**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 97232-1274

**Refer to NMFS No:**
**WCRO-2020-03191**

June 4, 2021

Michelle Walker
Chief, Regulatory Branch
Department of the Army
Seattle District, Corps of Engineers
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Cascade Logistic Park, Marysville, Snohomish County, Washington, Quilceda Creek- Frontal Possession Sound (HUC 171100110204) (NWS-2020-571)

Dear Ms. Walker:

Thank you for your letter of November 19, 2020, requesting initiation of formal consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the permitting of wetland fill associated the construction of the Cascade Logistic Park in Marysville, WA. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

The enclosed document contains the biological opinion (Opinion) prepared by the NMFS pursuant to section 7(a)(2) of the ESA on the effects of the proposed action. In this Opinion, the NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Puget Sound (PS) steelhead and Puget Sound Chinook salmon. The action will not affect the designated critical habitat of both of these species because critical habitat is not designated in the action area.

As required by section 7 of the ESA, the NMFS has provided an incidental take statement with this Opinion. The incidental take statement describes reasonable and prudent measures the NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action, and sets forth nondiscretionary terms and conditions that the US Army Corps of Engineers must comply with to meet those 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 EFH pursuant to Section 305(b) of the MSA. The NMFS reviewed the likely effects of the proposed action on EFH, and concluded that the action would adversely affect designated EFH for Pacific Coast Salmon. Therefore, we have included the results of that review in Section 3 of this document.

Please contact Janet Curran in the North Puget Sound Branch of the Oregon Washington Coastal Office by email at janet.curran@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

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

cc: Amanda Barbieri, USACE

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

Cascade Logistic Park, Snohomish County, Washington
Quilceda Creek- Frontal Possession Sound (HUC 171100110204) (NWS-2020-571)

**NMFS Consultation Number**: WCRO-2020-03191

**Action Agency**: U.S. Army Corps of Engineers

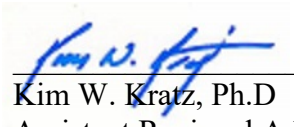
**Affected Species and NMFS' Determinations**:

| ESA-Listed Species | Status | Is Action Likely to Adversely Affect Species? | Is Action Likely To Jeopardize the Species? | Is Action Likely to Adversely Affect Critical Habitat? | Is Action Likely To Destroy or Adversely Modify Critical Habitat? |
|---|---|---|---|---|---|
| Puget Sound steelhead (*Oncorhynchus mykiss*) | Threatened | Yes | No | N/A | N/A |
| Puget Sound Chinook (*O. tshawytscha*) | Threatened | Yes | No | N/A | N/A |

| 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**:



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

**Date**: June 4, 2021

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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 USC 1531 et seq.), and implementing regulations at 50 CFR 402, as amended.

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

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

## 1.2 Consultation History

On November 19, 2020, NMFS received a request to initiate ESA section 7 consultation from the US Army Corps of Engineers (USACE). The initiation package included an ESA section 7 consultation initiation email and biological assessment (BA), including supporting documents (project drawings, mitigation plan, drainage report, stream relocation plan, etc). The BA documents the USACE's determination that the action may affect but is not likely to adversely affect (NLAA) Puget Sound (PS) Chinook salmon and PS steelhead. No critical habitat is designated in the action area, therefore the USACE determined that the project would have no effect on critical habitat. The nearest designated critical habitat is located in Middle Fork Quilceda Creek, located approximately 0.35 mile southwest of the project area. The USACE determined that project effects would not extend downstream into critical habitat. The USACE determined that the project would adversely affect Pacific salmon EFH within the action area. On March 29, 2021 we received a full package of revised project documents, including some new information. With this information, we initiated formal consultation on March 29, 2021.

## 1.3 Proposed Federal Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). For EFH consultation, federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The USACE's permitting action for the Cascade Logistics Park is for wetland, stream, and ditch fill under Section 404 of the Clean Water Act. The applicant will place fill in Edgecomb Creek, Ditch X, and onsite wetlands at 6600 172nd Street Northeast in Arlington, Washington, and 16015 51st Avenue Northwest in Marysville, Washington (48.148981 N latitude, -122.145529 W longitude) (Figure 1). The applicant proposes to fill 4.28 acres of wetlands, 10,165 linear feet of Edgecomb Creek, and 1,167 linear feet of Tributary X to develop a regional industrial park to include multiple buildings and associated infrastructure. The applicant will create a new two mile stream, wetland, and riparian corridor along the east side of the property. The USACE is permitting the wetland and stream fill, but not the future industrial park development, however we consider the effects of the entire development activity as a consequence of the USACE's permitting action for the stream, ditch, and wetland fill. Thus, we describe the proposed action as one complete project for the industrial park including the stream relocation and associated conservation and mitigation activities. The existing stream on the subject property is a highly degraded farm ditch with no functional riparian area. The stream relocation and establishment of a vegetated riparian area will restore two miles of Edgecomb Creek to a naturally functioning stream with increased habitat value.

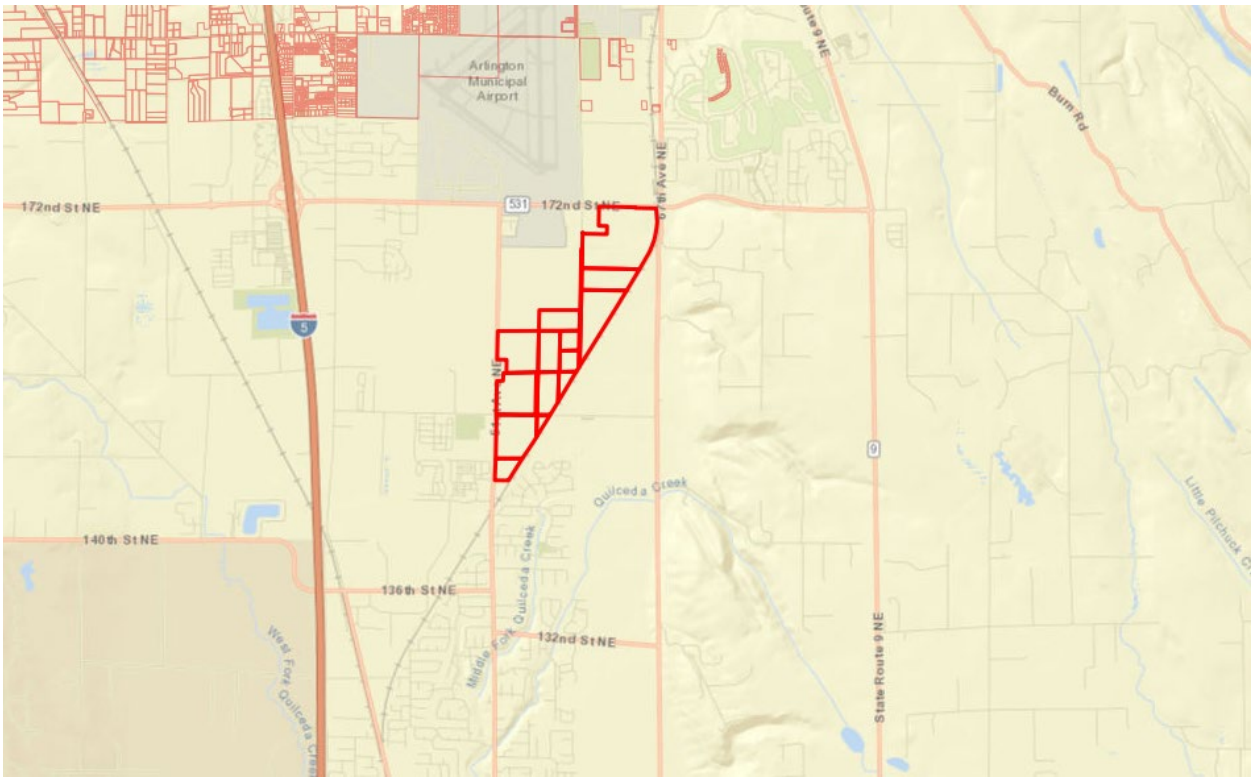


**Figure 1.** Vicinity Map

The subject property is located at 6600 172nd Street Northeast in the City of Arlington, Washington, and 16015 51st Avenue Northwest in the City of Marysville, Washington. The proposed project is located within both the City of Arlington and the City of Marysville jurisdictions. The subject property consists of 14 tax parcels totaling approximately 431 acres situated in the Northeast and Southwest ¼ of Section 27 and Northwest and Southwest ¼ of Section 34, Township 31 North, Range 5 East, W.M. (Snohomish County Tax Parcel Numbers 31052700100100, 31052700100300, 31052700300200, 31052700300500, 31052700300700, 31052700300800, 31052700300900, 31052700400300, 31053400200300, 31053400200400, 31053400200500, 31053400200600, 31053400200700, and 31053400300300). The BNSF Railroad runs along the eastern portion of the subject property; the project area consists of all parcels located west of the railroad. The proposed project is located in the 12-digit Hydrologic Unit Code (HUC) 171100110204.

The Applicant proposes to develop an industrial park to include nine buildings and associated infrastructure such as parking, access roads, and stormwater management facilities utilizing enhanced water quality treatment for runoff from all impervious surfaces. The industrial park buildings will range in size from slightly over 100,000 square feet to near 1,000,000 square feet. A rail spur may also be constructed onsite, outside the new stream corridor, if a rail-dependent tenant is identified in the future. The Cities of Arlington and Marysville have identified the need for a public road to connect 172nd Street Northeast to 152nd Street Northeast, and this north-south road (59th Avenue Northeast) will be constructed through the industrial park. Additional access roads will connect to 172nd Street Northeast, 152nd Street Northeast, and 51st Avenue Northeast. Internal roadways and loading areas ("truck courts") will also be constructed to facilitate semi-truck movement through the site and to buildings. Frontage improvements and roadway upgrades are required along 51st Avenue Northeast and 152nd Street adjacent to the site. Frontage improvements along 51st Avenue Northeast will include widening the existing two-lane road to a three-lane road and half street improvements (multi-modal path, curb, and gutter). Frontage improvements and roadway upgrades along 152nd Street is expected to include the expansion of the existing two-lane road to include up to 4 to 5 lanes with a curb, sidewalk, and gutter.

The proposed project will result in approximately 60 percent impervious surface coverage onsite. Stormwater runoff for the proposed industrial park will be collected from all pollutant generating impervious surfaces (loading areas, roadways, and building roofs). Runoff will also be collected from the widened roadways along 51st Avenue Northeast and 152nd Street Northeast. The proposed stormwater management system for the industrial park will consist of enhanced water quality treatment and stormwater detention; following detention and treatment, stormwater will be dispersed or infiltrated into a restored riparian corridor to be located on the east side of the project area. Stormwater from all impervious surfaces (e.g., rooftops, parking areas, roadways, etc.) will pass through the enhanced water quality system for treatment of metals such as copper and zinc, phosphorus, and petroleum hydrocarbons. The conceptual stormwater plan includes passing the water through basic, enhanced, and phosphorous water quality treatments using modular wetlands (e.g., from Forterra/BioClean) and detention ponds for flow control. Runoff from the 51st Avenue Northeast improvements will be infiltrated into a gravel trench. Runoff from 152nd Street Northeast is anticipated to be collected through catch basins and directed

through the onsite stormwater system including water quality treatment, detention pond control, and dispersion into the riparian corridor.

The project was designed to minimize impacts to wetlands and waterbodies to the greatest extent feasible; however, complete avoidance of aquatic features is not possible due to the central location of the ditched Edgecomb Creek on the subject property, the scattered distribution of wetlands throughout the subject property, and the large spatial footprints required for industrial buildings and associated utilities and road infrastructure. In order to accommodate the Applicant's purpose and need for the industrial site development, the project requires the realignment and restoration of Edgecomb Creek (10,165 linear feet), realignment of Ditch X (1,167 linear feet), and total fill of wetlands west of the mitigation corridor (4.28 acres of wetlands and an additional 0.60 acres indirect wetland impact). One large Category II wetland (Wetland AH) and several smaller Category IV wetlands (Wetlands S, T, and AK) will be preserved. The preservation of Wetland AH will also preserve a meandering section of Edgecomb Creek through the wetland. The existing Edgecomb Creek and Ditch X channels will be filled. The majority of onsite wetlands to be filled consist of low and moderate functioning Category IV and Category III wetlands, with one small Category II wetland along the existing stream channel. The onsite ditches will be filled, piped, or relocated. Ditch X currently provides off-channel habitat for Edgecomb Creek, and the ditch will be relocated to maintain connectivity with the realigned Edgecomb Creek. The 51st Avenue East Ditch and 152nd Street Northeast Ditches and Ditch U will also be filled and mitigated for as wetlands under local permitting requirements.

**Proposed Mitigation/Stream Restoration**

The proposed stream and wetland impacts require permitting with federal, state, and local agencies. Each agency requires the Applicant to complete mitigation actions. The Applicant will monitor the mitigation sites for 10 years to satisfy USACE requirements. Compensatory mitigation actions are intended to compensate for lost wetland and stream functions and values by providing an overall improvement in the quality of water quality, hydrologic, and habitat functions according to the needs of the site, local sub-basin, and overall Snohomish River watershed. To offset proposed impacts to Edgecomb Creek, the Applicant will realign Edgecomb Creek within a restored riparian corridor adjacent to the west side of the BNSF railroad. The existing stream is contained within a maintained farm ditch. The relocated stream will function as a naturally flowing stream within a functional riparian and wetland corridor. The stream relocation not only mitigates for lost function from filling the farm ditch, it will create two miles of new, naturally functioning stream within a 27-acre riparian corridor (Figure 2).

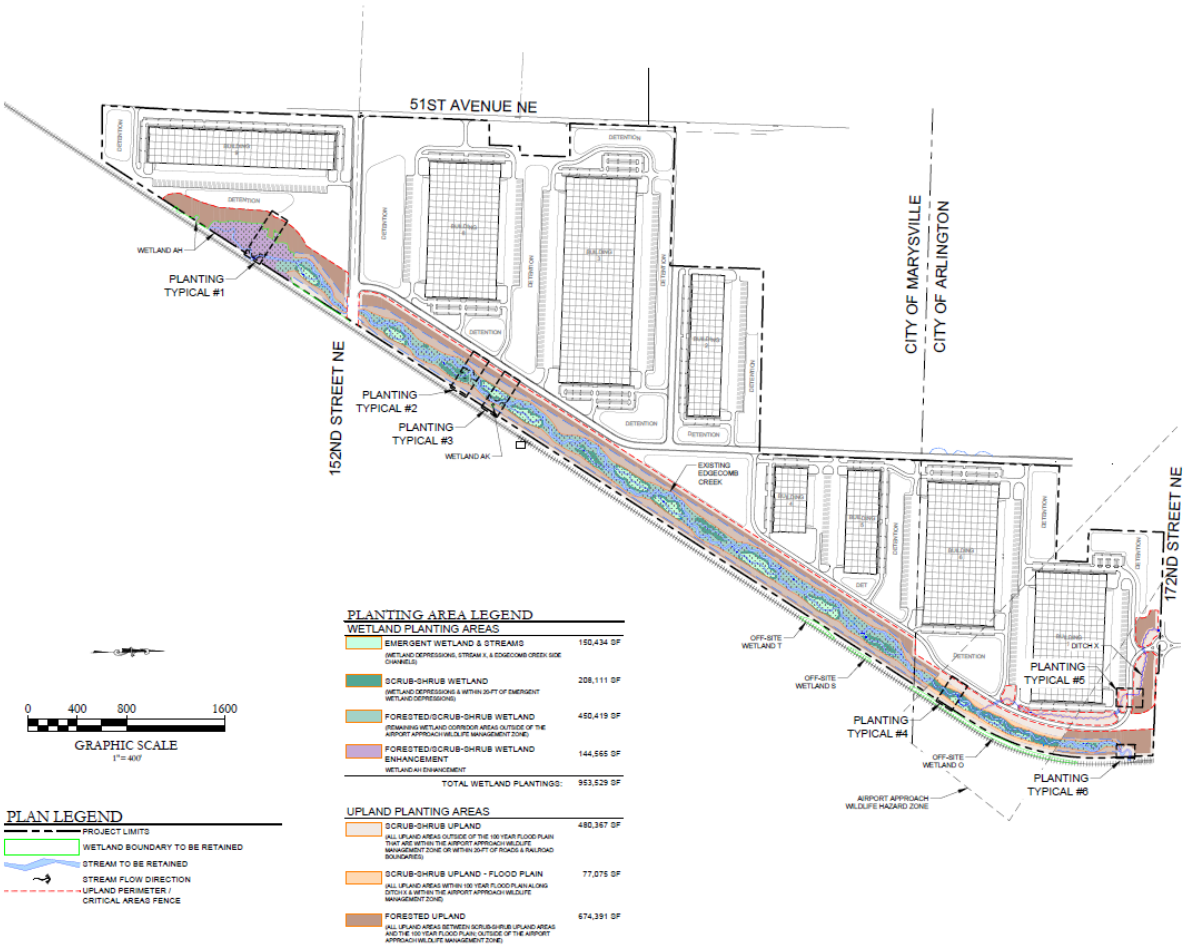


**Figure 2.** Conceptual Overview of Stream Relocation Corridor

The riparian corridor will be up to 315 feet wide and contain a pedestrian trail. Edgecomb Creek will be re-aligned through a widened stream channel that meanders through the riparian corridor; additional side channels will be created and connected to the mainstem stream channel to provide off-channel habitat and flood refugia. Suitable streambed substrates will be added the new channels. Stream functions will be further enhanced by small and large woody debris placement within channels. Riparian functions will be restored by diverse native plantings to create forest, scrub-shrub, and emergent vegetation communities. The re-aligned main-stem stream channel and created side-channel habitat will provide mitigation at a minimum of 1:1 for the fill of the existing Edgecomb Creek stream channel. The 1:1 ratio represents the ratio of linear feet of filled stream to linear feet of created stream, however the new stream channel will provide increased habitat value over the existing stream, which flows through farmland in a ditch without any riparian vegetation. Ditch X will also be re-aligned, lengthened, and reconnected to the re-aligned Edgecomb Creek. Compensatory wetland re-establishment and creation will occur within the riparian corridor.

As a non-compensatory mitigation measure (i.e. a conservation measure above and beyond what is required for mitigation by permitting agencies), the Applicant proposes to replace two partial fish barrier culverts underneath the BNSF railroad with box culverts designed to allow fish

access and convey Edgecomb Creek beneath the railroad. Ongoing maintenance for the riparian corridor may include removal of any beaver dams that are established early during the monitoring period to support native plant establishment.

**Construction Techniques**

The proposed project construction includes four components: 1) replacement of culverts beneath the BNSF railroad as a voluntary conservation measure; 2) site clearing, grading, and wetland fill; 3) mitigation corridor creation (including stream restoration and wetland creation actions); and 4) site construction and planting.

**Railroad Culvert Replacement**

The Applicant coordinated closely with BNSF to replace two undersized fish barrier culverts with larger box culverts to improve fish passage. While BNSF has indicated their initial support and willingness to allow the Applicant to replace these two culverts, formal authorization from BNSF has not been achieved as of the date of this opinion. An engineered feasibility study is underway to determine the feasibility of the proposed culvert replacements.

**Riparian Corridor Creation with Edgecomb Creek and Ditch X Relocation**

The riparian corridor creation will include the excavation of material to create the new Edgecomb Creek channel, side channels, Ditch X channel, and wetlands. Riparian corridor creation may be completed separately from clearing, grading, and wetland fill actions in the rest of the project area. Excavated material may be temporarily stored and then may be used to fill the existing stream channel and Ditch X. Any remaining excavated material will be removed from the site or used as needed for grading in the rest of the project area. The new stream channel will be entirely excavated prior to the stream relocation, with an upland bench left on the upstream end to prevent the stream from inadvertently diverting into the new channel. Streambed substrates, habitat features (e.g., small and large woody debris) and native vegetation will be installed following channel excavation. Following the connection of the new stream channel to the existing stream channel on the downstream end of the impact area, a block net will be placed across the new channel to prevent fish from entering the new channel. Dewatering and rewatering of the existing and new stream channels will be completed using temporary dams and bypass pipes. The Ditch X realignment is likely to occur concurrently with the Edgecomb Creek realignment. An upland bench will be left between the new Ditch X channel and new Edgecomb Creek channel until the dewatering and rewatering of Edgecomb Creek is complete.

The installation of a new culvert beneath 152nd Street Northeast will occur prior to the stream relocation. The road surface will be broken and roadbed material excavated to create a new trench for the box culvert. The box culvert will be installed, and the road will then be resurfaced with asphalt. During this initial work (prior to relocating the water), the Applicant proposes to install a box culvert of sufficient length to accommodate the future road improvement (widening by the City) footprint, to avoid the need for future work in the stream channel during road construction. This future road widening is planned independently by the City of Marysville and is not a consequence of the proposed action.

The stream relocation will be divided into at least two sections in order to minimize fish loss and turbidity impacts during fish recovery and dewatering efforts. The existing stream channel will be dewatered and the new stream channel rewatered from the downstream end of the proposed impact length to the upstream end. Following the dewatering of each existing channel section, the dried channel section may be immediately filled. Prior to dewatering, block nets will be installed at the upstream and downstream ends of the selected channel section, and fish capture and relocation efforts completed according to the Fish Protection Plan. An additional net will be installed at the downstream end of the new stream channel in order to prevent fish movement upstream while the relocation effort is going on. Following the fish capture and relocation, a bladder dam and a bypass pipe will be used to dewater each channel section. Due to the lack of a significant grade difference between the existing stream channel and new stream channel and the elevation of the site during initial grading activities and need to control rewatering rates, pumps will be necessary to move water from the existing stream channel to the new stream channel. As the stream channel dewatering progresses from downstream to upstream, the bypass pipe will be progressively moved up the new stream channel. Coir logs will be installed in the new stream channel to help capture sediments flowing downstream. Water will be gradually reintroduced, with time allowed for sediments to settle before moving to the downstream phases of the stream. The biodegradable coir logs may be left in place following stream relocation to provide sustained sediment control for the new channel. Once the stream has been fully relocated, the berm between Ditch X and the new stream channel will be removed.

**Site Construction and Plantings Installation**

The remaining site construction will progress after the completion of the stream relocation. The remaining site construction will generally include utility installation, road development, and building development. A rail spur may also be constructed onsite, outside the mitigation corridor, if a rail-dependent tenant is identified. Stormwater infrastructure will also be installed, consisting of enhanced water quality treatment facilities and detention ponds that outlet to dispersion areas within the riparian area of the stream corridor.

**Conservation Measures**

The Applicant designed the site layout to minimize impacts to Edgecomb Creek and wetlands as feasible. Site planning considerations to minimize impacts include: (1) avoidance of Wetland AH, which is a large Category II wetland (City of Marysville designation – Category I wetlands provided highest functions and values, followed by Category II then III, etc.). This wetland contains meandering and braided sections of Edgecomb Creek; and (2) avoidance of impacts to existing trees adjacent to the railroad where feasible.

The Applicant will capture and relocate fish and monitor water quality monitoring during dewatering and rewatering of Edgecomb Creek. The Applicant will follow protocols as described in their Fish Protection Plan and Water Quality Monitoring Plan.

Project Best Management Practices (BMPs) include Temporary Erosion and Sediment Control (TESC) measures consisting of silt fencing, seeding of disturbed soils, and items outlined in the project's erosion and stormwater control plans, to be prepared by the Project Engineer prior to

construction activities as applicable. Once TESC measures are in place, construction actions will proceed.

Equipment used for construction activities will be typical for demolition and reconstruction activities and will be kept in good working order free of leaks. All equipment staging and materials stockpiles will be kept in upland areas, and the areas will be kept free of spills and/or hazardous materials.

Once construction is complete, any disturbed areas will be revegetated using appropriate native and/or landscaping plants determined by the development manager. These actions will take place to permanently stabilize the soils and reduce erosion and restore any disturbed native vegetation to maintain a no net loss of ecological function.

### 1.4 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 for this project includes the all the upland development areas as well as the aquatic areas downstream of the project area within approximately 100 feet of the southernmost instream work areas where water quality will be temporarily impacted by earth movement in the stream channels during construction. The action area is also EFH for Pacific Coast salmon.

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

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

### 2.1 Analytical Approach

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

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

We use the following approach to determine whether a proposed action is likely to jeopardize listed species:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

## 2.2 Rangewide Status of the Species

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02.

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 et al. 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°F as an annual average, and up to 2°F in some seasons based on average linear increase per decade (Abatzoglou et al. 2014; Kunkel et al. 2013). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote 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 (Mote et al. 2014). Precipitation is more likely to occur during October through March,

less during summer months, and 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).

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 et al. 2010). Temperature increases shift timing of key life cycle events for salmonids and species forming the base of their aquatic foodwebs (Crozier et al. 2011; 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 to 3.7ºC 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. Acidification also impacts 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 to 32 inches by 2081 to 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 evolutionarily significant units (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.

### 2.2.1 Status of the Species

This section provides a summary of listing and recovery plan information, status, 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.fisheries.noaa.gov/).

***PS Chinook salmon***

We listed the PS Chinook salmon ESU as threatened on June 28, 2005 (70 FR 37160). Recovery plans for PS Chinook salmon include the Shared Strategy for Puget Sound 2007 Plan and the NMFS 2006 Plan (NMFS 2006; SSDC 2007). The most recent status review was in 2015 (NWFSC 2015). This ESU comprises 22 populations distributed over five geographic areas. Most populations within the ESU have declined in abundance over the past 7 to 10 years, with widespread negative trends in natural-origin spawner abundance and hatchery-origin spawners present in high fractions in most populations outside of the Skagit watershed. Escapement levels for all populations remain well below the Technical Recovery Team (TRT) planning ranges for recovery, and most populations are consistently below the spawner-recruit levels identified by the TRT as consistent with recovery.

Limiting factors for PS Chinook salmon include:
1. Degraded floodplain and in river channel structure.
2. Degraded estuarine conditions and loss of estuarine habitat
3. Degraded riparian areas and loss of in river large woody debris
4. Excessive fine-grained sediment in spawning gravel
5. Degraded water quality and temperature
6. Degraded nearshore conditions
7. Impaired passage for migrating fish
8. Severely altered flow regime

***PS Steelhead***

We listed the PS steelhead distinct population segment (DPS) as threatened on May 11, 2007 (72 FR 26722). On December 27, 2019, we published a final recovery plan for PS steelhead (84 FR 71379) (NMFS 2019). The plan indicates that within each of the three MPGs, at least fifty percent of the populations must achieve viability, *and* specific DIPs must also be viable:.

The most recent status review was in 2015 (NWFSC 2015). This DPS comprises 32 populations. The DPS is currently at very low viability, with most of the 32 populations and all three population groups at low viability. Information considered during the most recent status review indicates that the biological risks faced by the PS Steelhead DPS have not substantively changed since the listing in 2007, or since the 2011 status review. Furthermore, the PS Steelhead TRT recently concluded that the DPS was at very low viability, as were all three of its constituent major population groups (MPGs), and many of its 32 populations. In the near term, the outlook for environmental conditions affecting PS steelhead is not optimistic. While harvest and hatchery production of steelhead in PS are currently at low levels and are not likely to increase substantially in the foreseeable future, some recent environmental trends not favorable to PS steelhead survival and production are expected to continue.

Limiting factors for PS steelhead include:
1. Continued destruction and modification of habitat
2. Widespread declines in adult abundance despite significant reductions in harvest
3. Threats to diversity posed by use of two hatchery steelhead stocks
4. Declining diversity in the DPS, including the uncertain but weak status of summer-run fish
5. A reduction in spatial structure
6. Reduced habitat quality
7. Urbanization
8. Dikes, hardening of banks with riprap, and channelization

## 2.3 Environmental Baseline

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

which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The subject property is located in the City of Marysville and the City of Arlington in a mixed agricultural, commercial and residential setting. The subject property is currently used for agriculture (row crops and pasture) and is actively maintained as farmland. The subject property abuts 172nd Street Northeast to the north with commercial development beyond; a BNSF railway, agricultural fields and 67th Avenue Northeast to the east; agricultural fields and 51st Avenue Northeast to the west; and agricultural fields to the south. Topography onsite gently slopes to the south, however, is generally flat with an approximate elevation of 130 feet above mean sea level.

The site is within the Snohomish watershed (Water Resources Inventory Area 7). Edgecomb Creek is a small tributary in the Quilceda (*AeLsidef*) Creek subwatershed. The headwaters to Edgecomb originate from a hillside to the north, flow under the BNSF railroad tracks, and then onto the subject properties where Edgecomb becomes a linear farm ditch. Edgecomb then flows south and into the Middle Fork Quilceda Creek about a third of a mile south of the subject property. The Middle Fork Quilceda joins the mainstem Quilceda about 2 miles south of the subject property.

The greater Quilceda Creek watershed is an independent drainage with headwaters originating in the vicinity of Marysville and Arlington. Quilceda Creek discharges into Ebey Slough in the lower Snohomish River estuary. Within the Quilceda Creek basin, coho and chum salmon are the most common salmon species that spawn in the area. Cutthroat trout are year round residents. WDFW's Salmonscape map shows PS Chinook salmon as "documented spawning" in the lower five miles of the mainstem of Quilceda Creek. Closer to the subject property, the Middle Fork Quilceda is shown as "documented presence" for PS Chinook salmon. For Edgecomb Creek on the subject property and within the action area, the map shows the stream as "gradient accessible", meaning that this species can access the onsite stream, but their presence has not been confirmed. Therefore, the NMFS presumes that small numbers, relative to the Quilceda Creek subpopulation, of PS Chinook salmon juveniles may occasionally stray upstream and rear in Edgecomb Creek within the action area. Spawning adults are not likely to occur in the action area because the stream is too small; PS Chinook salmon are mainstem spawners in large stream and rivers.

Puget Sound steelhead also occur in the larger Quilceda Creek watershed. Similar to PS Chinook salmon, WDFW Salmonscape maps show the onsite stream as "gradient accessible." Downstream and outside of the action area, the Middle Fork Quilceda is shown as "presumed presence." The mainstem Quilceda is shown as "documented rearing." No spawning is shown for this species in the watershed. Therefore, the NMFS presumes that very small numbers of PS steelhead juveniles may stray upstream into the action area and rear in Edgecomb Creek. Within the action area, Edgecomb Creek provides rearing habitat for juvenile coho salmon (non-ESA listed). Coho are documented to spawn upstream, outside of the action area, in upper Edgecomb Creek.

The habitat conditions of Edgecomb Creek within the action area are severely degraded. The stream flows through a maintained farm ditch without a functional riparian area. The status of PS Chinook in the action area is not specifically reported by NWFSC (2015). In the adjacent Snohomish River watershed, this species is reported as declining by 31 and 42 percent respectively between 2012 and 2014 in the two major tributary rivers of the Snohomish. The status of the PS steelhead in the Quilceda Creek watershed is not specifically reported by NWFSC (2015). For the adjacent Snohomish River watershed, Snohomish/Skykomish River steelhead are in a negative trend with a 70 percent decline between 1990 and 2014.

The Recovery Plan for the greater Snohomish River (SBSRF 2005), refers to the Quilceda/Allen Watershed Plan (https://snohomishcountywa.gov/Archive/ViewFile/Item/2131) as the planning document for salmon recovery in the Quilceda. The Plan focuses on urban stormwater management, sediment management (preventing bare, disturbed soils from eroding), water quality (both urban and agricultural pollutants), stream and wetland restoration from past and ongoing disturbance, groundwater contamination, and urban flooding. Restoration of the onsite portion of Edgecomb Creek and correction of fish passage barriers in the area has been a goal of the local community for many years (City of Marysville, 2018).

In 2018 the Washington State Department of Transportation (WSDOT) completed a fish passage correction project along an upgradient reach of Edgecomb Creek immediately to the northeast of the subject property. Habitat upstream of the subject property is generally of higher quality than the onsite habitat. These upgradient sections of Edgecomb Creek are steeper, contain more meandering sections, and contain more riffle habitat with some pool and glide habitat. The stream substrates are dominated by gravels with some silt and cobbles. The riparian habitat consisted of a mixed coniferous/deciduous forest. The fish passage project significantly improved fish access to approximately two miles of stream habitat upstream of the subject property.

The landform within the action area is identified as the Marysville Trough. The Marysville Trough contains a shallow unconfined recessional outwash aquifer (Marysville Trough aquifer) that extends from the ground surface to 150 feet below the surface. This aquifer extends from Arlington and the Stillaguamish River to the north and to Marysville and the Snohomish River to the south (Carroll, 1999). This aquifer is comprised of loose to medium dense sands with traces of silt and gravel, with high permeability and transmissivity. The water table in the aquifer is highly response to rainfall events: “with the water table rising rapidly after moderate rainfall events and receding after prolonged dry periods” (Otak, 2009). The rapidly rising groundwater contributes to local flooding during the rainy season. Drain tiles and ditches have been installed to support agriculture and are effective at lowering shallow groundwater tables; these drain tiles and ditches create complex local groundwater flow paths. During the 1990s, flooding within the Quilceda Creek watershed was also assessed to have been exacerbated by increases in sediment inputs that decrease channel volumes by increasing silt accumulation and vegetation growth within stream channels. (Carroll, 1999).

Based on historical USGS maps, Edgecomb Creek once flowed from slopes to the northwest of the subject property into a large wetland complex at the toe of the Gretchell Plateau. The wetland complex was ditched and drained and Edgecomb Creek was channelized for agricultural

purposes (Otak, 2009). Historical aerial photographs show that the onsite channel has been channelized in its current configuration with minimal riparian cover and adjacent agricultural use since at least 1954. Edgecomb Creek is a mild gradient gravel bed stream that has been previously assessed to be mostly geomorphically stable with regards to sediment transport and bank erosion. The channel mostly contains very fine substrates and lacks pool/riffle habitat, wood debris, and planform sinuosity. Lower reaches of Edgecomb Creek (below 152nd Street Northeast) appear to be unstable, and substantial bank erosion and lateral channel migration have been observed downstream of Timberbrook Drive (Otak, 2009).

Water quality within Edgecomb Creek is presumed to be relatively poor (Otak, 2010). During the 1990s, watershed planning efforts in the Quilceda Creek and the neighboring Allen Creek identified water quality issues within the watersheds to include high sediment, nutrient, and bacteria levels and contaminants conveyed by runoff (Carroll, 1999). WSDOE conducted water quality monitoring along Edgecomb Creek in 2015 and 2016. The WSDOE data indicate that dissolved oxygen occasionally exceeds WAC criteria for salmonid rearing and migration. Edgecomb Creek is listed as a Category 2 (Water of Concern) for dissolved oxygen, and WSDOE has implemented a TMDL plan for bacteria in the stream.

## 2.4 Effects of the Action

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

### 2.4.1 Effects to Listed Species

The effects to both PS Chinook salmon and PS steelhead are from short term, temporary disturbance during construction and long term habitat alteration. The long term habitat alteration from the stream relocation will be beneficial to both species by creating higher quality stream habitat within a functional riparian area. The restored stream channel will also provide improved water quality for many parameters (e.g., temperature, dissolved oxygen), however, there will be ongoing stormwater runoff from the new impervious surfaces that, despite advanced treatment, may release low level contaminants to the stream (e.g. oils, lubricants, PAHs, heavy metals). These effects are described in more detail below.

**Temporary Disturbance**

Construction will cause direct and short-term impacts disturbance within the action area as follows:

- Fish disturbance and mortality from dewatering of existing channel;
- Temporary turbidity increases from constructing and rewatering the new channel; and,

- Fill of the existing stream and wetland habitat.

**Fish Disturbance and Mortality**

Dewatering activities associated with the relocation and fill of Edgecomb Creek and Ditch X will impact fish and other aquatic species present in the channels at the time of dewatering. High densities of fish, including brook lamprey and juvenile salmonids (non-listed coho and cutthroat trout), have been observed in Edgecomb Creek. No ESA-listed species have been documented in Edgecomb Creek. However, because WDFW models the onsite stream as accessible to PS Chinook and PS steelhead, very small numbers of juveniles of these species, relative to their respective populations, may be present during the relocation of Edgecomb Creek and Ditch X.

Due to fish presence within the stream, disturbance and mortality of individuals are likely to occur. Minimization measures will be implemented to reduce fish disturbance and mortality impacts; however, it is unlikely that every individual will be recovered due to the high fish densities and large fish recovery area. Culvert replacement and stream relocation activities will occur in the summer, during low stream flow conditions and during the USACE's regulatory fish window when ESA-listed salmonid species are unlikely to be present within the channel. Fish exclusion actions (e.g. placement of nets) will be used to temporarily block fish access to impacted areas during the replacement of the two culverts beneath the BNSF railroad. Based on site observations during Summer 2020 by the Applicant's consultant, a large length of stream will be dry during the summer season. Depending on flow conditions at the time of dewatering, the existing stream channel will be divided into at least two sections for dewatering to allow for effective fish capture and relocation efforts. The fish protection efforts will be completed using a combination of electro-fishing and netting to capture fish and relocate them to non-impacted areas of Edgecomb Creek.

Fish capture and release, although employed as a conservation measure to reduce overall effects to fish, will likely cause direct adverse effects to small numbers of juvenile PS Chinook salmon and juvenile PS steelhead should they be present. Additionally, any juvenile fish that evade capture will die when the work area is dewatered.

Fish that are captured will experience stress and some may be harmed or die. Minimally, herding and handling the fish would cause physiological stress responses (Moberg 2000; Shreck 2000). Fish may experience stress and injury from overcrowding in traps. Contact with nets may cause scale and skin damage. Electrofishing would cause effects that can range from increased respiratory action to mortality under certain conditions (Dalbey et al. 1996; Emery 1984; Snyder 2003). Small fish can also experience trauma if care is not taken during the various handling and transfer processes once captured.

The primary contributing factors to stress and mortality from handling are: (1) water temperature difference between the creek and holding buckets; (2) dissolved oxygen levels; (3) the amount of time that fish are held out of the water; and (4) physical trauma. Stress from handling increases rapidly if water temperature is too high, or if dissolved oxygen is below saturation. Debris buildup in traps can also injure or kill fish. BMPs related to the fish capture and relocation would reduce the potential for most of these consequences, and reduce resulting stress.

It is not possible to estimate the number of PS Chinook salmon and PS steelhead juveniles that will occur in the action area and be subjected to the effects of fish removal. The dewatered area of the stream will be approximately two miles long. Based on known fish occurrences in the action area, we conclude that very few individuals, relative to the local populations, would occur within the specific action area and be exposed to fish removal effects. Further, of these relatively few individuals, we can assume from fish capture and release studies that only up to 5 percent of that number would be seriously injured or killed (72 FR 2658), with the rest experiencing sub-lethal effects.

**Temporary Turbidity**

Temporary turbidity increases within the existing and new stream channels may result from site clearing and grading activities and are likely to occur during the rewatering of the new stream channel. High suspended sediment levels can clog the gills of fish, and disrupt feeding and movement patterns of juvenile fish (Bruton 1985). Responses of salmonids to elevated levels of suspended sediments often fall into three major categories: physiological effects, behavioral effects, and habitat effects. The severity of the effect is a function of concentration and duration, so that low concentrations and long exposure periods may be as deleterious as short exposures to high concentrations of suspended sediments. As the sediment is suspended and moves downstream, the concentration levels will be diluted as heavier sediment particles settle out of suspension. Likewise, the intensity of effects diminishes as sediments settle.

Minimization measures will be implemented to reduce suspended sediments. Fish exclusion nets will be placed on the upstream and downstream extents of the impact area to prevent fish entry into the new channel during rewatering. The new channel will be rewatered in at least two sections to reduce the channel length that is exposed to rewatering at a given time. Rewatering rates will be controlled by bypass pump pipes, such that turbidity levels in the new channel may be controlled by the rewatering rate. Coir logs and temporary settling ponds will be used within and adjacent to the new channel to provide additional control of suspended sediments. The limit of downstream turbidity increases will be approximately 100 feet at the sourthermost work area. The applicant will monitor turbidity and keep fish exclusion nets in place until turbidity recedes. The proposed fish exclusion and sediment controls are anticipated to lead to avoidance or significant reduction in direct fish exposure to elevated suspended sediments. Effects to fish are likely to be limited to minor behavioral changes with fish volitionally avoiding turbidity pulses (Based on Newcombe and Jensen (1996).

**Stream, Off-Channel Habitat, and Wetland Fill**

The existing stream channel and Ditch X will be filled following dewatering. The wetlands proposed for impact will also be filled over the course of proposed project activities. The fill of the existing channels and wetlands will result in immediate loss of aquatic habitat. The impacts of the immediate loss of aquatic habitat on fish species will be minimized by fish capture and removal; however, non-fish aquatic organisms will also be directly, if temporarily, impacted. The permanent fill of the existing channel is likely to temporarily affect local stream trophic webs, including the loss of salmonid prey in the channel at the time of impact. This impact to salmonid prey will be temporary due to recolonization of aquatic invertebrates from upstream. Benthic

macroinvertebrates have a natural propensity to recolonize cleared or disturbed areas via crawling, drifting, and oviposition (Townsend and Hilldrew, 1976). The rates of benthic macroinvertebrate recolonization depend on the size of the disturbed area as well as the proximity of a source of colonizers (e.g., upstream and downstream) and the distances the colonizers must travel. For example, small-scale reaches of disturbed substrates can be recolonized as quickly as in a few days (Giller and Campbell, 1989) to a few months (Malmqvist et al. 1991, Fowler 2004). Given the two mile length of the stream location, the full recolonization of the stream will likely take more than a few months. The reduction in available prey may reduce the fitness of a very small number of PS Chinook salmon and PS steelhead juveniles should they stray into the channel soon after relocation. This impact would only affect a very small number of juveniles from one age cohort.

**Long-Term Stormwater Effects**

The proposed action will add nearly 280 acres of new impervious surfaces from roadways, building, and parking lots (WDOE 2008; WDOE 2014McIntyre et al. 2015; McQueen et al. 2010; Peter et al. 2018; Spromberg et al. 2016). Vehicle-related contaminants include petroleum-based PAHs, heavy metals, tire fragments, and a growing list of other contaminants that are just beginning to be identified (Peter et al. 2018). Many common roofing materials leach metals, particularly arsenic, copper, and zinc (WDOE 2014). PAHs and phthalates may also be released from roofing materials. The Washington State Department of Ecology (WDOE) conducted a study of contaminants in roof runoff (WDOE 2014). Rooftop structures that are made of unprotected galvanized steel, such as ductwork and flashing, may also leach high levels of zinc (WDOE 2008). Additionally, roof runoff is likely to contain pollutants that accumulate through atmospheric deposition (Lye 2009). The proposed action includes advanced stormwater treatment technology that will significantly reduce the concentration of contaminants, but not completely eliminate them.

Salmonids can uptake contaminants directly through their gills, and through dietary exposure (Karrow et al. 1999; Lee and Dobbs 1972; McCain et al. 1990; Meador et al. 2006; Neff 1982; Varanasi et al. 1993). Direct exposure to runoff-borne pollutants can cause effects in exposed fish that range from avoidance behaviors, to reduced growth, altered immune function, and immediate mortality in exposed individuals. The intensity of effects depends largely on the pollutant, its concentration, and/or the duration of exposure (Beitinger and Freeman 1983; Brette et al. 2014; Feist et al. 2011; Göbel et al. 2007; Incardona et al. 2005; Incardona et al. 2004; Incardona et al. 2006; McIntyre et al. 2012; Meador et al. 2006; Sandahl et al. 2007; Spromberg et al. 2016).

Beitinger and Freeman (1983) report that fish possess acute chemical discrimination abilities and that very low levels of some water-borne contaminants can trigger strong avoidance behaviors. Exposure to PAHs can cause reduced growth, increased susceptibility to infection, and increased mortality in juvenile salmonids (Meador et al. 2006; Varanasi et al. 1993). Zinc can bind to fish gills and cause suffocation (WDOE 2008). In freshwater, exposure to dissolved copper at concentrations between 0.3 to 3.2 µg/L above background levels has been shown to cause avoidance of an area, to reduce salmonid olfaction, and to induce behaviors that increase juvenile

salmon's vulnerability to predators (Giattina et al. 1982; Hecht et al. 2007; McIntyre et al. 2012; Sommers et al. 2016; Tierney et al. 2010).

Acute exposure to *untreated* stormwater runoff from roads and bridges has been directly linked to pre-spawner die off in adult coho salmon (McIntyre et al. 2015; Spromberg et al. 2016). The McIntyre et al. (2015) study also found that stormwater filtered through soil media (bioretention) that was previously lethal to coho and their invertebrate prey was no longer lethal after filtering, but the authors caution that performance of systems in the field compared to lab studies may differ. "First flush" rain events are a concern because concentrations of contaminants may be much higher during these events, leading to less effective treatment on occasion. There also remains uncertainty as to meeting biologically relevant thresholds; various stormwater treatment technologies are proven to be effective at reducing the concentrations of contaminants and reducing toxicity of stormwater, but the link to biologically relevant thresholds is less well studied and understood (McIntyre et al. 2014).

McIntyre et al. (2014) assessed biological toxicity of treated and untreated stormwater to zebrafish. The authors found that urban stormwater runoff from a densely used highway was toxic to developing zebrafish embryos across multiple storm events, and that soil filtration reversed "nearly all forms of developmental toxicity" as observed through the morphology of developing fish. The authors did not study whether or not the abnormalities associated with treated stormwater would reduce the fitness of the fish later in life, but they found that "bioretention treatment of runoff restored zebrafish development to nearly normal, with embryos in treated effluent that were comparable to controls," except for smaller eye development with treated stormwater.

With the proposed action, the concentration of contaminants being generated by the impervious surfaces will likely be less than what was studied in both McIntyre et al. studies (2014 and 2015) because the vehicle usage will be less at the site compared to the urban highway from the studies. Additionally, the stormwater will be treated and then discharged to a vegetated buffer, which will provide additional natural filtration of contaminants, plus the stormwater will dilute further as it enters into the stream. The stormwater will be collected into multiple detention ponds located throughout the property. These ponds will discharge treated stormwater into the vegetation riparian area. Treated stormwater will then sheet flow toward Edgecomb Creek. The concentrations of the various contaminants that would remain in the effluent and ultimately reach the stream are unknown. The treatment technology is designed to be protective of aquatic life (WDOE 2019), but low level, residual contaminants may still reach the stream because no treatment technology is 100 percent effective. However, it is highly unlikely that lethal levels of contaminants will reach the stream and very few exposed juvenile salmonids would experience long term reduced fitness or survival as a result of the proposed action because the treatment technology (modular wetlands from Forterra/BioClean) will substantially reduce the concentration of contaminants.

PS Chinook salmon and PS steelhead do not spawn in the action area. This makes it less likely that these fish would be exposed to critical early developmental effects from the stormwater. However, given the large size of the proposed action with nearly 280 acres of new impervious surfaces, it is reasonably likely that very small numbers of juvenile fish, relative to the respective

populations, will occasionally be exposed to sublethal levels contaminants from the site, either directly or indirectly through food sources. Stormwater contaminants that reach the stream could be biologically available at the site into the foreseeable future. For example, amphipods and copepods uptake PAHs from contaminated sediments (Landrum and Scavia 1983; Landrum et al. 1984; Neff 1982), and pass them to juvenile Chinook salmon and other fish through the food web.

The severity of effects from stormwater discharge to the populations of listed fish in the action area is expected to be so small as to not be measurable because of the advanced water quality treatment and additional filtration through vegetated buffers. In addition, the Applicant will retrofit existing runoff from the adjacent railroad and roadways, thereby reducing effects of existing stormwater. The quality of the water coming from the railroad corridor is not known, but it likely contains pollutants from oil, diesel fuel, etc. The existing railroad runoff sheet flows through approximately 100 feet of pasture grasses before reaching the site. The runoff will then be captured and filtered through a Media Filter Drain. The Media Filter Drain (MFD) mix consists of a mixture of crushed rock, dolomite, gypsum, and perlite. The crushed rock provides the support matrix of the medium; the dolomite and gypsum add alkalinity and ion exchange capacity to promote the precipitation and exchange of heavy metals; and the perlite improves moisture retention to promote the formation of biomass within the MFD mix. The combination of these materials provides physical filtering, precipitation, ion exchange, and biofiltration. The Media Filter Drain will be installed along the eastern property line along the full extent of the railroad adjacent to the onsite stream corridor (approximately 2 miles). The treated water will then flow through approximately 100 feet of the vegetated riparian area prior to reaching Edgecomb Creek. The use of this treatment technology in addition to the natural filtration of the pasture grasses and vegetated riparian area provides the capacity to significantly reduce any contaminants that come from the railroad corridor. Finally, the proposed action will also capture existing untreated stormwater from adjacent roadways, which will reduce existing levels of contaminants in the action area from the adjacent roads.

## 2.5 Cumulative Effects

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

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

The current condition of ESA-listed species and designated critical habitat within the action area are described in the Status of the Species and Critical Habitat and the Environmental Baseline

sections above. The contribution of non-federal activities to those conditions include past and on-going shoreline development and upland urbanization. Those actions were driven by a combination of economic conditions that characterized traditional natural resource-based industries, general resource demands associated with settlement of local and regional population centers, and the efforts of social groups dedicated to restoration and use of natural amenities, such as cultural inspiration and recreational experiences.

NMFS is unaware of any specific future non-federal activities that are reasonably certain to affect the action area. However, NMFS is reasonably certain that other future non-federal actions such as upland urban development are all likely to continue and increase in the future as the human population continues to grow across the region. Continued habitat loss and degradation of water quality from urbanization and chronic low-level inputs of non-point source pollutants will likely continue into the future.

The intensity of these influences depends on many social and economic factors, and therefore is difficult to predict. Further, the adoption of more environmentally acceptable practices and standards may gradually reduce some negative environmental impacts over time. Interest in restoration activities has increased as environmental awareness rises among the public. State, tribal, and local governments have developed plans and initiatives to benefit ESA-listed salmonids within Lake Washington and the watersheds that flow into the action area. However, the implementation of plans, initiatives, and specific restoration projects are often subject to political, legislative, and fiscal challenges that increase the uncertainty of their success.

## 2.6 Integration and Synthesis

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

The species considered in this Opinion have been listed under the ESA because of declines from historic levels of abundance and productivity, loss of spatial structure and diversity, and an array of limiting factors as a baseline habitat condition. Each species will be affected over time by cumulative effects, some positive – as recovery plan implementation and regulatory revisions increase habitat protections and restoration, and some negative – as climate change and unregulated or difficult to regulate sources of environmental degradation persist or increase. Overall, to the degree that habitat trends are negative, effects on viability parameters of each species are also likely to be negative. In this context we consider the effects of the proposed action's effect on individuals of the listed species at the population scale.

The action area provides freshwater rearing habitat for PS Chinook salmon and PS steelhead. Direct loss of fish during construction will be inconsequential to the local population abundance. Cumulative effects are likely to include further degrading factors as human population growth and climate change continue, however some of these effects may be tempered by technology (e.g. stormwater treatment) or in some locations reversed by restoration activities. Taken as a whole, the overall project effects are positive for salmonid habitat, particularly for non-listed coho salmon. The new stream channel and riparian corridor will provide much improved habitat functions and improved water quality for many parameters (e.g. temperature, dissolved oxygen, retrofit of existing untreated stormwater), which will outweigh the addition of new, low level residual toxins in treated stormwater. For the Quiceda Creek subpopulations of PS Chinook salmon and PS steelhead, the action area is not designated as critical habitat and very few fish, relative to these local populations, likely stray into the action area. Overall, the action is likely to be neutral to these populations and not affect the overall abundance of these species in the Quilcenda Creek watershed. Given the best available information, the scale of the direct and indirect effects of the proposed action, when considered in combination with the baseline, cumulative effects, and the impacts of climate change, will be too small to cause any population level effects on the PS Chinook salmon ESU and the PS steelhead DPS . Therefore, the proposed action will not appreciably reduce the likelihood of survival and recovery of these listed species.

## 2.7 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of PS steelhead and PS Chinook salmon.

## 2.8 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.

### 2.8.1 Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

Harm of PS Chinook salmon and PS steelhead from exposure to:

- Fish capture and removal during stream dewatering,
- stormwater-related degraded water quality, and
- stormwater-related contaminated forage

NMFS cannot predict with meaningful accuracy the number of PS Chinook salmon and PS steelhead that are reasonably certain to be harmed by exposure to any of these stressors. The distribution and abundance of the fish that occur within an action area are affected by a variety of factors including habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional, and may operate across far broader temporal and spatial scales than are affected by the proposed action. Thus, the distribution and abundance of fish within the action area at any time over the life of the project cannot be precisely predicted. Additionally, NMFS knows of no device or practicable technique that would yield reliable counts of individuals that may experience these impacts.

In such circumstances, NMFS uses the causal link established between the activity and the likely extent and duration of changes in habitat conditions to describe the extent of take as a numerical level of habitat disturbance. The most appropriate surrogates for take are action-related parameters that are directly related to the magnitude of the expected take. The best available surrogates for the extent of take of PS Chinook salmon and PS steelhead from exposure to stormwater-related degraded water quality and contaminated forage is the amount of pollution generating impervious surface.

The amount of pollution generating impervious surface is appropriate because the volume of stormwater would be directly related to the amount of deletrious contaminants in the stormwater. Therefore, the extent of take for this action is defined as site modifications creating no more than 280 acres of impervious surface (65 percent impervious surface of the total 431 acres site). USACE can confirm via As Built reporting if the developer exceeds this threshold. Exceedance of any of the exposure limits described above would constitute an exceedance of exempted take that would trigger the need to reinitiate consultation.

### 2.8.2 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.

### 2.8.3 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).

USACE shall require the applicant to:

1. Implement monitoring and reporting to confirm that the extend of take for the proposed action is not exceeded.

### 2.8.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and USACE or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). USACE 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:

    a. Require the applicant to submit as built construction documents to verify that no more than 280 acres of impervious surface are created by the development of the Cascade Logistics Park.
    b. If post construction monitoring indicates failure to conform to project design criteria, send a report to: projectreports.wcr@noaa.gov. Be sure to include the NMFS Tracking number for this project in the subject line: Attn: WCRO-2020-03191.

## 2.9 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).

USACE should encourage the applicant to:

1) Paint or coat all galvanized metal onsite with non-toxic paint or sealant

## 2.10 Reinitiation of Consultation

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

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

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

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

This analysis is based, in part, on the EFH assessment provided by USACE and descriptions of EFH for Pacific Coast salmon (PFMC 2014) 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 proposed action and action area for this consultation are described in Sections 1 and 2 of this document. The action area includes areas designated as EFH for various life-history stages of Pacific Coast salmon (PFMC 2014). The action area is not designated as a habitat area of particular concern (HAPC).

### 3.2 Adverse Effects on Essential Fish Habitat

The ESA portion of this document describes the adverse effects of this proposed action on ESA-listed species and critical habitat, and is relevant to the effects on EFH for Pacific coast salmon. Based on the analysis of effects presented in Section 2.5, the proposed action will cause small-scale adverse effects on this EFH through post-construction stormwater runoff that may cause direct or indirect physical, chemical, or biological alteration of the water or substrate, and through the contamination of prey. Therefore, we have determined that the proposed action would adversely affect the EFH identified above. Taken as whole, the project will improve habitat conditions for coho salmon in the action area and will likley support greater numbers of juvenile fish in the action area.

## 3.3 Essential Fish Habitat Conservation Recommendations

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, approximately 5 acres of designated EFH for Pacific Coast salmon.

To reduce adverse alteration of the physical, chemical, or biological characteristics of the water and substrates and available prey:

1. USACE should encourage the applicant to:
    a. Paint or coat all galvanized metal onsite with non-toxic paint or sealant;
    b. Limit new impervious surfaces to 65 percent of the site.

## 3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, USACE 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

USACE 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 & 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 USACE. Other interested users could include housing project applicants, the citizens of Tacoma, and tribes. Individual copies of this opinion were provided to USACE. The document will be available within two weeks at the NOAA Library Institutional Repository (https://repository.library.noaa.gov/welcome). The format and naming adheres to conventional standards for style.

### 4.2 Integrity

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

### 4.3 Objectivity

***Information Product Category:*** Natural Resource Plan

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

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

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

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

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