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

Refer to NMFS Consultation No.:
WCR-2018-9888 (Freeman)
WCR-2018-10202 (Tidewater)

December 10, 2018

William D. Abadie
Acting Chief, Regulatory Branch
Portland District, 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 Issuance of Permits to Freeman Rock, Inc. and Tidewater Contractors, Inc. for Gravel Removal Projects in the Chetco River, Curry County, Oregon (Corps Nos. NWP-2006-927/2 and 2007-196/2).

Dear Mr. Abadie:

Thank you for your letters of May 25, 2018 and June 13, 2018, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the proposed issuance of permits under your regulatory authority found in section 404 of the Clean Water Act to Freeman Rock, Inc. and Tidewater Contractors, Inc. for gravel removal in the Chetco River, Curry County, Oregon (Corps Nos. NWP-2006-927/2 and 2007-196/2). 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 these actions.

In this biological opinion (opinion), we conclude the proposed action is not likely to jeopardize the continued existence of Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), and will not result in the destruction or adverse modification of designated critical habitat for SONCC coho salmon. We also concur with the U.S. Army Corps of Engineers (Corps) determination the proposed action is not likely to adversely affect the southern distinct population segment (DPS) North American green sturgeon (*Acipenser medirostris*) and the southern DPS Pacific eulachon (*Thaleichthys pacificus*). The effects of this action would all occur outside the geographic range of designated critical habitat for eulachon and southern green sturgeon.

As required by section 7 of the ESA, we are providing an incidental take statement (ITS) with the opinion. The ITS describes reasonable and prudent measures we consider necessary or appropriate to minimize the impact of incidental take associated with this action. The ITS sets forth nondiscretionary terms and conditions, including reporting requirements, you and your applicants must comply with to implement the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species. Exceeding the specified level of take in the ITS would trigger reinitiation of this consultation.

This document also includes the results of our analysis of the action's likely effects on EFH pursuant to section 305(b) of the MSA, and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These conservation recommendations are a subset of the ESA take statement's terms and conditions. Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to us within 30 days after receiving these recommendations.

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

Please contact Chuck Wheeler, fisheries biologist in the Oregon Coast Branch, at 541.957.3379 if you have any questions concerning this section 7 consultation, or if you require additional information.

Sincerely,

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

cc: Stuart Blanco, Tidewater
Ted Freeman, Freeman Rock
Tyler Krug, Corps of Engineers

WCR-2018-9888 (Freeman)
WCR-2018-10202 (Tidewater)

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

Issuance of Permits to Freeman Rock, Inc. and Tidewater Contractors, Inc. for Gravel Removal Projects in the Chetco River, Curry County, Oregon
(Corps Nos. NWP-2006-927/2 and 2007-196/2)

NMFS Consultation Number: WCR-2018-9888 (Freeman)
WCR-2018-10202 (Tidewater)

Action Agency: U.S. Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?*	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Southern Oregon/Northern California Coast coho salmon	Threatened	Yes	No	No
Southern distinct population segment North American green sturgeon	Threatened	No	N/A	N/A
Southern distinct population segment Pacific eulachon	Threatened	No	N/A	N/A

*Please refer to Section 2.11 for the analysis of species or critical habitat that are not likely to be adversely affected.

Fishery Management Plan That Describes EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast salmon	Yes	Yes
Pacific Coast groundfish	No	N/A
Coastal pelagic species	No	N/A

Consultation Conducted By: National Marine Fisheries Service
West Coast Region

Issued By:

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

Date: December 10, 2018

WCR-2018-9888 (Freeman)
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1. INTRODUCTION

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

1.1 Background

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

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

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

The action area provides habitat for adult and juvenile migration, and juvenile rearing for Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*). We listed SONCC coho salmon as threatened under the ESA on June 28, 2005 (70 FR 37160, previously listed on May 6, 1997 [62 FR 24588]), designated critical habitat on May 5, 1999 (64 FR 24049) and issued protective regulations under section 4(d) of the ESA on June 28, 2005 (70 FR 37160, previously issued on July 18, 1997 [62 FR 38479]).

Two other species listed under the ESA occur in the action area. We listed the southern distinct population segment (DPS) 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 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 for eulachon on October 20, 2011 (76 FR 65324). The action area is not within the geographic range of designated critical habitat for eulachon or green sturgeon.

The action area is also designated as EFH for various life stages of Pacific salmon (PFMC 2014) and may adversely affect EFH for those species.

1.2 Consultation History

Thank you for your letters of May 25, 2018 and June 13, 2018, requesting initiation of consultation.

On May 25, 2018, we received a biological assessment (BA) from the Portland District of the U.S. Army Corps of Engineers (Corps) along with a letter requesting formal consultation on the potential effects of authorizing Freeman Rock, Inc. (Freeman) to mine gravel in the Chetco River between rivermile (RM) 4.5 and 5.5. On June 13, 2018, we received a BA from the Corps along with a letter requesting formal consultation on the potential effects of authorizing Tidewater, Inc. (Tidewater) to mine gravel in the Chetco River at RM 10.

While the Corps permits these two operations independently and sent separate requests for consultation, the actions are closely related. Both permits authorize gravel mining from the same river, affecting the same stream reaches, listed species, designated critical habitat and EFH. Furthermore, the calculations of reserve volumes apply to both with the amount of gravel available to share between the companies. For these reasons, we have included both actions in a single biological opinion analyzing the effects of the actions as a whole, as per. 50 C.F.R. 402.14(c)(6).

The Corps concluded the proposed action is likely to adversely affect SONCC coho salmon and SONCC coho salmon critical habitat. The Corps concluded the proposed action is not likely to adversely affect eulachon or green sturgeon. The effects of this action would all occur outside the geographic range of designated critical habitat for eulachon and green sturgeon. The Corps concluded the proposed action may adversely affect EFH for Pacific salmon.

The Corps permitted gravel removal by these applicants under 5-year individual permits in 2014. We issued an opinion (WCR-2013-10441) on October 6, 2014, concluding the authorizations were not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. This opinion included two reasonable and prudent measures and two terms and conditions. The Corps and applicants followed all of these and operated consistent with the proposed action. These 5-year permits are expiring, which lead to a new Corps permitting action and this new consultation. During the five-year period covered by the 2014 permits, Freeman removed gravel twice and Tidewater three times. During the other years, the operators weighed the volume of gravel available and the cost of removing it, and decided to carry the volumes forward per the provisions of proposed action.

Previously, the Corps permitted gravel removal by these applicants under a regional general permit (RGP) for 5 years beginning in 2011. Neither operator removed gravel in 2011 due to low volume availability. Both operators removed gravel in 2012. The permits and associated opinion (refer to NMFS No.: NWR-2011-58) were vacated in April 2013, by the U.S. District Court (Case No. 3:10-cv-01129-AC). As a result, no gravel extraction occurred during 2013.

In 2010, the Corps permitted gravel extraction by these companies under a RGP analyzed in an opinion issued by us on September 3, 2010. The Corps reevaluated the proposed action, determined that changes in the proposed action were necessary, and requested withdrawal of the completed opinion on November 5, 2010. We withdrew the opinion and incidental take statement on November 19, 2010. During the one month the permits were in place, neither operator removed gravel due to low volume availability.

On August 24, 2007, we issued an opinion (refer to NMFS Nos.: NWR-2007-688, NWR-2007-3134) for a 2-year permit to mine gravel at the two sites. On August 27, 2008, we issued an opinion (refer to NMFS No.: NWR-2007-5167) for a 1-year permit to mine gravel on the Chetco River at a third site. Freeman removed gravel both years under this permit, Tidewater removed gravel in 2008 only. The third operator did not remove gravel.

We received monitoring reports for these operations under each of the previous opinions. The applicants operated consistent with the proposed action, complied with the opinions' terms and conditions and did not exceed the extent of take.

1.3 Proposed Federal Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

The proposed action is the Corps' issuance of two permits for 10 years under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act to remove gravel from two locations in the Chetco River between RM 4.5 and 11. Under the proposed Freeman permit, gravel would be extracted from gravel bars between RM 4.5 and RM 5.5, and under the proposed Tidewater permit, gravel would be extracted from a bar located between RM 10 and 11. The proposed permits include a maintenance reserve volume, recovery reserve volume, bar form retention requirements, general construction details, and a monitoring plan.

Annual Gravel Recruitment Calculation. The Corps will base the gravel available for extraction on the amount recruited within the previous year. Each spring of the calendar year, the applicants will estimate the amount of gravel recruited past the U.S. Geological Survey (USGS) Chetco River gauging station (14400000) during the previous water year (October 1 through September 30). The calculations will only use finalized USGS data input into the Parker equation (Parker 1990a, 1990b), which estimates the amount of gravel influx under given flows. Flow and gravel influx calculations will be provided to the Corps at least 60 days prior to the proposed start date of gravel extraction to allow the Corps to conduct an independent analysis of the adequacy and accuracy. The Corps will coordinate with NMFS and respond to the applicants within 30 days of receipt regarding the adequacy and accuracy of the applicant's calculations.

Maintenance Reserve Volume. The first 26,000 cubic yards (cy) of gravel recruited into the Lower Chetco River will be reserved from extraction as a maintenance reserve. Therefore, extraction will not occur during years when less than 26,000 cy recruits past the USGS stream gauge at RM 10.5. If the 26,000 cy reserve volume is not met in 1 year, the deficit will be carried over to the next year until the cumulative recruitment exceeds 26,000 cy per year. The total for the 2 years must exceed 52,000 cy for gravel harvest to occur. If the 52,000 cy cumulative reserve volume is not met in 2 years, the deficit will be carried over to the third year, *etc.*

A group of technical experts[1] calculated the 26,000 cy reserve volume per year for the Chetco River using information derived from Wallick *et al.* (2009). According to these technical experts, the reserve volume constitutes the annual volume of influx required to maintain the existing condition of all gravel bars in the lower 11 miles of the Chetco River (Agency Technical Team 2010).

Recovery Reserve Volume. The 26,000 cy maintenance reserve preserves the current geomorphic channel condition. To allow for improvement and recovery of the physical, biological, and chemical components of the Chetco River system, the proposed action leaves a recovery reserve volume in addition to the maintenance reserve volume. The applicants will reserve at least 20% of the calculated influx gravel volume in addition to the maintenance reserve that recruits to the lower Chetco River.

If a 5-year influx event occurs, (118,000 cy or more) the 26,000 cy maintenance reserve volumes will continue to apply, but the 20% recovery reserve will not. When an event this large occurs, the extractions will be limited by the bar form retention requirements described below and the amount of gravel that recruits to the extraction locations. There is 89% probability that a 5-year influx event will occur during the permit duration.

Volume allocation. The following bar-specific allocation of harvested aggregate will apply: 50% for Freeman Rock; 50% for Tidewater Contractors. This annual default allocation means that no more than 50% of the annual allotment will come from the Freeman or Tidewater project locations individually. However, a deviation from this default per bar allocation schedule for any given year may be approved by the Corps and NMFS after coordination with the appropriate agencies.

Bar Form Retention. To retain the hydraulic control exerted by bars on the stream channel, the operators will retain the form and function of bars by using the following restrictions:

- Head of bar buffer. The operators will protect the upstream third of the bar from any excavation activities.
- Excavated backwater length. The extraction area will not be greater than two-thirds of the bar feature, and will include the head slope and side slope of the backwater.
- Excavated backwater depth. The maximum depth will be equal to the low flow elevation at the downstream end. The backwater area will be sloped to prevent fish entrapment.
- Excavated backwater head slope. No steeper than 10 to 1 (horizontal to vertical).
- Excavated backwater side slope. No steeper than 4 to 1 (horizontal to vertical).

General Construction Details. The permits will be conditioned as follows:

- Extraction plans. In years when extraction will occur, each applicant will produce an extraction plan and send it to the Corps at least 60 days prior to the proposed start date. The plan will include the exact locations of gravel removal, expected volumes, and estimated proposed area of disturbance on the bar in acres.

[1] This group consisted only of representatives from the Corps of Engineers, National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon Department of State Lands, and Oregon Department of Land Conservation and Development.

- Plan Review. The Corps will review each applicants' proposed extraction plan for conformity with this proposed action, and will respond within 30 days of receipt. The Corps will coordinate this independent review in consultation with other regulatory and consulting agencies, including NMFS.
- Volume carryover. If the maintenance reserve volume is exceeded, but the operators choose not to remove any material available for extraction, the available amount may be carried over into the next year.
- Unextracted volume. If volume is available to extract in a year and the operators choose to extract any amount of it, they may not carryover any authorized volume not extracted to the following year.
- Equipment and access. The operators will use excavators and front-end loaders to excavate sand and gravel. Dump trucks are generally used to haul material to the upland stockpile site or processing facility.
- Stockpiles. The operators will not stockpile material below the ordinary high water mark.
- Temporary crossings. The operators may need temporary crossings of the Chetco River with a flatcar bridge to access gravel bars on the opposite bank. The only in-water river crossing will be for installation and removal of the bridge. Native material from authorized excavation areas and/or concrete blocks may be used to form footings and ramps at each end of the bridge. The operators will remove temporary crossings, including temporary fill material, by the end of the approved in-water work window.
- Vehicle staging and cleaning. Operators will designate vehicle staging areas for cleaning, maintenance, refueling, and monitoring for petroleum leaks and repairs. These staging areas will be no closer than 150 feet from the ordinary high water line of any stream, waterbody, or wetland unless otherwise approved in writing by the Corps. The operators will steam-clean all equipment prior to the start of each excavation season and as needed during the season. Wash and rinse water will not discharge into waterways, unless adequately treated. Each day prior to leaving the staging area to perform excavation activities, operators will inspect vehicles for fluid leaks and repair them before leaving the staging area. The operators will document all inspections, log them in a record, and make them available to the Corps.
- Stormwater management. To minimize the amount of sediment released into the Chetco River from upland processing activities, operators will meet Oregon Department of Environmental Quality (ODEQ) requirements. These requirements are specified in the National Pollutant Discharge Elimination System (NPDES) 1200-A general permit which each operator is subject to. The turbidity of stormwater released from the upland sites cannot cause more than a 10% cumulative increase in natural stream turbidities.
- Spill prevention and response. The NPDES permits also require implementation of a spill prevention and response plan to minimize the potential of a contaminant spill and the size of a spill if one were to occur.
- In-water work window. The operators will complete all in-water work between July 15 and September 30 unless otherwise approved by the Corps and NMFS.
- Alcove creation. Both applicants have the option to create alcoves as part of their extraction plans each year.[2] The operators would create alcoves on the backside of the downstream ends of their gravel bars by enhancing the naturally occurring features. The

[2] Because alcove creation is not reasonably certain to occur, we have not assumed any benefits of alcove construction in the effects analysis.

material removed for alcove construction would count towards the available volume for that year. The alcove excavation will not go below the low water level at time of construction. Any proposed alcove proposal must be approved by the Corps and NMFS prior to implementation.

Monitoring Plan. The Corps will ensure the following monitoring activities occur annually:

- In years where gravel extraction is proposed, the operators will conduct a pre-harvest survey at least 60 days before initiation of gravel extraction. Survey requirements are as follows:
    - A registered surveyor will perform the survey. Survey accuracy will be +/- 0.1 foot, unless the agencies agree to an alternate level of accuracy.
    - The survey will extend longitudinally from one pool-riffle complex below extraction to one pool-riffle complex above extraction.
    - Survey cross sectioning will not exceed 50-feet in width.
    - The survey will extend laterally to the extents of the flood-prone area, defined as an elevation twice the maximum bankfull depth at a riffle crest, unless the agencies agree to an alternate location.
    - Elevation data will reference a standard geodetic datum (NAVD 88 and NAD 83, *etc.*).
    - The survey will reference at least one permanent monument. The monument should be set outside the active floodplain, near a roadway utility pole, or other public works infrastructure, or near a permanent site improvement such as a gate or driveway.
- When gravel extraction occurs, the operators will conduct a post-harvest survey (using the pre-harvest survey requirements) no more than 30 days after the completion of operations for the season.
- The operators will compile a post-excavation report and provide it to the Corps and NMFS by December 31 each year excavation occurs. The report will contain the following:
    - Pre-extraction surveys.
    - Photos of the harvest area before, during, and after harvest.
    - Post-extraction surveys.
    - A report on volumes extracted during the season.

Interrelated actions exist with the proposed action. Both Tidewater and Freeman have processing facilities. Freeman’s facilities are adjacent to their gravel mining site at RM 4.5. Tidewater’s facilities are located at RM 2. The operators haul gravel from the bars to their respective facilities. The gravel can be sold without processing, but more often, it is crushed and made into concrete or asphalt and shipped from the locations. All of the operations in these areas, including those involving crushers, concrete mixers, asphalt batch plants, dump trucks, and all of the stockpile areas are interrelated to the proposed action because they have no independent utility.

The Corps approved the foregoing description of the proposed action on August 22, 2018.[3] We relied on this description, including all features identified to reduce adverse effects, to complete this consultation. To ensure that this opinion remains valid, the action agency or applicant must keep us informed of any changes to the proposed action.

Failure to maintain reserve volumes, use bar form retention requirements, follow general construction details (including compliance with NPDES permit requirements), conduct timely monitoring, or provide timely reporting may constitute a modification of this action that has an effect on listed species or critical habitat not considered in this opinion and thus may require reinitiation of this consultation.

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

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

The Corps determined the proposed action is not likely to adversely affect eulachon or green sturgeon. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (2.12). The effects of this action would all occur outside the geographic range of designated critical habitat for eulachon and green sturgeon.

2.1 Analytical Approach

This biological opinion includes both a jeopardy analysis and/or an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of" a listed species, which is "to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those

[3] E-mail from Tyler Krug (Corps of Engineers) to Chuck Wheeler (NMFS) on August 22, 2018, approving the description of the proposed action.

that alter the physical or biological features (PBFs) essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

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

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

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

2.2 Rangewide Status of the Species and Critical Habitat

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

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

During the last century, average regional air temperatures in the Pacific Northwest increased by 1-1.4°F as an annual average, and up to 2°F in some seasons (based on average linear increase per decade; Abatzoglou *et al*. 2014, Kunkel *et al*. 2013). Record high surface air temperatures occurred within SONCC coho salmon range in 2014 and 2015 (NMFS 2016). Warming is likely to continue during the next century as average temperatures are projected to increase another 3 to 10°F, with the largest increases predicted to occur in the summer (Mote *et al*. 2014). Decreases in summer precipitation of as much as 30% by the end of the century are consistently predicted across climate models (Mote *et al*. 2014). The years from 2012 to 2015 were all below average for precipitation within SONCC coho salmon range (NMFS 2016). Precipitation is more likely to occur during October through March, less during summer months, and more winter precipitation will be rain than snow (ISAB 2007, Mote *et al*. 2013, Mote *et al*. 2014). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007, Mote *et al.* 2014). Models consistently predict increases in the frequency of severe winter precipitation events (i.e., 20-year and 50-year events), in the western United States (Dominguez *et al*. 2012). The largest increases in winter flood frequency and magnitude are predicted in mixed rain-snow watersheds (Mote *et al*. 2014).

Overall, about one-third of the current cold-water salmonid habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (Mantua *et al*. 2009). Higher temperatures will reduce the quality of available salmonid habitat for most freshwater life stages (ISAB 2007). Reduced flows will make it more difficult for migrating fish to pass physical and thermal obstructions, limiting their access to available habitat (Mantua *et al*. 2010, Isaak *et al*. 2012). Temperature increases shift timing of key life cycle events for salmonids and species forming the base of their aquatic foodwebs (Crozier *et al*. 2011, Tillmann and Siemann 2011, Winder and Schindler 2004). Higher stream temperatures will also cause decreases in dissolved oxygen and may also cause earlier onset of stratification and reduced mixing between layers in lakes and reservoirs, which can also result in reduced oxygen (Meyer *et al*. 1999, Winder and Schindler 2004, Raymondi *et al*. 2013). Higher temperatures are likely to cause several species to become more susceptible to parasites, disease, and higher predation rates (Crozier *et al*. 2008, Wainwright and Weitkamp 2013, Raymondi *et al*. 2013).

As more basins become rain-dominated and prone to more severe winter storms, higher winter stream flows may increase the risk that winter or spring floods in sensitive watersheds will damage spawning redds and wash away incubating eggs (Goode *et al*. 2013). Earlier peak stream flows will also alter migration timing for salmon smolts, and may flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and reducing smolt survival (McMahon and Hartman 1989, Lawson *et al*. 2004).

In addition to changes in freshwater conditions, predicted changes for coastal waters in the Pacific Northwest as a result of climate change include increasing surface water temperature, increasing but highly variable acidity, and increasing storm frequency and magnitude (Mote *et al*. 2014). Elevated ocean temperatures already documented for the Pacific Northwest are highly likely to continue during the next century, with sea surface temperature projected to increase by 1.0-3.7°C by the end of the century (IPCC 2014). Habitat loss, shifts in species' ranges and abundances, and altered marine food webs could have substantial consequences to anadromous, coastal, and marine species in the Pacific Northwest (Tillmann and Siemann 2011, Reeder *et al*. 2013).

Moreover, as atmospheric carbon emissions increase, increasing levels of carbon are absorbed by the oceans, changing the pH of the water. Acidification also impacts sensitive estuary habitats, where organic matter and nutrient inputs further reduce pH and produce conditions more corrosive than those in offshore waters (Feely *et al*. 2012, Sunda and Cai 2012).

Global sea levels are expected to continue rising throughout this century, reaching likely predicted increases of 10-32 inches by 2081-2100 (IPCC 2014). These changes will likely result in increased erosion and more frequent and severe coastal flooding, and shifts in the composition of nearshore habitats (Tillmann and Siemann 2011, Reeder *et al*. 2013). Estuarine-dependent salmonids such as chum and Chinook salmon are predicted to be impacted by significant reductions in rearing habitat in some Pacific Northwest coastal areas (Glick *et al*. 2007).

Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances, and therefore these species are predicted to fare poorly in warming ocean conditions (Scheuerell and Williams 2005, Zabel *et al*. 2006). This is supported by the recent observation that anomalously warm sea surface temperatures off the coast of Washington from 2013 to 2016 resulted in poor coho and Chinook salmon body condition for juveniles caught in those waters (NWFSC 2015). Changes to estuarine and coastal conditions, as well as the timing of seasonal shifts in these habitats, have the potential to impact a wide range of listed aquatic species (Tillmann and Siemann 2011, Reeder *et al*. 2013).

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

2.2.1 Status of the Critical Habitats

We designated SONCC coho salmon critical habitat on May 5, 1999 (64 FR 24049). It includes all areas accessible to any life-stage up to long-standing, natural barriers and adjacent riparian zones. This section describes the status of designated critical habitat affected by the proposed action by examining the condition and trends of essential PBFs of that habitat throughout the designated areas (Table 1). These features are essential to the conservation of the listed species because they support one or more of the species' life stages (*e.g*., sites with conditions that support spawning, rearing, migration, and foraging).

Table 1. PBFs of critical habitats designated for SONCC coho salmon, and corresponding species life history events.

Physical and Biological Features		Species Life History Event
Site	**Site Attribute**	
Spawning and juvenile rearing areas	Cover/shelter Food (juvenile rearing) Riparian vegetation Space Spawning gravel Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development Fry emergence from gravel Fry/parr/smolt growth and development
Adult and juvenile migration corridors	Cover/shelter Food (juvenile) Riparian vegetation Safe passage Space Substrate Water quality Water quantity Water temperature Water velocity	Adult sexual maturation Adult upstream migration and holding Fry/parr/smolt growth, development, and seaward migration
Areas for growth and development to adulthood	Ocean areas – not identified	Nearshore juvenile rearing Subadult rearing Adult growth and sexual maturation Adult spawning migration

Rangewide Critical Habitat Status. Key habitat concerns are insufficient instream flow, unsuitable water temperature, and insufficient winter- and summer-rearing habitat (NMFS 2016). Numerous habitat restoration projects have been completed in many rivers and streams in the SONCC coho salmon range, but many more are needed to achieve the scale of habitat changes needed for this species to recover.

Many large and small rivers support populations of SONCC coho salmon, including the Elk, Rogue, Chetco, Smith, and Klamath. The following is a summary of critical habitat information for the Elk, Rogue, and Chetco rivers, but the descriptions in the SONCC coho recovery plan (NMFS 2014) of other basins is similar.

The Elk River flows through Curry County, and drains approximately 92 square miles (or 58,678 acres) (Maguire 2001a). Historical logging, mining, and road building have degraded stream and riparian habitats in the Elk River basin. Limiting factors identified for salmon and steelhead production in this basin include sparse riparian cover, especially in the lower reaches, excessive fine sediment, high water temperatures, and noxious weed invasions (Maguire 2001a).

The Rogue River drains approximately 5,160 square miles within Curry, Jackson and Josephine counties in southwest Oregon. The mainstem is about 200 miles long and traverses the coastal mountain range into the Cascades. The Rogue River estuary has been modified from its historical condition. Jetties were built by the Corps in 1960, which stabilized and deepened the mouth of the river. A dike that extends from the south shore near Highway 101 to the south jetty was completed in 1973. This dike created a backwater for the large shallow area that existed here, which has been developed into a boat basin and marina, eliminating most of the tidal marsh.

The quantity of estuary habitat is naturally limited in the Rogue River. The Rogue River has a large drainage area, but its 1,880 acre estuary is one of the smallest among Oregon's coastal rivers. Between 1960 and 1972, approximately 13 acres of intertidal and 14 acres of subtidal land were filled in to build the boat basin dike, the marina, north shore riprap and the other north shore developments (Hicks 2005). Jetties constructed in 1960 to stabilize the mouth of the river and prevent shoaling have altered the Rogue River, which historically formed a sill during summer months (Hicks 2005).

The Lower Rogue Watershed Council's watershed analysis (Hicks 2005) lists factors limiting fish production in tributaries to the Lower Rogue River watershed. The list includes water temperatures, low stream flows, riparian forest conditions, fish passage, and over-wintering habitat. Limiting factors identified for the Upper Rogue River basin include fish passage barriers, high water temperatures, insufficient water quantity, lack of large wood, low habitat complexity, and excessive fine sediment (Rogue Basin Coordinating Council 2006).

The Chetco River estuary has been significantly modified from its historical condition. Jetties were erected by the Corps in 1957, which stabilized and deepened the mouth of the river. These jetties have greatly altered the mouth of the Chetco River and how the estuary functions as habitat for salmon migrating to the ocean. A boat basin and marina were built in the late 1950s and eliminated most of the functional tidal marsh. The structures eliminated shallow water habitats and vegetation in favor of banks stabilized with riprap. Since then, nearly all remaining bank habitat in the estuary has been stabilized with riprap. The factors limiting fish production in the Chetco River appear to be high water temperature caused by lack of shade, especially in tributaries, high rates of sedimentation due to roads, poor over-wintering habitat due to a lack of large wood in tributaries and the mainstem, and poor quality estuary habitat (Maguire 2001b).

2.2.2 Status of Listed Species

A recovery plan is available for this species (NMFS 2014). In 2016, we completed a 5-year review for this ESU. Table 2, below provides a summary of listing and recovery plan information, status summaries and listing factors for the species addressed in this opinion. More information can be found in the recovery plan and 2016 status reviews for this species. These documents are available at the NMFS West Coast Region Website and are incorporated here by reference.

Table 2. Listing classification and date, recovery plan reference, most recent status review, status summary, and limiting factors for SONCC coho salmon.

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Southern Oregon/ Northern California Coast coho salmon	Threatened 6/28/05	NMFS 2014	NMFS 2016	This ESU comprises 31 independent, 9 dependent, and 5 ephemeral populations all grouped into 7 diversity strata. Of the 31 independent populations, 24 are at high risk of extinction and 6 are at moderate risk of extinction. The extinction risk of an ESU depends upon the extinction risk of its constituent independent populations; because the population abundance of most independent populations are likely below their depensation threshold, the SONCC coho salmon ESU is at high risk of extinction and is not viable.	• Lack of floodplain and channel structure • Impaired water quality • Altered hydrologic function • Impaired estuary/mainstem function • Degraded riparian forest conditions • Altered sediment supply • Increased disease/predation/competition • Barriers to migration • Fishery-related effects • Hatchery-related effects

For Pacific salmon, steelhead, and certain other species, we commonly use the four "viable salmonid population" (VSP) criteria (McElhany *et al.* 2000) to assess the viability of the populations that, together, constitute the species. These four criteria (spatial structure, diversity, abundance, and productivity) encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are collectively at appropriate levels, they maintain a population's capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment.

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

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

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

"Productivity," as applied to viability factors, refers to the entire life cycle (*i.e.*, the number of naturally-spawning adults produced per parent). When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany *et al.* (2000) use the terms "population growth rate" and “productivity” interchangeably when referring to production over the entire life cycle. They also refer to “trend in abundance,” which is the manifestation of long-term population growth rate.

For species with multiple populations, once the biological status of a species’ populations has been determined, we assess the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance documents from technical recovery teams. Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as metapopulations (McElhany *et al.* 2000).

Rangewide Species Status. In the 5-year review, we concluded that the ESU should remain listed as threatened; in the last 5 years, there has not been improvement in the status of SONCC coho salmon or a significant change in risk to persistence of the ESU (NMFS 2016).

<u>Spatial Structure and Diversity</u>. This species includes all naturally-spawned populations of coho salmon in coastal streams from the Elk River near Cape Blanco, Oregon, through and including the Mattole River near Punta Gorda, California; progeny of three artificial propagation programs are also included in the ESU (NMFS 2016). Williams *et al.* (2006) designated 45 populations of coho salmon in the SONCC coho salmon ESU as dependent or independent based on their historical population size. Independent populations are populations that historically would have had a high likelihood of persisting in isolation from neighboring populations for 100 years and are rated as functionally independent or potentially independent. Dependent populations historically would not have had a high likelihood of persisting in isolation for 100 years. These populations relied upon periodic immigration from other populations to maintain their abundance. Two populations are both small enough and isolated enough that they are only intermittently present (McElhany *et al.* 2000, Williams *et al*. 2006, NMFS 2014). These populations were further grouped into seven diversity strata based on the geographical arrangement of the populations and basin-scale genetic, environmental, and ecological characteristics (Table 3).

NMFS (2014) determined the role each of the populations will serve in recovery (Table 3). Independent populations likely to respond to recovery actions and achieve a low risk of extinction most quickly are designated “Core” populations. We based this designation on current condition, geographic location in the ESU, a low risk threshold compared to the number of spawners needed for the entire stratum, and other factors. Independent populations with little to no documentation of coho salmon presence in the last century, and poor prospects for recovery were designated as non-core 2. All other independent populations are designated non-core 1. With improved data from 2006, NMFS (2014) found five of the 45 populations were ephemeral. We also established biological recovery objectives and criteria for each population role (Table 4) in our recovery plan for this species; core populations will play a major role in recovering this ESU while the other populations will contribute to maintaining and increasing connectivity and diversity (NMFS 2014).

Table 3. Independent and dependent SONCC coho salmon populations by stratum and role of each population in recovery. Ephemeral populations per NMFS (2014) not listed.

Diversity Stratum	Independent Population	Population Role
Northern Coastal Basins	Elk River	Independent - Core
	Brush Creek	Dependent
	Mussel Creek	Dependent
	Lower Rogue River	Independent - Non-Core 1
	Hunter Creek	Dependent
	Pistol River	Dependent
	Chetco River	Independent - Core
	Winchuck River	Independent - Non-Core 1
Interior Rogue River	Illinois River	Independent - Core
	Middle Rogue and Applegate rivers	Independent - Non-Core 1
	Upper Rogue River	Independent - Core
Central Coastal Basins	Smith River	Independent - Core
	Elk Creek	Dependent
	Wilson Creek	Dependent
	Lower Klamath River	Independent - Core
	Redwood Creek	Independent - Core
	Maple Creek/Big Lagoon	Independent - Non-Core 2
	Little River	Independent - Non-Core1
	Strawberry Creek	Dependent
	Norton/Widow White Creek	Dependent
	Mad River	Independent - Non-Core 1
Interior Klamath River	Middle Klamath River	Independent - Non-Core 1
	Upper Klamath River	Independent - Core
	Salmon River	Independent - Non-Core 1
	Scott River	Independent - Core
	Shasta River	Independent - Core
Interior Trinity River	Lower Trinity River	Independent - Core
	Upper Trinity River	Independent - Core
	South Fork Trinity River	Independent - Non-Core 1
Southern Coastal Basins	Humboldt Bay tributaries	Independent - Core
	Lower Eel and Van Duzen rivers	Independent - Core
	Guthrie Creek	Dependent
	Bear River	Independent - Non-Core 2
	Mattole River	Independent - Non-Core 1
Interior Eel River	South Fork Eel River	Independent - Core
	Mainstem Eel River	Independent - Core
	Middle Fork Eel River	Independent - Non-Core 2
	North Fork Eel River	Independent - Non-Core 2
	Middle Mainstem Eel River	Independent - Core
	Upper Mainstem Eel River	Independent - Non-Core 2

Table 4. Biological recovery objectives and criteria to measure whether recovery objectives are met for SONCC coho salmon (NMFS 2014).

VSP Parameter	Population Role	Biological Recovery Objective	Biological Recovery Criteria[1]
Abundance	Core	Achieve a low risk of extinction	The geometric mean of wild adults over 12 years meets or exceeds the "low risk threshold" of spawners for each core population[2]
	Non-Core 1	Achieve a moderate or low risk of extinction	The annual number of wild adults is greater than or equal to four spawners per IP-km for each non-core population[2]
Productivity	Core and Non-Core 1	Population growth rate is not negative	Slope of regression of the geometric mean of wild adults over the time series ≥ zero[2]
Spatial Structure	Core and Non-Core 1	Ensure populations are widely distributed	Annual within-population distribution ≥ 80%[4] of habitat[3,4] (outside of a temperature mask[5])
	Non-Core 2 and Dependent	Achieve inter- and intra-stratum connectivity	≥ 80% of accessible habitat[3] is occupied in years[6] following spawning of cohorts that experienced high marine survival[7]
Diversity	Core and Non-Core 1	Achieve low or moderate hatchery impacts on wild fish	Proportion of hatchery-origin adults (pHOS) < 0.05
	Core and Non-Core 1	Achieve life-history diversity	Variation is present in migration timing, age structure, size, and behavior. The variation in these parameters,[8] is retained.

[1]All applicable criteria must be met for each population in order for the ESU to be viable.
[2]Assess for at least 12 years, striving for a coefficient of variation (CV) of 15% or less at the population level (Crawford and Rumsey 2011).
[3]Based on available rearing habitat within the watershed (Wainwright *et al.* 2008). For purposes of these biological recovery criteria, "available" means accessible. 70% of habitat occupied relates to a truth value of approximately 0.60, providing a "high" certainty that juveniles occupy a high proportion of the available rearing habitat (Wainwright *et al.* 2008).
[4]The average for each of the three year classes over the 12 year period used for delisting evaluation must each meet this criterion. Strive to detect a 15% change in distribution with 80% certainty (Crawford and Rumsey 2011).
[5]Williams *et al.* (2008) identified a threshold air temperature, above which juvenile coho salmon generally do not occur, and identified areas with air temperatures over this threshold. These areas are considered to be within the temperature mask.
[6]If young-of-year are sampled, sampling would occur the spring following spawning of the cohorts experiencing high marine survival. If juveniles are sampled, sampling would occur approximately 1.5 years after spawning of the cohorts experiencing high marine survival, but before juveniles outmigrate to the estuary and ocean.
[7]High marine survival is defined as 10.2% for wild fish and 8% for hatchery fish (Sharr et al. 2000). If marine survival is not high, then this criterion does not apply.
[8]This variation is documented in the population profiles in Volume II of the recovery plan (NMFS 2014).

Abundance and Productivity. Although long-term data on abundance of SONCC coho salmon are scarce, the best available data indicate that none of the seven diversity strata appear to support a single viable population, although all diversity strata are occupied (NMFS 2014). Further, 24 out of 31 independent populations are at high risk of extinction and 6 are at moderate risk of extinction. The extinction risk of an ESU depends upon the extinction risk of its constituent independent populations (Williams *et al*. 2011); because the population abundance of most independent populations are likely below their depensation threshold (NMFS 2016), the SONCC coho salmon ESU is at high risk of extinction and is not viable. Estimates from the Rogue River with its four independent populations indicate a small but significant positive trend ($p = 0.01$) over the past 35 years and a non-significant negative trend ($p > 0.05$) over the past 12 years or four generations (NMFS 2016). The decline in abundance from historical levels and the poor status of population viability criteria are the main factors behind the extinction risk of the ESU.

Limiting Factors. There is a heightened risk to SONCC coho salmon since the 2011 status review, primarily due to drought conditions, poor ocean conditions, and increased water withdrawals in many areas (NMFS 2016). The recovery plan uses "stresses" to describe the physical, biological, or chemical conditions and associated ecological processes that may be impeding SONCC coho salmon recovery (NMFS 2014). Stresses for this species include:

- Lack of floodplain and channel structure
- Impaired water quality
- Altered hydrologic function (timing of volume of water flow)
- Impaired estuary/mainstem function
- Degraded riparian forest conditions
- Altered sediment supply
- Increased disease/predation/competition
- Barriers to migration
- Fishery-related effects
- Hatchery-related effects

Chetco River. The Chetco River population is functionally independent and in the northern sub-stratum of the coastal sub-basins strata (Williams *et al*. 2006). It is one of three historically independent populations within the northern coastal sub-stratum. The size and location of the Chetco River makes it an important link between the Rogue River SONCC coho salmon populations and the Northern California SONCC coho salmon populations. The Chetco River SONCC coho salmon population is the only functionally independent population between the Smith River in California and the Rogue River in Oregon.

The Chetco River is capable of supporting rearing and migration of SONCC coho salmon through RM 42 and spawning, rearing, and migration from RM 42 to RM 49. The first few miles of tributaries to the lower Chetco River, such as Eagle Creek, Emily Creek, Jack Creek and the North Fork Chetco River, are also capable of supporting SONCC coho salmon spawning and rearing. Adult SONCC coho salmon enter the Chetco River from October to December and spawn from November through January. Downstream juvenile SONCC coho salmon migration typically occurs from April through June.[4] SONCC coho salmon smolts likely begin downstream migration in March and April and pass through the estuary in May or June (USACOE 1975).

Estimates of the historical population size of SONCC coho salmon in the Chetco River vary widely. Chetco River coho salmon were historically "a fair sized run" (USFS 1996). Local

[4] Oregon Department of Fish and Wildlife data. Available online at: https://nrimp.dfw.state.or.us/nrimp/default.aspx?p=336. Accessed on September 12, 2018.

residents described coho salmon in the Chetco River as formerly abundant and the target of a net fishery (Maguire 2001b). Coho salmon extensively used lower tributaries with estuarine tributary Tuttle Creek noted as having particularly large runs of coho salmon. The historical population has been estimated to be as high as approximately 68,000 adults.[5] In contrast, a panel discussion of fisheries professionals estimated a historical population between 5,000 and 8,000.[6]

Over the last century, the Chetco River has been impacted by timber harvest, road building, rural and urban development, and gravel mining. The status of the Chetco River SONCC coho salmon population as a whole has suffered in response to the habitat changes. The USFS (1996) characterized Chetco River coho salmon as greatly diminished from historical levels and relatively scarce.

There is not sufficient reliable data to develop dependable abundance numbers. The overall population productivity for Chetco River coho salmon appears to be very low and current abundance is likely below the depensation threshold of 135 adults (NMFS 2014). The only available data on spawner returns comes from the Oregon Department of Fish and Wildlife (ODFW) Chinook salmon spawning surveys (1998-2012) which occasionally document coho salmon.[7] ODFW estimates annual returns based on these surveys, but the reliability and utility of the data and the associated estimates is low because, the surveys did not target coho salmon, their geographic scope misses a lot of the coho spawning grounds, and coho salmon spawning may not occur at the same times as that of Chinook salmon (NMFS 2014).[8] The average of ODFW's annual estimates of adult returns for the last 5 years is 108 coho salmon. For the 5 years prior (2008-2012), the average annual return was 81 adults. [9] While this appears like a positive trend, the reliability of the ODFW spawning surveys is too low and variability of the resulting data is too high to be reasonably certain. These estimates were derived using 3 to 9 surveys per year, detecting between 1 and 5 fish each year.

As described in detail in Section 2.4 below, the Chetco River between the HWY 101 bridge and RM 11 is experiencing an apparent recent positive trend in habitat quality due to reform and regulation of Federal forest management (in the 1990s), gravel mining (in 1994 by the State of Oregon and in 2006 by the Corps), and the county planning and permitting processes. Because fish abundance is limited by the habitat available to them (Bjornn and Reiser 1991, Hays *et al.*

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[5] E-mail from Tom Nickelson, Retired Oregon Department of Fish and Wildlife, to Chuck Wheeler, NMFS (December 10, 2005) (discussing the historical size of the Chetco River SONCC coho salmon population).

[6] Chetco River Watershed Council Fisheries Professionals Panel Discussion, Jim Waldvogel, Oregon and California Sea Grant Programs (July 25, 2006) (discussing the historical size of the Chetco River SONCC coho salmon population).

[7] E-mail from Steve Mazur, Oregon Department of Fish and Wildlife, to Chuck Wheeler, NMFS (September 12, 2018) (attaching Rogue Watershed District estimates of annual spawning escapement of coho salmon spawning in the coastal strata of the Oregon portion of the SONCC, 1998-2017).

[8] In years where estimates are zero, the Chinook salmon surveyors either did not see any coho salmon, did not distinguish the difference between Chinook salmon and coho salmon, or did not mark them down as they were not the target of their work. It is highly unlikely that the actual number of spawners in those years was zero because adults returned three or six years later (indicating successful spawning the year in which a zero was recorded).

[9] This is a different conclusion than what was reached in NMFS #NWR-2011-58 with information available at that time. Variability in the most recent three years of data decreased the statistical significance of the trend to where no trend is detectable.

1996), it is likely the improvements in habitat quality have had or will have a positive effect on SONCC coho salmon numbers. As part of the proposed action in 2014, Freeman implemented a large wood restoration action through 0.4 miles of Jack Creek, a tributary to the Chetco River at approximately RM 5. Because this reach of stream has spawning and rearing, the restoration likely has improved SONCC coho salmon survival and abundance that will continue into the future.

Little information is available for juvenile SONCC coho salmon abundance in the Chetco River, as well. Juveniles were found at only two locations and at very low densities within the basin during snorkeling surveys conducted in 2003 and 2004 (Jepsen and Rodgers 2004, Jepsen 2006). In a trapping operation on Jack Creek between March 9 and May 10, 2007; ODFW captured 69 out-migrant coho salmon smolts. Operation of this trap between March 13 and May16, 2008 caught 163 coho salmon smolts. The trap did not provide enough data for ODFW to make estimates of the total outmigration for either year, but due to inefficiencies in trapping (Newcomb and Coon 2001) it is likely four to five times the number caught. In addition, low water levels stopped the trap in mid-May, while the coho salmon smolt outmigration likely lasts to mid-June.

Limiting Factors. The SONCC coho salmon recovery plan (NMFS 2014) compiled information from multiple sources including the expert panel on limiting factors for Oregon's SONCC coho salmon populations (ODFW 2008) and the Chetco River watershed assessment (Maguire 2001b). NMFS (2014) concluded the limiting factors for the Chetco River are degraded riparian forest conditions and lack of floodplain and channel structure. The plan determined the life stage most limited is juveniles, and it is limited due to poor quality rearing habitat. Specifically, the plan says:

> Juvenile summer rearing habitat is impaired by high water temperatures resulting from degraded riparian conditions and water withdrawals. Winter rearing habitat is severely lacking because of channel simplification, disconnection from the floodplain, degraded riparian conditions, poor large wood availability, and an estuary which has been altered and reduced in size due to development, channelization, and diking. Large wood has been removed and is not naturally replacing at the rates required to maintain key components of habitat complexity.

Population Viability Criteria. Williams *et al.* (2008) developed a framework for assessing viability of SONCC coho salmon. The SONCC viability framework incorporates five criteria intended as surrogates for the basic concepts of viability; that is, abundance, productivity, diversity, and spatial structure (Williams *et al.* 2008). The five criteria are: (1) Effective population size/total population size, (2) population decline, (3) catastrophic population decline, (4) spawner density, and (5) hatchery influence. Data on the last four generations of coho salmon informs this assessment and several of the criteria. Williams *et al*. (2008) established extinction thresholds for high, moderate, and low risk. For a given population, the overall extinction risk is determined by the highest risk score for any category. The Chetco River population is at high risk of extinction because the estimated average spawner abundance is less than one fish per intrinsic potential kilometer (IPkm)[10] in the 3 consecutive years of lowest abundance within the 12 preceding years (NMFS 2014).

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). For this action, the action area is the Chetco River from the upstream end of the Tidewater gravel bar (RM 11) downstream through the river and estuary to RM 0, which is the confluence with the Pacific Ocean. The action area extends to RM 0 because the proposed action will remove hard, competent rock that could eventually transport naturally to the mouth of the Chetco River. The action area includes the operators' processing facilities at RM 2 and 4.5. The action area occurs in sixth-field hydrologic unit code (HUC) watershed # 171003120109.

2.4 Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

2.4.1 Critical Habitat within the Action Area

The SONCC coho salmon considered in this opinion migrate through the action area and use it for juvenile rearing. The PBFs that support these life history stages are water quality, water quantity, cover/shelter, food, riparian vegetation, space, spawning gravel, substrate, water temperature, water velocity, and safe passage.

While in the estuary, juvenile SONCC coho salmon prefer intertidal habitat (Bottom *et al*. 2005) because of its high productivity. Past impacts significantly modified the estuarine portion (lower 2.5 miles) of the action area from its historical condition. The amount of intertidal habitat (between 1.5 feet below mean sea level and 5 feet above) above the Highway 101 Bridge decreased from 53 acres to 30 acres between 1939 and 2008.[11] The Corps erected jetties in 1957, which stabilized and deepened the mouth of the river. The Corps and Port of Brookings/Harbor built a boat basin and marina in the late 1950s and expanded it through the 1960s and 1970s. The modifications eliminated most of the functional tidal marsh, shallow water habitats, and vegetation in favor of deeper water and banks stabilized with riprap. The jetties also eliminated formation of the seasonal sand bar that transformed the estuary into a freshwater lagoon in the summer. Since the 1950s, the Corps, Port of Brookings/Harbor and other private entities stabilized nearly all of the rest of the shoreline of the lower estuary with riprap. Gravel removal operations (described in detail below), particularly those in the estuary, exacerbated the loss of

[10] The intrinsic potential of habitat suitable for coho salmon expressed in kilometers as modeled by Williams *et al.* 2006.

[11] E-mail from Jim O'Connor, USGS, to Chuck Wheeler, NMFS (December 9, 2009) (providing bathymetry data on the Chetco River estuary).

shallow water by removing bed material faster than it accumulated. These actions have resulted in degraded PBFs in the estuary, particularly cover/shelter, food, and water quality.

The geomorphic condition of the Chetco River in the action area influences the baseline condition of many of the PBFs, including cover/shelter, water quality, food, riparian vegetation, space, substrate, water temperature, water velocity, and safe passage. In the absence of substrate removal, the Chetco River would be aggrading between RM 3 and 6 in response to Holocene sea level rise (Wallick *et al*. 2009). However, base elevations of this reach lowered up to six feet between 1977 and 2008 (Wallick *et al*. 2009). Wallick *et al*. (2009) studied the Chetco River and documented changes in several geomorphic parameters between 2009 and past conditions. Some conclusions from that report with implications to the baseline conditions of PBFs in the action area are:

- The overall historical vertical change of the Chetco River has been bed lowering (page 36).
    - The entire estuary is about 1.5 feet on average lower now than it was in 1939, with some areas as much as 6.5 feet lower (page 33).
    - Between RM 3 and 7.5, the current channel is consistently 3 to 6 feet lower than in 1977 (page 34).
    - The channel at RM 10.5 has experienced periods of aggradation and degradation, but overall has been lowering (page 36).
- The Chetco River experienced a large decrease in bar (and bare gravel) area along the entire study area between 1939 and 2008, with most change between RM 6.5 and the mouth (page 37).
- Between RM 2.5 and 5, sinuosity decreased from 1939 to 2008 (page 20).
- Since 1939, the river channel has generally increased low-flow stream width, particularly between RM 5 and 6.5 (page 20).

Gravel extraction is one of many factors likely responsible for the altered geomorphic condition (Wallick *et al*. 2009). Several companies have extracted gravel from the Chetco River since the early 1900s, with extraction peaking in the 1970s and 1980s, though documentation of removal volume is poor (Wallick *et al*. 2009). Gravel extraction likely exceeded estimated influx since at least the 1970s, up until 2008. Between 1976 and 1980, approximately 183,000 cy per year were extracted (Wallick *et al*. 2009). Reliable records of extraction begin in 2000 (Table 5). Table 5 is split after 2006 because that is when the Corps began regulating removal from riverine bars (the Corps began regulating the Estuary bar in 2005). The amount of gravel extracted from the Chetco River between 2000 and 2006 averaged 83,751 cy per year, which is 30,051 cy per year more than what the Parker equation (Parker 1990a; 1990b) estimated entered the lower river during that time (Table 5). After 2006, the amount of gravel extracted from the Chetco River averaged 26,290 cy per year, which is 32,274 cy per year less than what the Parker equation (Parker 1990a; 1990b) estimated entered the lower river during that time (Table 5).

Table 5. Volume of gravel removed from each Chetco River bar between 2000 and 2018, river total by year, and Parker Equation estimations of influx; all numbers in cy (USGS 2010, Linton[12], Krug[13]).

Year	Estuary Bar	Freeman RM 5	South Coast Lumber Bar	Tidewater RM 11	Extracted Total	Parker Estimate
2000	26,124	73,815		0	99,939	51,874
2001	0	48,865	5,000	0	53,865	1,396
2002	0	48,595	5,000	0	53,595	37,448
2003	35,161	51,420	10,000	12,011	108,592	59,896
2004	31,687	36,616	8,700	13,083	90,086	47,550
2005	0	54,000	9,500	0	63,500	41,150
2006	0	102,230	0	14,450	116,680	136,583
2000-2006	92,972	415,541	38,200	39,544	586,257	375,897
2007	0	61,196	0	0	61,196	67,600
2008	0	30,089	0	11,197	41,286	32,858
2009	0	0	0	0	0	52,900
2010	0	0	0	0	0	27,900
2011	0	0	0	0	0	41,795
2012	0	76,600	0	4,950	81,550	129,400
2013	0	0	0	0	0	60,973
2014	0	0	0	0	0	30,828
2015	0	18,250	0	13,841	32,091	48,765
2016	0	0	0	8,618	8,618	71,734
2017	0	26,526	0	15,960	42,486	102,128
2018	0	0	0	0	0	N/A
2007-2018	0	212,661	0	54,566	267,227	666,881

Conditions of each PBF in the action area are:

- Cover/shelter – The SONCC Recovery Plan (NMFS 2014) found degraded riparian forest conditions and a lack of floodplain and channel structure as key limiting stresses. We consider the poor condition of the cover/shelter PBF as most limiting the conservation value of critical habitat in the action area.
- Food – Bank stabilization and the loss of 23 acres of intertidal habitat above the Highway 101 Bridge has significantly reduced food resources. Food resources above the estuary appear unchanged from historical conditions.
- Riparian vegetation – Riparian vegetation in the action area below RM 8 has been significantly reduced by agricultural uses, commercial and residential development, and bank stabilization. Degraded riparian forest conditions is a key limiting stress in the SONCC recovery plan (NMFS 2014).
- Space – The amount of space does not appear significantly changed from historical conditions.

[12] E-mail from Judy Linton, Corps, to Chuck Wheeler, NMFS (June 16, 2014) (providing Chetco River extraction and recruitment volumes for years 2011-2013).
[13] E-mails from Tyler Krug, Corps, to Chuck Wheeler, NMFS (August 22, 2018) (providing Chetco River extraction and recruitment volumes for years 2014-2018).

- <u>Spawning gravel</u> – Spawning does not occur in the action area, but spawning gravel does not appear significantly changed from historical conditions.
- <u>Water temperature</u> – The Chetco River in the action area is on ODEQ's 303(d) list for stream temperature (ODEQ 2016). The listing was based on data from 2000 and 2001 where 96 days had a 7-day-average maximum temperature greater than 64.4°F. Water exits the Kalmiopsis Wilderness area warmer than ODEQ standards, but riparian vegetation conditions and width/depth ratios in the action area exacerbate this condition during summer months.
- <u>Water quality</u> – The Chetco River is moderately impaired for phosphates, excess nutrients, and high temperatures from urban and agricultural runoff (Maguire 2001b). These issues contribute to high algal growth and anoxic conditions in the estuary during summer months (Maguire 2001b).
- <u>Water quantity</u> – During the late summer and early fall, water withdrawals that reduce flow in the lower Chetco River and tributaries are of concern (NMFS 2014). The lower Chetco River, North Fork Chetco, middle mainstem Chetco, and Jack Creek are over-allocated during low flow months (Massingill 2001). The cities of Harbor and Brookings withdraw municipal water from the lower five miles of the Chetco River.
- <u>Water velocity</u> – Bank stabilization and loss of sinuosity likely have increased water velocities in the action area; however, no data exists to verify this.
- <u>Safe passage</u> – The action area does not contain any natural or artificial barriers or structures that impede or delay migrating SONCC coho salmon. However, the condition of safe passage has been impaired in the action area due to a loss of stream complexity and sinuosity, and an increase in width to depth ratio.
- <u>Substrate</u> – Substrate in the action area consists of gravel, cobbles, and sand, with a small percentage of fine sediment. The combination is unlikely different from historical properties.

While the status of critical habitat is degraded and limited in conservation value, the trend of critical habitat in the action area seems to be positive due to reform and regulation of Federal forest management (in the 1990s), modifications of gravel mining (in 1994 by the State of Oregon and in 2006 by the Corps), and the county planning and permitting processes. The most limiting PBF of cover/shelter provides a good indicator of that trend. At high stream flows (approaching and exceeding flood stage), the channel characteristics most important to the cover/shelter PBF are extent of gravel bar and gravel bar vegetation. These two characteristics relate to channel complexity, which gives adult and juvenile coho salmon places to hide and take refuge when they would otherwise get washed downstream. At low stream flows (during the summer months), the most important feature is pool depth where deeper pools improve juvenile rearing. Also important during the summer is channel width, wide channels in the summer increase solar heating of the stream. In temperature limited streams such as the Chetco River, additional solar heating can render habitats lethal to juvenile coho salmon, even in deep pools.

Between 1994 and 2016 (the most recent aerial photo), significant improvements occurred in gravel bar extent in the action area, most notably near Social Security Bar (Figure 1). During this time, Social Security Bar doubled in size and a new bar developed upstream (filled arrow on right of each photo in Figure 1). Because the river stage is higher in the 1994 picture, some of the difference is owed to less water in the channel in 2016. However, the change is much too great to be all due to flow level. With growth of the gravel bars comes stability and stability allows vegetation colonization. There is no vegetation growing on bars in the 1994 photo. In the 2016 photo, Social Security Bar has spots of vegetation and the bar on the southern side of the channel is nearly covered (open arrow). These changes to gravel bar extent and vegetation likely markedly improved juvenile and adult SONCC coho salmon migration by providing refuge during high river flows.

Figure 1. Changes at Social Security Bar on the Chetco River between 1994 and 2016. Filled arrows indicate new gravel bar, open arrows indicate improved vegetation (Google Earth 2018).

Similar improvements to migration habitat have occurred in the reach of the Chetco River near the mouth of the North Fork (Figure 2). Changes near the North Fork have also vastly improved summer rearing habitat for SONCC coho salmon. In 1994, the channel is wide and shallow, with many isolated pools (filled arrow) that likely trapped juvenile salmonids, killing them when flows receded during the summer. In 2016, the low-flow channel of the Chetco River is significantly more sinuous with several connected deep pools (open arrows). Some of the narrowing of the channel is due to the lower discharge during the 2016 photo, but the lower stage cannot account for the improvement in depth or sinuosity. These changes indicate narrower and deeper channels, which provide more preferred rearing habitat to coho salmon juveniles. A narrow, deep low flow channel has less exposure to warm air temperatures and solar heating, which minimizes temperature gain. In a system with temperature limitations for rearing juvenile coho salmon, minimizing temperature gain is important.

Figure 2. Changes at Freeman extraction location on the Chetco River at the Confluence of North Fork Chetco River between 1994 and 2016. Filled arrows indicate isolated pools, open arrows indicate connected deep pools (Google Earth 2018).

Since the Corps' reform of their permit process for gravel mining in 2006, no other wide-scale changes have occurred to land use that would affect the action area. Gravel extraction methods on the Freeman and Tidewater bars changed with the Corps permits beginning in the 2007 extraction season. All operations since 2007 have implemented methods to retain bar form during extraction of gravel. Since 2012, all removals have incorporated bar form retention, as well as, maintenance and recovery reserves. In 2013, neither operator had permits to remove gravel. Tidewater used to extract gravel from a bar in the estuary, but has not since 2004 due to Corps and NMFS review. While the estuary is still deeper and has lost intertidal habitat as described above, aerial photos indicate the estuary upstream of the Highway 101 Bridge is improving.

In 2017, the Chetco bar fire burned approximately 130,000 acres of the Chetco River watershed above the action area (USFS 2017). The burned area poses a risk to OC coho salmon critical habitat within the action area due to post-fire runoff, debris flows, and sediment delivery (USFS 2017). Over the next 20 years, the amount of fine sediment, gravels, and large wood delivered to streams will likely increase due to tree death from the fire (Cottom 2017). While the large wood and gravels may improve habitat in the action area, fine sediment will adversely affect habitat value. In the long term, the amount of large wood transported to the action area will likely be reduced until new forests are established in riparian areas upstream. The amount of shade on streams in the burned area has likely been, and will continue to be, reduced by tree death (Cottom 2017) causing potential stream temperature increases in the action area. Overall some short term benefits (gravel and large wood) will accrue in the next decade or so, with net negative effects (large wood reduction and temperatures) after that.

It is unlikely that any fire-derived gravel and sediment has already been transported to the action area where it would account for any of the channel changes. Therefore, we attribute the habitat quality improvement in the lower Chetco River mostly to changes in gravel extraction.

In summary, the lower portion of the estuary is a highly modified environment, featuring several degraded PBFs. The upper portion of the estuary appears to be improving, but remains degraded with respect to several PBFs, including cover/shelter, food resources, water temperature, and water quality. The riverine portion of the action area also has several degraded PBFs, with cover/shelter being considerably most limiting, and water temperature a concern. However, the recent trend in habitat value of the Chetco River between the HWY 101 bridge and RM 11 is positive due to changes in gravel mining.

2.4.2 Species within the Action Area

Within the action area, SONCC coho salmon abundance exhibits the same poor status as the population in general. The best available information suggests the average annual return of Chetco River spawners is likely below the depensation threshold of 135 fish (NMFS 2014). When a population is under this threshold, recovery will be slow (due to density dependent variables like finding mates, Liermann and Hilborn 2001), but depensation does not mean recovery is unattainable (NMFS 2014). The average annual estimate from the ODFW data is 108 spawners per year over the last 5 years.

Past and present human activities that have adversely affected SONCC coho salmon in the action area include impacts from gravel mining, timber harvest, agriculture, water withdrawals, urban development, residential development, and road building. The naturally-caused Chetco Bar Fire will also affect the action area. The details of these activities and occurrences and their impacts are outlined in section 2.4.1 above. In particular, gravel extraction, which began early in the twentieth century, peaked in the 1970s and 1980s with as many as 15 companies operating per year. These operations extracted millions of cy of gravel with 915,000 cy extracted between 1976 and 1980 alone (183,000 cy/year) (Wallick *et al*. 2009). Impacts from activities within the action area have led to degraded baseline conditions reflected in poor aquatic habitat complexity, low quantities of large wood, degraded water quality, and disconnected and fragmented riparian vegetation.

Adults only migrate through the action area and are likely not exposed to the baseline conditions long enough to significantly affect their survival or reproductive fitness. Some juvenile SONCC coho salmon rear in the mainstem Chetco River during the summer,[14,15] but these fish are likely in poor condition due to low channel complexity and elevated temperatures, and are unlikely to survive to smoltification because of a lack of overwintering habitat.[16] Because of the poor rearing conditions, we expect only a small portion of the population's juveniles spend significant time in the action area.

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[14] E-mail from Carl Page, Chetco River Watershed Council, to Chuck Wheeler, NMFS (June 21, 2010) (discussing snorkel surveys in the lower Chetco River).

[15] Snorkel surveys in the lower Chetco River by Chuck Wheeler, NMFS (August 26, 2008).

[16] Presentation of Todd Confer, Oregon Department of Fish and Wildlife, at the Regional Gravel Symposium (December 1, 2009).

NMFS (2014) concluded the limiting factors for the Chetco River are degraded riparian forest conditions and lack of floodplain and channel structure. The limiting factors for the action area are the same. These limiting factors lead to poor fitness and low survival of SONCC coho salmon juveniles in the action area. They decrease the chances that the juveniles will survive between the time they emerge from the gravel until they smolt and leave the estuary. When they emerge from the gravels, juvenile SONCC coho salmon begin searching for food and unoccupied territories (Sandercock 1991). They may move great distances upstream (Tripp and McCart 1983) or downstream (Chapman 1962). Juvenile SONCC coho salmon move into and out of Chetco River tributaries each year searching to maximize their growth and survival to smolt stage. They move in summer to find cover to protect them from predators and to avoid elevated temperatures. They move in the winter searching for complex habitat to protect them from high flows. Once in the mainstem, conditions are poor and returning to tributaries is likely difficult.

Under these environmental conditions (*i.e.* exposure to environmental stressors including low channel complexity, low large wood levels, poor estuarine habitat, and degraded water quality), individual juvenile SONCC coho salmon rearing in the action area are stressed. 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 stresses. Exceeding those limits will lead to injury or death of that individual. It is likely that degraded habitat conditions have contributed to low abundance and productivity for the Chetco River population.

As described in the critical habitat section above, the Chetco River between the HWY 101 Bridge and RM 11 is experiencing an apparent recent positive trend in habitat quality. It is likely the improvements in habitat quality have had or will have a positive effect on SONCC coho salmon. Unfortunately, at this time, the reliability of the ODFW spawning surveys is too low and variability of the resulting data is too high to develop dependable abundance numbers.

2.5 Effects of the Action

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

We have analyzed the effects of the proposed permits not only for their 10-year terms but beyond that time horizon to the extent that the effects can be meaningfully analyzed into the future. The effects of the proposed action potentially persisting past the 10-year term of the permits result from the negative effect of a slower rate of habitat quality improvement than if no gravel was removed. Consistent with the courts direction in *NEDC v Corps,* No. 10-1129-AC, 2011 WL 4369129 (D. Or. Sept. 19, 2011) -- which addressed ESA consultation on an action similar to that proposed here -- in the effects timeframe that extends beyond 10 years, we have not assumed that mining will cease and gravel recruitment will revert to natural levels.

2.5.1 Effects on Critical Habitat

SONCC coho salmon critical habitat was designated at the 5th field watershed scale. The action area is in the Chetco River fifth-field watershed (HUC# 1710031201), designated as critical habitat for SONCC coho salmon, which provides habitat to support successful adult spawning, juvenile rearing, and adult and juvenile migration. The PBFs essential for SONCC coho salmon present in the action area are cover/shelter, food, riparian vegetation, space, spawning gravel, water quality, water temperature, water quantity, water velocity, substrate, and safe passage.

Geomorphic Conditions. The proposed action involves gravel removal which affects quality of SONCC coho salmon critical habitat by altering geomorphic conditions within the stream. Geomorphic conditions of a stream are controlled by 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 (Federal Interagency Working Group 2006). 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' habitat quality as it regains the balance between supply and transport (Federal Interagency Working Group 2006). The following are some of the more predictable and widely observed habitat quality 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 2006). Sediment removal does not just affect the channel around the extraction site. It also reduces the supply of material to downstream bars, which will diminish in size because the stream still transports sand and gravel from those bars (Dunne *et al.* 1981).

Gravel bars are a particularly important habitat feature impacted by gravel mining, with implications for SONCC coho salmon. Gravel bars are an integral factor in channel development and improved habitat quality. They create undercut banks, deep pools, and other fluvial features to slow water velocities during high winter flows. Along with the woody vegetation that grows on stable gravel bars, these features provide the complex channel conditions required by SONCC coho salmon for winter high flow refuge and safe passage. During summer, gravel bars reduce the stream's width to depth ratio, which reduces stream temperatures by reducing solar radiation on the water surface. Gravel bars also provide the substrate and interstitial spaces that promote high populations of invertebrate forage species for juvenile SONCC coho salmon.

The proposed action involves removal of gravel and is therefore expected to have some of the above adverse effects on SONCC coho salmon critical habitat. The baseline habitat quality in the action area is degraded, but on a positive trend since reforms in 1994 by the State of Oregon and in 2006 by the Corps (see Section 2.4.1). In analyzing the effects of the proposed action, the results of more recent restrictions on mining operations, including bar form retention (since 2006) and maintenance and recovery reserves (since 2012) – which are identical to those in the proposed action, are relevant. Since 2006, the applicants chose not to mine several years. With the exception of 2013, these decisions were made weighing how much gravel was available after the maintenance and recovery reserves and the economics of mobilizing to remove it. In 2013, the Corps did not issues permits.

Between 2005 and 2016, the low-flow channel of the Chetco River near the North Fork Chetco River significantly narrowed (filled arrows) and changed from a braided channel to a single thread (open arrows, Figure 3). Note the flow in both photos is very similar, giving us an accurate comparison. These changes indicate narrower and deeper low flow channels, which maximize preferred rearing habitat to coho salmon juveniles. Furthermore, a narrow, deep low flow channel has less exposure to warm air temperatures and solar heating, which minimizes temperature gain. These new channel characteristics certainly have significant benefits to critical habitat PBFs.

Figure 3. Changes at Freeman extraction location on the Chetco River at the Confluence of North Fork Chetco River between 2005 and 2016. Filled arrows indicate a narrowing low flow channel, open arrows indicate conversion of braided channels to a single one (Google Earth 2018).

Similar changes occurred at Social Security Bar between 2005 and 2016 (Figure 4). The bar grew, particularly at its apex, narrowing the low flow channel (filled arrows, which are in the same location on each photo). The bar just upstream from Social Security Bar grew approximately 500 feet, significantly reducing the low flow channel (open arrows, which are in the same location on each photo). These channel changes have markedly improved PBFs for migration and rearing. Some of these observations are likely due to the slightly lower flow at the time of the photo, but the difference in flow is small and cannot account for much of the change.

Figure 4. Changes at Social Security Bar on the Chetco River between 2005 and 2016. Filled arrows indicate growth at the apex of the bar, open arrows indicate extension of the bar just upstream (Google Earth 2018).

It is important to point out that Social Security Bar is downstream of both gravel removal operations. The fact that it continues to grow over time is evidence the maintenance and recovery reserves are working as planned and allowing recovery of channel form and processes. This significant positive trend occurred despite some gravel being removed upstream. Since the proposed action is restricted similar to post-2006 mining permits, it is expected to allow a similar positive trend in habitat quality.

Chemical Contamination. Operation of construction equipment creates the potential for introduction of fuel and lubricants into the stream or into the adjacent riparian zone. In sufficient quantities, these substances can injure or kill aquatic organisms. Spill control minimization measures (as outlined in the General Construction Details in Section 1.3) include 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. A few drops (up to an ounce) of contaminants may drip/leak from the equipment at each of the extraction locations each year. The resulting effect of these small drips, leaks or spills on the water quality PBF will be so mild in intensity and short in duration that meaningful measurement, detection, 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 very small due to the requirement of best management practices, thus we do not reasonably expect one to occur.

Suspended Sediment. Temporary bridge installation, stream crossings by heavy equipment, upland processing facilities, and bar mining will all produce suspended sediment plumes at various times. Plumes from installing temporary bridge footing and stream crossings by heavy equipment will be short-lived (up to an hour) and localized (less than 100 feet). Plumes from bar surfaces disturbed by extraction are likely to last the duration of the first storm or two.

However, monitoring reports from these operators during previous permits have shown these plumes do not measurably exceed an upstream control sample. For the interrelated upland processing facilities, the NPDES 1200-A permits limit turbidity[17] of stormwater released from the upland sites to less than a 10% increase in natural stream turbidities. Plumes from upland processing facilities will occur for the duration of each rainstorm and a few hours after. However, provided the operators adhere to the NPDES 1200-A permit, concentrations of suspended sediment in the Chetco River due to upland activities will be low and unlikely to be measurable due to the volume and velocity of water flowing in the river versus the volume from the outfall.

Summary of Effects on Critical Habitat

Limited chemical contamination and suspended sediment plumes will occur with the proposed action, but the effects of them on critical habitat will not be meaningful to PBFs. By extracting gravel, the proposed action will result in a slower improvement rate of habitat quality than if the action was not carried out. This will affect the cover/shelter, food, safe passage, water temperature, and water velocity PBFs. However, we are confident the habitat quality will continue to improve at a rate similar to that since 2006, because the proposed limitations on removal are identical to those in place since 2012 and better than those implemented prior to that year. We now have clear evidence that habitat quality has improved significantly since 2006 as a result of those limitations. In short, the maintenance and recovery reserves and bar form retention requirements are working as planned and allowing recovery. The evidence shows narrower and deeper low flow channels, which maximize preferred rearing habitat to coho salmon juveniles. Furthermore, a narrow, deep low flow channel has less exposure to warm air temperatures and solar heating, which minimizes temperature gain. These new channel characteristics have significant benefits to critical habitat PBFs.

2.5.2 Effects on Listed Species

The action area provides juvenile SONCC coho salmon rearing habitat year round. Some juveniles will likely move into and out of the action area multiple times during the year they spend in freshwater, while others may spend nearly all of their time within it. All individuals of the Chetco River population are exposed to the effects of the proposed action by traveling through the action area at least twice during their lives. Juvenile SONCC coho salmon migrate through the action area to the ocean in the spring. Adult SONCC coho salmon migrate through the action area to their upstream spawning grounds in the fall. Effects from the proposed action are likely to primarily affect rearing juveniles as adults only migrate through the action area and are unlikely to be exposed to any adverse effects for longer than the time required for migration. Within the action area, the key limiting stresses are lack of floodplain and channel structure and degraded riparian forest conditions (NMFS 2014).

Geomorphic Conditions. A direct relationship exists between geomorphic conditions, habitat complexity, and the health of juvenile SONCC coho salmon in the action area. Degrading stream geomorphic conditions reduces habitat complexity which increases stress on juveniles.

[17] Turbidity is a visual measure of how much light transmission through water is attenuated by suspended sediment or other dissolved or particulate material in the water.

Juvenile SONCC 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.

The protective measures afforded by the proposed action, including the maintenance reserve, recovery reserve, and bar form retention, will ensure the trend in habitat quality will remain positive at a rate maximized for the amount of gravel removed. In particular, the protective measures of the proposed action will preserve functions of gravel and gravel bars. The applicants propose to incorporate head of bar buffers. These buffers retain bar form and function by protecting the part of the gravel bars performing almost all of the natural physical processes of the river that create high value habitat (Federal Interagency Working Group 2006). The applicants also propose maintenance and recovery reserves. These reserves will ensure the amount of gravel removed is substantially less than the amount deposited each year in the action area. This will allow natural stream processes to continue to build the mined bars, as well as the other bars throughout the lower 11 miles of the Chetco River (Dunne *et al.* 1981).

Because the proposed action will result in a slower improvement rate of habitat quality than if the action was not carried out, it will result in a similar slower improvement in carrying capacity in the action area with attendant impacts on SONCC coho salmon. Carrying capacity is the maximum number of fish that can survive within the action area, based on the ability of the available habitat to support them. A suite of environmental factors (most notably habitat quality) determines carrying capacity of a stream (Bjornn and Reiser 1991), and the most important factors are called limiting factors. Changing one or more of the limiting factors will change carrying capacity (Bjornn and Reiser 1991). When limiting factors are abated, carrying capacity increases, thus increasing the number of juveniles that can survive (Hays *et al.* 1996).

For the action area, the lack of floodplain and channel structure and degraded riparian forest conditions are the primary limiting factors (NMFS 2014). Parameters affected by the proposed action's effect on a slower rate of habitat quality improvement are directly related to floodplain and channel structure. Thus, a slower rate of habitat improvement will slow the rate of improvement in this limiting factor and the resulting carrying capacity of the action area. Because fish in excess of the carrying capacity are likely to perish and carrying capacity improvement will be slowed by the proposed action, the proposed action results in a greater number of juvenile deaths.

We now have compelling evidence that habitat quality has improved significantly since 2006 as a result of the reserve volumes and bar form retention. As outlined above, the evidence shows narrower and deeper low flow channels, which maximize preferred rearing habitat to coho salmon juveniles and minimize temperature gain. These improve the limiting factor of floodplain and channel conditions, with an associated increase of the carrying capacity, and growth of the population.

Chemical Contamination. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons, which can kill salmonid fish at high levels of exposure and can cause lethal and sublethal adverse effects to aquatic organisms (Neff 1985, Hatch and Burton 1999). Spill control minimization measures (as outlined in the General Construction Details in Section 1.3) include vehicle staging, cleaning, and implementing a spill control and prevention plan will minimize the probability, magnitude and extent of a large spill. 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 fish 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 juvenile SONCC coho salmon.

Suspended Sediment. Of key importance in considering the detrimental effects of suspended sediment on rearing juvenile OC coho salmon are the concentration and duration of the exposure. 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% 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

Suspended sediment concentrations generated by proposed activities are unlikely to exceed any of these thresholds. Plumes from installing temporary bridge footings, stream crossings by heavy equipment, and the enhancement activity are unlikely to last 4 hours. Concentrations of plumes from interrelated upland processing facilities and bar mining will not be measurable or detectable compared to background levels when they occur. Therefore, suspended sediment plumes are not likely to have any detectable adverse effects on juvenile SONCC coho salmon.

Physical Injury. At times, the applicants will need to cross the Chetco River to access gravel bars on the opposite side. Temporary bridges are not required every year,[18] but we do not have reliable information to predict how often they will be installed. Therefore, we assume the

[18] A temporary bridge has not been necessary at either site in the last 10 years.

worst case scenario of one bridge being installed each year per applicant. Instead of repeated and frequent crossings with dump trucks, the operators will place a flatcar temporarily as a bridge. To install and remove the flatcar, each applicant will drive heavy equipment across the river four times per year (there and back to install, there and back to remove). The applicants will construct footings on each end of temporary bridges with a few cy of gravel bar material and some concrete blocks. The footings may encroach on the low-flow channel of the river. The applicants will remove or smooth out material used for the footings of the bridge after the bridge removal. This work affects a small area of stream channel, but will not alter the geomorphology of the channel and will not be detectable after the first fall storm that inundates the area after the bridge has been removed.

The heavy equipment crossings to install and remove flatcar bridges will disturb an area approximately 10 feet wide by 50 feet long (the width of the low flow channel). Anytime heavy equipment enters water where fish are present, the potential for injury or death is present. The operators typically choose to cross the stream at the most shallow point. Habitat where the equipment will be crossing is low quality for SONCC coho salmon. The routes will be in water that is less than 2 feet deep, with no flow obstructions and uniform substrate. There are no pools, overhanging vegetation, large wood or any other features that would attract SONCC coho salmon to these areas. While there are no special features to attract SONCC coho salmon juveniles to the crossing areas, their presence is not discountable. At some point during the crossings, a few juveniles are likely to be present. Furthermore, since no other cover is present, startled juveniles may hide in the interstitial spaces of gravel and cobbles where the equipment will cross, thus increasing their chance of being injured or killed.

Considering the amount of habitat affected (500 square feet) per crossing, the low abundance of SONCC coho salmon juveniles, the low value of affected habitat, and the probability of juveniles being crushed (low but not discountable), heavy equipment crossings are likely to expose only a small number of SONCC coho salmon juveniles per year to an increase in likelihood of injury, with death of only a few individuals over the term of the permit.

Summary of Effects on SONCC Coho Salmon. The effects of gravel removal associated with the proposed action are expected to slow the improvement rate of habitat quality than if the action was not carried out. This will correspond to a slower rate of improvement in the resulting carrying capacity of the action area. However, we are confident the habitat quality and carrying capacity will continue to improve at a rate similar to that since 2006, because the proposed limitations on removal are identical to those in place since 2012 and better than those implemented prior to that year. We now have compelling evidence that habitat quality has improved significantly since 2006 as a result of those limitations, which we expect translate into significant improvements in carrying capacity.

The effects on SONCC 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. Heavy equipment crossings are likely to expose a small number of SONCC coho salmon juveniles per year to an increase in likelihood of injury, with death of only a few individuals over the term of the permit.

The number of Chetco River spawners is likely below the depensation threshold of 135 fish (NMFS 2014). When a population is under this threshold, recovery will be slow (due to density dependent variables like finding mates, Liermann and Hilborn 2001), but depensation does not mean recovery is unattainable (NMFS 2014). Because the fecundity of coho salmon is high (2,500 to 5,000 eggs per female, Beacham 1982, Sandercock 1991) it does not take many spawners finding each other to translate into increased numbers of juveniles. The average annual estimate from the ODFW data is 108 spawners per year for the last 5 years. The resultant SONCC coho salmon offspring will benefit from the continued improvement in habitat quality and associated juvenile carrying capacity in the Chetco – which is allowed by the proposed action in light of the protective features. Improved juvenile survival in turn is expected to translate into numbers of adult spawners trending higher, and surpassing the depensation threshold. Thus, the proposed action will allow the continued improvement in habitat quality of the mainstem Chetco River, which is expected to improve abundance of SONCC coho salmon in the Chetco River population.

2.6 Cumulative Effects

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

The SONCC coho salmon recovery plan (NMFS 2014) identified urban/residential/industrial development as a key limiting threat, but after examination of the biological assessment and additional queries to State and local agency websites, we were unable to identify any future non-Federal actions reasonably certain to occur that would affect the action area. Other ongoing, non-Federal activities within and upstream of the action area (as described in Section 2.4) likely will continue to follow recent patterns and carry their effects forward. In particular, agricultural land use and timber harvesting on non-Federal lands will continue at levels similar to the recent past. These activities will continue to negatively affect habitat quality and SONCC coho salmon in the action area by reducing floodplain and channel structure and degrading riparian forest conditions.

Because no new activities affecting coho salmon in the action area are reasonably certain to occur and ongoing activities will continue at similar levels to the recent past, the effect on habitat quality and SONCC coho salmon from cumulative effects will also continue at similar levels to the recent past.

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 diminishes the value of designated or proposed critical habitat for the conservation of the species.

2.7.1 Critical Habitat

At the designation-wide scale, critical habitat for SONCC coho salmon is poor and has been degraded from historical conditions by ongoing land management activities. Habitat impairments recognized as factors leading to decline of the species were included in the original listing notice for SONCC coho salmon as: (1) Channel morphology changes; (2) substrate changes; (3) loss of instream roughness; (4) loss of estuarine habitat; (5) loss of wetlands; (6) loss/degradation of riparian areas; (7) declines in water quality; (8) altered streamflows; (9) fish passage impediments; and (10) elimination of habitat (62 FR 24588).

The Chetco River is designated as critical habitat for SONCC coho salmon. The action area provides habitat to support successful juvenile rearing, and adult and juvenile migration. As with every fifth-field HUC in the SONCC coho salmon ESU, critical habitat affected by this action is important to the population it supports and the likelihood of promoting species conservation across the entire designation area.

The environmental baseline is degraded from human caused impacts, particularly urban and residential development, agriculture, and forestry. These activities have resulted in the cover/shelter PBF limiting the conservation role of critical habitat within the action area. However, the trend in critical habitat has been positive from regulatory reforms, particularly since 2006 with restrictions on gravel extraction. The large wood restoration action in Jack Creek likely made significant improvements to SONCC coho salmon critical habitat that will continue into the future. The 2017 Chetco Bar Fire will have a host of effects on the action area, some positive (including delivery of gravels and large wood) and some negative (including increased stream temperature and delivery of fine sediments).

Climate change may result in higher winter storm flows which could increase the influx of gravel; however, it may also pose some higher risks to the PBFs, such as lower summer stream flow and higher stream temperatures.

The proposed action will result in a slower improvement rate of habitat quality than if the action was not carried out. This will result in a slower rate of improvement in the cover/shelter, food, safe passage, water temperature, and water velocity PBFs. However, we are confident the SONCC coho salmon critical habitat will continue to improve at a rate similar to that since 2006, because the proposed limitations on removal are identical to those in place since 2012 and better than those implemented prior to that year. We now have a multi-year track record indicating that these limitations have allowed significant habitat quality improvement.

The effects on critical habitat from cumulative effects will continue at similar levels to the recent past.

In summary, critical habitat for SONCC coho salmon in the Chetco River population is in poor condition but has experienced significant improvements since gravel mining reforms were implemented in 2006. The proposed action will result in adverse effects to PBFs, but the protective measures applied to gravel removal will maintain a rate of improvement within the action area similar to that in recent years. There now exists a track record of the protective measures being implemented and evidence they produce significant positive habitat outcomes.. Furthermore, we weigh the small proportion of the action area relative to the watershed and designated area of critical habitat overall, the short period of time adults will be in the action area and the small portion of the population's juveniles spending significant time in the action area. 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, when added to environmental baseline, and anticipated cumulative effects and climate change, 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.

2.7.1 Listed Species

In the 5-year review, we concluded that the ESU should remain listed as threatened because there has not been improvement in the status of SONCC coho salmon or a significant change in risk to persistence of the ESU (NMFS 2016). Of the 31 independent populations of SONCC coho salmon, 24 are at high risk of extinction and 6 are at moderate risk of extinction. Because the population abundance of most independent populations is below their depensation threshold, the SONCC coho salmon ESU is at high risk of extinction and is not viable. SONCC coho salmon occurring in the action area are part of the Chetco River population, which is currently at a high risk of extinction. Although there is not sufficient reliable data to develop dependable abundance numbers, the overall population productivity for Chetco River coho salmon appears to be very low and current abundance is likely below the depensation threshold.

The environmental baseline is degraded from human caused impacts, particularly urban and residential development, agriculture, and forestry. Gravel mining has historically had substantial impacts on the mainstem of the Chetco River resulting in a lowered channel and simplified habitat. These activities have resulted in the limiting factors of lack of floodplain and channel structure and degraded riparian forest conditions. The recent trend in habitat within the action area has been positive. It is likely that the improvements in habitat quality have had and will have a similar positive trend in the number of adult SONCC coho spawners, although there is not sufficiently reliable data to develop dependable abundance numbers at this time. The large wood restoration action in Jack Creek likely has improved SONCC coho salmon survival and abundance that will continue into the future in the affected reach that will continue into the future. The 2017 Chetco Bar Fire will have a host of effects on the action area, some positive (including delivery of gravels and large wood) and some negative (including increased stream temperature and delivery of fine sediments).

Climate change may result in higher winter storm flows which could increase the influx of gravel; however, it may also pose some higher risks to the species, such as lower summer stream flow and higher stream temperatures.

Chemical contamination and suspended sediment plumes are only expected to have mild or undetectable adverse effects on SONCC coho salmon. The proposed action could result in injuring or killing a few juvenile SONCC coho salmon by crushing them with heavy equipment crossing the river. Gravel mining impacts habitat parameters that are important for SONCC coho salmon including winter high flow refugia, cool summer water temperatures, and the availability of forage species for juveniles. Gravel mining will continue under the proposed action, at levels similar to those since 2012, with impacts primarily to 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.

The proposed action will result in a slower improvement rate of habitat quality within the action area than if the action was not carried out. However, due to significant protective measures built into the proposed action, it will maintain a rate of improvement within the action area similar to that in recent years. The proposed limitations on removal are identical to those in place since 2012 and better than those implemented prior to that year. There now exists a track record of the protective measures being implemented and evidence they produce significant positive habitat outcomes. We expect the continued positive habitat trend will improve the status of limiting factors, with corollary increases of carrying capacity within the action area.

The effects on habitat quality and SONCC coho salmon abundance and productivity from cumulative effects will continue at similar levels to the recent past.

In summary, the Chetco River population has poor abundance with poor baseline habitat conditions. Based on the evidence of habitat improvements in the actions area, we expect the species is trending positive as well, however there is not sufficient reliable data to develop dependable abundance numbers. The proposed action is expected to result in injury or death of a few juveniles from heavy equipment crossings for bridge placement and will adversely affect coho salmon as a result of gravel removal. The proposed action will result in a slower rate of improvement than if no gravel was removed within the action area. However, based on the track record that now exists, we expect the protective measures applied to gravel removal will maintain a significant positive rate of habitat improvement. This improving habitat quality will contribute to improvements in the carrying capacity, improving abundance of SONCC coho salmon in the Chetco River population and allow for population growth and recovery into the future. Although the population is likely below the depensation threshold, there are sufficient numbers to ensure some successful spawning each year[19] and, given the species high fecundity rate and the expected improvement in habitat quality and hence juvenile carrying capacity, we expect the number of adults to trend higher and surpass the depensation threshold. Put another way, although the population growth rate is curbed by the current low abundance, there is still a sufficient number of returning adults to produce large quantities of offspring due to the fecundity rates of coho salmon. The likelihood that these juveniles will successfully reach smoltification is enhanced by the continually improving rearing habitat. These greater rates of smoltification are reasonably expected to translate into improved numbers of returning adults.

[19] Even the unreliable ODFW data available indicates that successful spawning is occurring in each cohort. As explained above, estimates of zero spawners in some years is highly unlikely to mean that the actual number of spawners in those years was zero because adults returned three or six years later (indicating successful spawning the year in which a zero was recorded).

By implementing the same reserve volumes and bar for retention requirements, gravel mining will be carried out in a manner that allows the observed habitat improvements to continue into the future. 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. Because the restrictions built into the proposed action will ensure the recent significant rate of improvement in habitat quality to continue, when we consider the proposed actions effects in light of the current population status (including benefits from prior enhancement activities), when added to environmental baseline, and consider cumulative effects and climate change, we find the proposed action will not appreciably reduce the likelihood of the survival or recovery of the Chetco River SONCC coho salmon population (the only population affected). Given our conclusion that the population will not be impeded in recovery as a result of the proposed program, it will also not appreciably reduce the likelihood of the survival or recovery of SONCC coho salmon at the ESU level.

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, any effects of interrelated and interdependent activities, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of SONCC 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). "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, we determined that incidental take is reasonably certain to occur as injury or death of SONCC coho salmon juveniles due to crushing from heavy equipment crossing the Chetco River to place temporary bridges. Incidental take would also occur as harm or death to SONCC coho salmon due to habitat modification (slower habitat quality improvement which slows the rate of improvement in limiting factors and carrying capacity of the action area).

Monitoring the actual number of fish killed or injured by in-water use of heavy equipment to place a bridge is impractical due to the flow in the river, size of fish, and the difficulty of accomplishing such a task. Observation would also add significant additional stress or risk of injury to these fish. In such circumstances, we use a surrogate that is causally linked to the expected level of the incidental take. For heavy equipment use to place a bridge, the best available take surrogate is the number of crossings by heavy equipment since the extent of incidental take associated with stream crossings is directly correlated to the number of crossings (the more times the stream is crossed the greater the likelihood that there will be an interaction between the equipment and fish). We estimate heavy equipment will need to cross the Chetco River at most four times per year per applicant (over and back to place the bridge, over and back to remove the bridge). Therefore, four crossings per year per applicant is the surrogate for incidental take through this pathway. Although this surrogate might be construed as somewhat coextensive with the proposed action, it nevertheless functions as an effective reinitiation trigger because it applies on an annual basis and thus could trigger reinitiation every year.

We also cannot precisely predict the number of fish anticipated to be harmed or killed due to habitat modification. The relationship between gravel influx, habitat quality, carrying capacity, and survival is not quantifiable due to lack of data. The abundance of fish occurring within the action area is a function of habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. These biotic and environmental processes interact in ways that may be random or directional, and may operate across broad temporal and spatial scales. Furthermore, there are no methods available to monitor this death and injury because it will occur throughout the year over eleven miles of stream.

For habitat modification, the best available indicator for the extent of take is the area of gravel bar disturbed relative to the amount of gravel removed. By analyzing monitoring reports from Freeman and Tidewater for past permits, we estimate that no more than 0.2 acres of gravel bar need to be disturbed for every 1,000 cy of gravel harvested. This is the most logical take surrogate for this pathway. In addition to being the most practical and feasible indicator to measure, area of gravel bar disturbed per unit of gravel removed is proportional to the adverse effects of the proposed action. A relatively small amount of removal may have a large effect if the depth is minimal and it is spread out over a large area. Also, because extraction occurs in three dimensions (square area plus depth), the area of gravel bar disturbed per unit of gravel removed is closely related to the intensity of activity, yet is distinct from the total amount of gravel removed. Thus, area of gravel bar disturbed per unit of gravel removed will remain proportional to the amount of take, regardless of the level of annual extraction allowed by the proposed action.

Exceeding any of the following measures for extent of take will trigger reinitiation of this consultation:

1. Four heavy equipment crossings per applicant per year.
2. 0.2 acres of gravel bar disturbed per 1,000 cy of gravel harvested.

2.9.2 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.

2.9.3 Reasonable and Prudent Measures

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

For this proposed action, the Corps shall:

- Minimize incidental take from habitat modification by accurately defining gravel bar extent for calculating bar form retention requirements.
- 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.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps and their applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The Corps and their 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 ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. To implement reasonable and prudent measure #1 (gravel bar extent), the Corps shall ensure accurate calculation of bar form retention requirements by defining the functional extent of gravel bars according to the following (see Figure 5):
    a. Freeman south bank bar. Upstream extent is currently at 42.073080°, -124.212812°. Downstream extent is currently at 42.070635°, -124.218608°.
    b. Freeman north bank bar. Upstream extent is currently at 42.073367°, -124.206422°. Downstream extent is currently at 42.072917°, -124.212289°.
    c. Tidewater bar. Upstream extent is currently at 42.128206°, -124.182314°. Downstream extent is currently at 42.124250°, -124.186856°.
    d. Adjustments. Through evolution of the channel, these points will need to be adjusted from time to time. Adjustments may be requested by the Corps, applicants, or NMFS, but they must be approved by NMFS prior to becoming effective.

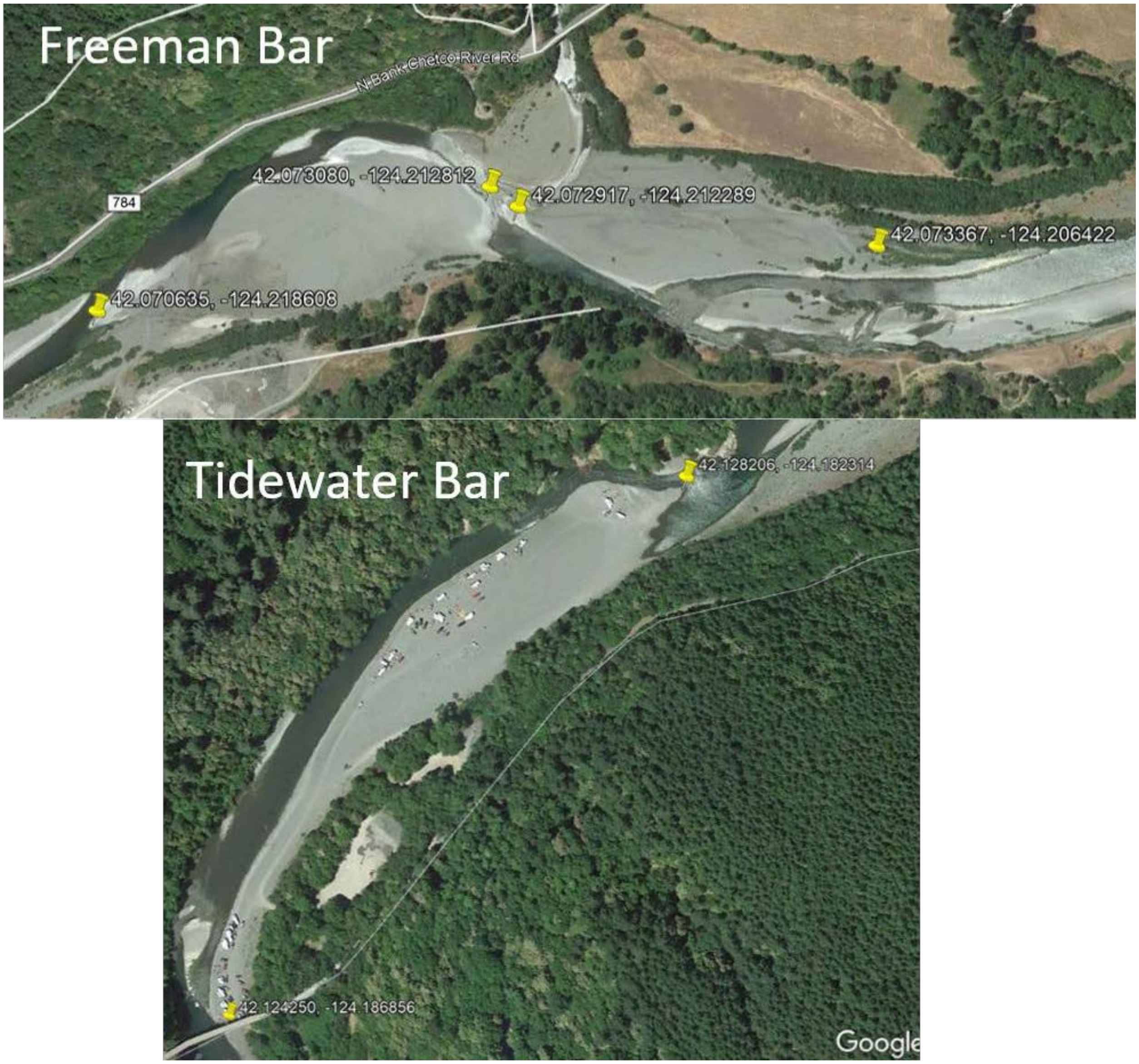

Figure 5. Functional extents of the affected gravel bars marked with yellow pins.

2. To implement reasonable and prudent measure #2 (monitoring), the Corps shall ensure that we receive a monitoring report by December 31 every year from each operator with the following information:
    a. Project Identification.
        i. Permittee name, permit number, and project name.
        ii. Project location by sixth-field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
        iii. Corps contact person.
        iv. Starting and ending dates for work completed.
    b. Habitat Conditions. Photos of habitat conditions at the action sites before, during, and after action completion.
        i. Include general views and close-ups showing details of the action and action area.

ii. Label each photo with date, time, project name, photographer's name, and a comment about the subject.

c. Project Data. Include the following specific project data in the annual monitoring report:

i. Pre-and post-extraction surveys adhering to Federal Interagency Working Group (2006).

ii. Volume of gravel extracted.

iii. Extent of area disturbed by gravel extraction.

iv. The number of stream crossings by heavy equipment.

v. Pollution control. A summary of pollution and erosion control inspections, including any erosion control failure, contaminant release and correction effort.

vi. Any incidence of observed injury or mortality of listed species.

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. The Corps should coordinate with the permittees and NMFS to develop methods to make the sand and gravel that Corps dredge ships remove from the Chetco River when they maintain the navigation channel available for commercial reuse. This material is commercially viable and obtaining it from the dredge would have less impact to fisheries resources than bar extraction.

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

2.11 Reinitiation of Consultation

This concludes formal consultation for the Freeman Rock, Inc. and Tidewater Contractors, Inc. gravel removal projects in the Chetco River.

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

2.12 "Not Likely to Adversely Affect" Determinations

This determination for eulachon and green sturgeon 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 or green sturgeon in the action area.

The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Discountable effects are those extremely unlikely to occur. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs or where alteration of any PBFs of critical habitat reduces those features' ability to support listed species' conservation needs in the action area. Beneficial effects are contemporaneous positive effects without any adverse effect on the listed species or critical habitat. In terms of critical habitat, completely beneficial effects are positive only: an action cannot be deemed wholly beneficial if it has any adverse effect on critical habitat.

The proposed action and the action area for this consultation are described in the Introduction to this document (Sections 1.3 and 1.4).

2.12.1 Species in the Action Area

Eulachon. The Southern DPS of eulachon includes all naturally-spawned populations occurring in rivers south of the Nass River in British Columbia to the Mad River in California. In the early 1990s, there was an abrupt decline in the abundance of eulachon returning to the Columbia River (Gustafson *et al*. 2016). Despite a brief period of improved returns in 2001-2003, the returns and associated commercial landings eventually declined to the low levels observed in the mid-1990s (Gustafson *et al*. 2016). Although eulachon abundance in monitored rivers has generally improved, especially in the 2013-2015 return years, recent poor ocean conditions and the likelihood that these conditions will persist into the near future suggest that population declines may be widespread in the upcoming return years (Gustafson *et al*. 2016). We completed a recovery plan for eulachon in 2017 (NMFS 2017). This plan found the greatest threat to eulachon is climate change, with bycatch in offshore shrimp fisheries as the only other moderate to high threat in all subpopulations. The recovery plan's priority actions include working with stakeholders to further reduce severity of threats to eulachon, as well as develop a research program to enable a greater understanding of eulachon and the impact large-scale threats like climate change have on eulachon productivity, recruitment, and persistence.

The ODFW has confirmed the existence of eulachon in the Chetco River.[20] Willson *et al*. (2006) lists the Chetco River as a spawning population. First appearance of eulachon spawners in the Chetco River has not been studied, but based on the available information for eulachon run-timing, small numbers of spawners, and frequency of occurrence, adult eulachon will probably migrate through the action area from mid-January through May.

[20] E-mail from Todd Confer, Oregon Department of Fish and Wildlife, to Jeff Young, NMFS (June 14, 2010) (providing data for estuary sampling in Southwest, OR).

Eggs hatch in 20 to 40 days (Smith and Saalfeld 1955, Parente and Snyder 1970, Berry and Jacob 1998, Langer *et al*. 1977) and larval eulachon, which are feeble swimmers, are carried downstream within hours or days (Parente and Snyder 1970, Samis 1977, Howell 2001). Thus, larval eulachon could be present in the action area from February through June. Some studies found larval eulachon may be retained for weeks or months in inlets or fjords of estuaries on the British Columbia mainland coast (McCarter and Hay 2003), but no such habitat features exist in the Chetco River Estuary. It has almost no backwater areas and is likely flushed with every tide cycle. Therefore, individual larval eulachon will likely only be present a day or two as they are carried out to sea. These individuals are unlikely to be feeding as larval nutrition is provided by the yolk sac prior to first feeding (WDFW and ODFW 2001).

Green sturgeon. The Sacramento River contains the only known green sturgeon spawning population in this DPS. The current estimate of spawning adult abundance is between 824-1,872 individuals (NMFS 2015). Telemetry data and genetic analyses suggest that Southern DPS green sturgeon generally occur from Graves Harbor, Alaska to Monterey Bay, California (NMFS 2015). We completed a recovery plan for green sturgeon in August 2018 (NMFS 2018). The greatest threat to green sturgeon is its restricted spawning geography, with the majority of spawning occurring within a single reach of the mainstem Sacramento River (NMFS 2018). Recovery actions in the plan focus on the Sacramento River Basin and San Francisco Bay Estuary and aim to restore passage and habitat, reduce mortality from fisheries, entrainment, and poaching, and address threats in the areas of contaminants, climate change, predation, sediment loading and oil and chemical spills (NMFS 2018).

Green sturgeon use the Chetco River estuary for subadult and adult growth, development, and migration. Green sturgeon congregate in coastal waters and estuaries, including non-natal estuaries. 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). Recent 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 (WDFW and ODFW 2012). Green sturgeon in these estuaries may move into tidal flats, particularly at night, to feed (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).

2.12.2 Effects on Listed Species

The opinion detailed the adverse effects of the proposed action on the environment, including: (1) Slower habitat quality improvement than if no gravel was removed; (2) potential chemical contamination; (3) potential injury due to in-water equipment use; and (4) potential increased suspended sediment.

We determined that all effects of the proposed action are insignificant or discountable with respect to eulachon or green sturgeon and are therefore not likely to adversely affect those species. The effects from a slower rate of habitat quality improvement will be insignificant because the magnitude of effect on habitat features beneficial to these species will be very small. Green sturgeon only use the estuary, which is not expected to have measurable changes due to gravel extraction. Eulachon use the estuary and the lowest reach of river. However, they only spawn in the lower river and fry migrate to the ocean immediately. They do not require the complex channel habitats and high flow refuge affected by slowing the rate of habitat improvement.

The effects from small contaminant drips/leaks will be insignificant because, as explained in the opinion, due to various conservation measures built into the proposed action, the volume of contaminant is expected to be low, especially relative to the high volume of water in the river. The effects of a large contaminant spill are discountable because a large spill is extremely unlikely to occur.

The effects from heavy equipment use are discountable because neither species will be in the river near the crossing sites when either applicant installs a bridge. Green sturgeon and eulachon use only the estuary and areas just upstream from the estuary, whereas the river crossings will occur between RM 4.5-5.5.

The effects of suspended sediment is insignificant because, as explained in the opinion, it is expected to occur in undetectably low concentrations.

2.12.3 Conclusion

Based on this analysis, NMFS determines the proposed action is not likely to adversely affect green sturgeon or eulachon.

2.12.4 Reinitation

The reinitiation requirements set out in Section 2.10 of the opinion are also applicable to the not likely to adversely affect determinations in this section. This concludes the ESA portion of this consultation.

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

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

This analysis is based, in part, on the EFH assessment provided by the Corps and descriptions of EFH for Pacific Coast groundfish (Pacific Fishery Management Council [PFMC] 2005), coastal pelagic species (PFMC 1998), and Pacific Coast salmon (PFMC 2014) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed action and the action area for this consultation are described in the Introduction to this document (Sections 1.3 and 1.4). The action area includes areas designated as EFH for Pacific Coast salmon, Pacific Coast groundfish, and coastal pelagic species (Table 6). The Chetco River estuary is a Habitat Areas of Particular Concern (HAPC).

Table 6. Species with designated EFH in the action area.

Groundfish Species	
Leopard Shark (southern OR only)	*Triakis semifasciata*
Soupfin Shark	*Galeorhinus zyopterus*
Spiny Dogfish	*Squalus acanthias*
California Skate	*Raja inornata*
Spotted Ratfish	*Hydrolagus colliei*
Lingcod	*Ophiodon elongatus*
Cabezon	*Scorpaenichthys marmoratus*
Kelp Greenling	*Hexagrammos decagrammus*
Pacific Cod	*Gadus macrocephalus*
Pacific Whiting (Hake)	*Merluccius productus*
Black Rockfish	*Sebastes melanops*
Bocaccio	*Sebastes paucispinis*
Brown Rockfish	*Sebastes auriculatus*
Copper Rockfish	*Sebastes caurinus*
Quillback Rockfish	*Sebastes maliger*
English Sole	*Pleuronectes vetulus*
Pacific Sanddab	*Citharichthys sordidus*
Rex Sole	*Glyptocephalus zachirus*
Rock Sole	*Lepidopsetta bilineata*
Starry Flounder	*Platichthys stellatus*
Coastal Pelagic Species	
Pacific Sardine	*Sardinops sagax*
Pacific (Chub) Mackerel	*Scomber japonicus*
Northern Anchovy	*Engraulis mordax*
Jack Mackerel	*Trachurus symmetricus*
California Market Squid	*Loligo opalescens*
Pacific Salmon Species	
Chinook Salmon	*Oncorhynchus tshawytscha*
Coho Salmon	*Oncorhynchus kisutch*

3.2 Adverse Effects on Essential Fish Habitat

The ESA portion of this document (section 2.4) describes the adverse effects of this proposed action on SONCC coho salmon. This ESA analysis of effects is relevant to Pacific Coast salmon EFH and equates to a "would adversely affect" determination.

We conclude the proposed action would not adversely affect Pacific Coast groundfish or coastal pelagic species EFH, or the estuary HAPC. Species covered under these EFH designations only occur in the estuary portion of the action area, similar to eulachon and green sturgeon which section 2.11 found the proposed action is not likely to adversely affect. The adverse effects from altering riverine geomorphic conditions will not be measurable in the estuary. We found that adverse effects from suspended sediment and small contaminant spills will be too small to be measurable or detectable even at the extraction sites. The effect will only be smaller downstream in the estuary. The probability of a large contaminant spill occurring is not reasonably likely.

3.3 Essential Fish Habitat Conservation Recommendations

We believe the following conservation measures are necessary to avoid, mitigate, or offset the impact 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 slower habitat quality improvement by accurately defining gravel bar extent for calculating bar form retention requirements by applying permit conditions 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.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in Section 3.2, above, approximately 527 acres of designated EFH for Pacific coast salmon, Pacific coast groundfish, and coastal pelagic species.

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 us 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 our EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

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

3.5 Supplemental Consultation

The Corps must reinitiate EFH consultation with us 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 our EFH Conservation Recommendations (50 CFR 600.920(l)).

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion are the Corps. Other interested users could include the Corps' applicants. Individual copies of this opinion were provided to the Corps. The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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