immediately across from Coffee Lake Creek at the existing SW OrePac Lane crossing, and continue south to a T-intersection that will extend eastward to the existing terminus of SW 5th Street, again crossing Coffee Lake Creek (Figure 1). The existing OrePac Lane will be removed.

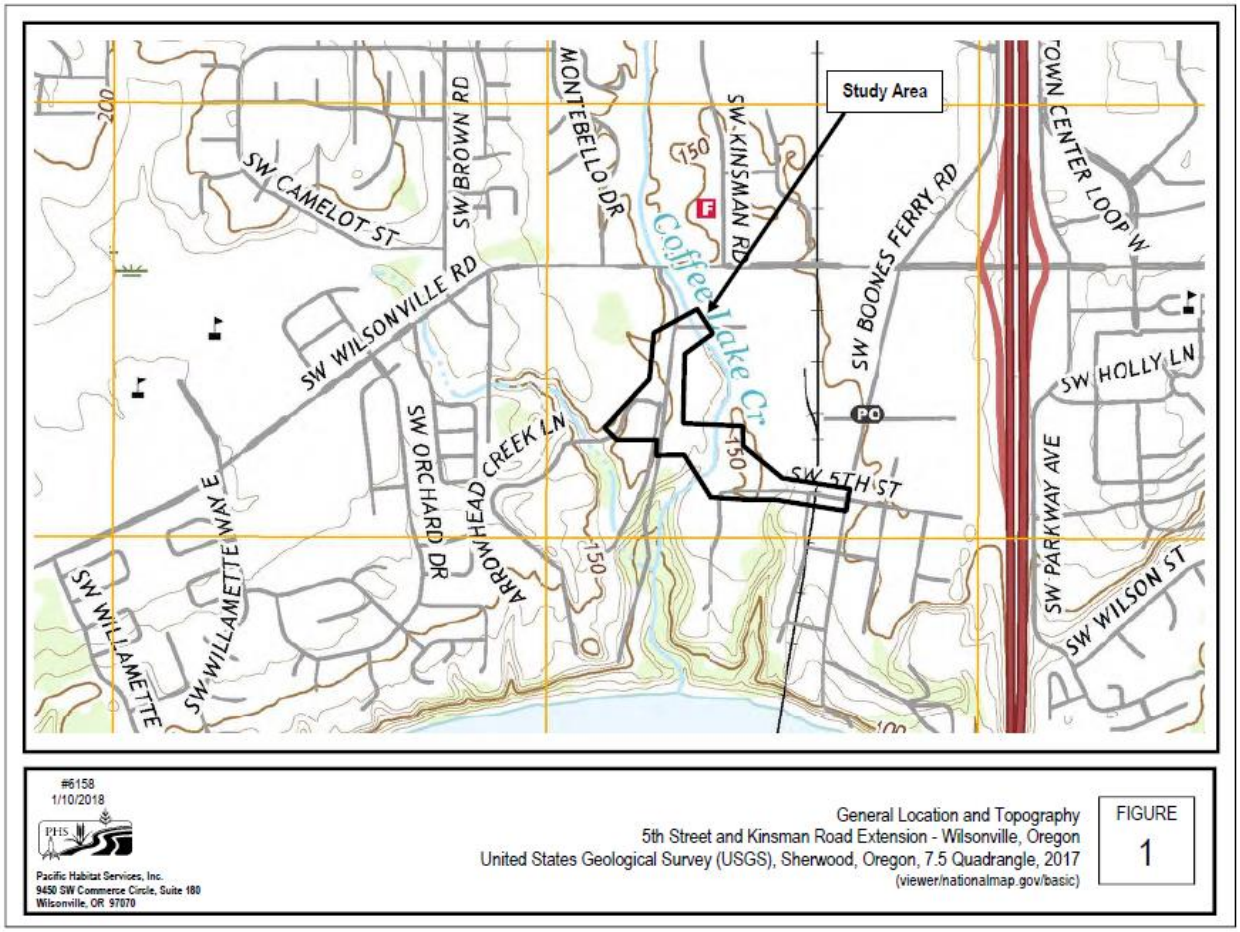

Figure 1. Proposed action location, outlined in black.

The proposed action involves two distinct bridge construction locations (Figure 2), in addition to the road and trail extensions.

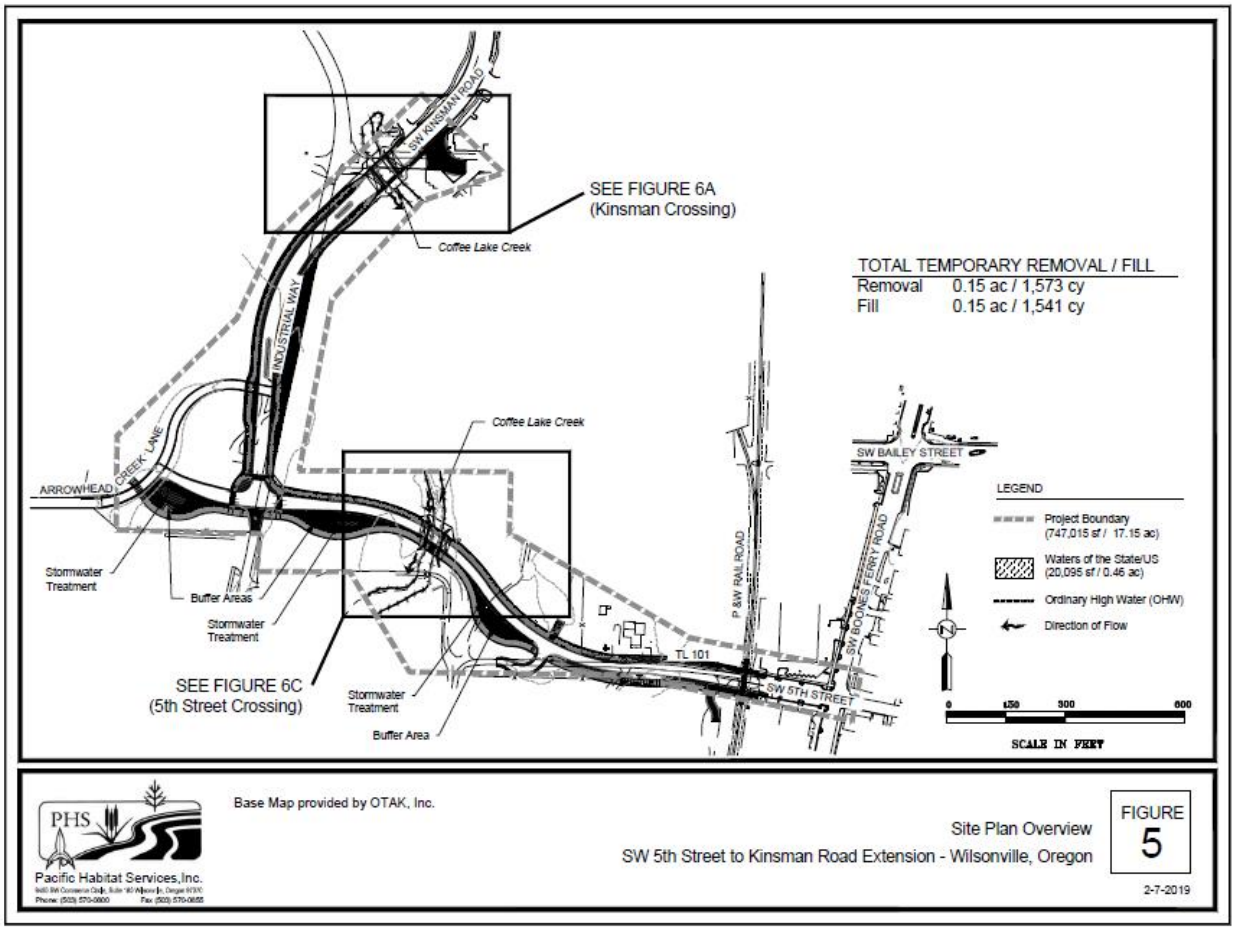

Figure 2. Locations of Kinsman Bridge and 5th Street Crossing Bridge.

Kinsman Bridge

The Kinsman Bridge crossing will be a single span structure to cross the narrow floodplain and main channel of Coffee Lake Creek. The bridge abutments will lie above and outside Ordinary High Water (OHW) and the 100-year flood elevation. This new crossing will replace the existing bridge crossing, which consists of an existing 18 ft span across the channel. The deck width would be 62 ft. The bridge will be 42.9 ft long from the centerlines of both abutments. The length of the span was determined based on the alternative method employed for Forest Service headwaters streams, which was recommended by NMFS. This method integrates Forest Service guidance on providing fish passage at road-stream crossings (U.S. Forest Service, 2008), as well as Corps stream crossing BMPs derived from this Forest Service guidance (USACE 2015). Using this method to calculate adequate abutment elevations will help to avoid or minimize adverse effects on listed species or critical habitat due to a reduction in floodplain connectivity and other physical and biological processes necessary for salmon survival.

Removal of the OrePac Lane Bridge will occur concurrently with construction of the Kinsman Bridge. Removal of approximately 56 cubic yards of rebar and concrete will be required, followed by approximately two cubic yards of backfilled soil to restore the disturbed streambed to natural contours.

5th Street /Tonquin Trail Bridge

The 5th Street Bridge crossing has also been designed to be a single span structure that will cross Coffee Lake Creek. The bridge abutments will be supported on footings that will lie above OHW and the 100 year flood elevation. The bridge will convey the Tonquin Trail extension and will have a 60 ft deck width. The bridge will be 47.4 ft long from the centerlines of both abutments. The length of the span was determined based on the alternative method employed for Forest Service headwaters streams, which was recommended by NMFS for the Coffee Lake Creek project setting. This method integrates Forest Service guidance on providing fish passage at road-stream crossings (U.S. Forest Service, 2008), as well as Corps stream crossing BMPs derived from this Forest Service guidance (USACE 2015). Application of this alternative methodology is appropriate for the project site as the watershed limits the flow volume that can be generated. The bridge span formula typically recommended by NMFS would equal 1.5 x ACW, and is based on much larger watersheds, streams, and rivers. Consequently, applying the normal NMFS bridge span calculation formula to the project site would result in over-estimating the likely flow volume generated in this small watershed and stream. The gradient in the overall watershed and project locations are fairly flat; therefore, NMFS does not expect large high flow events to be a regular occurrence. Additionally, Coffee Lake has a water control structure on it, meaning that the contributing inputs upstream of the dam are attenuated by the reservoir, further muting high flow events within the system. Based on these factors, Coffee Lake Creek behaves much more like a headwater stream, and as such, using the Forest Service methodology for calculating bridge span distance over headwater streams is appropriate in this specific circumstance.

A 15 inch sanitary sewerline extension will be joined to the 5th Street bridge crossing. The sewerline will be encased within a 30 inch steel casing at the stream crossing. The trench bottom on either side of the channel will also be sealed bentonite, and access manholes will be positioned 50 ft apart on the adjoining upland terraces.

Kinsman and 5th Street Connector Roadways, and Tonquin Trail

The proposed Kinsman Road and 5th Street extensions will be constructed to meet the functional classification of collectors with no on-street parking, per City of Wilsonville standards. The proposed Kinsman Road typical section will consist of two 12 ft wide travel lanes; a 12 ft median; two off-street 6 ft bike lanes, and a 5 ft sidewalk on the east side and 8.5-foot sidewalk on the west side, each separated from motorized traffic by raised curbs and landscape buffers and gutters.

The proposed 5th Street typical section will consist of two minimum 12 ft wide travel lanes; one 6 ft bike lane and one 5 ft sidewalk, each separated from motorized traffic by raised curbs and landscape buffers and gutters. The Tonquin Trail, a 16 ft wide shared use path, will roughly follow the south side of the 5th Street right-of-way, generally separated from the roadway surface by landscape buffers and curbs.

To meet requirements of ODOT Rail, within 200 ft of the railroad crossing the bike path will be separated from the Tonquin Trail and will be moved to the south side of 5th Street. At this point the Tonquin Trail will be reduced to 12 ft in width.

Cofferdams will be used to isolate the two bridge crossing construction locations from flowing water. Constructing the temporary sandbag/plastic sheet cofferdam and bypass pipe assemblies will require up to 116 cubic yards of fill. All materials will be removed at the completion of upstream construction and stabilization activities. These in-water isolation areas will be 0.09 acres for the Kinsman crossing and 0.06 acres for the 5th Street crossing.

Kinsman/OrePac Crossing

The total area of temporary impacts associated with the Kinsman Road Bridge construction and concurrent removal of the OrePac Lane Bridge will be confined by the placement of stream isolation measures (cofferdams); potentially any portion of streambed lying between these structures may be subject to temporary disturbance, even if not involving measurable fill or removal of materials. The total area of temporary impacts at the Kinsman crossing is 0.09 acres. The following elements will take place within the stream isolation area:

- OrePac Lane Bridge:
  Removal of concrete/rebar etc. (approximately 56 cubic yards). Backfill (approximately 2 cubic yards of soil) to restore the disturbed streambed to natural contours.

- Kinsman Bridge Crossing:
  Spread footings below scour prism of channel (riprap and soil) approximately 745 cubic yards removal, and 780 cubic yards fill. Native backfill will be used to restore the banks and simulate natural streambed conditions. The Kinsman bridge scour prism and associated setbacks for footing protection have been calculated according to NMFS guidelines.

Additional streambank material outside of the OHW is anticipated to be removed in conjunction with reshaping and restoration of the channel banks through this previously constricted section, effectively enhancing the stream's hydraulic capacity through the reach.

5th Street/ Sanitary Sewerline Crossing

The total area of temporary impacts associated with the 5th Street Bridge and sanitary sewerline construction is also best delimited by the placement of the associated cofferdams; potentially any portion of the streambed and banks lying between these structures may be subject to temporary disturbance, even if not involving measurable fill or removal of materials. The total area of temporary impacts at the 5th Street crossing is 0.06 acres. The following elements will take place within the stream isolation area:

- 5th Street Bridge Crossing:
  Spread footings below the scour prism of the channel (riprap and soil), with approximately 772 cubic yards of removal, and 759 cubic yards of fill. Native backfill

will be used to restore the banks and simulate natural streambed conditions. Again, the 5th Street bridge scour prism and associated setbacks for footing protection have been calculated according to NMFS guidelines.

- Sanitary Sewerline:
  The placement of the sanitary sewerline will not require any removal or fill within the OHW of Coffee Lake Creek, as it will be suspended within the 5th Street Bridge structure above both the OHW and the 100-year flood elevations.

The total area of temporary impacts (for both bridge crossing areas) is 0.15 acres, with 1,517 cubic yards of removal and 1,539 cubic yards of fill.

Stormwater Management Plan

A new piped conveyance network will convey stormwater flows to three new discharge locations, two into Coffee Lake Creek and one into an adjacent ditch to the west of the railroad tracks. Four separate outfalls into Coffee Lake Creed will be constructed (two at each new bridge crossing). Pipes draining the project site to these locations will be designed to meet City of Wilsonville conveyance standards. Outfalls will be armored with a ditch inlet surrounded by riprap to dissipate energy at the end of each pipe run, and all grading and materials will be constructed and installed above OHW.

A new pipe crossing beneath the 5th Street extension will serve as conveyance connectivity for the ditch that runs north to south through the project site, approximately 200 ft west of the railroad. This culvert is also considered to be a discharge location, accepting treated and detained on site flows and directing flows into the ditch downstream of the road crossing. The conveyance system will be designed to convey flows generated by the developed right-of-way as well as contributing offsite flows based on future adjacent land use zoning. The new culvert providing the ditch connection through the roadway will be designed to safely convey a 100-year event with the appropriate headwater depth.

To achieve flow conditions less than or equal to the duration of peak flow rates from pre-developed conditions for all peak flows between 42% of the 2-year storm peak flow rate up to the 10-year peak flow rate, as required by the City, the applicant will construct flow control manholes immediately downstream of each vegetated filtration swale, filtration rain garden, and flow control pond. Swales, rain garden, and pond facilities provide flow control using flow control structures with orifices mounted to the end of each underdrain outfall connection to backwater the available storage within the facility soils and allow for a slow, calculated release of flows. Maintaining these flow conditions is consistent with SLOPES V (NMFS 2014), which applies the same criteria.

Water quality treatment will be conducted using Low Impact Development (LID) best management practices (BMPs), including vegetated filtration swales, a rain garden, and a pond to manage and treat the majority of the stormwater runoff from the newly constructed roadway. Pavement removal will also occur within a small portion of the newly constructed roadway.

Additionally, catch basin StormFilters and filtration planters will be used for treatment of runoff within the improved segment of Boones Ferry Road.

In-water Work Timing

Work conducted below the OHW line of Coffee Lake Creek will occur within the ODFW-approved in water work window (IWWW) (July 15 – October 15), a period when water levels are typically at their lowest and federally-listed salmonids are less likely to be present downstream. Construction operations will cease under high flow conditions that may result in inundation of the project area, except where efforts are required to avoid or minimize resource damage.

Construction BMPs

Erosion Control

- To ensure protection of the water quality within Coffee Lake Creek during project construction, an Erosion and Sediment Control Plan (ESCP) will be prepared and carried out to prevent pollution related to construction operations. This plan will include practices to prevent erosion and sedimentation associated with the construction of the bridge and roadway approaches, equipment and material storage sites, fueling operations and staging areas.
- At a minimum, erosion control measures will be designed to keep turbidity below 10% ambient (background) conditions, 30 m (100 ft) downstream from the source.
- Inspection of erosion control measures. During construction, all erosion control measures will be inspected daily during the rainy season and weekly during the dry season to ensure they are working adequately. If inspection shows that the erosion controls are ineffective, work crews will be mobilized immediately to make repairs, install replacements, or install additional controls as necessary. Sediment must be removed from erosion controls once it has reached 1/3 of the exposed height of the control. A written log will be maintained documenting all erosion control emergencies. This log will include the time the call was received, the corrective action undertaken, and the time the correction was completed.

Erosion control measures shall include, but not be limited to the following:

- Sediment detention measures, such as placement of weed-free straw bales and silt fences six feet from the bottom of newly constructed slopes. Whenever straw bales are used, they will be staked and dug into the ground 12 cm (5 in);
- Temporary plastic sheeting for immediate protection of open areas (where seeding/ mulching are not appropriate);
- Erosion control blankets or heavy duty matting (e.g., jute, coir) may be used on steep unstable slopes;
- Biobags, weed-free straw bales and loose straw may be used for temporary erosion control. Temporary erosion and sediment controls will be used on all exposed slopes during any hiatus in work;

- On cut slopes steeper than 1:2 (v:h), a tackified seed mulch will be used so that the seed does not wash away before germination and rooting occurs; and
- Material removed during excavation shall only be placed in locations where it cannot enter sensitive aquatic resources. Conservation of topsoil (removal, storage and reuse) will be employed.

Water Quality / Hazardous Material

- A Pollution Control Plan (PCP) will be prepared by the Contractor to prevent point-source pollution entering Coffee Lake Creek. The PCP will include the following content:
    i) Practices to confine, remove and dispose of excess concrete, cement and other mortars or bonding agents, including measures for washout facilities;
    ii) A description of any hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring; and;
    iii) A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.
- No uncured concrete or water having had contact with newly poured concrete (within 24 hours of pour) shall come in contact with actively flowing waters. Moist burlap or an approved equivalent will be used for concrete curing.
- No pollutants of any kind (petroleum products, fresh concrete, silt, sandblasting material, welding slag, etc.) shall come in contact with an active flowing stream.
- Appropriate containment measures will be implemented to prevent construction debris from dropping into Coffee Lake Creek; any material that does drop will be removed with a minimum disturbance to the streambed and water quality.
- An oil absorbing, floating boom shall be available on-site at all times.
- Vehicle maintenance, refueling of vehicles and storage of fuel shall be at least 150 ft from the ordinary high water elevation of Coffee Lake Creek. The area may only be used if it is sufficiently contained and presents no possibility for contamination.

Clearing and Grubbing

- Work limits shall be clearly marked in the field prior to beginning work.
- Within the limited work areas, vegetation shall be cut off at ground level and roots left intact, excluding areas approved for grubbing.

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

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the

continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provides an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

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

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

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 rangewide 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 RPA to the proposed action.

2.2 Rangewide Status of the Species and Critical Habitat

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

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote, 2016; Mote et al., 2014). Rain-dominated watersheds and those with significant contributions from groundwater may be less sensitive to predicted changes in climate (Mote et al., 2014; Tague et al., 2013).

During the last century, average regional air temperatures in the Pacific Northwest increased by 1-1.4 degrees Fahrenheit as an annual average, and up to 2 degrees Fahrenheit in some seasons (based on average linear increase per decade; (Abatzoglou et al., 2014; Kunkel et al., 2013)). Recent temperatures in all but two years since 1998 ranked above the 20th century average (Mote et al., 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10 degrees Fahrenheit, with the largest increases predicted to occur in the summer (Abatzoglou et al., 2014).

Decreases in summer precipitation of as much as 30 percent by the end of the century are consistently predicted across climate models (Abatzoglou et al., 2014). Precipitation is more likely to occur during October through March and less during summer months. More winter precipitation will be rain than snow (ISAB, 2007) (Mote et al., 2013; Mote et al., 2014). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB, 2007; Mote et al., 2014). Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez et al., 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote et al., 2014).

The combined effects of increasing air temperatures and decreasing spring through fall flows are expected to cause increasing stream temperatures; in 2015 this resulted in 3.5-5.3 degree Celcius increases in Columbia Basin streams and a peak temperature of 26 degrees Celcius in the Willamette (NWFSC, 2015). Overall, about one-third of the current cold-water salmonid habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (Mantua et al., 2009).

Higher temperatures will reduce the quality of available salmonid habitat for most freshwater life stages (ISAB, 2007). Reduced flows will make it more difficult for migrating fish to pass physical and thermal obstructions, limiting their access to available habitat (Isaak et al., 2012; Mantua and Hamlet, 2010). Temperature increases shift timing of key life cycle events for salmonids and species forming the base of their aquatic foodwebs (Crozier et al., 2008; Tillmann and Siemann, 2011; Winder and Schindler, 2004). Higher stream temperatures will also cause decreases in dissolved oxygen and may also cause earlier onset of stratification and reduced mixing between layers in lakes and reservoirs, which can also result in reduced oxygen (Meyer et al., 1999; Raymondi et al., 2013; Winder and Schindler, 2004). Higher temperatures are likely to cause several species to become more susceptible to parasites, disease, and higher predation rates (Crozier et al., 2008; Raymondi et al., 2013; Wainwright and Weitkamp, 2013).

As more basins become rain-dominated and prone to more severe winter storms, higher winter stream flows may increase the risk that winter or spring floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (Goode et al., 2013). Earlier peak stream flows will also alter migration timing for salmon smolts, and may flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (Lawson et al., 2004; McMahon and Hartman, 1989)
In addition to changes in freshwater conditions, predicted changes for coastal waters in the Pacific Northwest as a result of climate change include increasing surface water temperature, increasing but highly variable acidity, and increasing storm frequency and magnitude (Mote et al., 2014). Elevated ocean temperatures already documented for the Pacific Northwest are highly likely to continue during the next century, with sea surface temperature projected to increase by 1.0-3.7 degrees Celsius by the end of the century (IPCC, 2014). Habitat loss, shifts in species' ranges and abundances, and altered marine food webs could have substantial consequences to anadromous, coastal, and marine species in the Pacific Northwest (Reeder et al., 2013; Tillmann and Siemann, 2011).

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. A 38 percent to 109 percent increase in acidity is projected by the end of this century in all but the most stringent CO2 mitigation scenarios, and is essentially irreversible over a time scale of centuries (IPCC, 2014). Regional factors appear to be amplifying acidification in Northwest ocean waters, which is occurring earlier and more acutely than in other regions and is already impacting important local marine species (Feely et al., 2012). Acidification also affects sensitive estuary habitats, where organic matter and nutrient inputs further reduce pH and produce conditions more corrosive than those in offshore waters (Feely et al., 2012; Sunda and Cai, 2012).

Global sea levels are expected to continue rising throughout this century, reaching likely predicted increases of 10-32 inches by 2081-2100 (IPCC, 2014). These changes will likely result in increased erosion and more frequent and severe coastal flooding, and shifts in the composition of nearshore habitats (Reeder et al., 2013; Tillmann and Siemann, 2011). Estuarine-dependent salmonids such as chum and Chinook salmon are predicted to be impacted by significant reductions in rearing habitat in some Pacific Northwest coastal areas (Glick et al., 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances, and therefore these species are predicted to fare poorly in warming ocean conditions (Scheuerell and Williams, 2005; Zabel et al., 2006). This is supported by the recent observation that anomalously warm sea surface temperatures off the coast of Washington from 2013 to 2016 resulted in poor coho and Chinook salmon body condition for juveniles caught in those waters (NWFSC, 2015). Changes to estuarine and coastal conditions, as well as the timing of seasonal shifts in these habitats, have the potential to impact a wide range of listed aquatic species (Reeder et al., 2013; Tillmann and Siemann, 2011).

The adaptive ability of these threatened and endangered species is depressed due to reductions in population size, habitat quantity and diversity, and loss of behavioral and genetic variation. Without these natural sources of resilience, systematic changes in local and regional climatic conditions due to anthropogenic global climate change will likely reduce long-term viability and sustainability of populations in many of these ESUs (NWFSC, 2015). New stressors generated by climate change, or existing stressors with effects that have been amplified by climate change, may also have synergistic impacts on species and ecosystems (Doney et al., 2012). These conditions will possibly intensify the climate change stressors inhibiting recovery of ESA-listed species in the future.

Table 1, below provides a summary of listing and recovery plan information, status summaries and limiting factors for the species addressed in this opinion. More information can be found in recovery plans and status reviews for these species. These documents are available on the NMFS West Coast Region website (http://www.westcoast.fisheries.noaa.gov/). Acronyms appearing in the table include DPS (Distinct Population Segment), ESU (Evolutionarily Significant Unit), ICTRT (Interior Columbia Technical Recovery Team), MPG (Multiple Population Grouping), NWFSC (Northwest Fisheries Science Center), TRT (Technical Recovery Team), and VSP (Viable Salmonid Population).

2.3 Status of the Species

Table 1. Listing classification and date, recovery plan reference, most recent status review, status summary, and limiting factors for each species considered in this opinion.

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Lower Columbia River Chinook salmon	Threatened 6/28/05	NMFS 2013a	NWFSC 2015	This ESU comprises 32 independent populations. Twenty-seven populations are at very high risk, 2 populations are at high risk, one population is at moderate risk, and 2 populations are at very low risk Overall, there was little change since the last status review in the biological status of this ESU, although there are some positive trends. Increases in abundance were noted in about 70% of the fall-run populations and decreases in hatchery contribution were noted for several populations. Relative to baseline VSP levels identified in the recovery plan, there has been an overall improvement in the status of a number of fall-run populations, although most are still far from the recovery plan goals.	• Reduced access to spawning and rearing habitat • Hatchery-related effects • Harvest-related effects on fall Chinook salmon • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Contaminant
Upper Columbia River spring-run Chinook salmon	Endangered 6/28/05	Upper Columbia Salmon Recovery Board 2007	NWFSC 2015	This ESU comprises four independent populations. Three are at high risk and one is functionally extirpated. Current estimates of natural origin spawner abundance increased relative to the levels observed in the prior review for all three extant populations, and productivities were higher for the Wenatchee and Entiat populations and unchanged for the Methow population. However, abundance and productivity remained well below the viable thresholds called for in the Upper Columbia Recovery Plan for all three populations.	• Effects related to hydropower system in the mainstem Columbia River • Degraded freshwater habitat • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Persistence of non-native (exotic) fish species • Harvest in Columbia River fisheries

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River spring/summer-run Chinook salmon	Threatened 6/28/05	NMFS 2017a	NWFSC 2015	This ESU comprises 28 extant and four extirpated populations. All expect one extant population (Chamberlin Creek) are at high risk. Natural origin abundance has increased over the levels reported in the prior review for most populations in this ESU, although the increases were not substantial enough to change viability ratings. Relatively high ocean survivals in recent years were a major factor in recent abundance patterns. While there have been improvements in abundance and productivity in several populations relative to prior reviews, those changes have not been sufficient to warrant a change in ESU status.	• Degraded freshwater habitat • Effects related to the hydropower system in the mainstem Columbia River, • Altered flows and degraded water quality • Harvest-related effects • Predation

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Upper Willamette River Chinook salmon	Threatened 6/28/05	NMFS 2011	NWFSC 2015	This ESU comprises seven populations. Five populations are at very high risk, one population is at moderate risk (Clackamas River) and one population is at low risk (McKenzie River). Consideration of data collected since the last status review in 2010 indicates the fraction of hatchery origin fish in all populations remains high (even in Clackamas and McKenzie populations). The proportion of natural origin spawners improved in the North and South Santiam basins, but is still well below identified recovery goals. Abundance levels for five of the seven populations remain well below their recovery goals. Of these, the Calapooia River may be functionally extinct and the Molalla River remains critically low. Abundances in the North and South Santiam rivers have risen since the 2010 review, but still range only in the high hundreds of fish. The Clackamas and McKenzie populations have previously been viewed as natural population strongholds, but have both experienced declines in abundance despite having access to much of their historical spawning habitat. Overall, populations appear to be at either moderate or high risk, there has been likely little net change in the VSP score for the ESU since the last review, so the ESU remains at moderate risk.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats • Altered food web due to reduced inputs of microdetritus • Predation by native and non-native species, including hatchery fish • Competition related to introduced salmon and steelhead • Altered population traits due to fisheries and bycatch

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River fall-run Chinook salmon	Threatened 6/28/05	NMFS 2017b	NWFSC 2015	This ESU has one extant population. Historically, large populations of fall Chinook salmon spawned in the Snake River upstream of the Hells Canyon Dam complex. The extant population is at moderate risk for both diversity and spatial structure and abundance and productivity. The overall viability rating for this population is 'viable.' Overall, the status of Snake River fall Chinook salmon has clearly improved compared to the time of listing and compared to prior status reviews. The single extant population in the ESU is currently meeting the criteria for a rating of 'viable' developed by the ICTRT, but the ESU as a whole is not meeting the recovery goals described in the recovery plan for the species, which require the single population to be "highly viable with high certainty" and/or will require reintroduction of a viable population above the Hells Canyon Dam complex.	• Degraded floodplain connectivity and function • Harvest-related effects • Loss of access to historical habitat above Hells Canyon and other Snake River dams • Impacts from mainstem Columbia River and Snake River hydropower systems • Hatchery-related effects • Degraded estuarine and nearshore habitat.

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Columbia River chum salmon	Threatened 6/28/05	NMFS 2013a	NWFSC 2015	Overall, the status of most chum salmon populations is unchanged from the baseline VSP scores estimated in the recovery plan. A total of 3 of 17 populations are at or near their recovery viability goals, although under the recovery plan scenario these populations have very low recovery goals of 0. The remaining populations generally require a higher level of viability and most require substantial improvements to reach their viability goals. Even with the improvements observed during the last five years, the majority of populations in this ESU remain at a high or very high risk category and considerable progress remains to be made to achieve the recovery goals.	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Degraded stream flow as a result of hydropower and water supply operations • Reduced water quality • Current or potential predation • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Lower Columbia River coho salmon	Threatened 6/28/05	NMFS 2013a	NWFSC 2015	Of the 24 populations that make up this ESU, 21 populations are at very high risk, 1 population is at high risk, and 2 populations are at moderate risk. Recent recovery efforts may have contributed to the observed natural production, but in the absence of longer term data sets it is not possible to parse out these effects. Populations with longer term data sets exhibit stable or slightly positive abundance trends. Some trap and haul programs appear to be operating at or near replacement, although other programs still are far from that threshold and require supplementation with additional hatchery-origin spawners .Initiation of or improvement in the downstream juvenile facilities at Cowlitz Falls, Merwin, and North Fork Dam are likely to further improve the status of the associated upstream populations. While these and other recovery efforts have likely improved the status of a number of coho salmon populations, abundances are still at low levels and the majority of the populations remain at moderate or high risk. For the Lower Columbia River region land development and increasing human population pressures will likely continue to degrade habitat, especially in lowland areas. Although populations in this ESU have generally improved, especially in the 2013/14 and 2014/15 return years, recent poor ocean conditions suggest that population declines might occur in the upcoming return years	• Degraded estuarine and near-shore marine habitat • Fish passage barriers • Degraded freshwater habitat: Hatchery-related effects • Harvest-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River sockeye salmon	Endangered 6/28/05	NMFS 2015	NWFSC 2015	This single population ESU is at very high risk dues to small population size. There is high risk across all four basic risk measures. Although the captive brood program has been successful in providing substantial numbers of hatchery produced fish for use in supplementation efforts, substantial increases in survival rates across all life history stages must occur to re-establish sustainable natural production In terms of natural production, the Snake River Sockeye ESU remains at extremely high risk although there has been substantial progress on the first phase of the proposed recovery approach – developing a hatchery based program to amplify and conserve the stock to facilitate reintroductions.	• Effects related to the hydropower system in the mainstem Columbia River • Reduced water quality and elevated temperatures in the Salmon River • Water quantity • Predation

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Upper Columbia River steelhead	Threatened 1/5/06	Upper Columbia Salmon Recovery Board 2007	NWFSC 2015	This DPS comprises four independent populations. Three populations are at high risk of extinction while 1 population is at moderate risk. Upper Columbia River steelhead populations have increased relative to the low levels observed in the 1990s, but natural origin abundance and productivity remain well below viability thresholds for three out of the four populations. The status of the Wenatchee River steelhead population continued to improve based on the additional year's information available for the most recent review. The abundance and productivity viability rating for the Wenatchee River exceeds the minimum threshold for 5% extinction risk. However, the overall DPS status remains unchanged from the prior review, remaining at high risk driven by low abundance and productivity relative to viability objectives and diversity concerns.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded floodplain connectivity and function, channel structure and complexity, riparian areas, large woody debris recruitment, stream flow, and water quality • Hatchery-related effects • Predation and competition • Harvest-related effects

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Lower Columbia River steelhead	Threatened 1/5/06	NMFS 2013a	NWFSC 2015	This DPS comprises 23 historical populations, 17 winter-run populations and six summer-run populations. Nine populations are at very high risk, 7 populations are at high risk, 6 populations are at moderate risk, and 1 population is at low risk. The majority of winter-run steelhead populations in this DPS continue to persist at low abundances. Hatchery interactions remain a concern in select basins, but the overall situation is somewhat improved compared to prior reviews. Summer-run steelhead populations were similarly stable, but at low abundance levels. The decline in the Wind River summer-run population is a source of concern, given that this population has been considered one of the healthiest of the summer-runs; however, the most recent abundance estimates suggest that the decline was a single year aberration. Passage programs in the Cowlitz and Lewis basins have the potential to provide considerable improvements in abundance and spatial structure, but have not produced self-sustaining populations to date. Even with modest improvements in the status of several winter-run DIPs, none of the populations appear to be at fully viable status, and similarly none of the MPGs meet the criteria for viability.	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Reduced access to spawning and rearing habitat • Avian and marine mammal predation • Hatchery-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Upper Willamette River steelhead	Threatened 1/5/06	NMFS 2011	NWFSC 2015	This DPS has four demographically independent populations. Three populations are at low risk and one population is at moderate risk. Declines in abundance noted in the last status review continued through the period from 2010-2015. While rates of decline appear moderate, the DPS continues to demonstrate the overall low abundance pattern that was of concern during the last status review. The causes of these declines are not well understood, although much accessible habitat is degraded and under continued development pressure. The elimination of winter-run hatchery release in the basin reduces hatchery threats, but non-native summer steelhead hatchery releases are still a concern for species diversity and a source of competition for the DPS. While the collective risk to the persistence of the DPS has not changed significantly in recent years, continued declines and potential negative impacts from climate change may cause increased risk in the near future.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats due to impaired passage at dams • Altered food web due to changes in inputs of microdetritus • Predation by native and non-native species, including hatchery fish and pinnipeds • Competition related to introduced salmon and steelhead • Altered population traits due to interbreeding with hatchery origin fish

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Middle Columbia River steelhead	Threatened 1/5/06	NMFS 2009b	NWFSC 2015	This DPS comprises 17 extant populations. The DPS does not currently include steelhead that are designated as part of an experimental population above the Pelton Round Butte Hydroelectric Project. Returns to the Yakima River basin and to the Umatilla and Walla Walla Rivers have been higher over the most recent brood cycle, while natural origin returns to the John Day River have decreased. There have been improvements in the viability ratings for some of the component populations, but the DPS is not currently meeting the viability criteria in the MCR steelhead recovery plan. In general, the majority of population level viability ratings remained unchanged from prior reviews for each major population group within the DPS.	• Degraded freshwater habitat • Mainstem Columbia River hydropower-related impacts • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Harvest-related effects • Effects of predation, competition, and disease
Snake River basin steelhead	Threatened 1/5/06	NMFS 2017a	NWFSC 2015	This DPS comprises 24 populations. Two populations are at high risk, 15 populations are rated as maintained, 3 populations are rated between high risk and maintained, 2 populations are at moderate risk, 1 population is viable, and 1 population is highly viable. Four out of the five MPGs are not meeting the specific objectives in the draft recovery plan based on the updated status information available for this review, and the status of many individual populations remains uncertain A great deal of uncertainty still remains regarding the relative proportion of hatchery fish in natural spawning areas near major hatchery release sites within individual populations.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded freshwater habitat • Increased water temperature • Harvest-related effects, particularly for B-run steelhead • Predation • Genetic diversity effects from out-of-population hatchery releases

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Southern DPS of green sturgeon	Threatened 4/7/06	NMFS 2018b	NMFS 2015c	The Sacramento River contains the only known green sturgeon spawning population in this DPS. The current estimate of spawning adult abundance is between 824-1,872 individuals. Telemetry data and genetic analyses suggest that Southern DPS green sturgeon generally occur from Graves Harbor, Alaska to Monterey Bay, California and, within this range, most frequently occur in coastal waters of Washington, Oregon, and Vancouver Island and near San Francisco and Monterey bays. Within the nearshore marine environment, tagging and fisheries data indicate that Northern and Southern DPS green sturgeon prefer marine waters of less than a depth of 110 meters.	• Reduction of its spawning area to a single known population • Lack of water quantity • Poor water quality • Poaching

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Southern DPS of eulachon	Threatened 3/18/10	NMFS 2017c	Gustafson et al. 2016	The Southern DPS of eulachon includes all naturally-spawned populations that occur in rivers south of the Nass River in British Columbia to the Mad River in California. Sub populations for this species include the Fraser River, Columbia River, British Columbia and the Klamath River. In the early 1990s, there was an abrupt decline in the abundance of eulachon returning to the Columbia River. Despite a brief period of improved returns in 2001-2003, the returns and associated commercial landings eventually declined to the low levels observed in the mid-1990s. Although eulachon abundance in monitored rivers has generally improved, especially in the 2013-2015 return years, recent poor ocean conditions and the likelihood that these conditions will persist into the near future suggest that population declines may be widespread in the upcoming return years	• Changes in ocean conditions due to climate change, particularly in the southern portion of the species' range where ocean warming trends may be the most pronounced and may alter prey, spawning, and rearing success. • Climate-induced change to freshwater habitats • Bycatch of eulachon in commercial fisheries • Adverse effects related to dams and water diversions • Water quality, • Shoreline construction • Over harvest • Predation

2.4 Status of the Critical Habitat

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

For most salmon and steelhead, NMFS's critical habitat analytical review teams (CHARTs) ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code (HUC5) in terms of the conservation value they provide to each ESA-listed species that they support (NMFS 2005). The conservation rankings were high, medium, or low. To determine the conservation value of each watershed to species viability, the CHARTs evaluated the quantity and quality of habitat features, the relationship of the area compared to other areas within the species' range, and the significance to the species of the population occupying that area. Even if a location had poor habitat quality, it could be ranked with a high conservation value if it were essential due to factors such as limited availability, a unique contribution of the population it served, or is serving another important role.

For southern DPS green sturgeon, a team similar to the CHARTs — a critical habitat review team (CHRT) — identified and analyzed the conservation value of particular areas occupied by southern green sturgeon, and unoccupied areas necessary to ensure the conservation of the species (USDC 2009). The CHRT did not identify those particular areas using HUC nomenclature, but did provide geographic place names for those areas, including the names of freshwater rivers, the bypasses, the Sacramento-San Joaquin Delta, coastal bays and estuaries, and coastal marine areas (within 110 m depth) extending from the California/Mexico border north to Monterey Bay, California, and from the Alaska/Canada border northwest to the Bering Strait; and certain coastal bays and estuaries in California, Oregon, and Washington.

For southern DPS eulachon, critical habitat includes portions of 16 rivers and streams in California, Oregon, and Washington (USDC 2011). We designated all of these areas as migration and spawning habitat for this species. A summary of the status of critical habitats, considered in this opinion, is provided in Table 2, below.

Table 2. Critical habitat, designation date, federal register citation, and status summary for critical habitat considered in this opinion

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Lower Columbia River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 47 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some, or high potential for improvement. We rated conservation value of HUC5 watersheds as high for 30 watersheds, medium for 13 watersheds, and low for four watersheds.
Upper Columbia River spring-run Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses four subbasins in Washington containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. We rated conservation value of HUC5 watersheds as high for 10 watersheds, and medium for five watersheds. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Snake River spring/summer-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers (except the Clearwater River) presently or historically accessible to this ESU (except reaches above impassable natural falls and Hells Canyon Dam). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Willamette River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon containing 56 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 22 watersheds, medium for 16 watersheds, and low for 18 watersheds.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Snake River fall-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers presently or historically accessible to this ESU (except reaches above impassable natural falls, and Dworshak and Hells Canyon dams). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Columbia River chum salmon	9/02/05 70 FR 52630	Critical habitat encompasses six subbasins in Oregon and Washington containing 19 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 16 watersheds, and medium for three watersheds.
Lower Columbia River coho salmon	2/24/16 81 FR 9252	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 55 occupied watersheds, as well as the lower Columbia River and estuary rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 34 watersheds, medium for 18 watersheds, and low for three watersheds.
Snake River sockeye salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers; Alturas Lake Creek; Valley Creek; and Stanley, Redfish, Yellow Belly, Pettit and Alturas lakes (including their inlet and outlet creeks). Water quality in all five lakes generally is adequate for juvenile sockeye salmon, although zooplankton numbers vary considerably. Some reaches of the Salmon River and tributaries exhibit temporary elevated water temperatures and sediment loads that could restrict sockeye salmon production and survival (NMFS 2015b). Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Washington containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 20 watersheds, medium for eight watersheds, and low for three watersheds.
Lower Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses nine subbasins in Oregon and Washington containing 41 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 28 watersheds, medium for 11 watersheds, and low for two watersheds.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Upper Willamette River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses seven subbasins in Oregon containing 34 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 25 watersheds, medium for 6 watersheds, and low for 3 watersheds.
Middle Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of occupied HUC5 watersheds as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.
Snake River basin steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 25 subbasins in Oregon, Washington, and Idaho. Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Southern DPS of green sturgeon	10/09/09 74 FR 52300	Critical habitat has been designated in coastal U.S. marine waters within 60 fathoms depth from Monterey Bay, California (including Monterey Bay), north to Cape Flattery, Washington, including the Strait of Juan de Fuca, Washington, to its United States boundary; the Sacramento River, lower Feather River, and lower Yuba River in California; the Sacramento-San Joaquin Delta and Suisun, San Pablo, and San Francisco bays in California; tidally influenced areas of the Columbia River estuary from the mouth upstream to river mile 46; and certain coastal bays and estuaries in California (Humboldt Bay), Oregon (Coos Bay, Winchester Bay, Yaquina Bay, and Nehalem Bay), and Washington (Willapa Bay and Grays Harbor), including, but not limited to, areas upstream to the head of tide in various streams that drain into the bays, as listed in Table 1 in USDC (2009). The CHRT identified several activities that threaten the PBFs in coastal bays and estuaries and necessitate the need for special management considerations or protection. The application of pesticides is likely to adversely affect prey resources and water quality within the bays and estuaries, as well as the growth and reproductive health of Southern DPS green sturgeon through bioaccumulation. Other activities of concern include those that disturb bottom substrates, adversely affect prey resources, or degrade water quality through re-suspension of contaminated sediments. Of particular concern are activities that affect prey resources. Prey resources are affected by: commercial shipping and activities generating point source pollution and non-point source pollution that discharge contaminants and result in bioaccumulation of contaminants in green sturgeon; disposal of dredged materials that bury prey resources; and bottom trawl fisheries that disturb the bottom (but result in beneficial or adverse effects on prey resources for green sturgeon).
Southern DPS of eulachon	10/20/11 76 FR 65324	Critical habitat for eulachon includes portions of 16 rivers and streams in California, Oregon, and Washington. All of these areas are designated as migration and spawning habitat for this species. In Oregon, we designated 24.2 miles of the lower Umpqua River, 12.4 miles of the lower Sandy River, and 0.2 miles of Tenmile Creek. We also designated the mainstem Columbia River from the mouth to the base of Bonneville Dam, a distance of 143.2 miles. Dams and water diversions are moderate threats to eulachon in the Columbia and Klamath rivers where hydropower generation and flood control are major activities. Degraded water quality is common in some areas occupied by southern DPS eulachon. In the Columbia and Klamath river basins, large-scale impoundment of water has increased winter water temperatures, potentially altering the water temperature during eulachon spawning periods. Numerous chemical contaminants are also present in spawning rivers, but the exact effect these compounds have on spawning and egg development is unknown. Dredging is a low to moderate threat to eulachon in the Columbia River. Dredging during eulachon spawning would be particularly detrimental.

2.5 Action Area

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

The action area is not limited to the actual project footprint, but includes staging and stockpile areas, as well as other areas that could receive affects from the proposed action, including areas downstream that could experience effects relative to water quality. Given the proposed stormwater treatment and detention methods for the project and the rapid mobility of stormwater runoff pollutants, the action area for this project extends from the project site down the length of Coffee Lake Creek (approximately 0.3 mile) to its confluence with the Willamette River, and then continues downstream along the Willamette River to its confluence with the Lower Columbia River, and out to the Pacific Ocean. Effects beyond the Willamette River (e.g. Lower Columbia River to the Pacific Ocean) are likely indistinguishable given the considerable dilution factor and other sources of anthropogenic stormwater and pollutants commonly found in stormwater within the Columbia River.

2.6 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).

Ecological Characteristics of the Project Area

Coffee Lake Creek originates in the Tonquin Scablands region between Wilsonville and Tualatin, an area of the Tualatin Mountains that was shaped to a significant degree by enormous Pleistocene flood events. The creek flows in a relatively natural channel until reaching the Coffee Lake Creek basin, a large flood-scoured depression and former lakebed upstream of the project area. The creek was channelized through this basin for agricultural drainage purposes many decades ago. South of the basin, the creek enters a relatively narrow channel which continues south to Southwest Wilsonville Road and beyond, where it enters the project area.

Within the study area, Coffee Lake Creek is restricted to a relatively narrow, moderately steep sided channel; its regular width and graded side slopes indicate that historic channel construction and/or modifications have occurred along most of its length, most likely for agricultural drainage activities and flood control. These channel modifications; however, do not appear to have extended south of the existing culverted access road crossing near the central portion of the study area.

The project site is primarily comprised of open, cropped agricultural land, pastureland, or scrubland with a few scattered trees. The riparian corridor at the project site includes actively managed fields with narrow bands of weedy shrubs (e.g., Himalayan blackberry) and grasses immediately along the channel margins. A few widely separated clumps of small trees and larger

shrubs are present along the channel. Mature trees are mostly located outside the floodplain; however, the riparian area supports an intact, mostly closed canopy mixed forest south of the culverted private road crossing. Nearby land uses include dispersed single family residential development, agricultural/nursery operations, industrial, and open space.

According to the BA, Coffee Lake Creek (also known as 'Seely Ditch') originated as an agricultural drainage ditch through the former lakebed, with steep banks and unconsolidated silt beds. It is highly likely that the Coffee Lake Creek basin provided little or no suitable habitat for salmonids prior to Euroamerican settlement. Early accounts describe the former lakebed as the 'Black Swamp', a willow swamp without mapped channels prior to excavation of Seely Ditch through the length of the basin in the mid to late 1850s. Any woody vegetation within the basin was largely cleared to support agriculture (both grazing and crop production).

Vegetation and Fish Presence

Coffee Lake Creek is surrounded by agricultural and industrial land uses and has been excavated to enhance drainage over several decades. Habitat elements for salmonids are lacking in the vicinity of the project area due to these anthropogenic activities. There is poor shade and vegetation cover, little to no forage opportunities, inhospitable water temperatures for salmonid use, and little to no refuge area to avoid predation. These habitat elements exist closer to the confluence of Coffee Lake Creek and the Willamette River; however, they are not present within the project area.

Coffee Lake Creek has very limited woody cover along its banks, and lacks significant shading prior to entering a mature forested overstory located downstream of the study area. ODFW has documented a variety of warm water fish, including brown bullhead (*Ameiurus nebulosus*), mosquitofish (*Gambusia affinis*), bluegill (*Lepomis macrochirus*), threespine stickleback (*Gasterosteus aculeatus*), reticulate sculpin (*Cottus perplexus*), and largemouth bass (*Micropterus salmoides*) within Coffee Lake Creek. The only salmonids known to occur in Coffee Lake Creek are UWR Chinook salmon, which were documented below an old flume structure blocking fish passage near the Arrowhead Creek confluence, downstream of the project area (ODFW 2006).

Water Quality

Turbidity, temperature, and pollutants are all limiting factors that contribute to a degraded baseline condition of existing water quality conditions in the project area. Temperatures in Coffee Lake Creek are likely too high to support salmonid rearing activity, especially in the summer months, even if the fish passage blockage upstream of the site were removed to allow salmon to access the creek. Climate changes is likely to continue the sub-optimal temperature profile of the creek, which is only likely to improve with increased riparian shade and increased inundation/connectivity to other water bodies. Turbidity levels increase seasonally and recently spiked during 2016 and 2017, for an unknown reason. The area is surrounded by agricultural land uses and the exact source of this turbidity event could not be isolated.

Habitat Access

Upstream fish passage from the Willamette River into Coffee Lake Creek is effectively blocked near its lowest reach; though both salmon and steelhead were documented near the mouth in ODFW's 2005 survey, none were found in the reaches above. This is likely due both to the stream gradient averaging 8% for the first 1200 ft of channel above the Willamette, and to the presence of an old flume structure near Coffee Lake's confluence with Arrowhead Creek. These two factors may effectively preclude upstream salmon smolt migration, while warm stream temperatures would also discourage warm-season occupancy by salmon and steelhead. Due to the presence of the flume structure, Coffee Lake Creek serves little to no conservation service for UWR Chinook salmon or steelhead, or other salmonid species. However, according to ODFW, this structure is slated for removal in the future. Upon removal of this fish passage barrier, the creek may provide a modest contribution toward recovery in reconnecting access to shallow water habitat, which has been severely limited along the Willamette River due to development.

Previous ESA Consultations

A search of the Public Consultation Tracking System (PCTS), performed on June 17, 2019, did not produce specific results for previous section 7 consultations in or around the Coffee Lake Creek area. However, the search did reveal one formal section 7 consultation completed on June 14, 2017, for the installation of a replacement outfall pipe near I-5 crossing of the Willamette River near Boones Ferry Park. The replacement outfall pipe was needed to replace a leaking outfall pipe. The action also installed an effluent diffuser as part of the outfall mechanism. NMFS found the action would adversely affect UWR Chinook salmon and UWR steelhead and their designated critical habitat.

The PCTS database listed several other actions that underwent informal consultation in Clackamas County, but not close to Coffee Lake Creek, that were related to urban growth and development such as new construction, dock improvements, and other community development activities. These activities are testament to the continued growth of the area, which is not likely to subside in the near future given current trends in population increases within the northwest region.

2.7 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.

Direct effects include all immediate impacts (adverse and beneficial) resulting from proposed project-related actions. The project will require in-water work within Coffee Lake Creek for new bridge construction, existing bridge removal, and stream channel restoration. As such, direct, short-term water quality impacts may result from turbidity during grading or other earthwork activities but these effects will be mitigated using a coffer dam, and the flume located

downstream of the project site will also block movement of any debris that might inadvertently enter the water beyond the control of the coffer dam. In addition, the presence of construction equipment within and near the Coffee Lake Creek channel creates the potential for introduction of chemical contamination from accidental spills, improper storage of petrochemicals, or mechanical failure. BMPs will be used to control the risk of chemical spills at the project site; therefore, no effects on ESA-listed species or critical habitat are expected from use of heavy equipment or chemical spills.

Indirect effects of a proposed action are those impacts that are reasonably certain to occur later in time (including use and maintenance of the project components after construction of the project is complete). As discussed above, the proposed project alignment will transition from a mostly vegetated, primarily pervious condition to an impervious concrete surface following construction of the bridge decks and connecting roadways. As such, the proposed project will result in approximately 4.5 acres of new impervious surfaces, with approximately 0.7 acres of existing road surface to be replaced. The proposed project also includes the construction of a stormwater management system designed to manage the quality and quantity of stormwater generated from within the project area. Potential impacts to federally-listed salmonids, green sturgeon, and eulachon could result from alterations to existing water quality caused by the discharge of treated stormwater into Coffee Lake Creek.

Stormwater runoff from the proposed project will contribute to the total incremental effect on the environment caused by all development activities within the Willamette Basin and Lower Columbia River. At this scale, the additive effect of persistent pollutants contributed by many small, unrelated land developments has a greater impact on natural processes than the input from larger, individual projects, and the impacts of many small and large projects are all compounded together (NRC 2009; Vestal and Rieser 1995). Even at very low levels, chronic exposures to those contaminants have a wide range of adverse effects on species considered in this opinion (Carls et al 2008; Comeleo et al 1996; Feist et al 2011; Hect et al 2007; Jonson et al 2007; Sandahl et al 2007; Spromberg and Meador 2006; and NMFS 2013b). Neither this specific discharge nor any other can be associated with adverse effects to specific individual of species considered in this opinion, but these contaminants have been shown to injure or kill individual fish through a variety of behavioral, endocrine disrupting, and immunotoxic disease effects, either by themselves or through additive , interactive, and synergistic interactions with other contaminants (NMFS 2013b). Once in the river, these pollutants are either transported toward the ocean in solution, or adsorbed to suspended particles, or else they are retained in sediments, particularly clay and silt, which can only be deposited in areas of reduced water velocity, such as behind dams or backwater and off-channel areas, until they are mobilized and transported by future sediment moving flows (Alpers et al. 2000a; Alpers et al. 2000b; Anderson et al. 1996).

2.7.1 Effects of the Proposed Action on Listed Species.

Four pathways were identified whereby the proposed action may affect listed species under NMFS' jurisdiction:

1. Ground disturbing activities that may result in sediments reaching the stormwater collection and conveyance system and be transported downstream into habitat occupied by listed species;

2. Spills of fuel or other toxic chemicals that migrate to the stormwater collection and conveyance system and be transported downstream into habitat occupied by listed species;
3. Modification of stormwater volume, during post-construction site operation, resulting in decreased flows and turbidity discharging into Dry Creek;
4. Water quality impacts from stormwater discharge, during post-construction site operation.

Of the above pathways, only numbers 3 and 4 are reasonably certain to cause effects to listed species and designated critical habitats as described below. Increased turbidity would not affect listed species or their critical habitat as there is there is an instream obstruction downstream of the project area, which would prevent sediment from being transported downstream. Additionally, the use of coffer dams would help to contain any sediment that is disturbed during construction activities. Proper implementation of BMPs for chemical storage and spill control would prevent transport of toxic chemicals downstream.

Pacific Salmon

The species with highest probability of using the mainstem Willamette River and its tributaries in relatively close proximity to the project site are UWR Chinook salmon and UWR steelhead. Other salmonid species, as well as eulachon and green sturgeon do not occur near the project site and therefore would be subject indirect impacts from the action that will occur later in time, but are still reasonably certain to occur.

The Pacific salmon considered in this opinion typically show one of the following life histories:

Subyearling:	UWR spring-run Chinook salmon, CR chum salmon
Yearling:	UCR spring-run Chinook salmon, SR spring/summer-run Chinook salmon, LCR coho salmon, SR sockeye salmon, UWR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, LCR steelhead,
Mixed:	LCR Chinook salmon, SR fall-run Chinook salmon

Though UWR Chinook ESUs and steelhead DPSs are the most likely species to be present in close proximity to the confluence of the Willamette River and Coffee Lake Creek, neither adult nor juveniles of these species currently use Coffee Lake Creek due to a fish passage barrier at the confluence of Coffee Lake and Arrowhead Creek. If this fish passage barrier were to be removed, as proposed by ODFW, juvenile Chinook salmon may use Coffee Lake Creek for rearing, forage, and refuge as it is slow moving tributary of the Willamette River with easy access to the mainstem river for migration.

Effects on Water Quality/Quantity

The use of BMPs plus low stream flow and the lack of precipitation during this time of year make it unlikely that any discharge of sediment or contaminants due to construction activities will be transported past the fish passage barrier at the confluence of Coffee Lake Creek and Arrowhead Creek in sufficient quantities to impair aquatic habitats or essential fish behavior. However, stormwater runoff that will occur during the wet season after construction is completed

will eventually enter the Willamette River where it will expose salmon and steelhead to a variety of lethal and sublethal effects, including disrupted behavior, reduced olfactory function, immune suppression, reduced growth, disrupted smoltification, hormone disruption, disrupted reproduction, cellular damage, and physical and developmental abnormalities (Hecht et al. 2007). Petroleum-based contaminants that are transported by stormwater runoff, such as fuel, oil, and some hydraulic fluids, contain PAHs, which are acutely toxic to salmon, steelhead, and other fish and aquatic organisms at high levels of exposure and cause sublethal adverse effects on aquatic organisms at lower concentrations (Heintz et al. 2000; Heintz et al. 1999; Incardona et al. 2005; Incardona et al. 2004; Incardona et al. 2006).

The proposed project includes post construction riparian plantings, which may provide additional cover, which is currently lacking in the project area. Increased shade provided by plantings may help to improve water temperatures; however, temperature modifications in the absence of removal of the fish passage barrier would do little to increase habitat suitability for salmon.

The amount of impermeable surface will increase by a total of 4.5 acres within the action area. Therefore, a storm water management system has been designed as part of the proposed action to manage stormwater quality and quantity that will eventually be discharged into Coffee Lake Creek, which empties into the Willamette River. The stormwater management plan consists of LID BMPs designed to the standards described in NMFS (2014). These BMPs include vegetated filtration swales, a filtration rain garden, vegetated filter strips, and natural dispersion. Swale and rain garden facilities will provide water quality treatment and detention for most of the new roadway. These facilities will outfall within the Arrowhead Creek and Coffee Lake Creek drainage basins. Removal of existing paved area and preservation of trees within these drainage basins will also help to offset increased stormwater runoff that will result from increased impermeable surface.

Conveyance of stormwater runoff throughout the project area will be achieved using conventional storm structures and pipes. Four new outfalls from conveyance systems will be installed and protected using riprap dissipators prior to discharging into Coffee Lake Creek. The dissipators are designed to discharge treated stormwater outside of the creeks OHW to avoid stream impacts. Despite the assumed efficacy of the proposed stormwater management efforts, stormwater runoff, especially during summer months, would likely be warmer than ambient instream temperatures. Therefore, increased stormwater outfalls may exacerbate already unsuitable water temperatures in the creek. If the fish passage barrier were removed in the future, as proposed by ODFW, fish would likely not use the creek during summer months for rearing purposes.

Effects on Substrate

The project area includes off channel habitat that is not likely to be used by adult salmonids. However, juvenile fish may be found downstream of the project site and may use the area of the creek near the confluence of the Willamette River. Rearing Chinook salmon and steelhead using the downstream end of Coffee Lake Creek will be exposed to increased stormwater runoff from the project including pollutants. Subyearlings present in the area and downstream of the post construction stormwater runoff are likely to be more susceptible to the effects of

bioaccumulative pollutants in shallow-water habitats because of their longer residence times than yearlings, although both are equally vulnerable to acute exposures (NMFS 2011). If all stormwater management plan actions are properly implemented, the baseline condition of off-channel habitat within and downstream of the project area will me minimally altered as a result of the proposed action. Additionally, the bridge span distance, in water work timing, and other BMPS would ensure that the current level of floodplain function would continue under post construction conditions.

Effects on Channel Condition & Dynamics

Channel conditions are not likely to change as a result of the proposed action, except for the addition of new fill. Increasing the area of impermeable surface and constructing new bridge spans would not alter the current water course or impede flow. Coffee Lake Creek is not currently used for spawning or rearing as juvenile UWR Chinook and steelhead are only able to access the area downstream of the project site due to the presence of a fish passage barrier located just south of the project area, and adult salmon are not known to spawn in the mainstem Willamette River.

Watershed Scale Effects

The proposed project would contribute to impervious surface area in the Willamette Basin, the additive effects on individual fish that would result from this project are minimal. The applicant will employ a series of BMPs to control stormwater runoff. These mitigating actions are consistent with conditions included for similar actions contained in the 2014 SLOPES V (NMFS 2014). Therefore, the adverse effects of the proposed action will be minimized to the maximum extent practicable, and would not result in measureable increases in background water pollution levels or stormwater runoff on a watershed scale.

Green Sturgeon.

Southern green sturgeon present their own life history pattern with respect to residence time and habitat use in the lower Columbia River, where they are present in the mainstem and its estuary during most parts of the year, although the total residence time there for individual sturgeon is unknown. As long-lived, benthic dwelling species that spend an appreciable amount of their life cycle in bays, estuaries, and lower elevation river systems, southern green sturgeon are vulnerable to the effects of pollutants, particularly in suspended sediments and bioaccumulation of contaminants in their prey, although exposure to pollutants has not been identified as a limiting factor for the species.

Effects on Water Quality/Quantity

Pollutants in stormwater runoff from the proposed project into the Willamette River will add to, and compound with, other pollutants already present in the Willamette and Columbia Basins in ways that adversely affect the amount of food available for southern green sturgeon by inuring or killing their prey. The applicant has prepared a stormwater management plan, which contains mitigating actions consistent with stormwater control conditions found in NMFS SLOPES V (2014). These BMPs will control stormwater runoff from the additional 4.5 acres of newly

constructed impervious surface, which will prevent large inputs of pollutants from entering the Columbia Basin. Though the relatively small influx of stormwater and subsequently transported pollutants may adversely affect green sturgeon it is not likely to harm the species or impede overall recovery of the southern green sturgeon population.

Effects on Substrate

As with water quality, off channel habitat would be affected by the accumulation of pollutants in sediment from stormwater runoff. Accumulated pollutants from the proposed project would compound with other pollutants already found in sediments downstream of the project site. The particulate forms of those pollutants are either immediately bioavailable via discharge, through re-suspension, are a delayed source of toxicity through bioaccumulation, or are available when water quality conditions favor dissolution at a later date (NMFS 2013Bb). Contaminated sediments will influence green sturgeon food sources through direct ingestion of prey, detritus or sediment while feeding, or by deposition of particulate forms of pollutants on the gill surfaces or sensory organs. The stormwater management plan actions will mitigate, to some degree the amount of pollutants entering the mainstem Willamette River, the Columbia River, and associated off channel habitat. Properly implemented BMPs will result in low levels of pollutant discharge from stormwater runoff, which are not expected to directly harm green sturgeon within the action area.

Effects on Channel Conditions & Dynamics

Effects are the same as those discussed under Pacific salmon.

Watershed Scale Effects

Effects are the same as those discussed under Pacific salmon.

Eulachon.

Eulachon have a very different life history than Pacific salmon and begin their passive migration to the sea as soon as they emerge from the egg. Wind, river currents, and the tidal ebb and flow necessary to flush water out of the Columbia River estuary may redistribute eulachon larvae between the mainstem and channel margins, and delay their ocean entry for several weeks. Despite this brief freshwater residence time, water quality has been identified as a factor limiting their recovery.

Effects on Water Quality/Quantity

Effects are generally the same as those discussed under Pacific salmon and green sturgeon. Additionally, accumulated pollutants from the proposed project added to the pollutant load that already exists will adversely affect water quality in eulachon mainstem spawning areas because the water column is an important connection between many bigeochemcial processes. Such process move stormwater pollutants through the action area in suspension, solution, or other bodies of aquatic organisms, which brings them into contact with eulachon in each of their life

stages (NMFS 2013). As stated previously, stormwater management measures and properly implemented BMPs will minimiz the adverse effects of stormwater pollution from the project resulting in harm to individual eulachon present within the action area.

Effects on Substrate

Eulachon larvae may be adversely affected by the addition of pollutants delivered downstream of the project area as they will be compounded with the pollutant load already present in mainstem spawning substrate. Particulate forms of stormwater pollutants that have accumulated within larval substrate are either immediately bioavailable via discharge, through re-suspension, or are available when water quality conditions favor dissolution at a later date. Adverse effects that may result from pollutant uptake by eulachon, either through the food web or through direct contact, will be minimized by stormwater management measures and use of BMPs intended to prevent direct discharge of runoff into river systems and to reduce the contaminant load prior to eventual stormwater entry into any waterbody near the project site. The pollutant load within spawning substrates is unlikely to be significantly altered by the proposed action, as its additive effects would be extremely minor and would diminish as water travels downstream and away from the project area.

Effects on Channel Conditions & Dynamics

Effects are the same as those discussed under Pacific salmon.

Watershed Scale Effects

Effects are the same as those discussed under Pacific salmon.

2.7.2 Summary of Effects on Fish Species

The effects of the proposed action on Pacific salmon, southern green sturgeon, and eulachon, are likely to have an adverse impact on individuals within the species populations; however, those effects will be minimized through implementation of a stormwater management plan and construction BMPs. Controlled stormwater discharge will ensure that runoff and associated pollutants do not enter the basin in large surges, but would alternately follow a prescribed path of travel where quantity and quality of stormwater can be managed to minimize harm to species within the affected area. The relatively small, and localized nature of the proposed action will not result in an appreciable modification of the baseline conditions for species status; nor will the proposed action result in effects that will detract from ongoing recovery efforts.

2.7.3 Effects of the Proposed Action on Critical Habitat

Salmon and Steelhead Critical Habitat

Freshwater Spawning Sites.
No effect because Coffee Lake Creek and the adjacent mainstem Willamette are not used for spawning by steelhead or Chinook salmon.

Freshwater Rearing Sites
Floodplain Connectivity – No effect. The project has been designed to maintain current floodplain function and, except for the addition of fill below OHW, no part of the action would modify the current level of floodplain connectivity.

Forage – Forage will be adversely affected to a small degree for the same reasons that water quality, substrate, and off channel habitat would impacted as discussed previously. Pollutants carried into rearing areas of the Willamette Basin will be added to the existing pollution load which may reduce abundance and distribution of forage fish in rearing locations throughout the system. These affects will be controlled to some degree through stormwater management measures and construction BMPs. The adverse effects of the project alone on forage will dissipate with increasing distance from the project site.

Natural Cover – Vegetation disturbed during construction will be replaced; thus, natural cover would be temporarily affected by the proposed action and would recover over time.

Water Quality – Increased stormwater runoff and associated pollution input into Coffee Lake Creek, the Willamette River, and the Columbia River would result in a small, additive adverse effects on water quality.

Water Quantity – Water quantity is like to increase in Coffee Lake creek as impermeable surface will increase by 4.5 acres. The proposed action includes stormwater control measures that will moderate the flow of stormwater into the creek and thus into the Willamette River. These measures will minimize adverse effects of large surges of stormwater input directly into waterways used for rearing by salmon.

Freshwater Migration Corridors
Free of Artificial Obstruction - Coffee Lake Creek is not used as a migration corridor; therefore, the presence of the fish passage barrier downstream of the project site, combined with the proposed action, which is designed to maintain floodplain function, will also not alter migration corridors salmon within the affected area.

Natural Cover – No effect. Coffee Lake Creek is not a migration corridor for salmon, thus temporarily disturbed vegetation in the project area would not affect a migratory corridor. Downstream affects would not detract from the current level of natural cover throughout the Basin.

Water Quality - The proposed action will result in a small impact on migration corridors downstream of the project area, as the project would result in a low level of stormwater input that would combine with chemical pollutants already present in the water column, including the mainstem Willamette River. The Willamette River is a migration corridor for UWR Chinook salmon as well as UWR steelhead. Stormwater runoff pollution concentrations would be expected to dissipate with increasing distance from the project site. Along the corridors, forage fish abundance may be altered as a result of water pollution, which could adversely affect prey availability for migrating salmon. Overall, stormwater pollution added to the Willamette River Basin and the Columbia River basin, and the effects thereof, would be small due to stormwater control implementation consistent with SLOPES V (NMFS 2014) as well as use of construction BMPs.

Water Quantity – No effect for Coffee Lake Creek as it is not a migration corridor and is blocked by a fish passage barrier. Downstream effects throughout the affected area are the same as those previously discussed for freshwater rearing sites.

Estuarine Areas – None designated.

Nearshore Marine Areas – None designated

Green Sturgeon Critical Habitat

As long-lived, benthic dwelling species that spend an appreciable amount of their life cycle in bays, estuaries, and lower elevation mainstem of rivers, southern green sturgeon are vulnerable to the effects of pollutants, particularly in suspended sediments and bioaccumulation of contaminants in their prey, although exposure to pollutants has not been identified as limiting factor for this species. Moreover, green sturgeon critical habitat in the Willamette River only extends to RM 46, approximately 60 miles west of the city of Portland. Thus, all adverse effects of the project will be very small and additive to existing impacts beginning at that reach.

Freshwater Rearing Sites

Floodplain Connectivity - No effect. The project has been designed to maintain current floodplain function and no part of the action would modify the current level of floodplain connectivity.

Forage – Pollutants in stormwater runoff from the proposed project reaching the lower Columbia River will add to, and compound with, other pollutants already present there in ways that adversely affect the amount of food available for southern green sturgeon by injuring or killing their prey, thus reducing the amount of energy available for young southern green sturgeon to meet the physiological demands of rearing and migration. Similarly, the differential impact of stormwater runoff on prey species is likely to change their relative abundance and their community composition, thus further altering the foraging efficiency of juvenile fishes. Consumption of contaminants ingested inside the bodies of prey, or with plankton, detritus or sediment that is also ingested while feeding, provides a major pathway into the body of southern

green sturgeon where they are likely to adversely affect juvenile fish growth and development, suppress their immune systems, and impair sensory functions thereby reducing their survival.

Natural Cover - No effect. Coffee Lake Creek is not a rearing site for green sturgeon, thus temporarily disturbed vegetation in the project area would not affect rearing. Downstream effects of the proposed action would not detract from the current level of natural cover throughout the Basin.

Water Quality – Adverse effects on water quality are the same as those discussed previously under species effects. The proposed project would contribute to the existing pollutant load in Coffee Lake Creek, which flows into the Willamette River, which connects to the Columbia River. Pollution from this project would be distributed through the basin by these waterways. Adverse effects on water quality will be minimized through the use of stormwater management measures and construction BMPs, and would not result in an adverse modification to critical habitat.

Water Quantity – The effects are the same as those discussed for Pacific Salmon freshwater rearing sites.

Freshwater Migration Corridors

Free of Artificial Obstruction – Effects are similar as those discussed for freshwater migration corridors for Pacific Salmon; however, the effects would be even more attenuated given the increased distance between the project are and the beginning of green sturgeon critical habitat.

Natural Cover – Effects are the same as those discussed for Pacific salmon freshwater migration corridors.

Water Quality - Pollutants in stormwater runoff from the proposed project reaching the Willamette River and the lower Columbia River will add to, and compound with, other pollutants already present there in ways that adversely affect water quality in in freshwater riverine systems used by southern green sturgeon because the water column is an important connection between many of the biogeochemical processes that move stormwater pollutants through the action area in suspension, solution, or the bodies of aquatic organisms, and is a medium that brings those pollutants into contact with southern green sturgeon.

Water Quantity – Effects on water quantity are the same as those discussed for Pacific Salmon freshwater migration corridors.

Estuarine Areas

Forage – Effects are similar to those discussed for Pacific Salmon freshwater rearing sites. However, pollutants carried from the project site would dissipate with increasing distance from the project location. Therefore, adverse effects on prey species would be similarly reduced with increasing distance.

Free of Artificial Obstruction – No effect.

Natural Cover – No effect.

Water Quality - Effects would be similar to effects on freshwater migration corridors, but lessening as southern green sturgeon move seaward toward the mouth of the Columbia River and the concentration of pollutants is reduced by tidal flushing.

Nearshore Marine Areas

Forage – Effects would minimal and similar to effects on food resources in estuarine areas, but further lessening as southern green sturgeon as move into the open ocean beyond the mouth of the Columbia River and the influence of its freshwater plume.

Migratory Corridor – Minimal effects considering the low concentration of stormwater pollutants that would remain in the water in this habitat area.

Water Quality – Adverse effects would be similar to those discussed for estuarine areas.

Eulachon Critical Habitat

Freshwater Spawning Sites and Incubation

Flow – Flow would be restricted during construction as would habitat access to the construction site due to the presence of two coffer dam structures intended to control turbidity and debris movement downstream. Due to the presence of a fish passage barrier downstream of the project site, it is unlikely that eulachon would be able access the project site reach of Coffee Lake Creek for spawning. However, post construction stormwater flow would move beyond the project area into the Willamette River and the Columbia River where eulachon may spawn. Effects of stormwater runoff in these rivers from the project are likely to be minimal as pollution concentrations would be small yet additive to the pollution load already existing in these water bodies. Therefore, any adverse effects on critical habitat would be very small.

Water Quality – Effects are the same as discussed for Pacific salmon and southern green sturgeon freshwater rearing sites.

Substrate – Effects are the same as those discussed in species specific effects section for eulachon.

Free of Artificial Obstruction – Effects are the same as Pacific salmon and green sturgeon freshwater rearing sites.

Freshwater and Estuarine Migration Corridors

Free of Artificial Obstruction – Effects are the same as those discussed for Pacific salmon and green sturgeon for freshwater migration corridors.

Flow – Effects are the same as discussed above for eulachon freshwater spawning sites and incubation.

Water Quality – Effects are the same as discussed for Pacific salmon and green sturgeon freshwater migration corridors.

Forage – Effects are the same as discussed for freshwater migration and rearing sites for Pacific salmon and green sturgeon.

Nearshore and Offshore Marine Foraging Areas

Forage – Effects are similar to those discussed for southern green sturgeon nearshore marine areas.

Water Quality – Effects are the same as those discussed for Green sturgeon nearshore marine areas.

Summary of Effects on Critical Habitat

In summary, the effects of the proposed action are likely to have an adverse impact on PBF conditions that rely on adequate water quality for sustainment. These PBFs include forage, substrate, and water quality as it relates to pollutant loading. Those effects lessen in the estuary, as freshwater influences subside and marine influences increase, and end in coastal marine areas beyond influences of the Columbia River freshwater plume. The types of effects of the proposed action on PBFs would be similar to the effects caused by historical or existing discharges of pollutants, and will add to those effects. However, due to the small scale of the project and its associated stormwater, the adverse impacts of the proposed action on PBFs are not expected to cause an active, new reduction in the conservation value of any of critical habitat considered here, at either the watershed or designation scale and are not expected to appreciably alter the trajectory toward recovery.

2.8 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.

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 versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

Approximately 6 million people live in the Willamette River and Columbia River Basins, concentrated largely in urban parts of the lower Columbia River and the Willamette Valley. The past effects of that population, expressed as loadings of pollutants contributed to the Willamette and Columbia Rivers from runoff originating in residential, commercial, industrial, and other land uses for economic development, are described in the Environmental Baseline. That human population is likely to continue to grow in the foreseeable future (Portland State University

2012). No projection of future pollutant loadings in the Columbia River as a result of that population increase is available but a larger population is likely to have a commensurate level of demand for residential, commercial, industrial, and other land uses that produce stormwater runoff. Thus, it is likely that historic trends will continue, but with changes as described below.

To counteract past trends in pollution of the lower Columbia River, State, tribal, local or private parties, including groups such as the Columbia River Inter-Tribal Fish Commission, the Lower Columbia River Estuary Partnership, and the Portland Harbor responsible parties, together with non-Federal members of the Portland Harbor Natural Resource Trustee Council acting in their own capacity, are likely to continue taking aggressive actions to reduce toxic pollution and stormwater runoff to the Columbia River from all sources (U.S. EPA 2011). Those actions include public education, increased toxic reduction and clean-up actions, monitoring to better identify and control sources, research into ecosystem effects of toxic pollutants, and development of a regional data management system.

Those actions, combined with similar efforts in the upper Willamette, upper Columbia, and Snake River Basins, have produced a significant reduction in the volume of some pollutants delivered to the lower Columbia River and its estuary, although data are still insufficient to identify a trend in the concentration of most of those contaminants in the water itself (Johnson *et al.* 2005; U.S. EPA 2009; U.S. EPA 2011). Moreover, while there are reasons to expect continued reduction in pollutant deliveries to the river and, eventually, in the concentration of contaminants in the river itself, direct evidence to show that improvements in habitat conditions leads to improvement in population viability is lacking.

2.9 Integration and Synthesis

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

Of the 15 species/ESUs that are likely to be adversely affected by this proposed action, none meet the NMFS guidelines for a viable salmonid population (McElhany *et al.* 2000). The effects of the proposed action are likely to cause a small addition to the limiting factors related to contaminant exposure, and water pollution when runoff from the proposed project area is sufficient to reach Coffee Lake Creek, mainstem Willamette River, and lower Columbia River. Those effects will be additive in nature as they will contribute persistent pollutants to areas with impaired water quality and contaminated substrate, and will make them available for accumulation in the prey base. These impacts are likely to impair essential fish rearing and feeding behavior patterns for some individuals of each species considered. However, the number of individual Pacific salmon, southern green sturgeon, and eulachon injured or killed annually from this incremental increase in stormwater pollutants will be small, commensurate

with its contribution to the total pollutant load that now enters the Willamette River and Columbia River from all sources; therefore, the proposed action is not likely to cause a new risk of harm or deterioration in the pre-action condition of any species or appreciably reduce the likelihood of survival or recovery.

The *Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon* was signed August 21, 2018 (NMFS 2018). The *Endangered Species Act Recovery Plan for the Southern Distinct Population Segment of Eulachon*, was signed on September 6, 2017 (NMFS 2017). The plans that address the needs of Pacific salmon affected by the action (IC-TRT 2011; NMFS 2009; NMFS 2012; NMFS and ODFW 2011; Upper Columbia Salmon Recovery Board 2007), all call for measures to improve water quality and reduce the impact of residential and municipal development, including improved stormwater management in particular, as among the most potent and high priority recovery actions. Thus, the proposed action, which includes stormwater treatment to reduce impacts, is consistent with actions identified in recovery plans as necessary to recover species in both the WLC and IC recovery domains.

The environmental baseline is such that individual ESA-listed fish in the action area are exposed to reduced water quality, lack of suitable riparian and aquatic habitat and restricted movement due to developed urban areas, land use practices, and the presence of a fish passage barrier downstream of the project site. These stressors, as well as those from climate change, already exist and are in addition to any adverse effects produced by the proposed action. Major factors limiting recovery of the ESA-listed species considered in this opinion include degraded estuarine and nearshore habitat; degraded floodplain connectivity and function; channel structure and complexity; riparian areas and large wood recruitment; stream substrate, streamflow; fish passage; water quality; harvest and hatchery impacts; predation/competition; and disease.

The effects of the proposed action on the factors limiting recovery of for ESA-listed species include water quality degradation caused by pollutants that would enter waterways through stormwater runoff from the proposed action. There pollutants are likely to injure or kill a small number of individual listed Pacific salmon, steelhead, green sturgeon, and eulachon each year. The load of contaminants and the volume of stormwater runoff that the project would add are small in comparison to the contaminant load and total discharge of the Willamette and Columbia Rivers, and the additional runoff would not expose listed species to a new risk, but those contaminants would still have result in an adverse impact when taken together with the existing contaminant load from other actions. However, even with the new additional load of pollutants from this project, the total load of pollutants within the action area is declining and is expected to decline further. Thus, the effects of the proposed action, when added to the environmental baseline, status of the 15 species, and cumulative effects, are not reasonably likely to reduce appreciably the abundance, productivity, spatial structure, or genetic diversity of the populations of the 15 species considered in this opinion.

The value of critical habitat for salmon, steelhead, green sturgeon, and eulachon in the area of impact is limited by diminished water quality, altered hydrology, lack of floodplain connectivity, and lack of complex habitat to provide forage and cover. The though Coffee Lake Creek itself

does not have a high conservation value for the species addressed in this consultation, the Willamette River and Columbia River do have a high conservation value despite the degraded baseline habitat conditions due to their role in rearing and migration.

The adverse effects on ESA-listed fish species discussed previously, will also adversely affect PBFs for their designated critical habitats. The proposed action is likely to contribute to a small reduction in the quality and function of critical habitat PBFs dependent upon water quality in the action area. However, this project's contribution to the degradation of the compromised baseline is not considered to be significant. At the watershed scale, the proposed action will not increase the extent of degraded habitat within the basin. Even when cumulative effects and climate change are included, the proposed action will not negatively influence the function or conservation role of critical habitat at the watershed scale. Critical habitat for salmon, steelhead, green sturgeon, and eulachon will remain functional, or retain the current ability for the PBFs to become functionally established.

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 their numbers, reproduction or distribution nor will the proposed action reduce the value of designated critical habitat for the conservation of the species.

2.10 Conclusion

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent actions, and cumulative effects, it is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UWR spring-run Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR Coho salmon, SR sockeye salmon, LCR steelhead, UWR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, southern green sturgeon, or southern eulachon, or result in the destruction or adverse modification of critical habitats designated for any of the listed fish species.

2.11 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.

2.11.1 Amount or Extent of Take

Actions necessary to complete construction components of the proposed action will occur within the floodplain in a waterway that is connected to the Willamette River. Construction activity will be conducted during the regulated in-water work window of July 15 through October 15 when water levels are at their lowest and ESA-listed species are less likely to be present downstream. Construction BMPs will limit input of all suspended sediment, debris, and pollution from the construction area and will prevent adverse effects on listed ESA-species. The proposed action will increase production of stormwater runoff that will deliver a wide variety of pollutants into aquatic habitats at times when those habitats are occupied by LCR Chinook salmon, UWR Chinook salmon, UCR spring- run Chinook salmon, SR spring/summer-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR Coho salmon, SR sockeye salmon, LCR steelhead, UWR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, southern green sturgeon, or eulachon.

Stormwater runoff from the proposed project will contain dissolved and particulate metals (*e.g.*, copper, lead, zinc), PAHs, pesticides, sediment, and other pollutants of concern that are reasonably certain to result in the harassment or harm of juveniles and adults of each of those species due to impaired juvenile rearing and migration and impaired adult migration for all species, and impaired reproduction in CR chum salmon and eulachon. This take cannot be accurately quantified as a number of ESA-listed fish because the distribution and abundance of fish that occur within an action area is affected by dam and reservoir operations, habitat quality, interactions with other species, harvest programs, and other influences that cannot be precisely determined by observation or modeling. Therefore, NMFS will not identify the amount of take, but will identify an incidental take surrogate that will serve as an extent of take.

Here, the best available indicators for the extent of take are the following combination of stormwater facility inspection, maintenance, and recording actions, because those variables will determine whether the stormwater treatment system continues to reduce the concentration of pollutants in stormwater runoff as designed, and thus reflect the amount of incidental take analyzed in the opinion (Claytor and Brown 1996; Santa Clara Valley Urban Runoff Pollution Prevention Program 1999; Santa Clara Valley Urban Runoff Pollution Prevention Program 2001):

1. Each part of the stormwater system, including the vegetated swale, swale inlet, rain garden, stormwater planter, and detention pond flow control structure, as well as all proprietary stormwater control mechanisms must be inspected and maintained at least quarterly for the first two years, at least twice a year thereafter, and within 48-hours of each major storm event.
2. All stormwater must drain out of the vegetated conveyance swales, the rain garden, and stormwater planters, within 72-hours after rainfall ends.
3. All structural components, including inlets and outlets, must freely convey stormwater.
4. Desirable vegetation in the vegetated filter strips and vegetated conveyance swales must cover at least 90% of the facility – excluding dead or stressed vegetation, dry

grass or other plants, and weeds.

If the stormwater system is not inspected and maintained (as described in #1); if water ponds in the noted conveyance mechanisms for longer than 72 hours after rainfall ends (#2), structural components are blocked (#3), or if desirable vegetation does not cover 90% of the conveyance mechanisms intended to be vegetated, and corrective action is not taken within seven days (#4), and corrective action is not taken with respect to #2-4 within seven days of a required inspection, the extent of take surrogate for stormwater will be exceeded and the Corps shall reinitiate this consultation.

2.11.2 Effect of the Take

In the biological 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.

2.11.3 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 Corps shall minimize take by:

1. Ensuring that stormwater runoff produced by the areas of the Kinsman and 5th Street crossing, the Kinsman and 5th Street connector, and the Tonquin Trail extension that are modified or constructed through the proposed action is treated with stormwater facilities that are designed, constructed, operated, and maintained using the best available information on LID and BMPs for stormwater treatment and discharge;
2. Ensuring that the stormwater management plan is implemented fully and successfully through biannual inspections, the results of which are documented in annual stormwater management reports.
3. Ensuring completion of a post construction monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this incidental take statement are effective in minimizing incidental take.

2.11.4 Terms and Conditions

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

1. The following terms and conditions implement reasonable and prudent measure 1 (stormwater management): The Corps shall ensure that the Coffee Lake Creek bridge

crossings, trail extension, and road extensions will be constructed, operated, and maintained with stormwater facilities as described below:

a. The project developer will be responsible for insuring installation, function and maintenance of the proposed stormwater treatment facilities during construction.
b. Following construction, any successor in interest to the project developer will assume responsibility for maintenance of all of the system components per the manufacturer's recommendations and as described in the Preliminary Drainage Report developed by Otak, Inc. (2018) for the City of Wilsonville.
c. The maintenance plan and responsibility will be recorded through an operations and maintenance agreement with the City of Wilsonville, Planning Department, through the local Code, Covenants, and Restrictions or other appropriate instrument.
d. Ensure that the planned storm drainage mechanisms discharge into a flow path that will effectively disperse runoff without causing erosion before the discharge reaches the Coffee Lake Creek.
e. Carry out the stormwater operation and maintenance plan as described in the submitted project proposal including:
    (1) Inspection and maintenance schedule.
    (2) Inspection and maintenance procedures.
    (3) Keeping and preserving log of all maintenance activities.

2. The following terms and conditions implement reasonable and prudent measure 2 (regular inspection of stormwater management elements): The Corps shall ensure that the applicant complete and maintain records of inspections and post flood event reports for the projects lifecycle as specified in the project proposal. The Corps shall ensure that all maintenance activities are documented and those records are also maintained by the applicant or designated responsible party. Additionally, all reports must be made available to the Corps and NMFS upon request.

3. The following terms and conditions implement reasonable and prudent measure 3 (monitoring and reporting):

a. A project completion report within 60-days of completing construction, including:
    i. Project name
    ii. Corps point of contact.
    iii. Construction completion date.
    iv. An explanation of the stormwater system as built or installed by the contractor, including any on-site changes from the original plan.
    v. A photograph of the stormwater outfalls with a map showing their location.
b. Three annual reports on stormwater operation and maintenance – for each of the three years after construction is complete, including a copy of the:
    i. Stormwater facility monitoring log with:
        (1) The name of the contractor (if applicable) for all inspections.

(2) The date of each regular inspection, and any additional inspection made within 48-hours of storm events with greater than or equal to 1.0 inch of rain during a 24-hr period.
(3) A description of any structural repairs, planter maintenance, or facility cleanout activities, vegetation management, erosion control, structural repairs or seals, ponding water, pests, and trash or debris removal.
(4) An estimate of the percent cover of healthy vegetation in planted stormwater management elements.

c. The applicant must report any exceedance of take covered by this opinion to NMFS immediately.
d. Each annual report must be submitted to NMFS at the following address no later than September 30 each year:

National Marine Fisheries Service
Oregon Washington Coastal Office
Attn: WCRO-2019-00420
1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232-2778

2.12 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). The following conservation recommendations are discretionary measures that NMFS believes is consistent with this obligation and; therefore, should be carried out by the Corps or applicants.

1. Identify and implement habitat enhancement or restoration activities in the Willamette River and Columbia River that:

- Increase the amount of shallow-water habitat in the reach to benefit ESA-listed salmonids
- Restore or create off-channel habitat or access to off-channel habitat, side channels, alcoves, wetlands, and floodplains
- Remove old docks and piles that are no longer in use
- Protect and restore riparian areas to improve water quality, provide long-term supply of large wood to streams, and reduce impacts that alter other natural processes
- Improve or regrade and revegetate streambanks
- Restore instream habitat complexity, including large wood placement
- Remove invasive plant species from upland vegetation and plant native species

2. The applicant should contact ODFW regarding the existing fish passage barrier located at the confluence of Arrowhead Creek and Coffee Lake Creek. Removal of this structure would directly contribute to species recovery for UWR Chinook salmon and UWR steelhead that would likely use Coffee Lake Creek for rest, forage, and off channel refuge. Allowing access to Coffee Lake Creek would increase the amount of shallow water habitat available for

salmonid use during winter months when water temperatures are likely to support presence of ESA-listed species.

Please notify NMFS if the Corps carries out this recommendation so that we will be kept informed of actions that are intended to improve the conservation of listed species or their designated critical habitats.

2.13 Reinitiation of Consultation

This concludes formal consultation for Coffee Lake Creek Bridge Construction and Road Extension.

As 50 CFR 402.16 states, 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.

To reinitiate consultation, contact the Oregon Washington Coastal Office of NMFS, and refer to NMFS No.: WCR-2019-00420.

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

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by the **[***Federal agency***]** and descriptions of EFH for Pacific coast groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Pacific coast salmon (PFMC 1999) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The Pacific Fishery Management Council described and identified EFH for groundfish (PFMC 2005), coastal pelagic species (PFMC 1998), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of groundfish, coastal pelagic species, and Chinook and coho.

Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have the following adverse effects on EFH designated for Pacific Coast salmon, groundfish and coastal pelagic species.

3.2 Adverse Effects on Essential Fish Habitat

NMFS determined that the action, as proposed, will adversely affect EFH designated for Chinook and coho salmon, groundfish and coastal pelagic species. The project will discharge stormwater runoff that contains PAHs, dissolved and suspended metals, and other persistent contaminants of concern into Coffee Lake Creek. The contaminants will move toward the, Willamette River, lower Columbia River, and Columbia River estuary, a Habitat Area of Particular Concern (HAPC) and the Pacific Ocean. Contaminants that are dissolved or in suspension will reach the ocean within days or weeks while others deposited in sediments will require years or decades to complete the trip. During that time, some of those contaminants will be absorbed or ingested by Chinook salmon and steelhead, sometimes in prey that will increase the concentration of contaminants through a process of bioaccumulation. After the contaminants reach the Columbia River estuary and enter the nearshore ocean, they will also be absorbed or ingested by groundfish and coastal pelagic species. Some individuals will be exposed to these contaminants in quantities sufficient to cause injury or death by modifying their behavior, disrupting endocrine functions, or causing immunotoxic disease effects, either by themselves or through additive, interactive, and synergistic interactions with other contaminants in the river.

3.3 Essential Fish Habitat Conservation Recommendations

The properties of EFH that are necessary for the spawning, breeding, feeding or growth to maturity of managed species in the action area are the same or similar to the biological requirements of ESA-listed species as analyzed above, and because the best management practices and conservation measures that the applicant included as part of the proposed action are adequate to avoid, minimize, or otherwise offset those adverse effects to designated EFH, NMFS has provided the following two conservation recommendations.

The following conservation recommendation is necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. This conservation recommendation is a subset of the ESA reasonable and prudent measures, terms and conditions:

> Follow reasonable and prudent measures #1 (ensure that stormwater runoff produced by the the project action are treated with stormwater facilities that are designed, constructed,

operated, and maintained using the best available information on LID and BMPs for stormwater treatment and discharge) and #2 (ensure completion of a monitoring and reporting program to confirm that the stormwater facilities were completed as described).

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

3.4 Statutory Response Requirement

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

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

3.5 Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The 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 user of this opinion is the Corps. Other interested users could include the City of Wilsonville as the project applicant. Individual copies of this opinion were provided to the Corps. The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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