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

July 16, 2025

Refer to NMFS No:
WCRO-2019-01806

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 Mohler Sand and Gravel Mining from the Winslow and Plant Gravel Bars on the Nehalem River (NWP-2002-765/4), Tillamook County, Oregon

Dear Mr. Abadie:

Thank you for your letter of July 11, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for permitting Mohler Sand and Gravel to remove sediment from the Winslow and Plant gravel bars on the Nehalem River (NWP-2002-765/4). Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1855(b)) for this action.

The enclosed document contains the biological opinion (opinion) prepared by NMFS pursuant to section 7 of the ESA on the effects of the proposed action. In this opinion, we conclude that the proposed action would adversely affect but is not likely to jeopardize the continued existence of Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*). We also conclude that the proposed action is likely to adversely affect, but is not likely to result in the destruction or adverse modification of designated critical habitat for OC coho salmon. We found the proposed action is not likely to adversely affect the southern distinct population segment of Pacific eulachon (eulachon) (*Thaleichthys pacificus*) and would occur outside the geographic range of designated critical habitat for eulachon. We also found the proposed action is not likely to adversely affect the southern distinct population segment of North American green sturgeon (green sturgeon) (*Acipenser medirostris*) or critical habitat designated for green sturgeon.

This opinion includes an incidental take statement (ITS) that describes reasonable and prudent measures (RPMs) the NMFS considers necessary or appropriate to minimize the incidental take associated with this action, and sets forth terms and conditions to meet those measures. The incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

Section 3 of this document includes NMFS's analysis of the action's likely effects on EFH pursuant to Section 305(b) of the MSA. Based on that analysis, NMFS concluded that the action would adversely affect designated freshwater EFH for Pacific Coast Salmon. Therefore, NMFS has provided conservation recommendations that can be taken by the U.S. Army Corps of Engineers (Corps) to avoid, minimize, or otherwise offset potential adverse effects on EFH. NMFS also concluded that the action would not adversely affect EFH for Pacific Coast groundfish and coastal pelagic species. Therefore, consultation under the MSA is not required for EFH for Pacific Coast groundfish and coastal pelagic species.

Section 305(b) (4) (B) of the MSA requires federal agencies to provide a detailed written response to NMFS within 30 days after receiving this recommendation. If the response is inconsistent with the EFH conservation recommendations, the Corps must explain why the recommendations will not be followed, including the scientific justification for any disagreements over the effects of the action and 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, NMFS requests that in Corps' statutory reply to the EFH portion of this consultation, the Corps clearly identify the number of conservation recommendations accepted.

Please contact Lance Kruzic, the Oregon Coast Branch supervisor, at 503-758-3141 if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Kathleen Wells
Assistant Regional Administrator
Oregon Washington Coastal Office

cc: Kinsey Friesen, Corps

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

Mohler Sand and Gravel Mining from the Winslow and Plant Gravel Bars on the Nehalem River

NMFS Consultation Number: WCRO-2019-01806

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?
Oregon Coast coho salmon	Threatened	Yes	No	Yes	No
Southern distinct population segment North American green sturgeon	Threatened	No	No	No	No
Southern distinct population segment Pacific eulachon	Threatened	No	No	No	No

Affected EFH and NMFS' Determinations:

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
Pacific Coast Groundfish	No	N/A
Coastal Pelagic Species	No	N/A

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

Issued By:

Kathleen Wells
Assistant Regional Administrator
Oregon Washington Coastal Office

Date: July 16, 2025

TABLE OF CONTENTS

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.), as amended, 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). 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 July 11, 2019, we received a biological assessment (BA) from the Corps of Engineers (Corps) along with a letter requesting formal consultation on the potential effects of permitting Mohler Sand and Gravel (applicant) to remove sediment from the Winslow and Plant Gravel Bars on the Nehalem River.

In a letter sent to you on August 1, 2019, we determined the materials provided with your consultation request did not provide all of the information necessary to initiate formal consultation under the ESA as described in the regulations governing interagency consultations (50 CFR §402.14(c)) or for EFH (50 CFR 600.920(g)). In particular, your BA stated the action would adhere to the best management practices outlined in *Sediment Removal from Active Stream Channels in Oregon* (Federal Interagency Working Group 2008) co-authored by the Corps. However, the proposed action did not incorporate all of the bar form retention methods outlined in that document. In an August 21, 2019 letter, you responded that the BA was in error, the applicant will not incorporate the bar form retention methods, and asked us to continue with formal consultation.

On September 5, 2019, the Oregon Department of Environmental Quality (DEQ) denied the Clean Water Act Section 401 water quality certification for this action. In emails from February 19 and February 21, 2020,[1] the Corps notified us that the applicant was modifying the proposed action and an updated proposed action would be sent. The Corps provided this updated proposed

[1] Emails from Brad Johnson (Corps) to Chuck Wheeler (NMFS), February 19 and February 21, 2020 (explaining the applicant is modifying the proposed action).

action on August 5, 2020[2] and held an August 28, 2020 conference call with the applicant and the state and federal agencies. In this call, the applicant agreed to re-assess incorporating the bar form retention methods. In a September 2, 2020 email, the Corps forwarded the new proposed action. This updated action included implementation of full bar form retention methods on Winslow Bar and reduced bar form retention methods on Plant Bar. It did not change the maximum removal volumes. After continued questions and requests for clarification from us, we held two conference calls with the Corps on October 22 and November 5, 2020, discussing the effects of extracting from a sediment supply-limited stream reach and not implementing full bar form retention methods. At the conclusion of this second meeting, we acknowledged the Corps would not further modify the proposed action and agreed to initiate formal consultation with the action as proposed at that time. On April 1, 2021, the Corps mutually agreed to an extension of the consultation deadline to May 31, 2021.

On March 5, 2025, NMFS and the Corps held a meeting to discuss the permit and potential mitigation.

The action area provides habitat for adult and juvenile migration, and juvenile rearing for Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*). We listed OC coho salmon as threatened under the ESA on June 20, 2011 (76 FR 35755), and designated OC coho salmon critical habitat and issued protective regulations on February 11, 2008 (73 FR 7816). Two other species listed under the ESA may occur in the action area. We listed the southern distinct population segment (DPS) of North American green sturgeon (*Acipenser medirostris*) (hereafter referred to as 'green sturgeon') as threatened under the ESA on April 7, 2006 (71 FR 17757), designated critical habitat on November 9, 2009 (74 FR 52300), and issued protective regulations on June 2, 2010 (75 FR 30714). We listed the southern DPS of Pacific eulachon (*Thaleichthys pacificus*) (hereafter referred to as 'eulachon') as threatened under the ESA on March 18, 2010 (75 FR 13012). We have not issued protective regulations for eulachon, but did designate critical habitat on October 20, 2011 (76 FR 65324). The action area is not within the geographic range of designated critical habitat for eulachon.

The Corps determined the action may affect and is likely to adversely affect OC coho salmon and their designated critical habitat. The Corps determined the action would have no effect on green sturgeon, green sturgeon critical habitat, and eulachon.

The action area is also designated as EFH for various life stages of Pacific salmon (PFMC 2014), Pacific Coast groundfish (PFMC 2005), and coastal pelagic species (PFMC 1998). The Corps determined the action may adversely affect Pacific salmon EFH, but would not adversely affect EFH for Pacific Coast groundfish or coastal pelagic species.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 Fed. Reg. 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in

[2] Email from Brad Johnson (Corps) to Chuck Wheeler (NMFS), August 21, 2020 (forwarding the applicant's response to the use of the standard best management practices).

implementing section 7(a)(2) of the Act. 89 Fed. Reg. at 24268; 84 Fed. Reg. at 45015. We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this biological opinion and incidental take statement would not have been any different under the 2019 regulations or pre-2019 regulations.

1.3. Proposed Federal Action

Under the ESA, "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). Under MSA, "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 Corps proposes to issue a 5-year permit to the applicant under section 404 of the Clean Water Act to remove sediment from two gravel bars in the Nehalem River. The proposed project involves bar scalping at the Winslow gravel bar (river mile 9.3) and the Plant gravel bar (river mile 9.8). Plant gravel bar is adjacent to the applicant's processing facilities.

The applicant proposes to remove up to 15,000 cubic yards of sediment from Plant Bar and up to 7,500 cubic yards from Winslow Bar per year. The amount removed each year varies from 4,500 to 7,500 cubic yards per year from each site depending on how much sediment is deposited during the previous winter flows (Boswell 2020a). Survey work is conducted pre- and post-removal for each year to ensure there is a benchmark to guide each year's operations.

The applicant will remove material from the gravel bars using a rubber tire front-end loader and load it into dump trucks. The applicant will conduct gravel removal in the summer when the yearly flows are at their lowest. Heavy equipment operators will drive onto the gravel bars through a single access point. The deposit site for extracted material is located upland from the gravel bar. The applicant uses a secondary access point a few hundred yards upstream for pickup trucks and other small vehicles. Operators fuel their vehicles and equipment at the Mohler Sand and Gravel Company Headquarters, less than 1 mile away from the gravel bars. In case of an accident, equipment malfunctions, or other unexpected event, spill kits are readily available for cleanup purposes.

Following gravel removal activities, the applicant will grade the gravel bars to ensure there are no depressions where fish may become stranded as river water levels fluctuate. The applicant will perform grading on the day of completion of gravel removal activities or the following day. At no time will any equipment or vehicle enter the water during removal or grading activities.

During low flow, Plant gravel bar is approximately 1,800 feet long by 220 feet wide, and the wetted width of the river at this location is approximately 80 feet. The active channel width at this location is the combined widths of the gravel bar and wetted width of the river, or 300 feet. Also measured during low flow, Winslow gravel bar is approximately 3,000 feet long by 400 feet wide, and the wetted width of the river is approximately 80 feet. Measured on the upstream edge of Winslow gravel bar, the active channel width of the river is 500 feet. The applicant leaves buffer strips on both sides of the removal area to protect the water's edge of the river and also the river bank on the other side. The applicant proposes to incorporate the following bar

form retention methods from Federal Interagency Working Group (2008), with reduced buffers in #1 and #2 on Plant Bar. These conditions would be included as part of the permit from the Corps to the applicant:

1) Head of bar buffer. Protect upper 1/6 of Plant Bar and 1/3 of Winslow Bar from any excavation activities. The protective armor layer will not be disturbed.
2) Lateral buffer. An undisturbed set-back area between the low flow channel and the active mining area will be no less than 10 percent of the active channel width at Plant Bar and 20 percent of the active channel width at Winslow Bar. The protective armor layer will not be disturbed.
3) Excavated backwater depth. Excavation will not extend below the ordinary low water mark. The applicant will grade the backwater floor to provide positive flow into the channel, preventing fish trapping.
4) Excavated backwater length. The maximum excavated backwater length will be 2/3 of the bar feature and will incorporate the head slope and side slope of the backwater (see below).
5) Excavated backwater head slope. No steeper than 10:1 (horizontal to vertical). This is the slope transition between the protected head of bar and the bottom of the backwater.
6) Excavated backwater side slopes. No steeper than 4:1 (horizontal to vertical). This is the transition between the lateral buffer area and the excavated backwater bottom.

Following completion of each year's gravel removal activities the applicant will grade the gravel bar to the level recorded during the previous year's dry season. To ensure consistency from year to year, the applicant will hire a qualified/licensed contractor to survey the gravel bars before and after gravel removal activities. These surveys provide the applicant a reference height to use as a benchmark. The applicant will also submit the survey result to the Oregon Department of State Lands for compliance with the applicant's state permit.

To comply with the DEQ's water quality permitting requirement the applicant will also survey a downstream reference site. The reference site will be located on another gravel bar approximately a quarter mile downstream of Winslow Bar. The reference site will be located on a comparable habitat type, which would be a riffle dominated by gravel of similar diameter in size and with similar hydrological processes of erosion and deposition.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

Under the MSA, "federal action" means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a federal agency (see 50 CFR 600.910).

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 reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

The Corps BA (page 31) states; "The conservation measures proposed in this BA should significantly reduce potential adverse effects on green sturgeon. Therefore, the project will not likely result in an incidental take of the species." (Corps BA, page 31).

The Corps BA (Page 31) also states:

> Pacific eulachon are not likely to be in the project area while gravel mining is occurring in the riverine reach; therefore, the gravel mining operations would not likely directly affect the species. Proposed conservation measures should mitigate potential long-term effects on their habitat in the project area; therefore, the Project will not likely result in an incidental take of the species.

However, the Corps concluded that "not likely to result in incidental take" equates to a no effect determination on those species and green sturgeon critical habitat (BA page 22-23). The proper determination for actions that may affect species and critical habitat, but will not likely result in take should be "not likely to adversely affect." Our determination is documented in the "Not Likely to Adversely Affect" Determinations section (2.12). The effects of this action would occur outside the geographic range of designated critical habitat for eulachon.

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

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

The designations of critical habitat for OC coho salmon, green sturgeon, and eulachon use the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The ESA Section 7 implementing regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the final rule revising the definition and adding this term (84 FR 44976, 44977; August 27, 2019), that revision does not change the scope of our analysis, and in this opinion, we use the terms "effects" and "consequences" interchangeably.

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

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

2.2. Range-wide Status of the Species and Critical Habitat

This opinion examines the status of each species that is likely to 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" for the jeopardy analysis. The opinion also examines the condition of designated critical habitat, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated critical habitat, and discusses the function of the PBFs that are essential for the species' conservation.

Detailed information about the biology, habitat, and conservation status and trends of the listed species and critical habitats considered in this opinion can be found in the listing regulations and critical habitat designations published in the Federal Register, as well as in the recovery plans and other sources at: https://www.fisheries.noaa.gov/species-directory/threatened-endangered, which are incorporated here by reference.

2.2.1 Status of the Species

The latest status assessment for coho salmon in the Nehalem River shows this population having a high certainty of being sustainable (NMFS 2022). This assessment uses a suite of status indicators from juvenile abundance, adult abundance, habitat use, and many other status metrics. Figure 1 shows the time series of adult coho salmon spawning in this population, with a recent abundance of more than 14,000 spawners in 2023.

Table 1 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.westcoast.fisheries.noaa.gov/) and cited in the References Section of this Opinion.

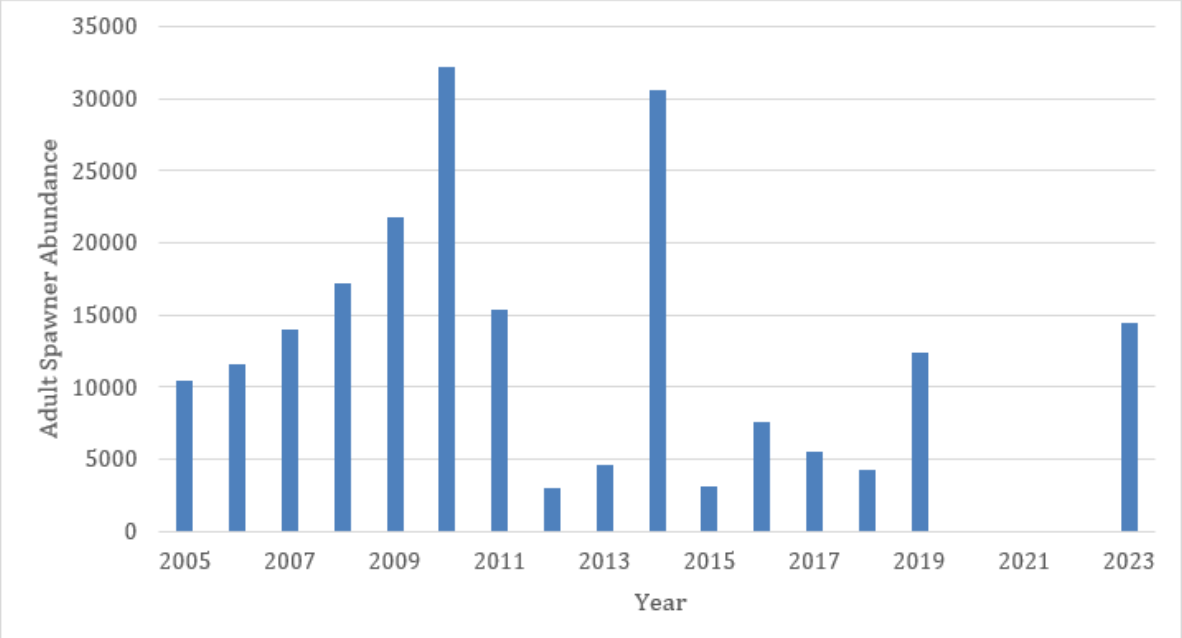

Figure 1. Abundance of coho salmon spawning in the Nehalem River population by year. No surveys were conducted in 2020 through 2022. Data from https://odfw-oasis.forestry.oregonstate.edu/coho-salmon-data (accessed June 11, 2025).

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 5-Year Review	Status Summary	Limiting Factors
Oregon Coast coho salmon	Threatened 6/20/11; reaffirmed 4/14/14	NMFS 2016	NMFS 2022; Ford 2022	This ESU comprises 56 populations including 21 independent and 35 dependent populations. The biological status of the ESU has decreased slightly since the 2015 review (high certainty of persistence, moderate certainty of sustainability), however, current ESU scores improved relative to the 2012 assessment (moderate certainty of persistence, low-to-moderate certainty of sustainability). Wainwright and Weitkamp (2013) indicated that Oregon Coast coho salmon will likely be negatively affected at all stages of the life cycle about climatic variation. Overall, the Oregon Coast coho salmon ESU is therefore at "moderate-to-low" risk of extinction.	• Reduced amount and complexity of habitat including connected floodplain habitat • Degraded water quality • Blocked/impaired fish passage • Inadequate long-term habitat protection • Changes in ocean conditions

2.2.2 Status of the Critical Habitat

This section describes the status of designated critical habitats affected by the proposed action by examining the condition and trends of the essential PBFs 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).

As stated in 73 FR 7816 (February 11, 2008), the PBFs for Oregon Coast coho salmon include:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.
2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them juveniles cannot access and use the areas needed

to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.

3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.
4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean. Similarly, these features are essential to the conservation of adults because they provide a final source of abundant forage that will provide the energy stores needed to make the physiological transition to fresh water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas.
5. Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels. As in the case with freshwater migration corridors and estuarine areas, nearshore marine features are essential to conservation because without them juveniles cannot successfully transition from natal streams to offshore marine areas. We have focused our designation on nearshore areas in Puget Sound because of its unique and relatively sheltered fjord-like setting (as opposed to the more open coastlines of Washington and Oregon).
6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential for conservation because without them juveniles cannot forage and grow to adulthood. However, for the reasons stated previously in this document, it is difficult to identify specific areas containing this PCE as well as human activities that may affect the PCE condition in those areas. Therefore, we have not designated any specific areas based on this PCE but instead have identified it because it is essential to the species' conservation, and specific offshore areas may be identified in the future (in which case any revision to this designation would be subject to separate rulemaking).

A summary of the status of OC coho salmon critical habitat 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
Oregon Coast coho salmon	2/11/08 73 FR 7816	Critical habitat encompasses 13 subbasins in Oregon. The long-term decline in OC coho salmon productivity reflects deteriorating conditions in freshwater habitat as well as extensive loss of access to habitats in estuaries and tidal freshwater. Many of the habitat changes resulting from land use practices over the last 150 years that contributed to the ESA-listing of OC coho salmon continue to hinder recovery of the populations; changes in the watersheds due to land use practices have weakened natural watershed processes and functions, including loss of connectivity to historical floodplains, wetlands and side channels; reduced riparian area functions (stream temperature regulation, wood recruitment, sediment and nutrient retention); and altered flow and sediment regimes (NMFS 2016). Several historical and ongoing land uses have reduced stream capacity and complexity in Oregon coastal streams and lakes through disturbance, road building, splash damming, stream cleaning, and other activities. Beaver removal, combined with loss of large wood in streams, has also led to degraded stream habitat conditions for coho salmon (Stout *et al*. 2012).

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). As described in section 1.3, the gravel bars where the proposed action will occur are located in the Nehalem River at river miles 9.3 and 9.8. The action area is defined as two-tenths of a mile upstream of Plant Bar on the Nehalem River (river mile 10.0) downstream through the bay to the mouth of the river where it meets the ocean. The action area extends to the mouth of the river at the ocean because the proposed action will remove hard, competent, igneous, sedimentary and metamorphic rock that could eventually be naturally transported through the river and estuary to the ocean. Once the material is in the ocean, the effects are unknown. The action area extends upstream two-tenths of a mile from Plant Bar because sediment removal creates instability that migrates upstream as the bed is eroded (Federal Interagency Workgroup 2008).

2.4. Environmental Baseline

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

The condition of habitat necessary to support listed coho salmon throughout the fish's entire life cycle is affected by many actions both within the action area and outside the action area. Below is a general overview of conditions currently affecting coho salmon throughout their life cycle and then conditions affecting coho salmon specifically within the action area.

Forests: Conifer forests dominate the Nehalem River watershed, with 98 percent of the watershed in forest cover (Nehalem Basin Partnership 2023). Forest management over the last century has changed terrestrial, riparian, and aquatic habitats throughout the Nehalem River watershed. Stream and river habitats have been simplified, contain less complexity from loss of large woody debris, and have altered temperature and flow discharge patterns compared to centuries ago. Forested stream habitats have reduced capacity to rear juvenile salmon, a lack slow water refugia areas and floodplain connectivity, and reduced stream complexity hinder the production of smolts entering the ocean. In more recent times, elevated air temperatures, reduced precipitation, and increased drought conditions have increased forest fire risk and insect outbreak (Halofsky *et al.* 2020). Additionally, these conditions affect tree reproduction, growth, and phenology, which will lead to spatial shifts in vegetation. Halofsky *et al.* (2018) projected that the largest changes will occur at low- and high-elevation forests, with expansion of low-elevation dry forests and diminishing high-elevation cold forests and subalpine habitats. Forest fires affect salmon streams by altering sediment load, channel structure, and stream temperature

through the removal of canopy. Predicted decreases in dry-season precipitation, combined with increases in air temperature, will likely contribute to the existing trend toward more extensive and severe forest fires and the continued expansion of fires into higher elevation and wetter forests (Alizedeh 2021).

Freshwater Environments: Uses of lands in riparian and upland areas for agricultural and other developments have reduced shading of the streams and rivers, disconnected floodplains from the stream channel, and resulted in reductions in habitat quantity and quality for coho salmon. Forest fires can increase stream temperatures dramatically in short time-spans by removing riparian cover (Koontz *et al.* 2018), and reduced precipitation and less snowpack have increased stream temperatures and lowered streamflows (Yan *et al*. 2021). This has reduced habitat capacity and critical stream refugia for juvenile salmon, especially in the summer period.

Malek *et al.* (2018), predicted that summer evapotranspiration is likely to increase in conjunction with declines in snowpack and increased variability in winter precipitation. Their results suggest that low summer flows are likely to become lower, more variable, and less predictable. Isaak *et al.* (2018) concluded that most stream habitats will likely remain suitable for salmonids in the near future, with some becoming too warm. Warm stream temperatures, with reduced summer rearing areas for coho salmon have been observed throughout the Nehalem River watershed.

Marine and Estuarine Environments: A recent study projects nearly complete loss of existing tidal wetlands along the U.S. West Coast, due to sea level rise (Thorne *et al.* 2018). California and Oregon showed the greatest threat to tidal wetlands (100%), while 68% of Washington tidal wetlands are expected to be submerged. Coastal development and steep topography prevent horizontal migration of most wetlands, causing the net contraction of this crucial habitat. Rising ocean temperatures, stratification, ocean acidity, hypoxia, algal toxins, and other oceanographic processes will alter the composition and abundance of a vast array of oceanic species. In particular, there will be dramatic changes in both predators and prey of Pacific salmon, salmon life history traits and relative abundance. For example, in a study of small planktivorous fish, Gliwicz *et al*. (2018) found that higher ambient temperatures increased the distance at which fish reacted to prey. Perhaps the most dramatic change in physical ocean conditions will occur through ocean acidification and deoxygenation. It is unclear how sensitive salmon and steelhead might be to the direct effects of ocean acidification because of their tolerance of a wide pH range in freshwater (although see Ou *et al.* 2015 and Williams *et al*. 2019), however, impacts of ocean acidification and hypoxia on sensitive species (e.g., plankton, crabs, rockfish, groundfish) will likely affect salmon indirectly through their interactions as predators and prey.

Recent Environmental Effects: In freshwater, year-round increases in stream temperature and changes in flow will affect physiological, behavioral, and demographic processes in salmon, and change the species with which they interact. Changing freshwater temperatures are likely to affect incubation and emergence timing for eggs, and in locations where the greatest warming occurs may affect egg survival, although several factors impact intergravel temperature and oxygen (e.g., groundwater influence) as well as sensitivity of eggs to thermal stress (Crozier *et al*. 2021). Changes in temperature and flow regimes may alter the amount of habitat and food available for juvenile rearing, and this in turn could lead to a restriction in the distribution of juveniles, further decreasing productivity through density dependence. For migrating adults,

changes in freshwater flows and temperatures have increased exposure to stressful temperatures, and alter migration travel times and increase thermal stress accumulation (Crozier *et al.* 2021, FitzGerald *et al.* 2020). Rising river temperatures increase the energetic cost of migration and the risk of en route or pre-spawning mortality of adults while in freshwater (Keefer *et al.* 2018, Barnett *et al.* 2020). Changes in winter precipitation will likely affect incubation and/or rearing stages. Changes in the intensity of cool season precipitation, snow accumulation, and runoff influence migration cues for fall adult migrants. Egg survival rates may suffer from more intense flooding that scours or buries redds. Changes in hydrological regime, such as a shift from snow to rain and then drier conditions, changes life history development, patterns, and diversity for this population. (Beechie *et al.* 2006). Increases in summer temperature and decreases in flow affect both juvenile and adult stages (Crozier and Zabel 2006, Crozier *et al.* 2010, Crozier *et al.* 2019).

Over the past three decades, restoration work has helped offset habitat losses and restore habitats necessary for coho salmon throughout the watershed (Nehalem Basin Partnership 2023). Since 1995, hundreds of habitat restoration and forest road management projects have been implemented for the benefit of fish passage, instream habitat, riparian and upland habitats, wetlands, and roads to the benefit of salmon production (Nehalem Basin Partnership 2023).

2.4.1 Critical Habitat within the Action Area

The OC coho salmon considered in this opinion migrate through the action area as adults and juveniles, and may use the action area for juvenile rearing when water temperatures are not too elevated for salmon survival (i.e. not during the summer). The PBFs that support these life history stages are described in section 2.2.2 above.

The project is located in the Lower Nehalem River watershed (5th field hydrologic unit code 1710020206) where critical habitat is designated for OC coho salmon. Water quality in the Nehalem River is generally good, though the estuary and mainstem up to the head of tide (just below Plant Bar) are impaired for *Escherichia coli* and temperature year-round (ODEQ 2024). In particular, elevated river temperatures during the summer exceed the critical limits for coho salmon rearing (>68 degrees Fahrenheit), and thus few juveniles rear in the action area throughout the summer. Upstream of the head of tide, the Nehalem River is impaired for fecal coliform (ODEQ 2024).

The current status of critical habitat in the action area where operations have occurred is degraded. The applicant has removed sediment from Winslow and Plant gravel bars for over four decades (Boswell 2020a). The applicant previously used the "redline method" to determine how much sediment to remove. The redline method takes available sediment from above a line relative to the low flow channel, typically one foot above low flow. The redline method often fails to protect geomorphic processes that support instream habitat complexity, resulting instead in expansive areas that are flat and devoid of bar features and vegetation (Federal Interagency Working Group 2008). The redline method of sediment removal typically increases the width to depth ratio, resulting in a shallow stream (Federal Interagency Working Group 2008) lacking the depth and habitat complexity used by salmonids. Furthermore, because instream mining tends to

cause instability in the upstream direction (Federal Interagency Working Group 2008), wide shallow channels tend to propagate upstream of the extraction site.

The U.S. Geological Survey (USGS) completed an assessment of channel stability in the Nehalem River watershed in 2012 (Jones *et al*. 2012). Within the fluvial reach of the Nehalem River (below Winslow Bar), there has been no systematic long-term change in bed elevation, though fluctuations up to one foot have occurred due to floods (Jones *et al.* 2012). Between 1939 and 2009 gravel bars in the lower Nehalem River became more numerous but smaller, the total acreage decreasing 49.8% (Jones *et al.* 2012). Jones *et al.* (2012) determined that losses in bar area at Winslow and Plant gravel bars appear to be related to a combination of bar erosion and vegetation establishment. Furthermore, Jones *et al.* (2012) concluded that "because trends in the number and area of bars and channel planform mirror overall trends, particularly in the overall reduction in bar area, it is unclear how these changes may specifically relate to gravel mining activities."

2.4.2 Species in the Action Area

The action area contains habitats for the Nehalem population of OC coho salmon. The Nehalem population numbers in the tens of thousands of natural spawners. For the ten-year period 2010-2019, the average annual adult return of coho salmon to the Nehalem population was 11,830. ODFW (2024) did not collect adult return data for the years 2020-2022, but in 2023 they estimated that 14,388 adult coho salmon returned to the Nehalem River. The NWFSC (2022) estimated two 15-year trends in natural spawner abundance for population in the OC coho salmon ESU. The NWFSC (2022) estimated that the trend was positive (0.19) for the first time period (1990-2005) and slightly negative (-0.06) for the second (2004-2019).

In a recent review of the status of the OC coho salmon ESU, NMFS (2022) evaluated the persistence and sustainability of the ESU and its populations. Based on available information NMFS (2022) determined that there was a high likelihood that the Nehalem population would persist (i.e., not go extinct) over a 100-year period without artificial support (population sustainability score of 0.63). The remaining primary limiting factors still to be addressed for this population relate to stream complexity, water quality, and loss of beaver habitat (NMFS 2022).

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b). We have analyzed the effects of the proposed permit not only for its 5-year term, but also beyond that time horizon to the extent that the effects are discernible and can be meaningfully analyzed into the future. To the extent that the effects timeframe extends beyond the permit timeframe, we have not assumed that mining will cease. If the Corps undertakes additional permitting for continued operations, NMFS will evaluate the

action as proposed at that time and the potential effects to determine if they remain consistent with the analysis and extent of take provided in this opinion, as informed by 50 C.F.R. 402.16.

2.5.1 Effects on Critical Habitat

The proposed action occurs in the Nehalem River and will affect the Lower Nehalem River downstream to the ocean. The action area is in the Lower Nehalem River fifth-field watershed (HUC# 1710020206), which is designated critical habitat for OC coho salmon. The action area provides habitat to support successful OC coho salmon adult and juvenile migration, and juvenile rearing. The PBFs essential for OC coho salmon present in the action area are described in section 2.2.2. The essential features related to the effects of the proposed action include unimpeded migration in the action area for both upstream and downstream passage and habitat quality and function to provide for the survival and rearing of salmon throughout the year under a variety of naturally occurring river flow conditions. Safe and effective passage and rearing of salmon is necessary throughout the action area to ensure the population continues to recover to viable levels.

Habitat Quality -- Geomorphic Conditions

A direct relationship exists between the amount of sediment removed from a stream and its geomorphic conditions, which directly affects habitat quality and function, and the survival of all salmon migrating, holding, and rearing in the action area. A dynamic balance between the amount of water flowing in the channel, the amount and size distribution of sediment delivered from upstream sources, the composition of the bed and banks, and the type and quantity of vegetation on the banks, controls geomorphic conditions of a stream (Federal Interagency Working Group 2008). Modifying any of these components, results in channel adjustments until a new equilibrium is achieved (Lane 1955). Sediment removal disturbs the equilibrium within a stream channel by intercepting materials moving within a dynamic system and triggers changes in the streams' physical characteristics as it regains the balance between supply and transport (Federal Interagency Working Group 2008). The following are some of the more predictable and widely observed morphological changes initiated by sediment removal: (1) Increased width/depth ratio; (2) bank erosion; (3) altered sediment transport; (4) decreased sinuosity; and (5) altered sediment sorting processes (Federal Interagency Working Group 2008). Sediment removal does not just affect the channel around the extraction site. It reduces the supply of material to downstream bars, which may diminish in size because the stream still transports sand and gravel from those bars (Dunne *et al.* 1981).

The proposed action permits disturbing up to 18.4 acres to extract up to 15,000 cubic yards of material from Plant Bar and up to 7,500 cubic yards from Winslow Bar each year. This represents two habitat units in the lower Nehalem River. The amount of sediment removed is directly proportional to surface disturbance and the level of effect on the dynamic balance of geomorphic conditions. At these harvest levels, negative effects to stream geomorphology as mentioned above (in particular increased width/depth ratios, bank erosion, and altered sediment sorting processes) are reasonably certain to occur. These effects reduce flow heterogeneity, which reduces habitat complexity and high flow refuge.

To limit the impacts on geomorphic conditions at the Winslow Bar, the applicant is proposing to fully implement the bar form retention methods from *Sediment Removal from Active Stream Channels in Oregon* (Federal Interagency Working Group 2008) at that location. The bar form retention methods are designed to retain channel constriction up to the channel forming flow level, as well as, retain the hydraulic control exerted by bars during higher flows (Federal Interagency Working Group 2008). Protecting pool maintenance processes requires bar form retention to the apex of the bar, which is typically at a point midway or slightly further downstream on the bar. Retaining these functions helps reduce the effects from sediment removal on the sediment transport and pool maintenance processes (Federal Interagency Working Group 2008).

With the proposed bar form retention methods on the Winslow Bar, the negative effects on stream geomorphology discussed above are likely to be minimal and the proposed buffers will allow for natural habitat processes to occur over time, with benefits to habitat function, habitat quality, and salmon survival. The head of bar and lateral buffers ensure minimal impact to stream morphology because the bar retains most of its ability to control hydraulics along the removal site. The limitations on backwater lengths, depths, and slopes reduce the probability of buffer instability and erosion. The bar form retention methods also reduce the potential for the river to form a cutoff channel through the mining site (which would reduce habitat-forming processes in the main channel). Thus, while habitat modification will occur at Winslow Bar, the adverse effects on habitat and salmon survival in the area will be limited in severity and spatial extent from implementing the buffers.

The applicant has modified the bar form retention methods for use on the Plant Bar by reducing the linear distance of the head-of-bar and lateral buffers by 50 percent. This is less protection than proposed on Winslow Bar. Providing some buffer areas on Plant Bar will reduce effects from gravel removal and improve habitat function and quality as compared to prior mining methods, but it will not provide as much habitat protection as recommended by the Federal Interagency Working Group (2008). Implementing some buffer areas at Plant Bar will allow for some natural habitat restoration that is expected to benefit the survival of all life stages of OC coho salmon in the action area.

In summary, gravel mining will continue to degrade the habitat function and natural habitat forming processes in the action area. Implementing the bar form retention methods proposed by the applicant will allow some natural habitat processes to restore habitat on the affected gravel bars and benefit critical habitat and coho salmon migrating, holding, and rearing in the area. Implementing the buffers should improve floodplain connectivity and natural cover PBFs of OC coho salmon in the freshwater and estuarine habitats. The greatest reduction in effects will be seen adjacent to Winslow Bar, where full bar form retention methods would be implemented. The use of modified bar form retention methods at Plant Bar will provide some improvements as well. The proposed action will not, however, return this portion of the Nehalem River to its natural condition, nor will it eliminate all of the negative habitat effects of instream gravel mining due to the proposed action occurring annually. The effects of the proposed action are limited to only two habitat units (the pools associated with the two gravel bars) in the lower Nehalem River where habitat function and quality will be altered but not eliminated. Coho salmon of all life stages will continue to be able to use these habitats for PBFs and thus the

overall geomorphic effects on habitat associated with the proposed action is are expected to be minimal.

Water Quality--Chemical Contamination

Operation of construction equipment can leak contaminants such as fuel and lubricants into the stream, on the gravel bar where mining occurs, and/or the adjacent riparian zone. In sufficient quantities, these substances can injure or kill aquatic organisms. Proposed conservation measures including vehicle staging, cleaning, and implementing a spill control and prevention plan will minimize the probability, magnitude, and extent of accidental chemical contamination. Potential fuel and lubricants sources include small drips/leaks and large spills. We assume a few drops (up to an ounce) of contaminants may drip/leak from the equipment at each of the extraction locations each year based upon normal machinery function and use. These contaminants will have a negative effect on the water quality PBF of OC coho salmon freshwater rearing and migration, and estuarine area critical habitat. However, the resulting effect of these small drips, leaks or spills will be so mild in intensity and short in duration that meaningful measurement or evaluation are not possible because of the low volume of contaminants and the high volume and velocity of the stream. The probability of a large spill is extremely unlikely given past operations and because the nearby location of the plant facility allows for rapid emergency response.

Water Quality--Suspended Sediment

Mining disturbs the coarse surface layer of gravel on the bars and exposes the finer sublayers making them susceptible to entrainment when fall rain events raise water elevations. Suspended sediment plumes from bar surfaces disturbed by extraction are likely during the first several fall storms. However, based on the best available information, the resulting suspended sediment concentration will likely be low for several reasons. First, the newly exposed surfaces are predominantly gravels and cobbles, due to the location of these bars in the river and fine sediments are transported downstream to the estuary where flows and gradient are lower. The ability for a stream to suspend substrate particles is directly related to water velocity and velocities in the extraction sites will be low until the river rises in response to rain typical of the fall and winter seasons. The amount of suspended sediment potentially added to the river from the extraction areas on Winslow and Plant bars is minimal because of the limited amount of habitat affected (two gravel bars). Given that the bars are located in the lower river near tidal influence, any additional fine sediment from the extraction activities would be undetectable when added to the existing sediment transport already happening at the proposed bar sites from upriver areas during winter high flow events that would inundate the gravel bars. During high flow events at this location, the Nehalem River naturally transports sediment, gravel, and cobble through the sites and the additional sediment caused by the proposed action is minor and not measurable. Therefore, the resulting effect on the water quality PBF of OC coho salmon freshwater rearing and migration, and estuarine area critical habitat site types will be so mild in intensity and short in duration that meaningful measurement or evaluation are not possible. In addition, it is not practical to monitor and determine the additional contribution of sediment coming from the proposed action at this location when higher river flows are typically very turbid entering the action area from upstream sources. The additional turbidity from the proposed action is not quantifiable.

2.5.2 Effects on Listed Species

Effects on species are a function of exposure and response. The duration, intensity, and frequency of exposure, and the life stage at exposure all influence the degree of response. OC coho salmon will be present and exposed to both the temporary and long-term effects to habitat alterations as described above. An individual fish's response is influenced by the duration of exposure, the species, and life stage exposed, and the fitness of the exposed individuals.

Species Presence and Exposure

In our analysis of the effects of the action on critical habitat, we discussed adverse effects on geomorphic conditions and water quality. To understand how the listed species will respond to these effects, we must first understand how individuals will be exposed to the effects.

Studies on the Oregon Coast designed to evaluate juvenile coho salmon use of estuarine habitat, life history composition, growth, and survival (Jones *et al*. 2014, Weybright and Giannico 2017) found that juvenile coho salmon may leave their natal streams during their first year and make use of a wide variety of habitat types. In particular, juveniles of various sizes and ages can occur in coastal estuaries all months of the year if the water temperatures do not exceed upper limits, with some remaining there weeks or months before entering the ocean. In the action area, water temperatures vary dramatically, with summer water temperatures at the gravel bars exceeding salmon upper limits but lower in the estuary where cooler ocean water occurs, within salmon preferences. During summer operations of sediment removal, no coho salmon will likely be present in the direct vicinity because water temperatures are too high (>70 degrees Fahrenheit). Juvenile coho salmon abundances are expected to be greatest in the action area during the spring and fall when water temperatures are preferable and migration rates are highest. When in the action area, juvenile coho salmon will be seeking habitats necessary for survival, with preference given to water temperature, and then refuge and feeding.

From September to December, adult OC coho salmon return from the ocean and pass through the action area. These returning adults are highly mobile, use the tide and higher stream flows to their advantage, and are unlikely to require more than a day to traverse through the action area. While in the action area, adult salmon generally migrate through the main channel of the Nehalem River when river flows are moderate, but during storm events leading to increased river flows, will migrate in lower-velocity waters, potentially occurring on the same side of the river where the proposed action occurs. It is also possible coho salmon would migrate along the opposite side of the river from the gravel bars in slow velocity water along the shoreline of the river.

Habitat Quality - Geomorphic Conditions

A direct relationship exists in the Nehalem River between geomorphic conditions, habitat complexity, and the health of juvenile OC coho salmon in the action area. Degrading the geomorphic conditions of the Nehalem River in the action area reduces habitat complexity. Reduced habitat complexity increases stress on juveniles because it is harder for them to find shelter from high stream velocities and predators. Juvenile OC coho salmon are already stressed

and in poor condition due to poor habitat complexity year-round and high stream temperatures during the summer. Stress may lead to reductions in biological reserves, altered biological processes, increased disease susceptibility, and altered performance of individual fish (*e.g.* growth, osmoregulation, survival). There are limits to an individual's ability to compensate for added stresses. Exceeding those limits will lead to injury or death of that individual. Adding additional environmental stressors to the already poor environmental baseline increases the probability of injury and death.

As discussed above, the proposed action will degrade geomorphic conditions in the action area. Some reasonably certain negative effects to stream geomorphology will be greater than normal width/depth ratios, bank erosion, and altered sediment sorting processes. These effects will be largely in the vicinity of the two gravel bars. We do not anticipate the action to have measurable effects on geomorphology downstream through the estuary to the ocean.

The effects will be greatest on juvenile pre-smolts residing in the action area. Juvenile pre-smolts reside longest within the action area and are most vulnerable to the lack of habitat complexity and high flow refuge. The effects will be greatest in the vicinity of the gravel bars. In this portion of the action area, individual juvenile coho salmon may experience added stress, reduced growth rates and subsequently their condition factors (a measure of robustness as an indicator of overall health). Low condition factor puts individuals at a significant disadvantage in terms of competition for resources, such as food and shelter, and increases their probability of disease and predation, thereby reducing survival rates.

Water Quality - Chemical Contamination

Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons which can kill salmonids at high levels of exposure and can cause lethal and sublethal adverse effects to aquatic organisms (Neff 1985, Hatch and Burton 1999). Requirements of the DEQ Clean Water Act Section 401 water quality certification, including vehicle staging, cleaning, and implementing a spill control and prevention plan will result in an extremely unlikely event of a large spill happening. Small drips, leaks or spills are possible, but the volume, intensity and duration of any resulting effect from these will be minor compared to the volume and velocity of the stream. The resulting effects on salmon from these small drips, leaks or spills will be so mild that meaningful measurement, detection, or evaluation are not possible. Thus, chemical contamination from the proposed action is not likely to injure or kill any OC coho salmon.

Water Quality - Suspended Sediment

The concentration and duration of the exposure are of key importance when considering the detrimental effects of suspended sediment on rearing juvenile OC coho salmon. High levels of suspended sediment can be lethal to salmonids; lower levels can cause chronic sublethal effects including loss or reduction of foraging capability, reduced growth, reduced resistance to disease, reduced respiratory ability, increased stress, and interference with cues necessary for homing and migration (Bash *et al*. 2001). Sublethal effects (such as olfactory effects) are those that are not directly or immediately lethal, but are detrimental and have some probability of leading to

eventual death via behavioral or physiological disruption. These responses can include changes in territorial behavior, alarm reactions with downstream displacement and increased predation and competition, avoidance behavior, decreased feeding, and reduced growth (Noggle 1978, Berg 1983, Lloyd 1987, Newcombe and Jensen 1996, Bash *et al*. 2001, Robertson *et al.* 2006).

Robertson *et al.* (2006) completed a literature review on coho salmon and found the following effects for suspended sediment concentrations and durations:

- Mortality – 96-hour exposure to concentration greater than 100,000 milligrams per liter (mg/L) killed 50 percent of individuals
- Gill damage – 96-hour exposure to concentrations greater than 40,000 mg/L
- Coughing – 96-hour exposure to concentrations of 240 mg/L
- Stress – 7-day exposure to concentrations of 2,000 mg/L
- Reduced feeding – 7-day exposure to concentrations of 2,000 mg/L

Based on our best professional judgment of local conditions in the action area, suspended sediment concentrations generated by proposed activities are unlikely to add a meaningful amount that would result in exceeding any of these thresholds from the proposed action. This is because the newly exposed surfaces are predominantly gravels and cobbles that settle quickly and do not contribute to suspended sediment loads. The ability for a stream to suspend substrate particles is directly related to water velocity and velocities in the extraction sites will be low as they re-water from the bottom with rising river levels. The amount of suspended sediment from the extraction areas will add little to the suspended loads of the Nehalem River because background concentrations of suspended sediment and water volume in the river are high during storm flows. Therefore, the resulting effect on OC coho salmon will be mild in intensity and short in duration that meaningful measurement or evaluation are not possible, and injury is not anticipated.

Summary of Effects on OC Coho Salmon

Sediment removal from streams and rivers can result in a variety of habitat impacts including bed degradation, bank erosion, and channel and habitat simplification (Federal Interagency Working Group 2008). The bar form retention method provides protections and setbacks that help reduce the effects of sediment removal and protects stream habitat associated with the affected gravel bars. The applicant has proposed to implement varying degrees of these measures, as stated in Section 1.3 above. Operations on Winslow Bar protect the upper 1/3 of the bar and for Plant Bar the upper 1/6. Lateral setbacks will be 10-20% of the active channel width. The applicant was using the "red-line method" which does not provide the same best management practices as the bar form retention method. The proposed action also only affects two gravel bars within the population area for coho salmon, and will only alter habitat quality, but not eliminate PBFs for this salmon population. Habitat conditions on the affected gravel bars will be less affected in the future, which will provide for enhanced habitat conditions compared to the environmental baseline.

The effects on OC coho salmon from suspended sediment and chemical contamination from small leaks will not be large enough to be meaningfully measured, detected, or evaluated. The

probability of a large spill is small due to required best management practices, thus we do not reasonably expect one to occur.

The population of coho salmon in the Nehalem River is currently at a sustainable level and one of the healthiest populations in the ESU (0.63 in 2020; NMFS 2022). Given the improved status of this population since ESA listing, existing habitat conditions are improving enough to support recovery. The proposed action on the two gravel bars in the lower Nehalem River is not related to the primary and secondary limiting factors/threats remaining to be addressed for this population (NMFS 2016, NMFS 2022), and thus the overall effects of the action are expected to be very low for the specific population. Application of the bar form retention method will allow for some natural habitat restoration to occur in the buffered areas, while allowing the proposed action to occur. This will provide for off-channel rearing of juvenile coho salmon during the winter (alcove and backwater habitats on the downstream areas of the gravel bars).

2.6. Cumulative Effects

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

Some continuing non-federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate variation 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 contribution of non-federal activities to the current condition of OC coho salmon and their designated critical habitat within the action area was described in the status and environmental baseline sections, above. Past activities affecting habitat conditions in the action area include agriculture, forest management, mining, road construction, human development, and river restoration. These activities and associated effects on habitat conditions in the action area are reasonably certain to continue to occur. Future activities will be driven by a combination of economic conditions that characterize 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 river restoration and use of natural amenities, such as cultural inspiration and recreational experiences.

Resource-based activities that affect the action area such as forestry, agriculture, gravel mining, urbanization, and road building are reasonably certain to continue exerting an influence on OC coho salmon habitat quality in the action area. However, the adoption of industry-wide standards to reduce environmental impacts and the shift away from resource extraction to a mixed economy should result in a gradual decrease in influence over time. Offsetting this decline will be human population growth. Between 2010 and 2019, the human population percentage

increase of Tillamook County was 7.1%.[3] A general increase in human activities, and a corresponding increase in natural resource consumption, is expected to cause slow, but incremental degradation to the action area. In contrast, environmental awareness is increasing among the public and, to a certain degree, industry, which is resulting in the conducting of activities and resource consumption in a manner that is less destructive to OC coho salmon habitat.

In considering all the aforementioned influences collectively, we expect habitat trends to remain flat or continue to slowly decline as human population increases and the effects of environmental variation to continue. At best, this habitat trend will have a neutral effect on population abundance and productivity for the species considered in this consultation. The worst-case scenario is for cumulative effects to have a slight negative effect on population abundance and productivity. Similarly, we expect the quality and function of critical habitat PBFs to express a flat or slightly negative trend over time because of population growth and the effects of drought, high river temperatures, and lower river flows during the summer.

2.7. Integration and Synthesis

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

2.7.1 Critical Habitat

The action area is designated critical habitat for OC coho salmon. Overall throughout the ESU, the value of PBFs for OC coho salmon critical habitat has declined due to numerous factors, mostly related to human development. Major limiting factors/threats for critical habitat include loss of habitats critical to juvenile rearing during the summer and winter periods.

The environmental baseline has been degraded by the effects of past land use (including gravel mining) and development. Many of the changes to critical habitat resulting from land use practices over the last 150 years have stabilized, but continue to hinder recovery of the populations. Restoration actions have increased in recent decades and are contributing benefits. Restoration actions may have short-term adverse effects, but generally result in long-term improvements to critical habitat conditions. The continued pattern of drought, lower streamflows, and higher summer water temperatures are reasonably certain to exacerbate degraded conditions, with reduced habitat and survival of coho salmon.

[3] US Census Bureau data, available at: https://www.census.gov/quickfacts/fact/table/

As described in the analysis of the effects of the action, the proposed action will result in adverse impacts to OC coho salmon critical habitat at Winslow and Plant gravel bars. However, it will only affect a small percentage of the available critical habitat. Impairing geomorphic conditions will result in negative effects to the floodplain connectivity and natural cover PBFs of OC coho salmon, but this is not directly related to the limiting factors/threats currently facing this population. Implementation of bar form retention methods by the proposed action will help protect natural habitat processes while allowing for some gravel mining to continue. The buffers are expected to provide improved off channel rearing areas for coho salmon.

The probability of a large spill is small, thus is not reasonably certain to occur. The effects of suspended sediment and small drips, leaks or spills on the water quality PBF cannot be meaningfully measured, or evaluated.

Cumulative effects from future state and private activities are reasonably certain to result in habitat trends remaining flat or slowly declining as human population increases and the effects of warmer water temperatures and lower summer stream flows continue. At best, this habitat trend will have a neutral effect on the quality and function of critical habitat PBFs in the action area. We do not expect cumulative effects to have a strong negative effect on quality and function of critical habitat PBFs in the action area given the existing conditions in the environmental baseline, which are not likely to change drastically during the permit term.

In summary, critical habitat for OC coho salmon in the Nehalem River population has suffered from past land management activities, but has experienced improvements in the form of habitat restoration since the time of the original species listing under the ESA. The proposed action will result in adverse effects to PBFs on two gravel bars in the lower river, but the bar retention methods will help improve conditions within the action area compared to the environmental baseline. In other systems where bar form retention methods have been implemented there is evidence that they produce significant positive habitat outcomes (NMFS 2018). Habitat will not be eliminated by the proposed action, but only slightly degraded on two affected gravel bars within the floodplains, and all life stages of coho salmon are expected to continue to use the action area for migration and rearing. In addition, adult salmon are expected to migrate through the affected habitat adjacent to the gravel bars quickly and not spend much time there. Juvenile coho salmon could be in the action area year-round, but are not likely to be in the areas adjacent to the gravel bars during the summer because of higher water temperatures. Based on the above analysis, when considered in light of the status of the critical habitat (including benefits in the action area from prior enhancement activities), the effects of the proposed action, cumulative effects and environmental variation, the proposed action will not appreciably diminish the value of critical habitat for the conservation of the species at the watershed level. Consequently, the proposed action will also not diminish the value of the critical habitat at the designation level.

2.7.2 Species

The last status review indicated a moderate risk of extinction for the OC coho salmon ESU (NMFS 2022). Their decline is due to numerous factors, including reduced amount and complexity of habitat, degraded water quality, blocked/impaired fish passage, inadequate long-term habitat protection, and changes in ocean conditions.

The effects on OC coho salmon from suspended sediment and chemical contamination from small leaks will not be large enough to be meaningfully measured, detected, or evaluated. The probability of a large spill is small due to required best management practices, thus we do not reasonably expect one to occur. Gravel mining impacts habitat parameters that are important for OC coho salmon including winter high flow refugia, cool summer water temperatures, and the availability of forage species for juveniles. Gravel mining primarily impacts rearing juveniles since adults only migrate through the action area and are likely not exposed to adverse effects long enough to significantly affect their survival or reproductive fitness.

Cumulative effects from future state and private activities are reasonably certain to result in habitat trends remaining flat or slowly declining as human population increases and the effects of drought and elevated water temperatures continue. At best, this habitat trend will have a neutral effect on population abundance and productivity for OC coho salmon in the action area. The worst-case scenario is for cumulative effects to have a slight negative effect on population abundance and productivity for OC coho salmon in the action area.

By implementing the bar form retention measures, gravel mining will be carried out in a manner less impactful than if no buffers are implemented. At the ESU or species scale, the status of individual populations determines the ability of the species to sustain itself or persist well into the future, thus impacts to the populations are important to the survival and recovery of the species. Since the proposed action includes appropriate measures to enhance habitat quality on the gravels into the future, the current viability of the Nehalem coho salmon population under the environmental baseline, and expected cumulative effects, we find the proposed action will result in low impacts to the Nehalem coho salmon population and their habitat. Given our conclusion that the proposed action will only affect one population (Nehalem River) and all other populations in the ESU will not be affected, the overall effects on the ESU are negligible.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of OC coho salmon or destroy or adversely modify its designated critical habitat.

2.9. Incidental Take Statement

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Harass" is further defined by guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt

normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1 Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as harm from exposure to degraded habitat quality from the physical disturbances to stream geomorphic conditions. Degrading stream geomorphic conditions can impair survival and passage conditions for all salmon in the action area and reduce habitat complexity that is important for the survival and rearing of juvenile salmon. Stress may lead to reductions in biological reserves, altered biological processes, increased disease susceptibility, and altered performance of individual fish (e.g. growth, osmoregulation, survival). There are limits to an individual's ability to compensate for added stresses. Exceeding those limits will lead to injury or death of that individual. Adding additional environmental stressors to the already degraded environmental baseline increases the probability of injury and death.

We cannot precisely predict the number of salmon anticipated to be harmed due to decreasing the quality of habitat for ESA-listed coho salmon. The relationship between habitat quality, sub-lethal effects, and survival is not quantifiable because it varies seasonally and is not observable. The abundance of salmon occurring within the action area is a function of habitat quality, water temperature, competition, predation, and the interaction of processes that influence these interactions. These biotic and environmental processes interact in ways that may be random or directional, and may operate across broad temporal and spatial scales. Furthermore, there is no monitoring to measure the stress and potential injury from habitat modification because the effects could occur throughout the year and the primary impacts will occur over more than half a mile of stream habitat.

In cases where quantifying a number of affected salmon is not possible, we use a take surrogate or take indicator that rationally reflects the incidental take caused by the proposed action. Here, the best available indicator for the extent of take is the area of gravel bar disturbed by extraction each year. By overlaying the proposed bar form retention methods, we estimate the extraction will disturb no more than 18.4 acres of instream gravel bar habitats. In addition to being the most practical and feasible indicator to measure, the area of gravel bar disturbance is proportional to the modification of geomorphic conditions and associated adverse effects of this project.

The area of gravel bar disturbed by extraction (18.4 acres combined between the two gravel bars) will be monitored annually using pre- and post-extraction surveys, with reports provided to NMFS, which provides an effective trigger for reinitiating consultation.

2.10.2 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.

2.10.3 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).

1. Minimize incidental take from habitat modification by accurately defining gravel bar extent for calculating bar form retention requirements.
2. Ensure completion of a 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.

2.10.4 Terms and Conditions

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

1. To implement reasonable and prudent measure #1, the applicant shall provide the results of the Winslow and Plant gravel bar surveys prior to summer operations each year to the Corps. The Corps will submit the survey report to NMFS (sent to projectreports.wcr@noaa.gov; use subject line "Attn: WCRO-2019-01806").
2. To implement reasonable and prudent measure #2 (monitoring), the applicant shall follow the monitoring plan as described in the BA and ensure that NMFS receives a monitoring report by December 31 every year from the applicant with the following information (sent to projectreports.wcr@noaa.gov; use subject line "Attn: WCRO-2019-01806"):
    a. Project Identification.
        i. Permittee name, permit number, and project name.
        ii. Corps contact person.
        iii. Starting and ending dates for work completed.
    b. Habitat Conditions.
        i. A series of photos that demonstrate bar conditions at the project site before, during, and after project completion.
        ii. Include general views and close-ups showing details of the project and project area.

iii. Label each photo with date, time, project name, photographer's name, and a comment about the subject – this should be done digitally and sent electronically.

c. Project Data. Include the following specific project data in the annual monitoring report:
   i. Pre- and post-extraction surveys adhering to Section 6.1 of Federal Interagency Working Group (2008).
   ii. Volume of material extracted.
   iii. Extent of area disturbed by extraction.
   iv. Dates of extraction (e.g. – month x to month y) and total number of days.
   v. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release and correction effort.

2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). The following conservation recommendation is a discretionary measure that we believe is consistent with this obligation and therefore should be carried out by the Corps:

1. The Corps should complete the interagency cooperative process for development of future in-stream sediment mining permits by completing rulemaking to implement the recommendations in Federal Interagency Working Group (2008) prior to the end of the 5-year permit term for this consultation (WCRO-2019-01806).

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

2.11. Re-initiation of Consultation

This concludes formal consultation for the Mohler Sand and Gravel Mining from the Winslow and Plant Gravel Bars on the Nehalem River.

As 50 CFR 402.16 states, re-initiation 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.

In the future, if the Corps receives an application to renew the permit issued to Mohler Sand and Gravel for the operations evaluated herein, NMFS will review the proposed action at that time to determine whether the action and its associated effects remain consistent with the analysis in this opinion and will determine the appropriate approach with regard to incidental take coverage.

2.12. "Not Likely to Adversely Affect" Determinations

This determination for eulachon, green sturgeon, and green sturgeon critical habitat was prepared by us pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402 and agency guidance for preparation of letters of concurrence. There is no designated critical habitat for eulachon in the action area.

When evaluating whether the proposed action is not likely to adversely affect listed species or critical habitat, NMFS considers whether the effects are expected to be completely beneficial, insignificant, or discountable. Completely beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Effects are considered discountable if they are extremely unlikely to occur.

The proposed action and the action area for this consultation are described in the Introduction to this document (Sections 1.3 and 2.3).

2.12.1 Southern DPS Eulachon

ESA-listed eulachon have not been observed in the Nehalem River (Monaco *et al*. 1990, Gustafson *et al.* 2010, and Gustafson *et al.* 2016) and no critical habitat is designated in the action area for this species (76 FR 65324). While survey effort for eulachon is likely low, if eulachon were present in the Nehalem River and used this area, some record of sightings would exist. Therefore, we are reasonably certain that if any eulachon are present in the lower Nehalem River estuary, their abundance would be extremely low and inconsistent throughout the year. Because of this, we are not reasonably certain any eulachon will be in the action area for exposure to the effects of the proposed action. Thus the probability of the proposed action affecting eulachon is discountable.

2.12.2 Southern DPS Green Sturgeon

There is only one population of Southern DPS green sturgeon. The total is estimated at 17,548 individuals (Mora *et al*. 2017). They spawn in the Sacramento River in California.

Green sturgeon use coastal waters and estuaries, including non-natal estuaries, all along California, Oregon, and Washington. Beamis and Kynard (1997) suggested that green sturgeon move into estuaries of non-natal rivers to feed. Data from Washington studies indicate that green sturgeon will only be present in estuaries from June until October (Moser and Lindley 2007). Fieldwork indicates that green sturgeon generally inhabit specific areas of coastal estuaries near or within deep channels or holes, moving into the upper reaches of the estuary, but rarely into freshwater in these particular areas (WDFW and ODFW 2012). Green sturgeon in these estuaries

may move into tidal flat areas to feed, particularly at night (Dumbauld *et al*. 2008). When they are not feeding in the shallows, green sturgeon likely will be holding in the deepest habitat available (WDFW and ODFW 2012).

Green sturgeon are known to occur along the Oregon Coast during their subadult and adult life stages and use the Nehalem River estuary (in the action area) to feed. Critical habitat occurs in the lower Nehalem estuary from the ocean upstream to approximately the confluence of the North Fork Nehalem River. Critical habitat is not designated for green sturgeon upstream near Winslow and Plant Bars.

Green sturgeon could migrate throughout the action area to feed; with the greatest possibility occurring during the summer period. Green sturgeon are not likely to be present near the gravel bars where activity occurs during the summer due to high water temperatures and low river flows. These conditions would make migration upstream to the gravel bar areas by sturgeon very difficult during the summer, and thus very unlikely to be present in the upper area of the action area where operations occur. If sturgeon were to occur in the river adjacent to the gravel bars in the summer, no activity occurs in the water and thus there would be no effect to sturgeon from operations. Effects of the action downstream throughout the action area would also be no effect on green sturgeon because there would be no interaction from chemical spills and habitat modification from gravel removal during this low flow period because the gravel bars are exposed and do not have water flowing over them. No effects would occur downstream until fall and winter periods when river flows increase and the gravel bars are then underwater again.

For the remaining periods of the year (fall, winter, spring), no operations on Winslow and Plant bars would occur. Effects of the summer operations, when river flows increase again in the fall, would occur downstream through the action area and affect habitat quality and water quality (as evaluated in section 2.5), but the effects on sturgeon would be discountable because green sturgeon are not likely to be present. The effects on habitat are also discountable and would not change the PBFs for green sturgeon in the designated critical habitat area downstream in the estuary from the gravel bars. The changes to habitat quality and water quality for green sturgeon are immeasurable and discountable for the areas downstream of the gravel bars.

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. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, biological, and chemical properties that are used by fish (50 CFR 600.10). 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 may

result from actions occurring within EFH or outside of it and may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH. 50 CFR 600.905(b).

3.1. Essential Fish Habitat Affected by the Project

The proposed action and action area for this consultation are described in the Introduction to this document (Sections 1.3 and 2.3). The action area includes areas designated as EFH for various life-history stages of groundfish, coastal pelagic species, and Pacific salmon (PFMC 2005, PFMC 1998, PFMC 2014). In addition, the Nehalem River estuary is a Habitat Area of Particular Concern (HAPC) for groundfish and Pacific salmon because estuaries are nutrient-rich and biologically-productive, providing a critical nursery ground for many species managed by the PFMC.

3.2. Adverse Effects on Essential Fish Habitat

We conclude the proposed action would not adversely affect Pacific Coast groundfish or coastal pelagic species EFH, or the estuary HAPC for groundfish. Species covered under these EFH designations only occur in the estuary portion of the action area, the effects to which are similar to effects on eulachon and green sturgeon. In section 2.11, we found the proposed action is not likely to adversely affect eulachon and green sturgeon.

We conclude the proposed action would adversely affect Pacific salmon EFH and the estuary HAPC for Pacific salmon. The ESA portion of this document (section 2.4) describes the adverse effects of this proposed action on OC coho salmon. The effects from impairing geomorphic conditions constitute an adverse effect to Pacific Coast salmon EFH. While this ESA analysis of effects on coho salmon is relevant to Pacific Coast salmon EFH, Pacific Coast salmon EFH also includes Chinook salmon. Chinook salmon will have greater effects than analyzed for coho salmon because of their potential to spawn in the Plant Bar reach.

Boswell (2020a) discusses the lack of historical observations of coho salmon and Chinook salmon spawning near the Plant Bar. The author attributed this to Plant Bar being low in the river system, stream velocities being high, and the reach being just a corridor to upriver. We agree the Nehalem River adjacent to Plant Bar is too large to be suitable spawning habitat for coho salmon. However, Chinook salmon spawn in many streams larger than this reach of the Nehalem River. Therefore, if the applicant allowed Plant Bar to naturally restore itself by not mining, we are reasonably certain it would recover the velocity heterogeneity and upwelling needed to support Chinook salmon redds if they do not already spawn in the vicinity. The Plant Bar reach is identified as fall Chinook salmon spawning habitat by ODFW.[4] Therefore, we expect the lack of Chinook salmon spawning cited by Boswell (2020a) is an indicator of the current state of Plant Bar, and it could support Chinook salmon spawning if rested. Thus, continued operations at

[4] SteamNet Mapper, available at: https://psmfc.maps.arcgis.com/apps/webappviewer/index.html

Plant Bar adversely affect Chinook salmon spawning by maintaining the rate of degradation and likely worsening it.

3.3. Essential Fish Habitat Conservation Recommendations

NMFS determined that the following conservation recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the adverse effects of the proposed action on EFH. These conservation recommendations are a subset of the ESA terms and conditions.

1. Gravel Bar Extent. Minimize adverse effects from gravel extraction by accurately defining gravel bar extent for calculating bar form retention requirements as stated in Term and Condition 1 in the accompanying opinion.
2. Monitoring. Ensure completion of a monitoring and reporting program to confirm the proposed action is meeting the objective of limiting adverse effects from permitted activities, as stated in Term and Condition 2 in the accompanying opinion.

3.4. Statutory Response Requirement

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

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 users of this opinion are the Corps. Other interested users could include the applicant. Individual copies of this opinion were provided to the Corps. 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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