

Central Waterfront District Permits

Pier 3 Haul Out

U.S. Army Corps of Engineers Permits NWP-2009-565-1 (issued October 11, 2022)

Oregon Department of State Lands Permit 60404-RF (issued August 9, 2022)

DEPARTMENT OF THE ARMY PERMIT

Permittee: Port of Astoria
10 Pier One, Suite 308
Astoria, OR 97103

Permit No: NWP-2004-369/14

Issuing Office: U.S. Army Corps of Engineers, Portland District

NOTE: The term "you" and its derivatives as used in this permit means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The Port of Astoria (Port) would perform maintenance dredging activities at the Port's Central Waterfront District (CWD). The Port would dredge up to a total of 1,130,400 cubic yards (cy) of accumulated sediment from a dredge prism measuring approximately 31 acres in size (Piers 1, 2, and 3 and Slips 1 and 2 combined) over a period of 10 years. The dredge depth would range from -18 to -45 feet mean lower low water (MLLW). The Port would remove up to 230,400 cy of accumulated sediment during the first year of the 10-year permit authorization period in order to reach the desired maintenance depths. After that, maintenance dredging would be limited to a maximum of 100,000 cy annually over the remaining years of the permit. Dredging activities would be conducted using a clam shell dredge, excavator, and/or suction dredge operated from a floating barge. The dredged material would be disposed of in-water at dispersive sites located in the flow lane of the Columbia River Federal Navigation Channel. Dredged material would be disposed of at three locations (Area A, Area B1, and Area B2). Area A would be used for disposal events that exceed more than 100,000 cy of sediment within a single year. Areas B1 and B2 would be used by the Port for the disposal of up to 100,000 cy of dredged material annually. Any material removed from Dredged Material Management Unit (DMMU) 2 would be placed at an approved upland facility due to unsuitable levels of contaminants found in sediments.

Purpose: Maintain previously authorized depths for vessel access to the CWD.

Project Location: The project is located in the Columbia River, between river miles 12 and 13.5, at the Port of Astoria Central Waterfront District, in Astoria, Clatsop County, Oregon.

Drawings: Fourteen (14 of drawings/maps) (Attachment 1)

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on November 19, 2030. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition No. 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions (Attachment 2).
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

- a. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be

required, upon due notice from the U.S Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

- b. Upon starting the activities authorized by this permit, Permittee shall notify the U.S. Army Corps of Engineers, Portland District, Regulatory Branch that the work has started. Notification shall be provided by e-mail to cenwp.notify@usace.army.mil and the e-mail subject line shall include: NWP-2004-369/14, Clatsop County.

Local Notice to Mariners

- c. Permittee shall notify the U.S. Coast Guard District Thirteen of the project by e-mail at D13-SMB-D13-LNM@uscg.mil at least 14 days prior to commencing work, so the project information can be issued in the Local Notice to Mariners.

In-water work timing

- d. All in-water work shall be performed during the in-water work period of November 1 through February 28, to minimize impacts to aquatic species. Exceptions to this time period requires specific approval from the Corps and the National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USFWS).

Endangered Species

- e. This Corps permit does not authorize you to take an endangered species, in particular the Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Snake River basin (SR) fall-run Chinook salmon, SR spring/summer run Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Upper Willamette River (UWR) Chinook salmon, Columbia River (CR) chum salmon (*O. keta*), LCR coho salmon (*O. kisutch*), SR sockeye salmon (*O. nerka*), LCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead, UCR steelhead, SR steelhead, UWR steelhead, southern designated population segment (DPS) of green sturgeon (*Acipenser medirostris*), southern DPS of eulachon (*Thaleichthys pacificus*), or Southern Resident Killer Whale (*Orcinus orca*). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a biological opinion (BO) under ESA Section 7, with "incidental take" provisions with which you must comply). The enclosed BO prepared by the NMFS, dated October 29, 2020, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with the "incidental take" that is also specified in the BO (NMFS Reference Number WCRO-2020-02481). Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached BO (Attachments 3), which terms and

conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute noncompliance with your Corps permit. The NMFS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

- f. In order to meet the requirements of the Magnuson-Stevens Fishery Conservation and Management Act the permittee shall (1) ensure that during dredging and active pumping of sediment, the suction dredge will remain in contact with the river bottom to the maximum extent possible, and will be raised no more than 3 feet above the bottom, and (2) ensure in-water work will be performed in accordance with permit conditions, which set timing restrictions for in-water work of November 1 to February 28.
- g. This Corps permit does not authorize you to take an endangered species, in particular Bull trout (*Salvelinus confluentus*) and Marbled Murrelet (*Brachyramphus marmoratus*). In order to legally take a listed species, you must have separate authorization under the ESA (e.g., an ESA Section 10 permit, or a biological opinion under ESA Section 7, with “incidental take” provisions with which you must comply. On November 4, 2020 the USFWS concurred your project if implemented as proposed, is not likely to adversely affect a listed species and/or adversely modify critical habitat nor constitute take of a listed species (USFWS Reference Number 01EOFW00-2021-I-0059). Failure to implement the project as proposed may constitute noncompliance with the ESA and your Corps permit. The USFWS the appropriate authority to determine compliance with the ESA.

Dredging

- h. Permittee shall provide a copy of the permit transmittal letter, permit form, and permit drawings to all contractors performing any of the work authorized by this permit. A copy of the permit shall be available on the vessel(s) used in the transport and disposal of dredged material.
- i. Permittee shall submit all dredging/disposal-related notifications and reports to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch by e-mail to cenwp.notify@usace.army.mil and the e-mail subject line shall include: NWP-2004-369/14, Clatsop County, Dredging. If you are submitting files larger than 20 MB, contact your county Regulatory Project Manager for instructions.
- j. Permittee shall conduct a pre-dredge bathymetric survey of the proposed dredging site for each dredge event. Plotted results of the pre-dredge bathymetric survey, to include plan and section views, shall be submitted to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch in PDF format at least 30 days prior to the start of dredging. Results must clearly display

the pre-dredge sediment surface in relation to the permitted dredge boundary and depth, as well as the location of project features such as docks, wharfs and other landmarks. The vertical datum must be clearly indicated. Full bathymetric survey data must be submitted upon request.

- k. At least 14 days prior to beginning annual dredging events, you shall submit to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch, and Portland Sediment Evaluation Team (PSET) Lead, a dredging operations and quality control plan for the authorized dredging and disposal. This plan must include: the Corps permit number, dredging contractor's name and contact information, proposed dredging schedule, proposed dredged equipment and methodology, method and equipment for dredging and disposal positioning procedures, water quality monitoring and spill control procedures, debris management procedures, and report submittal schedule. The plan must be approved by the Corps prior to the commencement of dredging.
- l. At least 14 days prior to beginning annual dredging, you must contact the U.S. Army Corps of Engineers, Portland District, Regulatory Branch, by telephone, (503) 808-4373, to schedule a Pre-dredge Meeting.
- m. At least 7 days prior to annual dredging, you, the dredging contractor, U.S. Army Corps of Engineers representatives (Regulatory Project Manager, Waterways and Maintenance Section, and PSET Lead), and Oregon Department of Environmental Quality (DEQ) representatives shall attend a Pre-dredge Meeting to review the Department of the Army permit conditions, dredging operations and quality control plan and the water quality certification.
- n. The work authorized by this permit includes periodic maintenance dredging. The special conditions in this permit apply to each maintenance dredging activity. Permittee shall notify the U.S. Army Corps of Engineers, Portland District, Regulatory Branch at least 14 days prior to beginning each annual maintenance dredging event.
- o. Pre-disposal site survey: Permittee shall conduct a pre-disposal bathymetric survey of the proposed disposal site. Plotted results of the pre-disposal bathymetric survey, to include plan and section views, shall be submitted to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch in PDF format at least 30 days prior to the start of dredging. Results must clearly display the pre-disposal sediment surface and the disposal site boundaries, as well as the disposal site location in relation to other features or landmarks (e.g., navigation channel boundary). The vertical datum must be clearly indicated. Full bathymetric survey data must be submitted upon request.
- p. The permittee shall contact the U.S. Army Corps of Engineers, Portland District Maintenance Dredging Coordinator, in writing at least 14 days prior to the disposal of dredged material in the channel, to ensure there are no conflicts with

ongoing Corps activities in or near the disposal site, and to ensure there is adequate capacity for the dredged material in the disposal location. The permittee shall notify the Portland District Maintenance Dredging Coordinator within 14 days of completion of work and include a report documenting the quantity of material dredged. Written correspondence must be addressed to:

U.S. Army Corps of Engineers, Portland District
Post Office Box 2946
Portland, Oregon 97208-2946
ATTN: Columbia River Maintenance Dredging Coordinator – Channels
and Harbors Project, CENWP-OD-NW

- q. For debris management procedures when using a clamshell dredge, dredged material placed in the dump scow or barge shall be filtered through a debris grid with a maximum opening size of 12 inches by 12 inches. Debris shall be properly disposed and not returned to waters of the U.S. Debris monitoring (observations, daily reports, photographs, debris disposal site) is required.
- r. Permittee shall not allow any water or dredged material placed in a hopper dredge or disposal barge or scow to overflow or leak from such vessels during transport to the dredged material disposal site.
- s. Permittee shall dispose dredged material at the disposal site only during the ebb tide.
- t. Permittee shall dispose of dredged material evenly over the entire disposal site to prevent mounding.
- u. Dredged material found unsuitable for unconfined in-water disposal shall be deposited at an upland site and be in compliance with rules and regulations promulgated by the local health district, DEQ and the landfill operator. At least 14 days prior to the commencement of dredging the location of the disposal site shall be provided to the U.S. Army Corps of Engineers (Corps), Portland District, Regulatory Branch by e-mail to cenwp.notify@usace.army.mil and the e-mail subject line shall include: NWP-2004-369/14, Clatsop County and to the DEQ by e-mail at 401applications@deq.state.or.us. Return water from dredged material to waters of the United States is prohibited without engineering controls approved by the Corps and DEQ.
- v. Dredged material transferred from a barge to uplands for disposal shall not be allowed to re-enter waters of the United States. Appropriate plates, containers and/or drip pans shall be used to catch and collect material during offloading to prevent material from entering waters of the United States.
- w. Permittee shall conduct a post-dredge bathymetric survey of the dredged site. Plotted results of the post-dredge bathymetric survey, to include plan and section

views, shall be submitted to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch in PDF format within 60 days of the completion of dredging for each annual dredge event. Results must clearly display the post-dredge sediment surface in relation to the pre-dredge sediment surface and the permitted dredge boundary and depth, as well as the location of project features such as docks, wharfs and other landmarks. The vertical datum must be clearly indicated. Full bathymetric survey data must be submitted upon request.

- x. Permittee shall conduct a post-disposal bathymetric survey of the disposal site. Plotted results of the post-disposal bathymetric survey, to include plan and section views, shall be submitted to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch in PDF format within 60 days of the completion of dredging and disposal for each annual dredge event. Results must clearly display the pre-disposal sediment surface and the post-disposal sediment surface, as well as the disposal site boundaries and the site location in relation to other features or landmarks (e.g., navigation channel boundary). The vertical datum must be clearly indicated. Full bathymetric survey data must be submitted upon request.
- y. Any deviations from the authorized dredging area or depths or deviations from the authorized dredged material disposal shall be reported to the Regulatory Branch Project Manager within 24 hours of discovery.

Sediment Evaluation

- z. Dredged Material Management Unit (DMMU) 2 (Slip 1), based on a High management area rank, the Port shall coordinate with the PSET at least 9 months prior to May 2023 to determine the need to re-characterize the DMMU 2 sediments.
- aa. DMMUs 1A (barge ramp), 2A (Slip 1), 3 (Slip 2), 4 (Slip 2), 4A (Slip 2), 5 (near DEQ Cleanup site in Slip 2), based on a Moderate site rank, the permittee shall coordinate with the PSET at least 9 months prior to June 2023 to determine the need to re-characterize the dredged materials and PDS.
- bb. DMMUs 1B, 1C, 1D (pier faces), based on a Low site rank, the permittee shall coordinate with the PSET at least 9 months prior to June 2025 to determine the need to re-characterize the dredged materials and post-dredge surface (PDS).
- cc. Dredging in DMMU 1A (barge ramp) is limited to -24 ft Mean Lower Low Water (MLLW) or shallower due to an elevated pesticide concentration at -25 feet MLLW. Sediments at -25 ft or deeper are unsuitable for unconfined, aquatic exposure.
- dd. If over-dredging occurs below -24 ft MLLW in the DMMU 1A (barge ramp), the Port shall conduct post-dredge sampling with a PSET-approved Sampling and

Analysis Plan (SAP) within 5 days of over-dredging discovery. Sediments will be analyzed for Sediment Evaluation Framework (SEF) marine pesticides. Results must be coordinated with the PSET within 20 days of sampling. Management of the post-dredge surface may be required if elevated pesticides concentrations are detected.

- ee. Due to elevated 4-methylphenol contamination, the dredged material from DMMU 2 in Slip 1 is unsuitable for unconfined, aquatic disposal without additional (biological) testing per the 2018 SEF. Dredged materials must be disposed of at an upland location.
- ff. To confirm suitable sediments are exposed after dredging in DMMU 2 (Slip 1), post-dredge sampling must be performed in DMMU 2 with a PSET-approved SAP within 5 days. The DMMU 2 post-dredge SAP must be approved prior to dredging. Results must be coordinated with the PSET within 20 days of sampling.
- gg. Due to core refusals, post-dredge sampling is required in DMMU 3 (Slip 2) with a PSET-approved SAP within 5 days. The DMMU 3 post-dredge SAP must be approved prior to dredging.
- hh. Due to a limited depth of characterization in DMMU 5 (Slip 2), post-dredge sampling with a PSET-approved SAP is required if dredging is planned or occurs below -6 ft Mean Lower Low Water (MLLW). The DMMU 5 post-dredge SAP must be approved prior to dredging. Results must be coordinated with the PSET within 20 days of sampling.
- ii. If sheens are observed when dredging DMMUs 4A or 5 in Slip 2, the Port should pause in-water activities, implement best management practices (i.e. absorbent booms), and coordinate with the DEQ 401 and Cleanup Programs to address water quality impacts.

Compliance

- jj. Submit dredge and disposal report with figures to Regulatory U.S. Army Corps of Engineers, Portland District, Regulatory Branch in PDF format within 60 days of each dredging and disposal event that includes debris monitoring results, dredging and disposal dates, disposal location map(s), post-dredge sampling data, dredge locations, volumes, acreages, dredge depths, photographs, debris and biological observations, and pre- and post-dredge bathymetric data.
- kk. Permittee shall complete and sign the enclosed Compliance Certification (Attachment 4). Permittee shall submit the completed certification to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch within 30 days of completion of the authorized activity. The completed certification shall be provided by e-mail to cenwp.notify@usace.army.mil and the e-mail subject line

shall include: NWP-2004-369/14, Clatsop County. If you are submitting files larger than 20 MB, contact your county Regulatory Project Manager for instructions.

- II. The work authorized herein includes periodic maintenance dredging and may be performed under this permit for 10 years from the date of issuance of this permit. The time limit for completing other work authorized by this permit ends 10 years from the date of issuance of this permit.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

- (X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
- (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
- () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this Authorization:

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or

revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

- a. You fail to comply with the terms and conditions of this permit.
- b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).
- c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.



(PERMITTEE SIGNATURE)

11-18-20

(DATE)



(PRINTED NAME)



(TITLE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

FOR THE COMMANDER, MICHAEL D. HELTON, PMP, COLONEL, CORPS OF ENGINEERS, DISTRICT COMMANDER:



(DISTRICT COMMANDER)

19 November 2020

(DATE)

William D. Abadie
Chief, Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign below.

PERMIT TRANSFEREE:

Transferee Signature

DATE

Name (Please print)

Address

City, State, and Zip Code

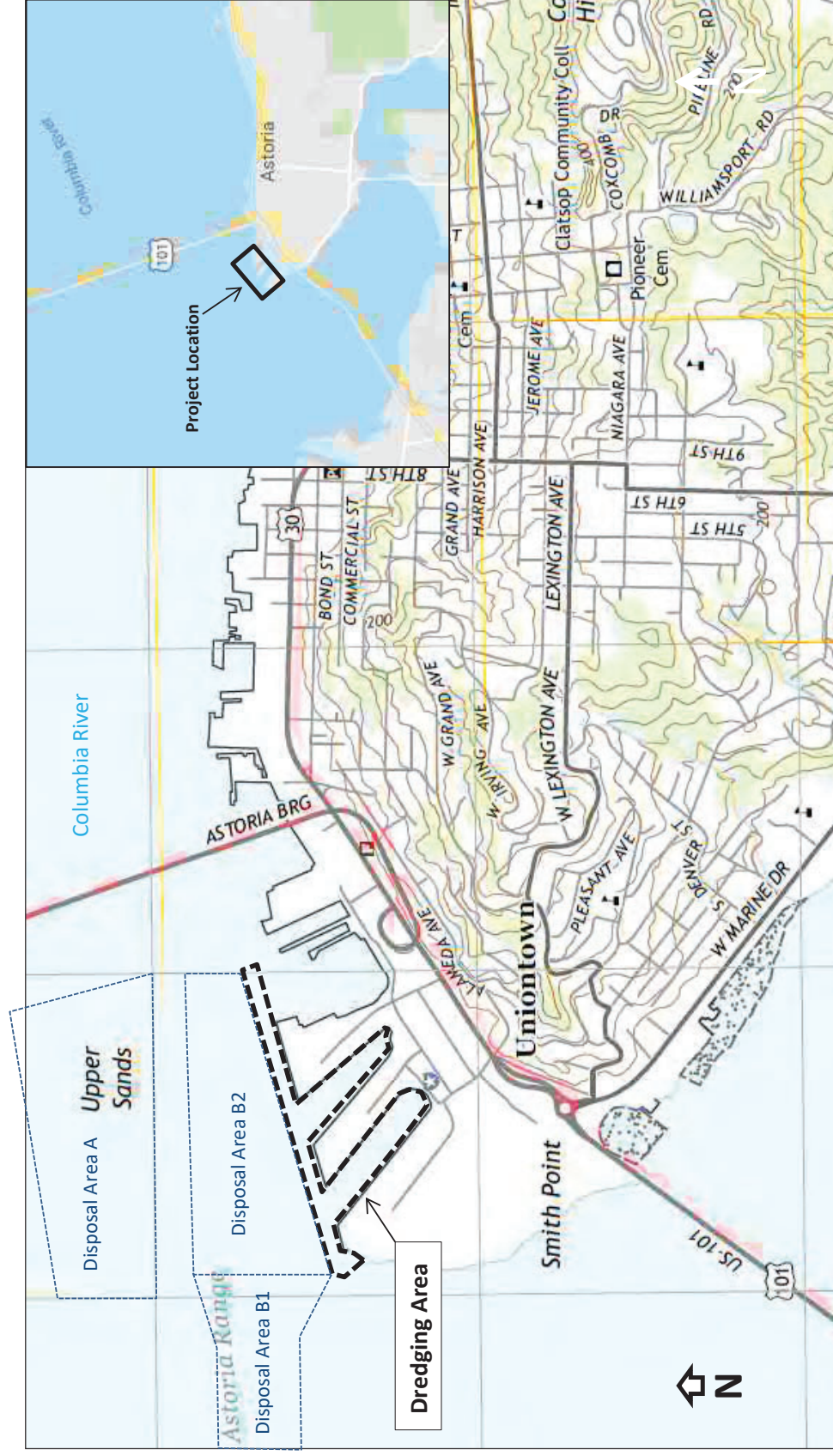


Figure 1: Location Map
 Port of Astoria CWD Maintenance Dredging
 (USGS Astoria, OR 2014)



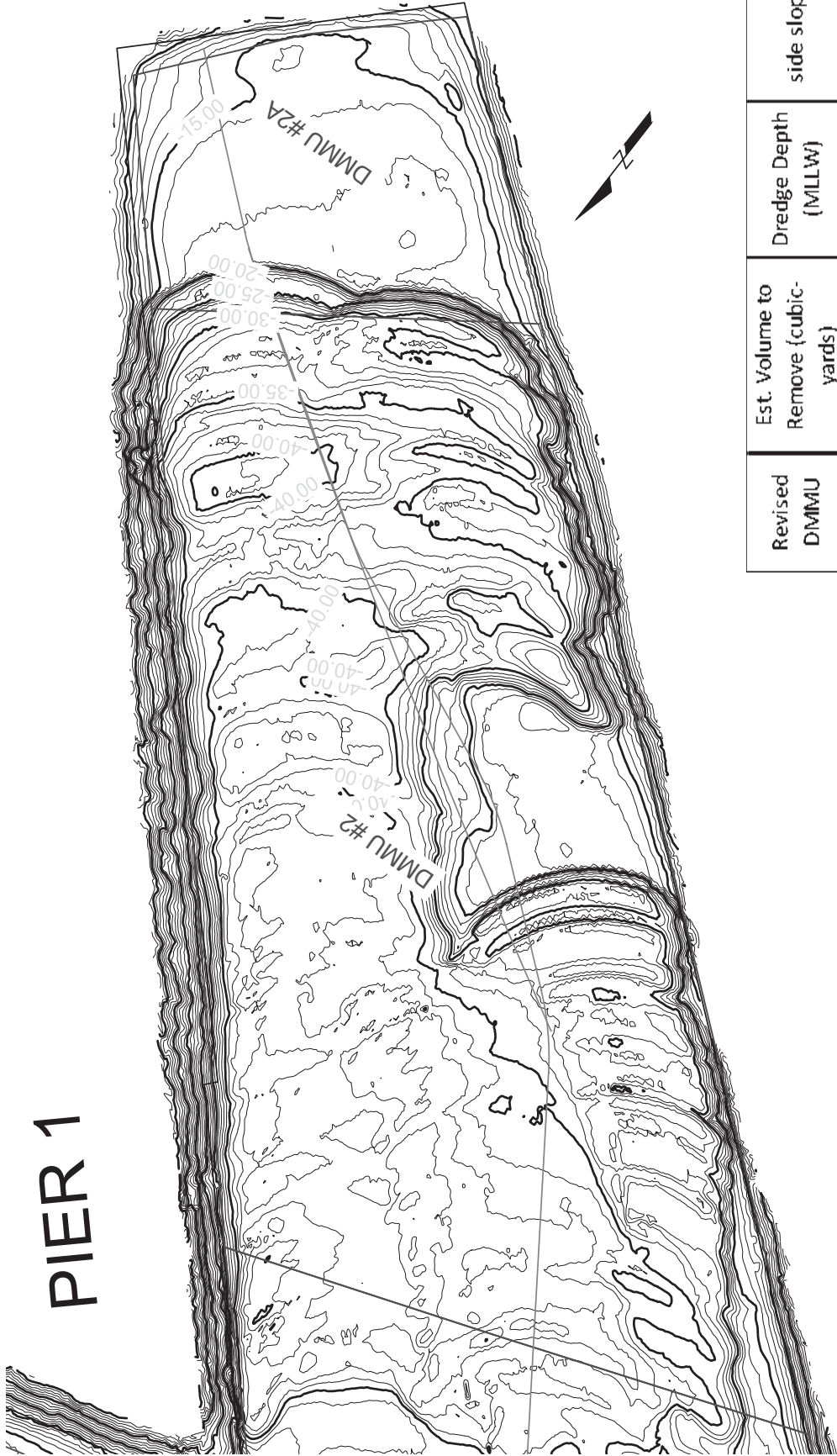
Figure 2: Aerial Photograph
 Port of Astoria CWD Maintenance Dredging
 (Google Earth 2018)



Figure 3: Aerial Photograph
 Port of Astoria CWD Maintenance Dredging
 (Google Earth 2018)



Figure 4: Proposed Dredge Disposal Locations
Port of Astoria CWD Maintenance Dredging



SOUNDING SURVEY COMPLETED BY TERRASOUND LIMITED FOR PORT OF ASTORIA ON MAR. 12, 2018
 HORIZONTAL: NAD83 (2011), STATE PLANE OREGON NORTH, US SURVEY FEET
 SOUNDINGS & ELEV. ARE IN FEET AND REFER TO MLLW AT 1402-19, BASED ON ASTORIA BRIDGE PIER
 STAFF GAUGE

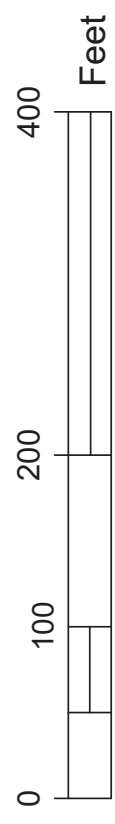
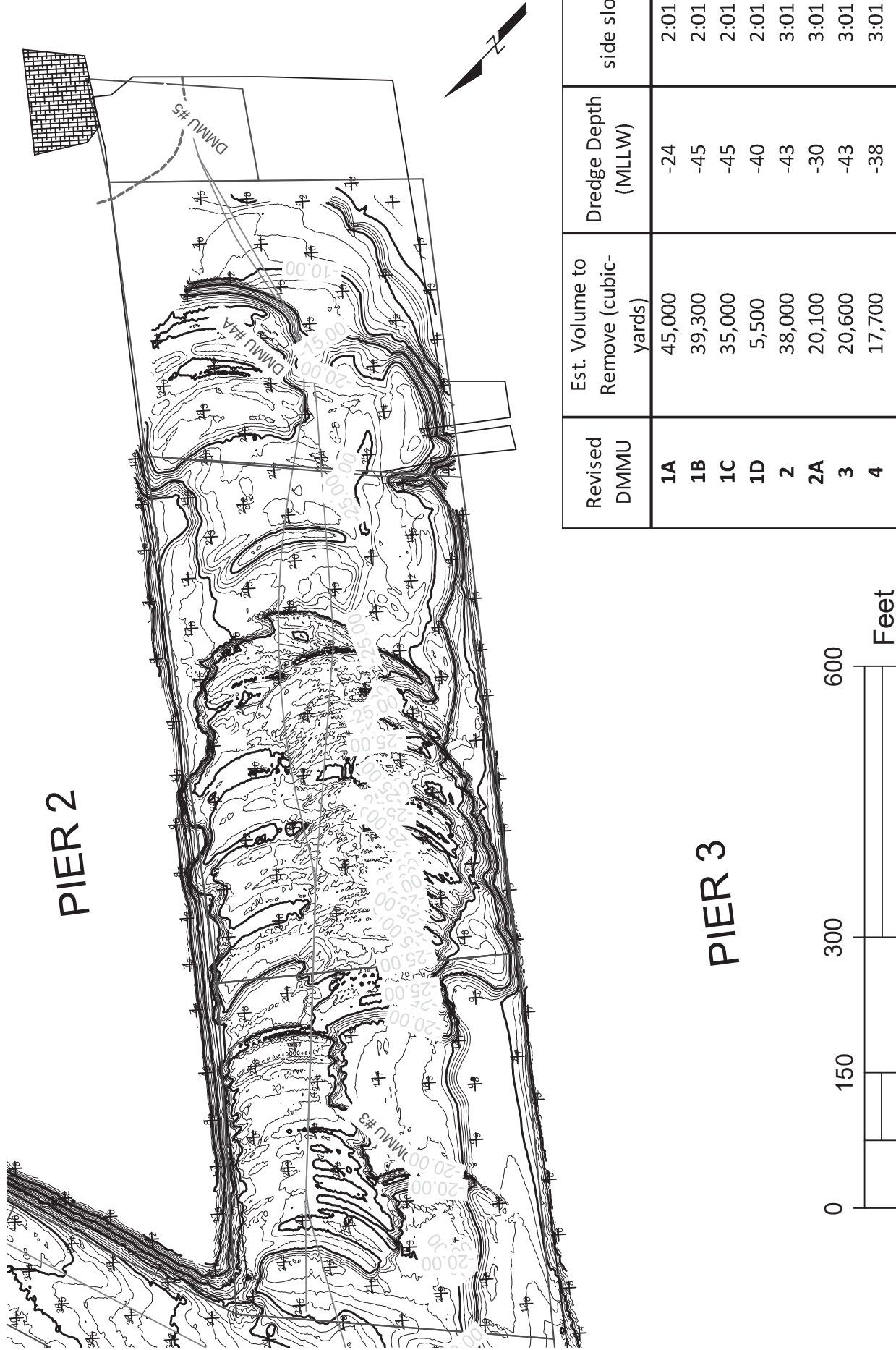


Figure 5: Existing Conditions

Revised DMMU	Est. Volume to Remove (cubic-yards)	Dredge Depth (MLLW)	side slope
1A	45,000	-24	2:01
1B	39,300	-45	2:01
1C	35,000	-45	2:01
1D	5,500	-40	2:01
2	38,000	-43	3:01
2A	20,100	-30	3:01
3	20,600	-43	3:01
4	17,700	-38	3:01
4A	5,200	-25	3:01
5	4,000	-18	3:01

"A-D" denotes change in PDS elevation within same DMMU



Revised DMMU	Est. Volume to Remove (cubic-yards)	Dredge Depth (MLLW)	side slope
1A	45,000	-24	2:01
1B	39,300	-45	2:01
1C	35,000	-45	2:01
1D	5,500	-40	2:01
2	38,000	-43	3:01
2A	20,100	-30	3:01
3	20,600	-43	3:01
4	17,700	-38	3:01
4A	5,200	-25	3:01
5	4,000	-18	3:01

“A-D” denotes change in PDS elevation within same DMMU

Figure 6: Existing Conditions

SOUNDING SURVEY COMPLETED BY TERRASOUND LIMITED FOR PORT OF ASTORIA ON MAR. 12, 2018
HORIZONTAL: NAD83 (2011), STATE PLANE OREGON NORTH, US SURVEY FEET
SOUNDINGS & ELEV. ARE IN FEET AND REFER TO MLLW AT 1402-19, BASED ON ASTORIA BRIDGE PIER STAFF GAUGE

PIER FACE DMMUS 1B PROFILE

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Scale: HOR 1:200 VER 1:50

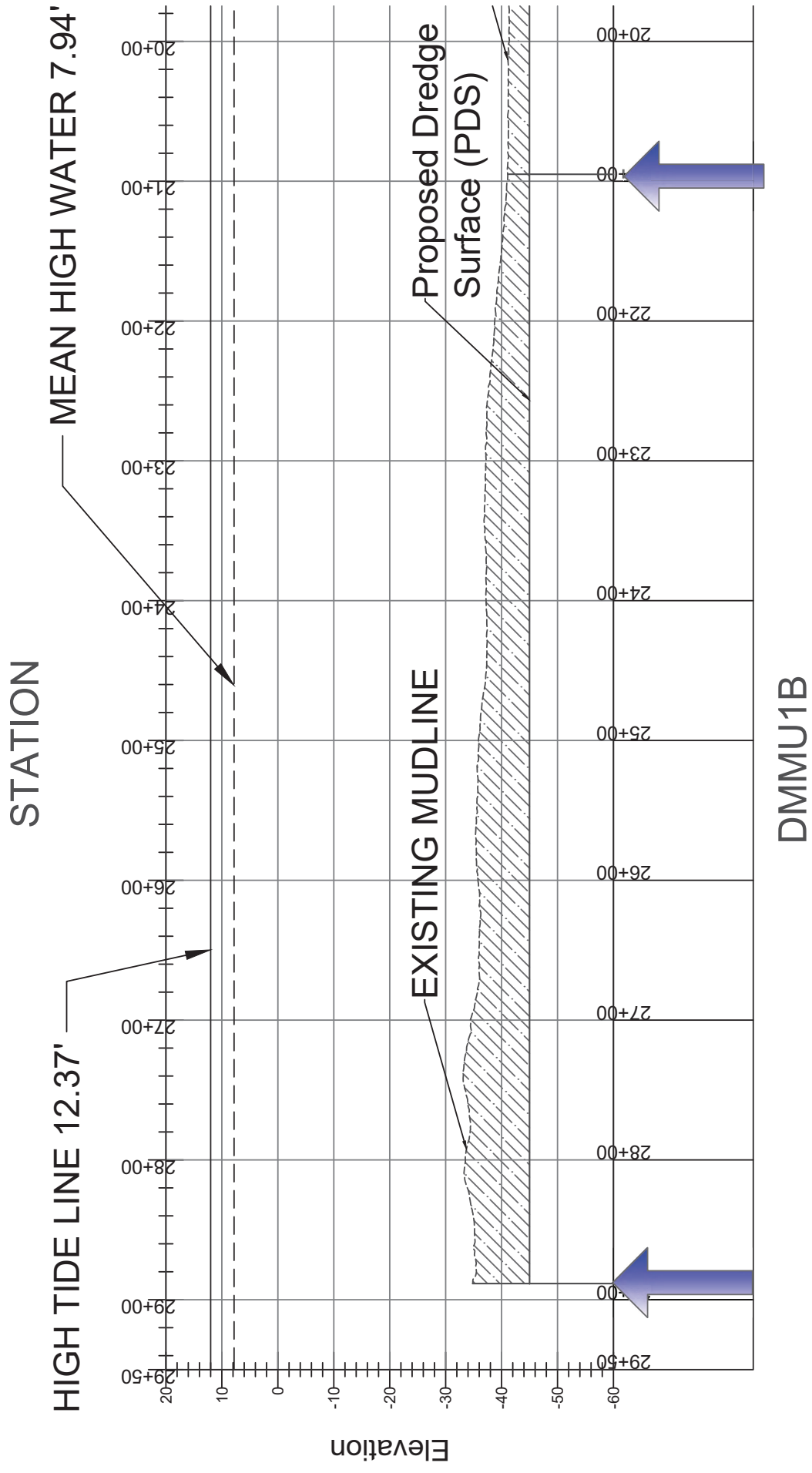


Figure 7: Pier Face

3 PIER FACE DMMUS 1B, 1C, &1D PROFILE

Scale: HOR 1:200 VER 1:50

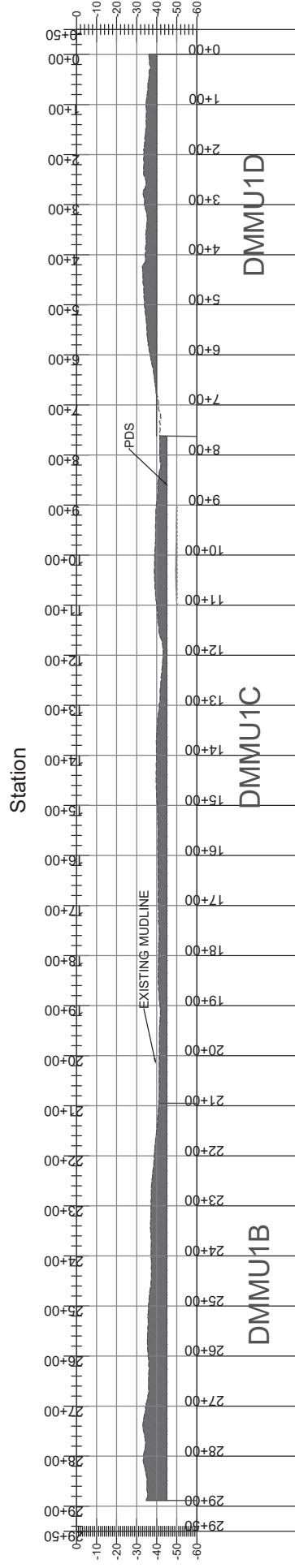


Figure 8: Pier Face

PIER FACE DMMUS 1C PROFILE

Scale: HOR 1:200 VER 1:50

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STATION

HIGH TIDE LINE 12.37'

MEAN HIGH WATER 7.94'

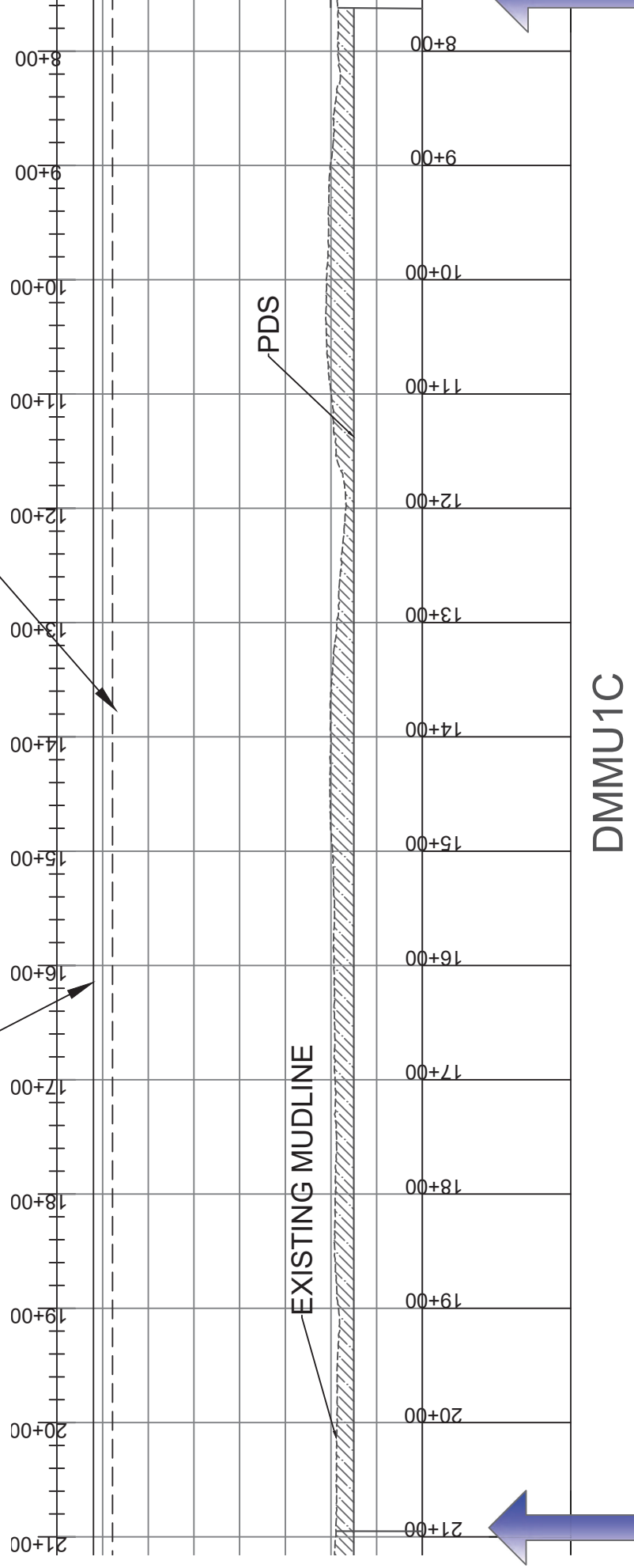


Figure 9: Pier Face

PIER FACE DMMUS 1D PROFILE

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Scale: HOR 1:200 VER 1:50

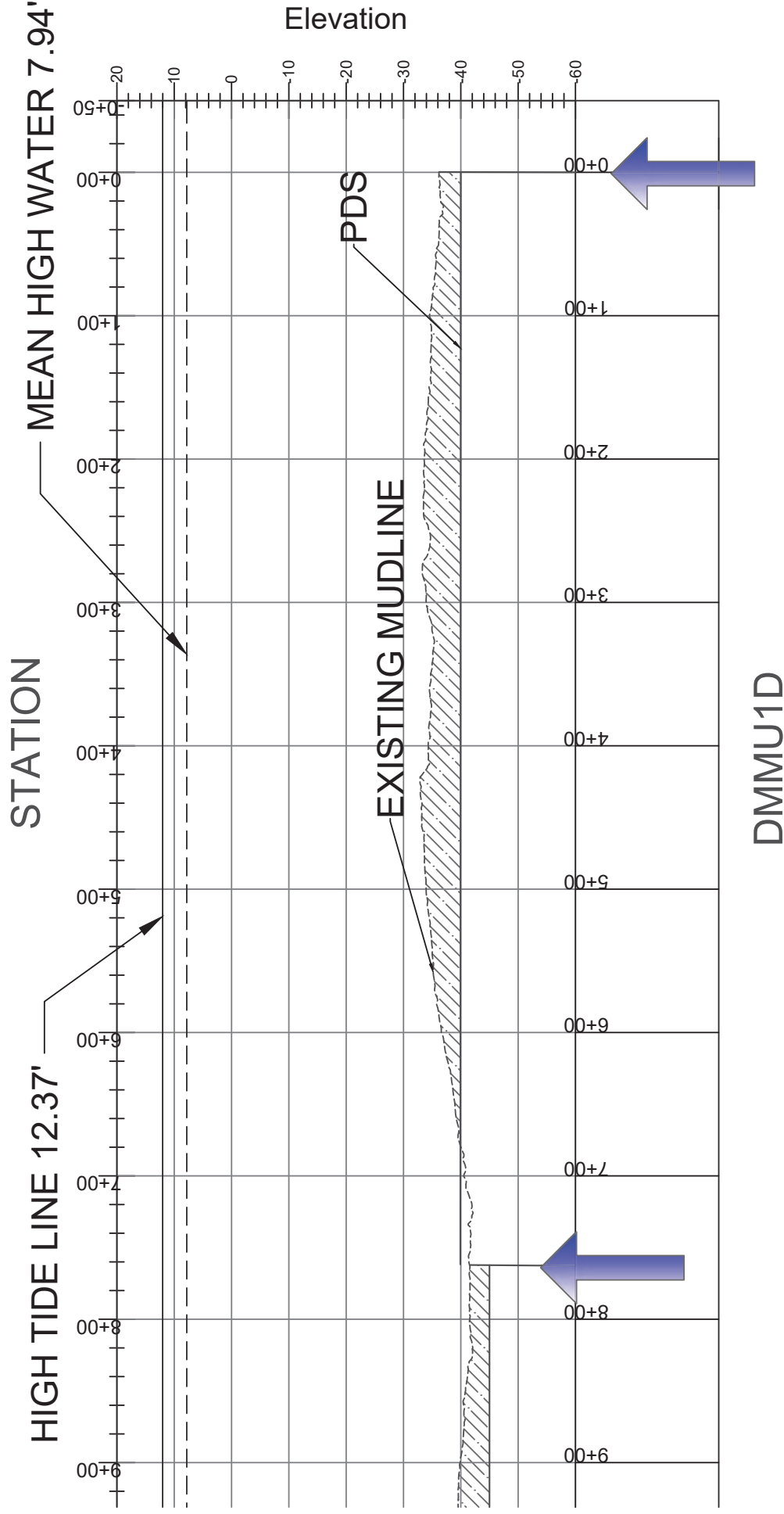


Figure 10: Pier Face

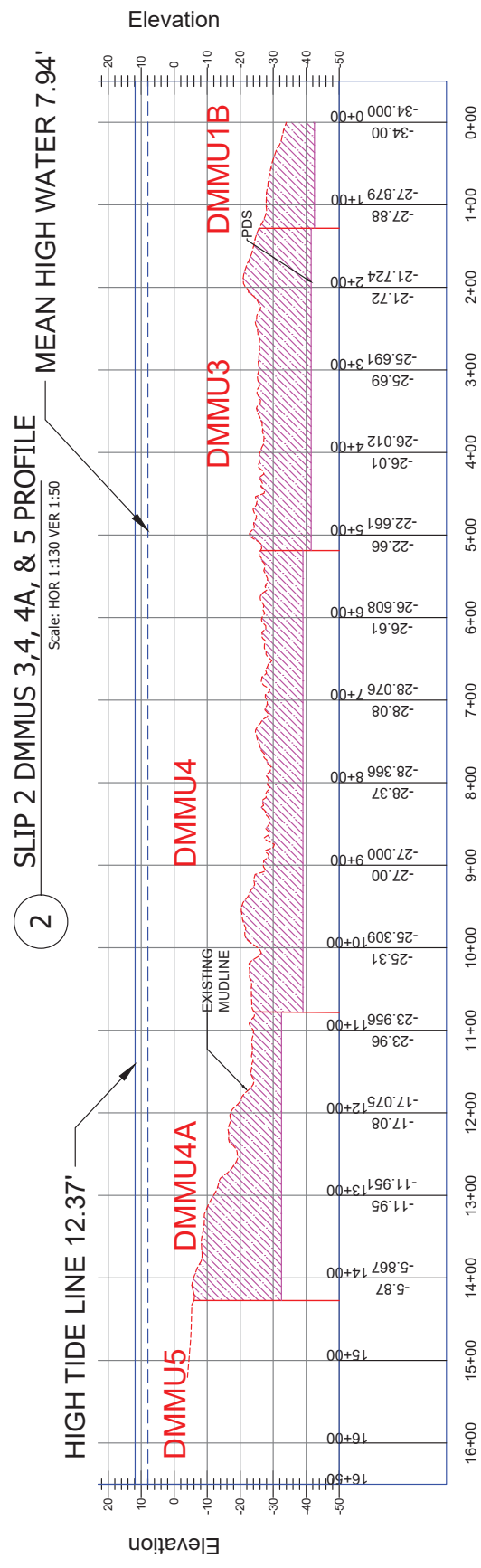
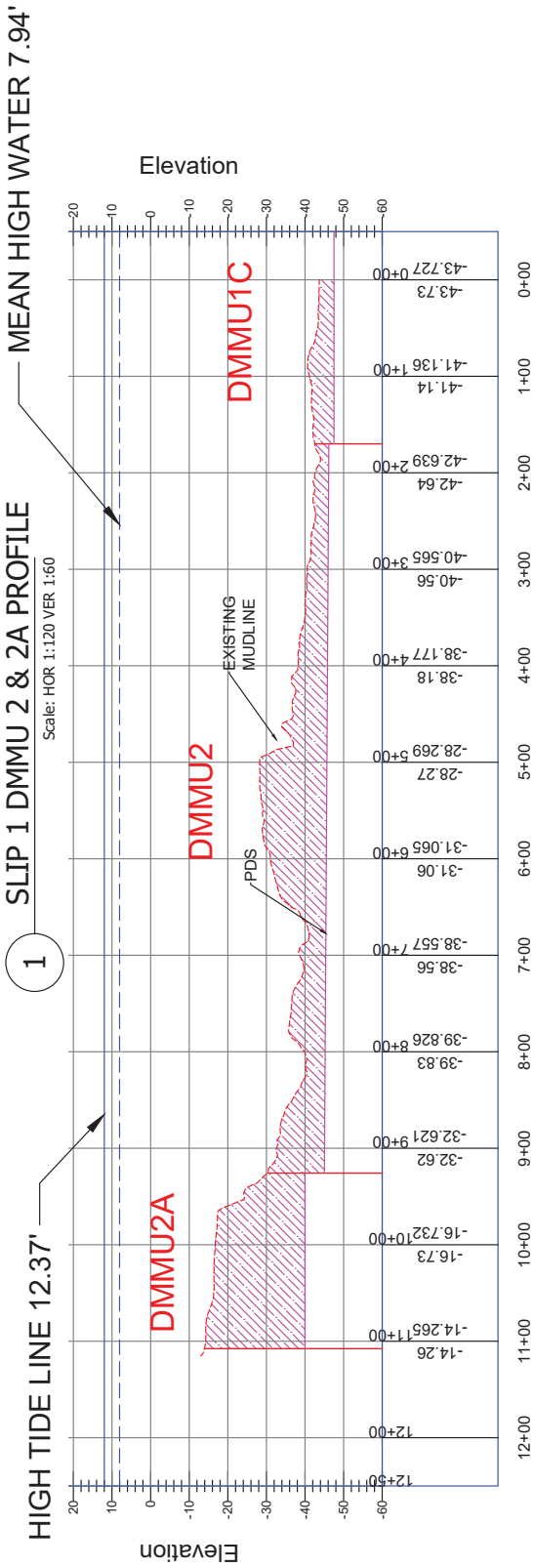
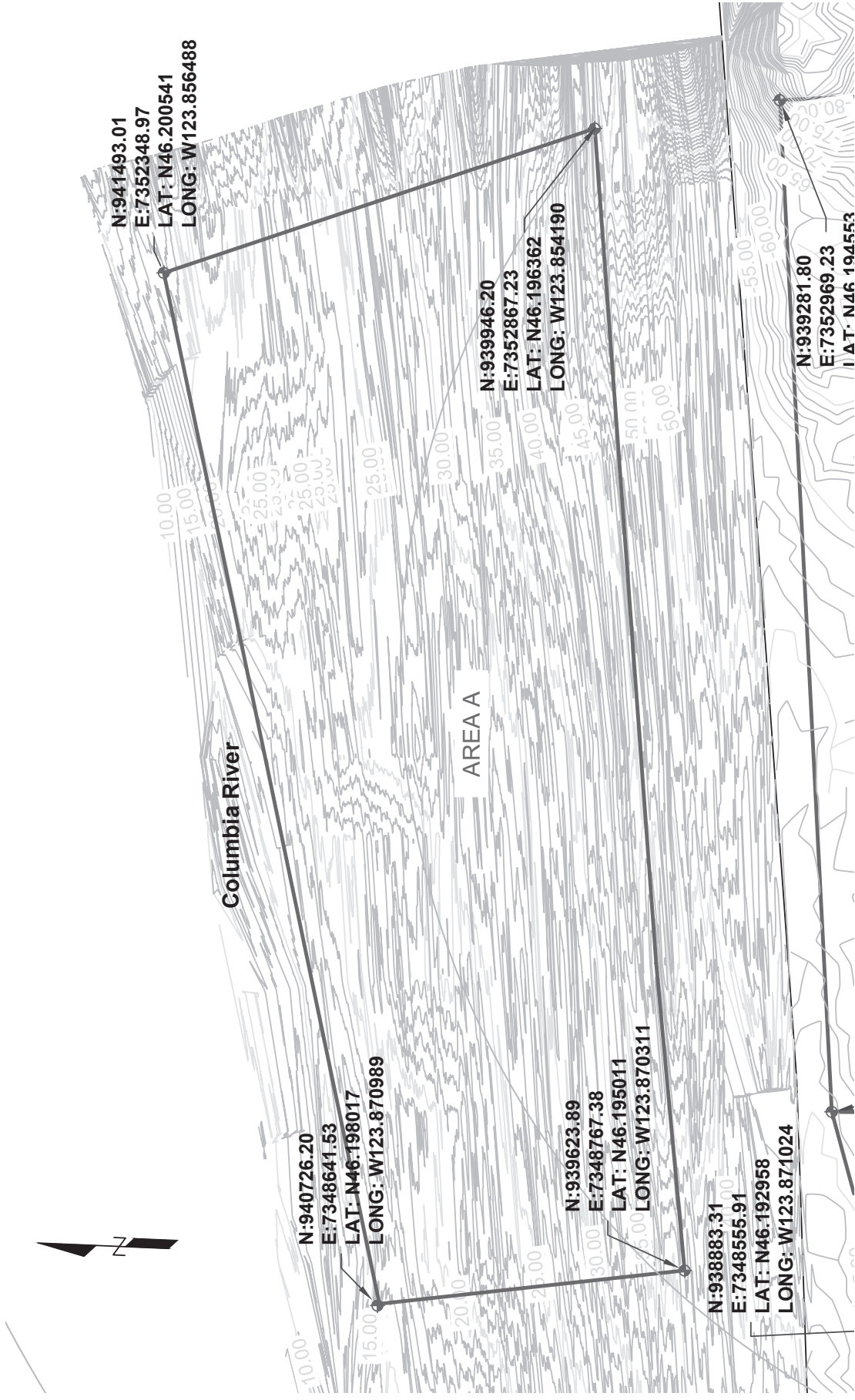


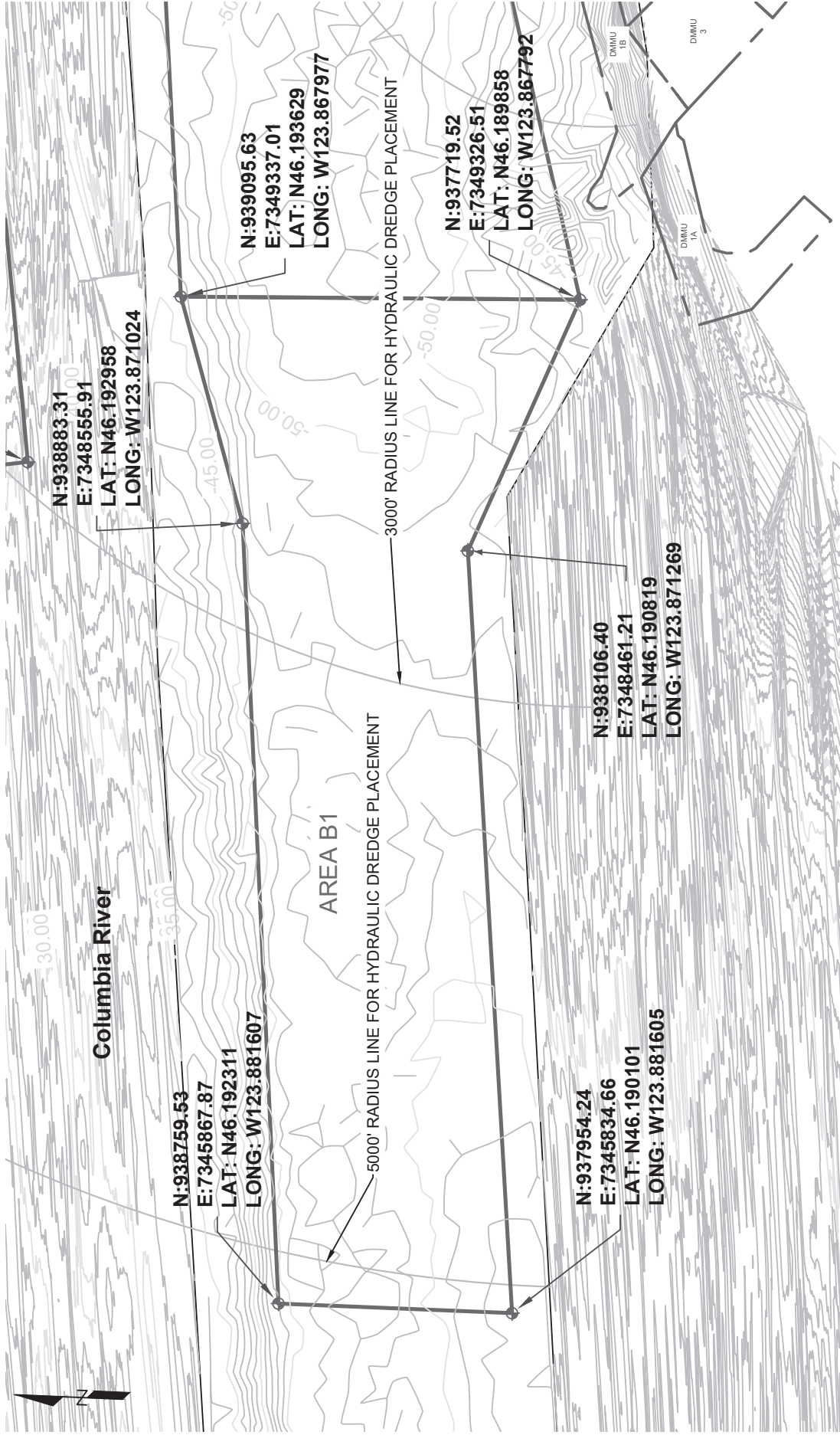
Figure 11: DMMU Profile



NOTE:
 DREDGE MATERIAL PLACEMENT AREA (A) IS APPROXIMATELY 121 ACRES. AREA CAN ACCEPT UP TO 411,400 YD³.
 ASSUME 70% USAGE OF THE AREA (85 ACRES) PLACEMENT DEPTH OF 3 FT MAXIMUM. 500 FT DOWNSTREAM OF BRIDGE.
 HYDRAULIC DREDGE PLACEMENT CENTERED FROM FACE OF SLIP 1. FLOWLINE PLACEMENT AT DEPTHS GREATER
 THAN -45 MLLW (AREA B1: APPROXIMATELY 68.5 ACRES, AREA B2: 88.2 ACRES).

USACE CHANNEL 2019 AND CROSS CHANNEL SURVEY 2018

Figure 12: 1:6000
 Dispersive dredged material disposal site: Area A



NOTE:
DREDGE MATERIAL PLACEMENT AREA (A) IS APPROXIMATELY 121 ACRES. AREA CAN ACCEPT UP TO 411,400 YD³.
ASSUME 70% USAGE OF THE AREA (85 ACRES) PLACEMENT DEPTH OF 3 FT MAXIMUM. 500 FT DOWNSTREAM OF BRIDGE.
HYDRAULIC DREDGE PLACEMENT CENTERED FROM FACE OF SLIP 1. FLOWLANE PLACEMENT AT DEPTHS GREATER
THAN -45 MLLW (AREA B1: APPROXIMATELY 68.5 ACRES, AREA B2: 88.2 ACRES).

USACE CHANNEL 2019 AND CROSS CHANNEL SURVEY 2018

Figure 13:

Dispersive dredged material disposal site: Area B1

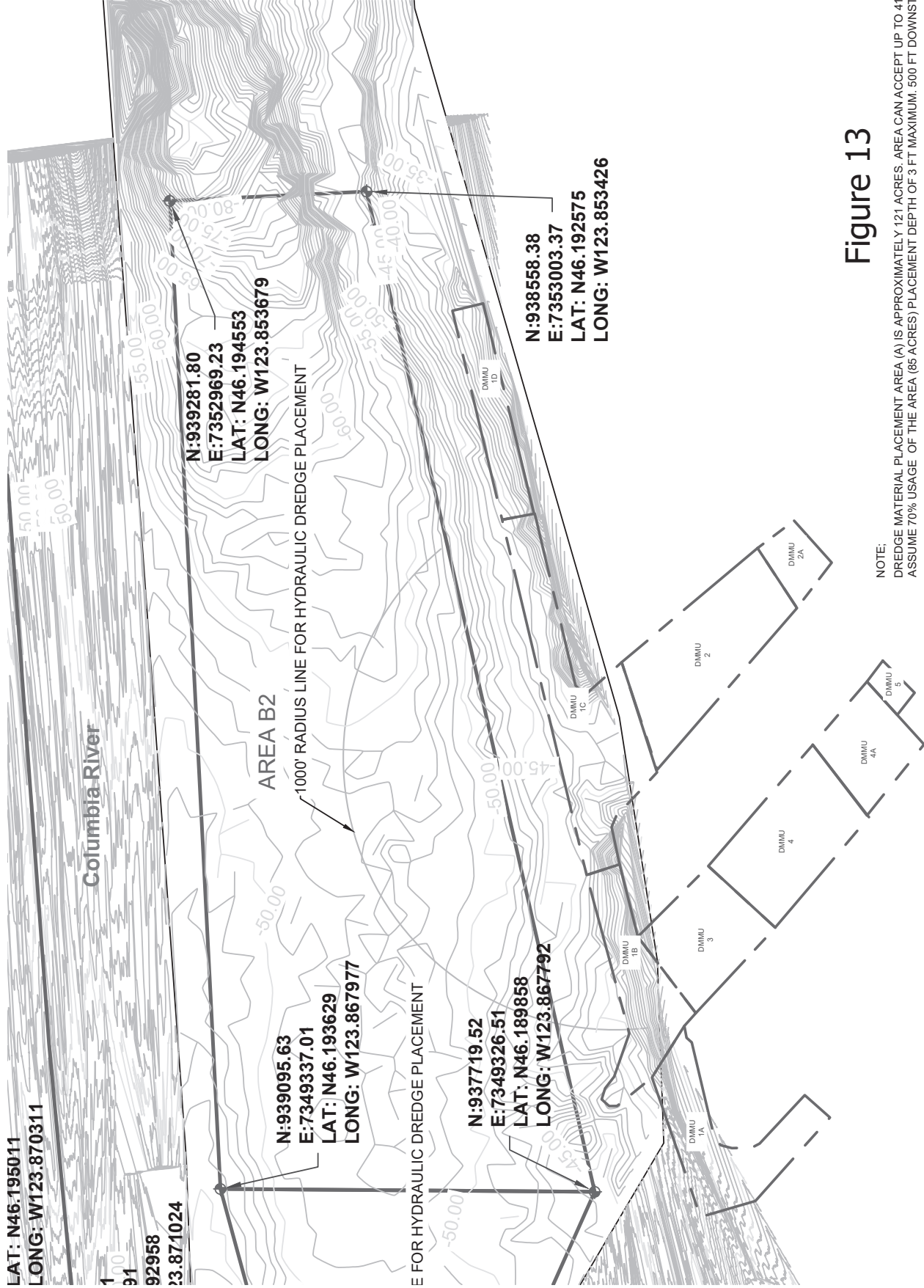


Figure 13

NOTE:
 DREDGE MATERIAL PLACEMENT AREA (A) IS APPROXIMATELY 121 ACRES. AREA CAN ACCEPT UP TO 411,400 YD³.
 ASSUME 70% USAGE OF THE AREA (85 ACRES) PLACEMENT DEPTH OF 3 FT MAXIMUM. 500 FT DOWNSTREAM OF BRIDGE.
 HYDRAULIC DREDGE PLACEMENT CENTERED FROM FACE OF SLIP 1. FLOWLINE PLACEMENT AT DEPTHS GREATER
 THAN -45 MLLW (AREA B1: APPROXIMATELY 68.5 ACRES, AREA B2: 88.2 ACRES).

USACE CHANNEL 2019 AND CROSS CHANNEL SURVEY 2018



Dispersive dredged material disposal site: Area B2



Oregon

Kate Brown, Governor

Department of Environmental Quality
Northwest Region Portland Office/Water Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100
(503) 229-5263
FAX (503) 229-6957
TTY 711

March 27, 2020

Matt McGrath
Port of Astoria
10 Pier One, Suite 308
Astoria, OR 97103

**RE: 2004-369-14; Port of Astoria Central Waterfront District (CWD) Maintenance Dredging
401 Water Quality Certification**

Dear Matt McGrath,

The Department of Environmental Quality (DEQ) has reviewed the U.S. Army Corps of Engineers (USACE) Permit application #2004-369-14 (Department of State Lands [DSL] #19212-RF3474), pursuant to a request for a Clean Water Act Section 401 Water Quality Certification (WQC) received on August 13, 2019. DEQ's 401 WQC public comment opportunity was circulated with the USACE public notice, and DEQ received no public comments.

According to the application, the Port of Astoria ("the Applicant") proposes to impact the Columbia River in order to conduct maintenance dredging operations. The project is located in the Columbia River, Astoria, Clatsop County, Oregon (Section 12, Township 8N, Range 10W).

Project Description: The applicant proposes to dredge up to 1,130,400 cubic yards (cy) of material over the course of the permit duration, including an annual amount of 50,000 – 100,000cy, and up to 230,400cy within any one single year. The dredging operation is divided between ten discrete dredge material management units (DMMU's) adjacent to three piers and two slips which accommodate a variety of marine vessels. The dredge prism is approximately 31.46 acres, with a dredge depth ranging from -18 to -45 feet mean low low water. All dredge material will be deposited in the flow lane of the Columbia River.

Status of Affected Waters of the State: The Columbia River is classified as water quality limited under the federal Clean Water Act. The Columbia River at river mile 12-13.5 is on the Section 303(d) list of impaired water bodies for arsenic, DDE 4,4, fecal coliform, polychlorinated biphenyls (PCBs), and temperature, and has EPA approved Total Maximum Daily Loads (TMDLs) that have been developed for dioxin (2,3,7,8-TCDD) and total dissolved gas.

The above listed parameters impair the following beneficial uses in the Columbia River: public domestic water supply, private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, commercial navigation and transportation.

Certification Decision: Based on the information provided by the applicant and USACE, DEQ is reasonably assured that implementation of the project will be consistent with applicable provisions of Sections 301, 302, 303, 306, and 307 of the federal Clean Water Act, state water quality standards set forth in Oregon Administrative Rules Chapter 340 Division 41, and other appropriate requirements of state law, provided the following conditions are incorporated into the USACE permit and strictly adhered to by the applicant.

401 WQC GENERAL CONDITIONS

- 1) **Responsible parties:** This 401 WQC applies to the applicant. The Applicant is responsible for the work of its contractors and sub-contractors, as well as any other entity that performs work related to this WQC.
- 2) **Work Authorized:** Work authorized by this Order is limited to the work described in the Joint Permit Application signed on May 9, 2019 and additional application materials (hereafter "the permit application materials"), unless otherwise authorized by DEQ. If the project is operated in a manner not consistent with the project description contained in the permit application materials, the Applicant is not in compliance with this 401 WQC and may be subject to enforcement.
- 3) **Duration of Certificate:** This 401 WQC for impacts to waters, including dredge and fill activities, is valid for ten years from the date of issuance of the USACE 404 permit. A new or modified 401 WQC must be obtained prior to any modification of the USACE 404 permit.
- 4) A copy of this 401 WQC letter must be kept on the job site and readily available for reference by Applicant or its contractors, as well as by DEQ, USACE, National Marine Fisheries Service (NMFS), Oregon Department of Fish and Wildlife (ODFW), and other appropriate state and local government inspectors.
- 5) **Modification:** Any approved modifications to this 401 WQC will incur a Tier 1 fee of \$985 at a minimum. Complex modifications may be charged a higher fee.
- 6) The Applicant must notify DEQ of any change in ownership or control of this project and obtain DEQ review and approval before undertaking any change to the project that might affect water quality.
- 7) DEQ may modify or revoke this 401 WQC, in accordance with OAR 340-048-0050, if project changes or project activities are having an adverse impact on state water quality or beneficial uses.
- 8) The applicant and its contractors must allow DEQ access to the project site, staging areas, and mitigation sites to monitor compliance with these 401 WQC conditions, including:
 - a. Access to any records, logs, and reports that must be kept under the conditions of this 401 WQC;
 - b. To inspect BMPs, monitoring or operational equipment or methods;
 - c. To collect samples or monitor any discharge of pollutants.

- 9) Failure of any person or entity to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.

DREDGING GENERAL CONDITIONS

- 10) **Spill Prevention:** The Applicant must fuel, operate, maintain and store vehicles and equipment, and must store construction materials, in areas that will not disturb habitat either directly or result in potential discharges. In addition, the following specific requirements apply:
- a. Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area placed 150 feet or more from any waters of the state. An exception to this distance may be authorized upon written approval by DEQ if all practicable prevention measures are employed and this distance is not possible because of any of the following site conditions:
 - i. Physical constraints that make this distance not feasible (e.g., steep slopes, rock outcroppings);
 - ii. Natural resource features would be degraded as a result of this setback; or
 - iii. Equal or greater spill containment and effect avoidance is provided even if staging area is less than 150 feet of any waters of the state.
 - b. If staging areas are within 150 feet of any waters of the state, as allowed under subsection (a)(iii) of this condition, full containment of potential contaminants must be provided to prevent soil and water contamination, as appropriate;
 - c. All vehicles operated within 150 feet of any waters of the state must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected in the vehicle staging area must be repaired before the vehicle resumes operation;
 - d. Before operations begin and as often as necessary during operation, equipment must be steam cleaned (or undergo an approved equivalent cleaning) until all visible external oil, grease, mud, and other visible contaminants are removed if the equipment will be used below the bank of a waterbody;
 - e. All stationary power equipment (e.g., generators, cranes, stationary drilling equipment) operated within 150 feet of any waters of the state must be covered by an absorbent mat to prevent leaks, unless other suitable containment is provided to prevent potential spills from entering any waters of the state;
 - f. An adequate supply of materials (such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials) needed to contain spills must be maintained at the project construction site and deployed as necessary;
 - g. All equipment operated in state waters must use bio-degradable hydraulic fluid; and
 - h. A maintenance log documenting equipment maintenance inspections and actions must be kept on-site and available upon request.
- 11) **Spill & Incident Reporting:**
- a. In the event that petroleum products, chemicals, or any other deleterious materials are discharged into state waters, or onto land with a potential to enter state waters, the discharge must be promptly reported to the Oregon Emergency Response Service (OERS, 1-800-452-0311). Containment and cleanup must begin immediately and be completed as soon as possible.

- b. If the project operations cause a water quality problem which results in distressed or dying fish, the operator must immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ, Oregon Department of Fish and Wildlife and other appropriate regulatory agencies.

SPECIFIC CONDITIONS FOR IN-WATER WORK

- 12) **Fish protection/ Oregon Department of Fish and Wildlife timing:** Applicant must perform in-water work only within the Oregon Department of Fish and Wildlife preferred time window as specified in the *Oregon Guidelines for Timing of In-Water Work* to Protect Fish and Wildlife Resources, or as authorized otherwise under a Department of State Lands removal/fill permit. Exceptions to the timing window must be recommended by Oregon Department of Fish and Wildlife and/or the National Marine Fisheries Services as appropriate.
- 13) **Aquatic life movements:** Any activity that may disrupt the movement of aquatic life living in the water body, including those species that normally migrate through the area, is prohibited. The Applicant must provide unobstructed fish passage at all times during any authorized activity. Exceptions must be reviewed and recommended by Oregon Department of Fish Wildlife and/or the National Marine Fisheries Service as appropriate.
- 14) **Turbidity:** The Applicant must implement Best Management Practices (BMPs) to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidities is prohibited except as specifically provided below:
 - a. **Monitoring:** Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two hour intervals each day during daylight hours when in-water work is being conducted. A properly calibrated turbidimeter is required.
 - i. **Representative Background Point:** Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area 100 feet upcurrent from the in-water disturbance, in order to establish background turbidity levels. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.
 - ii. **Compliance Point:** Monitoring must occur every two hours, 100 feet downcurrent from the disturbance, at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.
 - b. **Compliance:** Applicant must compare turbidity monitoring results from the compliance points must to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances are allowed as followed:

MONITORING WITH A TURBIDIMETER EVERY 2 HOURS	
TURBIDITY LEVEL	Restrictions to Duration of Activity
0 to 5 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 Hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
30 to 49 NTU above background	Work may continue maximum of 2 Hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
50 NTU or more above background	Stop work immediately and inform DEQ

- c. **Reporting:** The applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs, and keep these records on file for the duration of the permit. The daily logs must include: calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; and location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request. An example turbidity log is attached to this certification.

SPECIFIC CONDITIONS FOR DREDGING

- 15) **Pre-Dredge Notification:** The applicant must notify DEQ at least 14 before dredging is to commence.
- 16) **Post-Dredge Notification:** Submit dredge and disposal report with figures to Regulatory PM, PSET and ODEQ within 60 days of each dredging and disposal event (debris monitoring results, dredging/disposal dates, disposal location maps, post-dredge sampling data, locations, volumes, acreages, dredge depths, photographs, debris and biological observations, and hydro surveys).
- 17) **Sediment Characterization:** Sediment characterization has been conducted in accordance with the *Sediment Evaluation Framework for the Pacific Northwest (SEF)*, May 2018 [USACE, National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), DEQ, Washington Department of Natural Resources (WDNR), Washington Department of Ecology (Ecology), and Idaho Department of Environmental Quality (IDEQ)]. The applicant must follow all recommendations of the Portland Sediment Evaluation Team (PSET) Memorandum dated March 19, 2020. PSET determined that discrete locations within the dredge prism varied in their suitability for in-water disposal and aquatic exposure of the post-dredge surface. The data reagency expirations vary based on analysis of each DMMU, and range from June 2025 for low-ranked sites to June 2021 for high-ranked sites. If sheens are observed when dredging DMMU 4A or 5 in slip 2, the applicant must pause in-water activities, implement BMPs, and coordinate with DEQ to address water quality impacts.

- 18) **Dredging and Disposal Methods:** The PSET determination provides recommendations regarding the suitability for sediment disposal in water. The Applicant and its contractors must follow these recommendations and the following additional conditions:
- a. Suitable for Unconfined In-Water Disposal
 - i. Disposal locations are confined to those proposed in the application.
 - ii. Dredging method is limited to the method proposed in the application, unless otherwise authorized by DEQ.
 - iii. Dredged material disposal may not interfere with navigation.
 - iv. For dredged material proposed to be placed upland, a DEQ Solid Waste Letter of Authorization, or clean fill determination is required prior to placing material.
 - v. Dredged material may not be placed in wetlands, and return water must not cause harm to freshwater wetlands or other freshwater environments.
 - b. Not Suitable for Unconfined In-Water Disposal
 - ii. Dredging method is limited to diver assisted hydraulic suction, hydraulic suction, closed-lipped bucket, or excavation in the dry, unless another method is specifically authorized by DEQ;
 - iii. Discharge to waters resulting from dewatering during dredging or release of return water from an upland facility is prohibited except as provided below.
 - 1) All water removed with sediment must be contained and disposed of at an appropriately sized and sealed upland facility by evaporation or absorption by inert material (such as shredded paper).
 - iv. Dredged material disposal must be upland or at a landfill permitted to accept hazardous waste. DEQ Solid Waste Letter of Authorization, or clean fill determination is required, which may include contaminant specific limitations.
 - v. A leave surface management plan per PSET, DEQ Cleanup, or 401 WQC program is required prior to dredging.
 - c. The Applicant or its contractors must employ the following techniques to minimize sediment disturbance and distribution through the water column.
 - vi. Sequence or phase work activities to minimize the extent and duration of in-water disturbances;
 - vii. Employ an experienced equipment operator;
 - viii. Implement bucket control techniques, such as:
 - 1) Do not overfill the bucket.
 - 2) Close the bucket as slowly as possible on the bottom.
 - 3) Pause before hoisting the bucket off of the bottom to allow any overage to settle near the bottom.
 - 4) Hoist load very slowly.
 - 5) If dewatering is permissible, pause bucket at water surface to minimize distance of discharge.
 - 6) "Slam" open the bucket after material is dumped on a barge to dislodge any additional material that is potentially clinging to the bucket.
 - 7) Ensure that all material has dumped into the barge from the bucket before returning for another bite.

- 8) Do not dump partial or full buckets of material back into the wetted stream.
- ix. Implement suction dredge control techniques, such as:
 - 1) Operate with the intake head at or below the surface of the sediments being removed during all periods of active dredging.
 - 2) Slow cutter head rotation or lessen horsepower.
 - 3) Slow swing arm speed.
 - 4) Clean out slurry by pumping in river water before shutting down rather than purging.
 - 5) If purging becomes necessary, raise intake line no more than 3 feet from the bottom.
- d. Dredging of holes or sumps below maximum depth and subsequent redistribution of sediment by dredging, dragging, or other means is prohibited.
- e. All anthropogenic debris greater than 1 foot in dimension must be removed from dredged sediments prior to in-water disposal and transported to an appropriate upland disposal site.

If the applicant is dissatisfied with the conditions contained in this certification, a contested case hearing may be requested in accordance with OAR 340-048-0045. Such request must be made in writing to the DEQ Office of Compliance and Enforcement at 700 NE Multnomah St, Suite 600, Portland Oregon 97232 within 20 days of the mailing of this certification.

The DEQ hereby certifies this project in accordance with the Clean Water Act and state rules, with the above conditions. If you have any questions, please contact Jeff Brittain at brittain.jeffrey@deq.state.or.us, by phone at 503-229-5395, or at the address on this letterhead.

Sincerely,



Steve Mrazik
Water Quality Manager
Northwest Region

cc: Danielle Erb, USACE PM
James Holm, USACE
Anna Coates, DEQ
Dan Cary, DSL
Deanna Caracciolo, DLCD
Eric Campbell, Campbell Environmental



401 Water Quality Certification Turbidity Monitoring Report

Project Name:		USACE Project #	DSL Project #
---------------	--	-----------------	---------------

Name of Inspector(s):		Turbidimeter Model:		Calibration Standard Type (Circle One) Formazin Solution or Gelex		Calibration Standard Expiration Date:
Sampling Date:	Calibration Values:		*Upstream (Background) Point Location:		*Downstream (Compliance) Point Location:	
	_____ NTU (Standard) = _____ NTU (Reading)		Latitude:		Latitude:	
	_____ NTU (Standard) = _____ NTU (Reading)		Longitude:		Longitude:	

In-Water Work Start Time:	In-Water Work End Time:	Description of In-Water Work:
---------------------------	-------------------------	-------------------------------

Upstream Sample	Downstream Sample		Change in Turbidity (NTU)	Observation of waterbody		NOTES (Describe any modifications made to BMPs)
	Turbidity (NTU)	Time	Turbidity (NTU)	Tidal Stage	Note any plume, sheen, floatables, color	

* Include a figure with the turbidity sampling forms showing the sampling locations.

401 Water Quality Certification Turbidity Monitoring Report

Turbidity: The Applicant must implement appropriate Best Management Practices (BMPs) to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidity is prohibited except as specifically provided below:

Monitoring: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two hour intervals each day during daylight hours when in-water work is being conducted. A properly calibrated turbidimeter is required **unless another monitoring method is proposed and authorized by DEQ.**

Representative Background Point: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet upcurrent of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.

Compliance Point: The must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet downcurrent from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.

Compliance: The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances of the turbidity water quality standard are allowed as shown in the monitoring table shown here.

Reporting: The Applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request.

BMPs to Minimize In-stream Turbidity: The Applicant must implement the following BMPs, unless otherwise accepted by DEQ:

- i. Sequence/Phasing of Work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;
- ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;
- iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary in the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate;
- iv. Machinery may not be driven into the flowing channel, unless authorized by DEQ; and
- v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

MONITORING WITH A TURBIDIMETER EVERY 2 HOURS	
TURBIDITY LEVEL	Restrictions to Duration of Activity
0 to 4 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
50 NTU or more above background	Stop work immediately and inform DEQ



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

Refer to NMFS No:
WCRO-2020-02481

October 29, 2020

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

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens
Fishery Conservation and Management Act Essential Fish Habitat Response for the Port
of Astoria Maintenance Dredging (Clatsop County, Oregon, Columbia River – Baker
Bay, HUC: 170800060500) (NWP-2004-369-14)

Dear Mr. Abadie:

Thank you for your letter of September 13, 2019, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Port of Astoria Maintenance Dredging (NWP-2004-369-14). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA)(16 U.S.C. 1855(b)) for this action.

In the attached biological opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Snake River basin (SR) fall-run Chinook salmon, SR spring/summer run Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Upper Willamette River (UWR) Chinook salmon, Columbia River (CR) chum salmon (*O. keta*), LCR coho salmon (*O. kisutch*), SR sockeye salmon (*O. nerka*), LCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead, UCR steelhead, SR steelhead, UWR steelhead, southern designated population segment (DPS) of green sturgeon (*Acipenser medirostris*), southern DPS of eulachon (*Thaleichthys pacificus*), or Southern Resident Killer Whale (*Orcinus orca*) or result in the destruction or adverse modification of critical habitats.



As required by section 7 of the ESA, NMFS is providing an incidental take statement with the biological opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the U.S. Army Corps of Engineers or any applicant must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. 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 NMFS within 30 days after receiving these recommendations.

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

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.

Please contact Joshua Ashline, Oregon Washington Coastal Area Office in Lacey, Washington, 562-533-0987, Joshua.ashline@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kim W. Kratz".

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

cc: Danielle Erb
Eric Campbell
Matt McGrath

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

Port of Astoria Maintenance Dredging (NWP-2004-369-14)

NMFS Consultation Number: WCRO-2019-02481

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

Affected Species and NMFS' Determinations:

ESA-Listed Species	ESA Status	Is the action likely to adversely affect the species	Is the action likely to adversely affect the critical habitat?	Is the action likely to jeopardize the species?	Is the action likely to destroy or adversely modify critical habitat
Lower Columbia River (LCR) Chinook salmon (<i>Oncorhynchus tshawtscha</i>)	T	Yes	Yes	No	No
Upper Columbia River (UCR) spring-run Chinook salmon	E	Yes	Yes	No	No
Upper Willamette River (UWR) spring-run Chinook salmon	T	Yes	Yes	No	No
Snake River (SR) spring/summer run Chinook salmon	T	Yes	Yes	No	No
SR fall-run Chinook salmon	T	Yes	Yes	No	No
Columbia River (CR) chum salmon (<i>O. keta</i>)	T	Yes	Yes	No	No
LCR coho salmon (<i>O. kisutch</i>)	T	Yes	Yes	No	No
SR sockeye salmon (<i>O. nerka</i>)	E	Yes	Yes	No	No
LCR steelhead (<i>O. mykiss</i>)	T	Yes	Yes	No	No
Middle Columbia River (MCR) steelhead	T	Yes	Yes	No	No
UCR steelhead	T	Yes	Yes	No	No
UWR steelhead	T	Yes	Yes	No	No
SR steelhead	T	Yes	Yes	No	No
Southern DPS of green sturgeon (<i>Acipenser medirostris</i>)	T	Yes	Yes	No	No
Southern DPS of Pacific eulachon (<i>Thaleichthys pacificus</i>)	T	Yes	Yes	No	No
Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?		Are EFH Conservation Recommendations Provided?		
Pacific Coast salmon	Yes		Yes		
Pacific Coast groundfish	Yes		Yes		

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

Issued By:


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

Date: October 29, 2020

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1. INTRODUCTION

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

1.1 Background

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

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

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

1.2 Consultation History

This biological opinion is in response to the U.S. Army Corps of Engineers – Portland District (USACE) request for formal consultation on ESA listed species detailed in Table 1, authorizing the proposed action under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act, received by NMFS on September 13, 2019. Included in this request from the applicant, the Port of Astoria (hereafter; Port), and their agent, Campbell Environmental Consulting, LLC was a biological assessment, and supplemental information.

- On April 15, 2020, NMFS responded to the USACE request for a status update that the project had been overlooked, and was immediately assigned to a project biologist.
- On April 21, 2020, NMFS informed USACE that Southern Resident killer whale (SRKW) were not included within their species effects determinations, and would be included within the consultation.
- On September 19, 2019, critical habitat designations for SRKW were proposed to include new areas immediately adjacent to the action area. NMFS identified activities that would occur because of the proposed action and were likely to adversely affect SRKW and their proposed critical habitat.
- On May 4, 2020, representatives from USACE and NMFS held a meeting to discuss how to best proceed with the analysis of effects on proposed SRKW critical habitat, and determined, pending approval from the applicant on a conference biological opinion.

- On June 8, 2020, USACE formally requested a conference opinion for the proposed SRKW critical habitat. Upon further review of the proposed action NMFS determined that a conference biological opinion for SRKW was unnecessary, as the proposed action and its associated activities would not adversely affect SRKW and their proposed critical habitats.
- On August 14, 2020, USACE contacted NMFS to inquire about the possibility of modifying the proposed action to include upland disposal for a proportion of the dredged materials.
- On August 17, 2020, NMFS informed USACE of their willingness to modify the proposed action to include upland disposal, and requested an amendment to the biological assessment.
- On August 25, 2020, due to the modification to the proposed action NMFS closed the original consultation (WCRO-2019-02765).
- On September 8, 2020, USACE requested formal consultation including the modified proposed action by submitting an amendment to the biological assessment, upon which NMFS initiated formal consultation.

Table 1. List of species included in the consultation for the Port of Astoria Maintenance Dredging

ESU or DPS Species	Listing Notice	Listing Status	Critical Habitat Listing
Lower Columbia Chinook	6/28/2005 ; 70 FR 37160	Threatened	9/2/2005 ; 70 FR 52630
Lower Columbia Steelhead	1/5/2006 ; 71 FR 834	Threatened	9/2/2005 ; 70 FR 52630
Lower Columbia Coho	6/28/2005 ; 70 FR 37160	Threatened	2/24/2016 ; 81 FR 9252
Columbia River Chum	6/28/2005 ; 70 FR 37160	Threatened	9/2/2005 ; 70 FR 52630
Upper Columbia Chinook	6/28/2005 ; 70 FR 37160	Endangered	9/2/2005 ; 70 FR 52630
Upper Columbia Steelhead	1/5/2006 ; 71 FR 834	Threatened	9/2/2005 ; 70 FR 52630
Middle Columbia Steelhead	1/5/2006 ; 71 FR 834	Threatened	9/2/2005 ; 70 FR 52630
Snake River Sockeye	4/14/2014 ; 79 FR 20802	Endangered	12/28/1993 ; 58 FR 68543
Snake River Spring/Summer Chinook	6/28/2005 ; 70 FR 37160	Threatened	10/25/1999 ; 64 FR 57399
Snake River Fall Chinook	6/28/2005 ; 70 FR 37160	Threatened	10/25/1999 ; 64 FR 57399
Snake River Steelhead	1/5/2006 ; 71 FR 834	Threatened	9/2/2005 ; 70 FR 52630
Upper Willamette River Chinook Salmon	6/28/2005 ; 70 FR 37160	Threatened	9/2/2005 ; 70 FR 52630
Upper Willamette River Steelhead	1/5/2006 ; 71 FR 834	Threatened	9/2/2005 ; 70 FR 52630
Southern DPS Pacific Eulachon	3/18/2010 ; 75 FR 13012	Threatened	10/20/2011 ; 76 FR 65324
Southern DPS Green Sturgeon	4/7/2006 ; 71 FR 17757	Threatened	10/9/2009 ; 74 FR 52300
Southern Resident Killer Whale	2/16/2006 ; 70 FR 69903	Endangered	9/19/2019 ; 84 FR 49214

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). The EFH definition of a Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The USACE proposes to issue a permit authorizing dredging and deep-water disposal of dredged sediment within the Columbia River. The dredging will be done in the Port’s Central Waterfront District (CWD) which includes three piers and two slips. All portions of the proposed action are located in the Columbia River adjacent to the city of Astoria, Oregon (Figure 1). The CWD is used to moor a variety of large marine vessels including, cruise ships, U.S. Coast Guard Response Units, U.S. Navy Ships, USACE dredging vessels, barges, commercial fishing vessels, and log hauling ships.

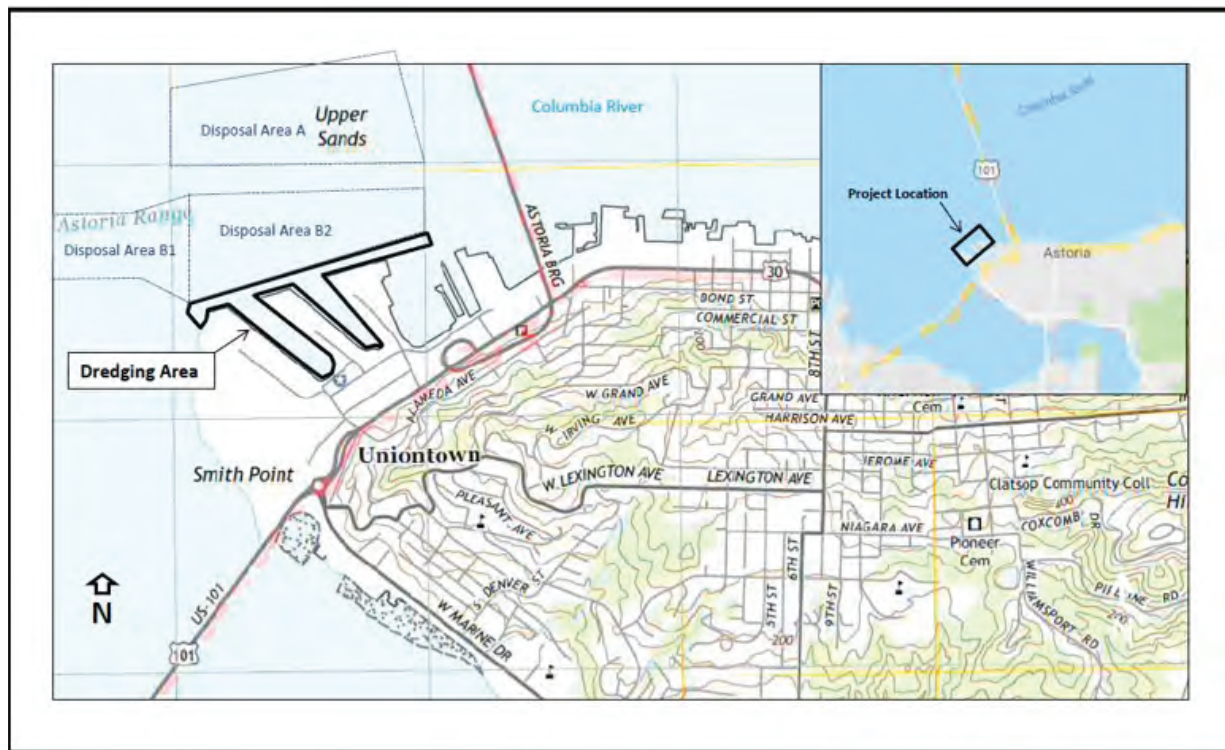


Figure 1. Port of Astoria maintenance dredging and disposal locations. Figure courtesy of Campbell Environmental LLC.

The Port is requesting a 10-year permit to conduct maintenance dredging of a maximum of 1,130,400 cubic yards (CY) of sediment. Dredging would occur for a maximum of 120 days per year for ten years. The proposed dredge prism is 31.5 acres at depths ranging from -18.0 to -45.0 feet mean-low-low-water (MLLW). The Port proposes to remove 50,000 – 100,000 CY accumulated sediment annually during the duration of the 10-year permit. If the Port is successful in securing funds to hire a dredging contractor a single year effort to remove 230,400

CY of sediment would occur, after which the Port would resume maintenance dredging of 50,000 – 100,000 CY per year.

All resulting dredge material will be deposited in the deep water flow lane of the Columbia River at three locations shown in Figure 1, with the exception of dredge materials originating from dredge material management unit (DMMU) 2 (Figure 2.), which will be disposed of at a to-be-determined upland site. The Portland Sediment Evaluation Team (PSET) reviewed the Sediment Characterization Report for the proposed dredging site and approved the associated dredge material for unconfined, aquatic disposal, with the exception of DMMU two which contains 4-methylphenol levels unsuitable for in-water disposal. The Port expects no more than 17,000 CY of sediment will be dredged annually from DMMU 2, and will not exceed 38,000 CY total, all of which will be disposed of at an approved to-be-determined upland site.

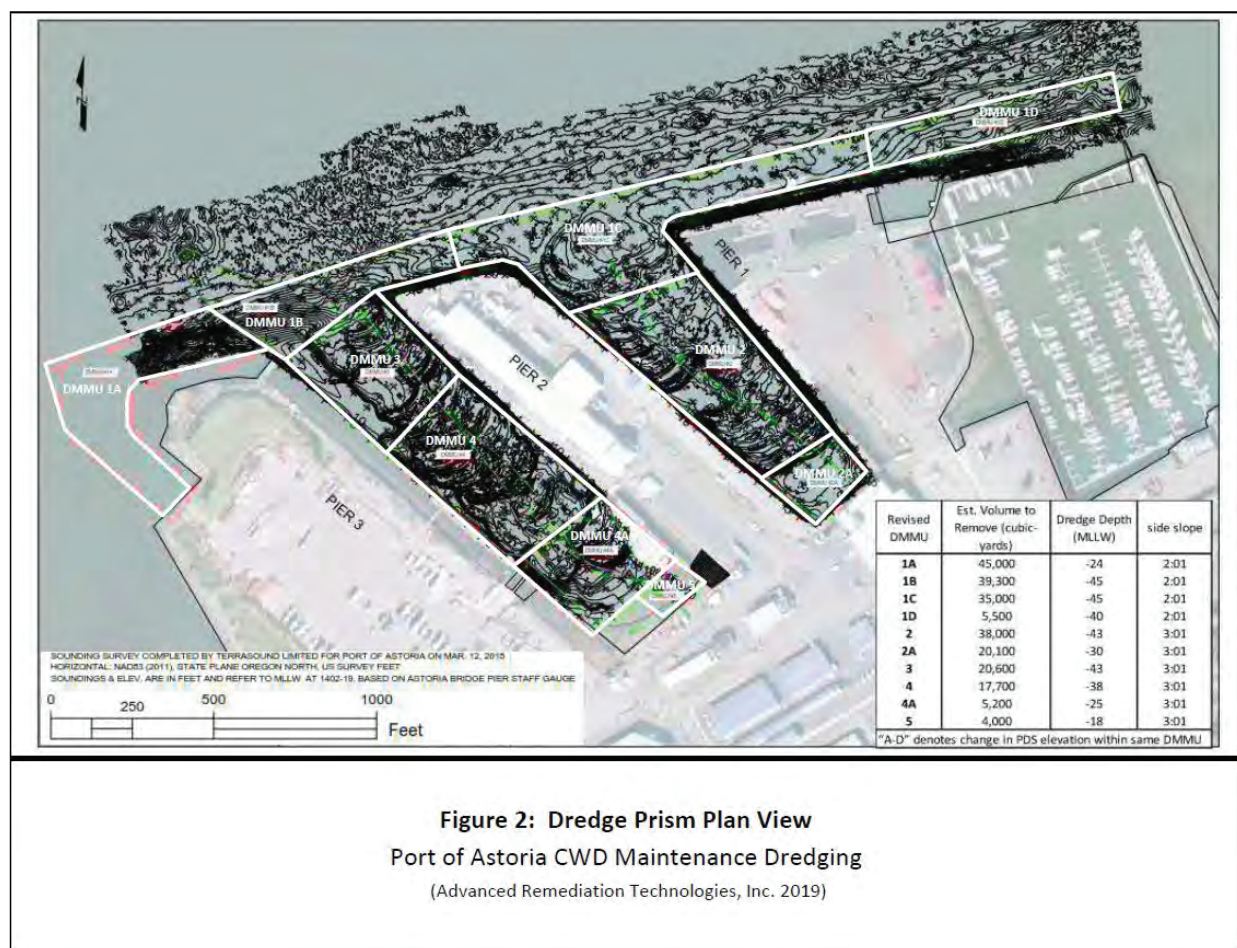


Figure 2. Locations of DMMUs and associated dredging quantities within the Port of Astoria's CWD. Figure courtesy of Campbell Environmental LLC.

The Port proposes to conduct dredging using a combination of clam shell, and hydraulic suction operated from a floating barge. Dredged sediments suitable for in-water disposal will be

discharged from a pipeline into the Columbia River to the designated disposal location adjacent to the navigation channel.

Conservation measures as proposed within the biological assessment submitted by the Port and their consultant Campbell Environmental LLC, have been incorporated into the proposed action to minimize adverse effects to ESA-listed species and their designated critical habitats. These conservation measures include the following:

- All in-water work will occur during the Oregon Department of Fish and Wildlife (ODFW) – preferred in-water work window (IWWW) for the Columbia River estuary (November 1 – February 28), a period when ESA-listed species are less likely to be present within the project action area.
- All construction equipment will access the project site via existing roadways and floating barges.
- All dredged materials and leave surface will be suitable and approved for in-water disposal based on the Sediment Evaluation Framework.
- All dredged sediment will be deposited in the flow lane of the Columbia River, where it will be recruited by the next high flow event and provide aquatic habitat functions.
- Dredge material will be deposited primarily during the ebb tide in the upper half of the water column to promote dispersal and prevent mounding.
- After each 10,000 CY of material placement the end of the discharge pipe will be moved a minimum of 500-600 feet from its previous location. In addition, the location of the discharge pipe shall alternate from one side of the placement area to the other for each move.
- Proposed dredging will not alter the character, slope, or size of the project area.
- Operation of a hydraulic intake below the mudline, and or slow operation of a clam shell or excavator will minimize the potential for entrainments during dredging activities.
- Where feasible, floating silt curtains will be placed around the in-water dredge area to minimize the dispersion of suspended sediment. Pollution Control Plan (PCP) will be prepared by the Contractor and carried out commensurate with the scope of the project that includes best management practices (BMPs) to confine, remove, and dispose of construction waste.
 - Procedures to contain and control a spill of any hazardous material.
 - Best management practices (BMPs) to confine, remove, and dispose of construction waste.
- All conditions of Oregon Department of Environmental Quality's 401 Water Quality Certification will be followed, specifically:
 - Fish protection via in water work timing.
 - Turbidity monitoring, compliance, and reporting.
- All equipment will be inspected daily for fluid leaks, any leaks detected will be repaired before operation is resumed.

We considered whether or not the proposed action would cause any other activities and determined based on USACE's statements that ocean going vessels utilizing the Ports CWD may affect proposed SRKW critical habitat at the mouth of the Columbia River, due to noise, and prey effects. Upon further review it was determined that this activity would not adversely affect

the SRKW proposed habitat (see Section 2.12) and that no other associated activities would also be caused by the proposed action.

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

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

2.1 Analytical Approach

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

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

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

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

2.2 Rangewide Status of the Species and Critical Habitat

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

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote 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). 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). 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). Earlier snowmelt will cause lower stream flows in late spring, summer, and fall, and water temperatures will be warmer (ISAB 2007; Mote et al. 2013). 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 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 Habitat

This section describes the status of designated critical habitat affected by the proposed action by examining the condition and trends of the essential physical and biological features of that habitat throughout the designated areas. These features are essential to the conservation of the ESA-listed species because they support one or more of the species' life stages (e.g., sites with conditions that support spawning, rearing, migration and foraging). Table 2, below, summarizes the general status of critical habitat, range-wide, for each species considered in this analysis.

Physical and Biological Features of Salmon and Steelhead Critical Habitat

The NMFS designated critical habitat for three different groups of salmonids that occupy the LCR, on three different dates. For each designation, NMFS used slightly different descriptions of the physical and biological features (PBFs) of critical habitat. In addition, NMFS identified the essential elements of the PBFs using slightly different terminology. This section presents each of the approaches to terminology used for each of the subsequent designations and attributes those to the specific salmonids covered by each designation. For convenience, many of the PBFs and their essential elements actually overlap from designation to designation.

The NMFS designated critical habitat for several Snake River salmonids on October 25, 1999(64 FR 57399), including Snake River Sockeye and separate Spring/Summer, and Fall-run Snake River Chinook salmon ESUs. Snake River steelhead critical habitat was designated in 2005 and is detailed below. The PBFs of critical habitat for Snake River salmonids are (1) Spawning and juvenile rearing areas; (2) juvenile migration corridors; (3) areas for growth and development to adulthood; and (4) adult migration corridors. The essential elements of the spawning and rearing PBFs are: 1) Spawning gravel; (2) water quality; (3) water quantity; (4) water temperature; (5) food; (6) riparian vegetation; and (7) access. The designation also breaks down the migration corridor for juvenile and adult salmonids as follows: Essential features of the juvenile migration corridors include adequate: (1) Substrate (2) water quality; (3) water quantity; (4) water temperature; (5) water velocity; (6) cover/shelter; (7) food; (8) riparian vegetation; (9) space; and (10) safe passage conditions. The adult migration corridors are the same areas included in juvenile migration corridors. Essential features would include those in the juvenile migration corridors, excluding adequate food.

Subsequently, NMFS designated critical habitat for 10 ESUs and DPSs of Columbia River salmon and steelhead and Snake River steelhead on September 2, 2005 (70 FR 52630), and lower Columbia River coho salmon on February 24, 2016 (81 FR 9252) as shown in Table 2. The PBFs are referred to as Primary Constituent Elements (PCE) in 70 FR 52630 and in 81 FR 9252, and those terms are used interchangeably in this document. Specific PCEs, and the essential features associated with the PCEs for salmonids designated in 2005, and 2016 include:

1. Freshwater spawning sites with water quantity and quality conditions and substrate that support spawning, incubation, and larval development;
2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility, water quality and forage that support juvenile development, and natural cover such as shade, submerged and overhanging large wood, logjams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks;
3. Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks that support juvenile and adult mobility and survival;
4. Estuarine areas free of obstruction and excessive predation with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation;
5. Nearshore marine areas free of obstruction and excessive predation with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and

6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

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

Physical and Biological Features of Pacific Eulachon Critical Habitat

The NMFS designated critical habitat for the southern DPS of Pacific eulachon on October 11, 2011 (76 FR 65324). Critical habitat includes portions of 16 rivers and streams in California, Oregon, and Washington (USDC 2011). We designated all of these areas as migration and spawning habitat for this species. Specific PBFs, and the essential features associated with the PBFs for Pacific eulachon designated in 2011 include:

1. Freshwater spawning and incubation sites with water flow, quality and temperature conditions and substrate supporting spawning and incubation, and with migratory access for adults and juveniles. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.
2. Freshwater and estuarine migration corridors associated with spawning and incubation sites that are free of obstruction and with water flow, quality and temperature conditions supporting larval and adult mobility, and with abundant prey items supporting larval feeding after the yolk sac is depleted. These features are essential to conservation because they allow adult fish to swim upstream to reach spawning areas and they allow larval fish to proceed downstream and reach the ocean.
3. Nearshore and offshore marine foraging habitat with water quality and available prey, supporting juveniles and adult survival. Eulachon prey on a wide variety of species including crustaceans such as copepods and euphausiids (Hay and McCarter 2000, WDFW and ODFW 2001), unidentified malacostracans (Sturdevant 1999), cumaceans (Smith and Saalfeld 1955), mysids, barnacle larvae, and worm larvae (WDFW and ODFW 2001). These features are essential to conservation because they allow juvenile fish to survive, grow, and reach maturity, and they allow adult fish to survive and return to freshwater systems to spawn.

Physical and Biological Features of Green Sturgeon Critical Habitat

NMFS designated critical habitat for the southern DPS of Green sturgeon on October 09, 2009 (74 FR 52300). Specific PBFs, and the essential features associated with the PBFs for Green sturgeon designated in 2009 include:

1. Freshwater riverine systems which provide food resources, and water quality including depth and flow for embryo, larval and juvenile growth and development. Adult spawning requires appropriate substrate and sediment quality, in addition to migratory corridors free of obstruction.
2. Estuarine areas which provide food resources, migratory corridors, and appropriate water and sediment quality, flow and depth to support growth of juvenile, sub-adult, and sexually mature green sturgeon.
3. Costal marine areas with adequate food resources are necessary for sub-adult and sexually mature green sturgeon growth. These areas also provide migratory corridors with appropriate water quality to spawning streams.

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

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Lower Columbia River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 47 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some, or high potential for improvement. We rated conservation value of HUC5 watersheds as high for 30 watersheds, medium for 13 watersheds, and low for four watersheds.
Upper Columbia River spring-run Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses four subbasins in Washington containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. We rated conservation value of HUC5 watersheds as high for 10 watersheds, and medium for five watersheds. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Snake River spring/summer-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers (except the Clearwater River) presently or historically accessible to this ESU (except reaches above impassable natural falls and Hells Canyon Dam). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Willamette River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon containing 56 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 22 watersheds, medium for 16 watersheds, and low for 18 watersheds.
Snake River fall-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers presently or historically accessible to this ESU (except reaches above impassable natural falls, and Dworshak and Hells Canyon dams). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Columbia River chum salmon	9/02/05 70 FR 52630	Critical habitat encompasses six subbasins in Oregon and Washington containing 19 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Lower Columbia River coho salmon	2/24/16 81 FR 9252	potential for improvement. We rated conservation value of HUC5 watersheds as high for 16 watersheds, and medium for three watersheds. Critical habitat encompasses 10 subbasins in Oregon and Washington containing 55 occupied watersheds, as well as the lower Columbia River and estuary rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 34 watersheds, medium for 18 watersheds, and low for three watersheds.
Snake River sockeye salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers; Alturas Lake Creek; Valley Creek; and Stanley, Redfish, Yellow Belly, Pettit and Alturas lakes (including their inlet and outlet creeks). Water quality in all five lakes generally is adequate for juvenile sockeye salmon, although zooplankton numbers vary considerably. Some reaches of the Salmon River and tributaries exhibit temporary elevated water temperatures and sediment loads that could restrict sockeye salmon production and survival (NMFS 2015b). Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Washington containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 20 watersheds, medium for eight watersheds, and low for three watersheds.
Lower Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses nine subbasins in Oregon and Washington containing 41 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 28 watersheds, medium for 11 watersheds, and low for two watersheds.
Upper Willamette River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses seven subbasins in Oregon containing 34 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 25 watersheds, medium for 6 watersheds, and low for 3 watersheds.
Middle Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of occupied HUC5 watersheds as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.
Snake River basin steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 25 subbasins in Oregon, Washington, and Idaho. Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced

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

2.2.2 Status of the Species

Table 3, below provides a summary of listing and recovery plan information, status summaries and limiting factors for the species addressed in this opinion. More information can be found in recovery plans and status reviews for these species. Acronyms appearing in the table include DPS (Distinct Population Segment), ESU (Evolutionarily Significant Unit), ICTRT (Interior Columbia Technical Recovery Team), MPG (Multiple Population Grouping), NWFSC (Northwest Fisheries Science Center), and VSP (Viable Salmonid Population).

Table 3. Listing classification and date, recovery plan reference, most recent status review, status summary, and limiting factors for each species considered in this opinion.

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

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

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

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River fall-run Chinook salmon	Threatened 6/28/05	NMFS 2017b	NWFSC 2015	This ESU has one extant population. Historically, large populations of fall Chinook salmon spawned in the Snake River upstream of the Hells Canyon Dam complex. The extant population is at moderate risk for both diversity and spatial structure and abundance and productivity. The overall viability rating for this population is 'viable.' Overall, the status of Snake River fall Chinook salmon has clearly improved compared to the time of listing and compared to prior status reviews. The single extant population in the ESU is currently meeting the criteria for a rating of 'viable' developed by the ICTRT, but the ESU as a whole is not meeting the recovery goals described in the recovery plan for the species, which require the single population to be "highly viable with high certainty" and/or will require reintroduction of a viable population above the Hells Canyon Dam complex.	- Degraded floodplain connectivity and function - Harvest-related effects - Loss of access to historical habitat above Hells Canyon and other Snake River dams - Impacts from mainstem Columbia River and Snake River hydropower systems - Hatchery-related effects - Degraded estuarine and nearshore habitat.
Columbia River chum salmon	Threatened 6/28/05	NMFS 2013	NWFSC 2015	Overall, the status of most chum salmon populations is unchanged from the baseline VSP scores estimated in the recovery plan. A total of 3 of 17 populations are at or near their recovery viability goals, although under the recovery plan scenario these populations have very low recovery goals of 0. The remaining populations generally require a higher level of viability and most require substantial improvements to reach their viability goals. Even with the improvements observed during the last five years, the majority of populations in this ESU remain at a high or very high risk category and considerable progress remains to be made to achieve the recovery goals.	- Degraded estuarine and nearshore marine habitat - Degraded freshwater habitat - Degraded stream flow as a result of hydropower and water supply operations - Reduced water quality - Current or potential predation - An altered flow regime and Columbia River plume - Reduced access to off-channel rearing habitat in the lower Columbia River - Reduced productivity resulting from sediment and nutrient-related changes in the estuary - Juvenile fish wake strandings - Contaminants

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

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River sockeye salmon	Endangered 6/28/05	NMFS 2015	NWFSC 2015	This single population ESU is at very high risk due to small population size. There is high risk across all four basic risk measures. Although the captive brood program has been successful in providing substantial numbers of hatchery produced fish for use in supplementation efforts, substantial increases in survival rates across all life history stages must occur to re-establish sustainable natural production. In terms of natural production, the Snake River Sockeye ESU remains at extremely high risk although there has been substantial progress on the first phase of the proposed recovery approach – developing a hatchery based program to amplify and conserve the stock to facilitate reintroductions.	• Effects related to the hydropower system in the mainstem Columbia River • Reduced water quality and elevated temperatures in the Salmon River • Water quantity • Predation
Upper Columbia River steelhead	Threatened 1/5/06	Upper Columbia Salmon Recovery Board 2007	NWFSC 2015	This DPS comprises four independent populations. Three populations are at high risk of extinction while 1 population is at moderate risk. Upper Columbia River steelhead populations have increased relative to the low levels observed in the 1990s, but natural origin abundance and productivity remain well below viability thresholds for three out of the four populations. The status of the Wenatchee River steelhead population continued to improve based on the additional year's information available for the most recent review. The abundance and productivity viability rating for the Wenatchee River exceeds the minimum threshold for 5% extinction risk. However, the overall DPS status remains unchanged from the prior review, remaining at high risk driven by low abundance and productivity relative to viability objectives and diversity concerns.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded floodplain connectivity and function, channel structure and complexity, riparian areas, large woody debris recruitment, stream flow, and water quality • Hatchery-related effects • Predation and competition • Harvest-related effects

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

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Upper Willamette River steelhead	Threatened 1/5/06	NMFS 2011	NWFS 2015	This DPS has four demographically independent populations. Three populations are at low risk and one population is at moderate risk. Declines in abundance noted in the last status review continued through the period from 2010-2015. While rates of decline appear moderate, the DPS continues to demonstrate the overall low abundance pattern that was of concern during the last status review. The causes of these declines are not well understood, although much accessible habitat is degraded and under continued development pressure. The elimination of winter-run hatchery release in the basin reduces hatchery threats, but non-native summer steelhead hatchery releases are still a concern for species diversity and a source of competition for the DPS. While the collective risk to the persistence of the DPS has not changed significantly in recent years, continued declines and potential negative impacts from climate change may cause increased risk in the near future.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats due to impaired passage at dams • Altered food web due to changes in inputs of microdetritus • Predation by native and non-native species, including hatchery fish and pinnipeds • Competition related to introduced salmon and steelhead • Altered population traits due to interbreeding with hatchery origin fish
Middle Columbia River steelhead	Threatened 1/5/06	NMFS 2009b	NWFS 2015	This DPS comprises 17 extant populations. The DPS does not currently include steelhead that are designated as part of an experimental population above the Pelton Round Butte Hydroelectric Project. Returns to the Yakima River basin and to the Umatilla and Walla Walla Rivers have been higher over the most recent brood cycle, while natural origin returns to the John Day River have decreased. There have been improvements in the viability ratings for some of the component populations, but the DPS is not currently meeting the viability criteria in the MCR steelhead recovery plan. In general, the majority of population level viability ratings remained unchanged from prior reviews for each major population group within the DPS.	• Degraded freshwater habitat • Mainstem Columbia River hydropower-related impacts • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Harvest-related effects • Effects of predation, competition, and disease

Species	Listing Classification and Date	Recovery Plan Reference	Most Recent Status Review	Status Summary	Limiting Factors
Snake River basin steelhead	Threatened 1/5/06	NMFS 2017a	NWFSC 2015	This DPS comprises 24 populations. Two populations are at high risk, 15 populations are rated as maintained, 3 populations are rated between high risk and maintained, 2 populations are at moderate risk, 1 population is viable, and 1 population is highly viable. Four out of the five MPGs are not meeting the specific objectives in the draft recovery plan based on the updated status information available for this review, and the status of many individual populations remains uncertain. A great deal of uncertainty still remains regarding the relative proportion of hatchery fish in natural spawning areas near major hatchery release sites within individual populations.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded freshwater habitat • Increased water temperature • Harvest-related effects, particularly for B-run steelhead • Predation • Genetic diversity effects from out-of-population hatchery releases
Southern DPS of green sturgeon	Threatened 4/7/06	NMFS 2018	NMFS 2015c	The Sacramento River contains the only known green sturgeon spawning population in this DPS. The current estimate of spawning adult abundance is between 824-1,872 individuals. Telemetry data and genetic analyses suggest that Southern DPS green sturgeon generally occur from Graves Harbor, Alaska to Monterey Bay, California and, within this range, most frequently occur in coastal waters of Washington, Oregon, and Vancouver Island and near San Francisco and Monterey bays. Within the nearshore marine environment, tagging and fisheries data indicate that Northern and Southern DPS green sturgeon prefer marine waters of less than a depth of 110 meters.	• Reduction of its spawning area to a single known population • Lack of water quantity • Poor water quality • Poaching

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

2.3 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).

The action area is located within Baker Bay on the Columbia River within the 12 digit, 6th level HUC 170800060500, at river mile 13. Specifically, the action area includes the Ports 31.5 acre CWD, where dredging will occur, and the three flow-lane disposal sites located within the main-stem Columbia River, including 300 feet downstream of these sites where suspended coarse grain sediments (e.g. gravel, and sand) are expected to settle out (Figure 1). Although the action area occurs in the tidally influenced Columbia River, the action area during dredge material disposal only extends downstream 300 ft because dredging disposal will occur exclusively during ebb tides.

2.4 Environmental Baseline

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

The action area is located in Astoria, Oregon near the confluence of the Columbia River and the Pacific Ocean, and so is influenced by water quality and prey community impacts associated with all upstream uses. Fish habitat in the action area has been adversely affected by a variety of in-water and upland human activities, including habitat losses from all causes (urbanization, roads, diking, etc.), flood control, irrigation dams, pollution, municipal and industrial water use, introduced species, hatchery production (NMFS 2013), and climate change as described in section 2.2 above. The action area is affected by many upriver activities and uses in Columbia River basin watersheds. In general, those conditions have declined in the last 150 years, together influencing conditions in the action area. These multiple watersheds, like the action area, are characterized by loss of connectivity with floodplains and feeding and resting habitat for juvenile salmonids in the form of low-velocity marshland and tidal channel habitats (Bottom *et al.* 2005). Each of the upland conditions influence habitat characteristics in the action area such as water quality and amount and composition of prey base. Water quality throughout the action area is degraded by urban, industrial, and agricultural practices across the basin that contributes multiple pollutants at levels above natural conditions. Habitat degradation has generally reduced the quality, complexity, and amount of this important rearing and migration habitat for salmon and steelhead. Survival through this reach has declined for both juvenile and adult salmonids resulting in reduced population productivity and abundance.

In addition, the environmental baseline includes the impacts from deep-water dredging to maintain the federal navigation channel for large commercial vessel traffic and shallow water dredging to maintain marinas for recreational vessels. Therefore, dredging activities occur across numerous areas and microhabitats within the Lower Columbia River including sloughs area, secondary channels, sloughs, and floodplain wetlands. All of these habitat areas provide rearing space for ESA-listed fish, and all have been degraded by shore-based development and construction and maintenance of boat moorage facilities. Floodplain and off-channel sloughs have been cut off by dikes and flood control levees, limiting potential refuge areas and forage sites for juvenile salmonids. The dredge sediment disposal in the Lower Columbia River has had adverse effects, including displacement of seasonally-flooded wetlands, regular disruption of shallow water benthic prey communities, and most significantly creation of attractive nesting habitat for avian predators feeding on juvenile salmonids (Evans *et al.* 2012; Sebring *et al.* 2013).

The hydrology and hydrograph of the Columbia River is significantly altered from historical conditions, shifting natural cues that salmonids rely on for spawning and outmigration behavior. River flow is less dynamic (Sherwood *et al.* 1990), sediment transport has decreased by as much as 50 percent (Simenstad *et al.* 1992). Other actions such as the depredation and relocation of large colonial nesting waterbird colonies have reduced the numbers of avian predators that prey upon salmonids in the Columbia River estuary that may improve progress in reaching recovery goals by up to 6 percent (NMFS 2011b). Degraded water quality in the action area results from load of increased fine sediments, elevated water temperatures especially during the winter (Weitkamp 1994), and a host of municipal and industrial discharges, permitted or otherwise (LCREP 2007). These conditions are a result of upstream land uses, and operations within the Port, all of which influence the LCR estuary and its recovery potential (Fresh *et al.* 2005).

All ESA-listed Columbia basin salmon and steelhead, in addition to eulachon and green sturgeon may rear and/or migrate through the action area, resulting in effects to individuals of species and rearing and migration critical habitat PBFs. Rearing of juvenile salmonids, and green sturgeon is likely to occur within the CWD, due to its isolation from main stem currents from mooring structures, and shallower waters composed primarily of sand/silt bathos near shorelines. Upstream migration of adult salmonids and eulachon and downstream migrations of salmonid smolts are likely to occur in the mainstem LCR in proximity to the dredge disposal sites. Thus dredging of the CWD will affect rearing fish and dredging disposal will affect migrating fish. Adult salmonids will move upstream and through the action area within minutes. Juvenile salmonids, depending on the species and age of the fish, may spend hours to months within the action area. Juvenile salmonid foraging primarily occurs in waters less than 25 feet deep, which is a very small proportion of the action area due to historical maintenance dredging of the CWD and Columbia River flow lane to depths greater than 30 feet. Deeper waters and greater flows found in the Columbia River flow land disposal sites will provide a migration corridor.

The baseline also includes the effects of projects that have proceeded subsequent to section 7 consultation. During the last five years, NMFS has engaged in various Section 7 consultations on Federal projects adversely affecting ESA-listed fish and their habitats in and near the action area. These include vicinity (Clatsop County, Oregon; Pacific County, Washington) to the action area (WCR-2019-11648, WCR-2018-10138, WCR-2017-7450, WCR-2017-6622, WCR-2016-5516),

including the effects of actions addressed in programmatic consultations (the SLOPES IV programmatic consultation; NMFS number WCR-2011-05585). In general, those actions caused temporary, construction-related effects (increased noise and turbidity), and longer term effects like increasing overwater coverage. Longer term effects that remain part of the baseline now include hindering quality of downstream migration and reduced benthic production of forage items.

All actions processed under the SLOPES IV programmatic consultation also include minimization measures to reduce or avoid both short- and long-term effects in the environment. These include requiring grated and translucent materials to allow light penetration, pile caps to prevent piscivorous bird perching, and limits on square footage of new overwater coverage. While some adverse effects of actions implemented under SLOPES IV can reduce fitness and survival in a small number of individuals, the minimization measures reduce the overall contribution to habitat degradation at large. So the overall effects of these actions do contribute to the present environmental baseline and the effects of existing structures (e.g. increased shading, reduction in prey, increased predation, and possible minor migration delays) are considered in this consultation.

Despite degraded habitat conditions ESA-listed species migrate through and rear in the action area. Numerous early life history strategies of CR salmonids have been lost as a result of past management actions discussed under the environmental baseline (Bottom *et al.* 2005). Salmonids in the action area will generally exhibit either a stream-maturing or ocean-maturing life history type. A stream-type life history is exemplified by juvenile salmon and steelhead that typically rear in upstream tributary habitats for over a year. Salmonids exhibiting this life history include LCR Chinook salmon (spring runs), LCR steelhead, LCR coho salmon, MCR steelhead, UWR steelhead, UWR Chinook salmon, SR spring/summer Chinook salmon, UCR Chinook salmon, SR steelhead, SR sockeye, and UCR steelhead. These juvenile fish will migrate through the action area as smolts, approximately 100 to 200 mm in size, move quickly downstream, and pass by the action area within one to two days (Dawley *et al.* 1986). An ocean-type life history is exemplified by juvenile salmon that move out of spawning streams and migrate towards the LCR estuary as sub-yearlings and are actively rearing within the LCR estuary. Fish that exhibit these life histories include LCR Chinook salmon (fall runs), CR chum salmon, and SR fall-run Chinook salmon. These fish are generally smaller in size (less than 100 mm) and more likely to spend days to weeks residing in tidal freshwater habitats characterized by the action area, with peak abundances occurring March through May (Hering *et al.* 2010; McNatt *et al.* 2016).

In addition to variations in outmigration timing, juvenile ESA-listed species also have a wide horizontal and vertical distribution in the CR related to size and life history stage. Generally speaking, juvenile salmonids will occupy the action area across the width of the river, and to average depths of up to 35 feet (Carter *et al.* 2009). Smaller-sized fish use the shallow inshore habitats and larger fish will use the channel margins and main channel. The pattern of use generally shifts between day and night. Juvenile salmon occupy different locations within the CR, and are typically in shallower water during the day, avoiding predation by larger fish that are more likely to be in deeper water. These juveniles will venture into the deeper areas of the river away from the shoreline, towards the navigation channel and along the bathymetric break – or channel margin – and will be closer to the bottom of the channel (Carter *et al.* 2009). The smaller

sub-yearling salmonids will likely congregate along the nearshore areas in shallow water and extend into the channel margins (Bottom *et al.* 2011). Yet, as Carlson *et al.* (2001) indicated, there is higher use of the channel margins than previously thought and considering the parameters above, relative juvenile position in the water column suggests higher potential sub-yearling use in areas of 20 to 30 feet deep.

Pacific eulachon are tributary spawners within the lower Columbia River, and utilize the main-stem Columbia River for adult migration, and drift of eggs and larvae to the estuary. Migration of adults into the Columbia River and its tributaries occurs from December through May, with peak abundances and spawning during February and March over sandy substrates in LCR tributaries. Eggs and larvae are present from February until early June, as they drift in currents downstream to the Columbia River estuary.

Green sturgeon utilize the action area during the summer and early fall months (Moser and Lindley 2007; Moser *et al.* 2016) and may be present within the action area early in the IWWW (November). Commercial catches of green sturgeon peak in October in the Columbia River estuary, and records from other estuarine fisheries (Willapa Bay and Grays Harbor, Washington) support the conclusion that sturgeon are present in these estuaries from June until October (Moser and Lindley 2007).

2.5 Effects of the Action

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

Effects of the proposed action are reasonably certain to include: 1) annual temporary, localized reduction in water quality; 2) annual temporary, localized reduction in available prey; and 3) annual, temporary, localized obstruction to safe passage. These changes in the environment will affect PBFs of critical habitat, and the species that are present when these effects occur.

2.5.1 Effects on Critical Habitat

The proposed action will affect designated critical habitat for LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, UWR spring-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead, green sturgeon, eulachon, and SRKW. Given the location of the proposed action and life history expression, all of the species considered in these opinions use this area for migration and rearing, with the exception of SRKW that use the area for migration, resting and predominantly foraging on Columbia River Chinook salmon.

The magnitude of these effects will vary spatially and by, species, and life stage, and are discussed by general species in turn below.

Salmonid Critical Habitat

The action area includes the PBFs for freshwater rearing and migration corridor for all salmonids considered in this opinion. The essential elements of freshwater rearing sites with substrate, water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility, water quality and forage that support juvenile development, and natural cover such as shade, submerged and overhanging large wood, logjams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

The essential features of freshwater migration corridors are freedom of obstruction and excessive predation with water quantity and quality conditions, and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks which support foraging, mobility and survival.

These two conservation roles that are served by the action area share many of the same essential features. The essential features in the action area affected by the proposed action would include: water quality, substrate, forage, and a corridor free of obstruction and predation.

The proposed action will have temporary effects to migration corridors and water quality (due to turbidity) within the Columbia River, including that it will temporarily obstruct or decrease safe passage, in a small area immediately around the suction dredge, clamshell bucket, and disposal pipeline during the November 1 to February 28 IWWW. Passage conditions will be made less safe by elevated turbidity, and a risk of entrainment (juveniles only). The majority of turbidity produced by the suction dredge is expected to remain localized within the 31.5-acre CWD, and in proximity to the active suction dredge due to the CWD being isolated from main-stem flows. Due to the coarseness of the predominant sediments (gravels and sands) being suspended by the dredge and disposal pipeline they are expected to settle out rapidly (within minutes), and in close proximity (several feet) to their source location. Any finer sediments (silts and clays) that happen to be suspended by the suction dredge and disposal pipeline will settle out slower (within an hour). Although the sediments responsible for increased turbidity produced by the suction dredge, and disposal pipeline are expected to settle out quickly, dredging is proposed to occur daily for four months. Due to the relative isolation of the CWD from the main-stem Columbia River, turbidity generated by suction dredge is only expected to enter the main-stem when suction dredging is occurring in close proximity to the ingress and egress channels, where water flow velocities are greatest during ebb tidal cycles.

The proposed action will temporarily reduce food availability in a limited area within the CWD, but available forage from littoral sources in the immediate area outside of the CWD will remain plentiful. Benthic invertebrates provide the primary food source for these juvenile salmonids – dominated by families of midges (Johnson *et al.* 2011). The aquatic invertebrates occupy the upper surface of the river bottom with a life cycle of many weeks to months before emerging into the water column. The proposed dredging operation will disturb benthic habitat and reduce

benthic productivity. The level and nature of the disturbance is not unlike natural processes that continually move river bottom sediments, burying or eroding benthic habitat. Recolonization of the benthic habitat by invertebrates is generally rapid – within weeks to months (McCabe *et al.* 1998), but is dependent upon the frequency of the dredging disturbance. Because dredging will not occur on the same location within the CWD more than once annually, reducing the frequency of the disturbance should allow for more rapid recolonization (weeks) by benthic invertebrates. Loss of forage will occur where the frequency and duration of the dredging delays natural recolonization.

We do not expect reduced food availability to juvenile salmonids to occur as a result of disposal of dredged sediments. The sediment disposal sites are outside the littoral area, and the community of benthic invertebrates are more evolved to handle natural disturbance regimes of faster flows and dynamic coarse grain sediment redistribution. Juvenile salmonids are likely not rearing in these locations due to a lack of habitat complexity (no wood or current breaks), and the benthic invertebrates occupying sediment disposal sites will likely be much larger and rearing juveniles will be gape limited in foraging on them. Adult salmonids do not forage when in freshwater.

Eulachon Critical Habitat

The action area includes eulachon PBFs for migration corridors, spawning and egg/larval development.

The proposed action will not have any permeant effects to adult migration corridors within the Columbia River, but will temporarily obstruct or decrease safe passage, in a small area immediately around the suction dredge, clamshell bucket, and disposal pipeline during the November 1 to February 28 IWWW due to elevated turbidity, and a risk of entrainment (eggs/larvae only). Additionally, the proposed action will not alter spawning substrate that eulachon rely because adult eulachon don't spawn in this section of the LCR as they typically favor large tributaries (i.e., Sandy River, Washougal River).

Green Sturgeon Critical Habitat

The action area includes the PBFs of estuary migratory corridors and prey base for green sturgeon, and the effects of the proposed action on green sturgeon critical habitat are similar to those described above for juvenile salmonids critical habitat PBFs. Both estuary migratory corridors and prey base are categorized as low-level threats to the southern DPS of green sturgeon critical habitat (NMFS 2018).

2.5.2 Species Effects

Effects of the action on species is based on individual fish exposure to the habitat changes described above, or effects occurring to the fish themselves. In this case, fifteen ESA-listed fish species of the upper and lower Columbia basins occupy the action area and they will be exposed to the habitat effects of the action, as well as direct exposure to the dredging equipment.

The potential effects anticipated to ESA-listed fish species exposed in the action area are associated with the habitat effects described above (i.e., short-term alterations in water quality from the action, short-term changes in benthic forage), and temporary obstruction of safe passage due to entrainment of fish by the dredge equipment. The level of exposure varies by timing and location of activity when different densities and life history stages of the ESA-listed fish will be present. The magnitude of exposure experienced by ESA-listed fish species is directly related to the amount of time the dredge is actively removing material from the benthos, as approximated by days of operation per year. In this case, dredging will occur for up to 120 days per year over a 10-year period.

Exposure of adult and juvenile fish will increase with greater duration and frequency of dredging. The greatest exposure for juvenile salmonids and green sturgeon to water quality, forage, and entrainment effects will occur during dredging activities with the CWD in water depths typically less than -25 feet where sub-yearling salmonids (fall Chinook, and LCR chum salmon) tend to rear and forage. Adult salmonids, and eulachon, as well as smolting stream-type salmonids (spring Chinook salmon, coho salmon, sockeye salmon and steelhead), will have the greatest risk of exposure to short-term water quality alterations while migrating through the dredge disposal sites, these fish will likely not be exposed to the dredging effects described for rearing fish above as the Port's CWD is mostly enclosed by an ingress and egress channels. This would likely preclude most, but certainly not all, fish from entering the area where the majority of dredging will occur.

Salmonid Exposure and Effects

Adult salmonids. Though peak migratory periods vary by species, some adult Columbia River salmonids are reasonably certain to be present in the action area during the IWWW, and are therefore will be exposed to the effects of the action. Adult Chinook salmon presence in the action area is most likely from late spring through the fall. Adult coho salmon presence is most likely in late summer through early winter. Adult chum salmon primarily occur during the fall. Adult sockeye salmon presence will most likely range from late spring to late summer. Adult steelhead presence will most likely range from early summer to early fall (from passage data at Bonneville Dam 10-year average, http://www.cbr.washington.edu/dart/adult_hrt.html). Based on the broad run timing of these species, and the proposed work period of November 1 - February 28, exposure is extremely unlikely for adult SR sockeye salmon. All other Columbia River species of adult salmonids have at least some exposure to the effects of the proposed action, but peak times of presence for most adults do not correspond fully with the IWWW.

Exposure and Response to Dredging Equipment Operation: Although adult Chinook salmon, coho salmon, chum salmon and steelhead will be present in the action area during the proposed action, only a few adult fish will experience adverse effects from the proposed action due to: (1) the limited footprint dredging disposal pipeline relative to the size of the Columbia River estuary (limiting probability of exposure to individual fish); (2) the isolation of the dredging sites within the enclosed CWD from the main-stem Columbia River; (3) the intermittent nature of the action; and (4) the migratory and avoidance behaviors inherent to adult salmon and steelhead.

Exposure to the habitat disruptions and the suction dredge are likely to be limited because of the size of the migration corridor in this area. The Lower Columbia River estuary is a massive body of water that presents no current migratory obstacles beyond high water temperatures that can occur during late summer (outside of the proposed work period); thus, migrating adult salmon are typically widely dispersed in the estuary. The action area is less than one percent of the total area of the Columbia River estuary, with sufficient space (3.5 miles) to the north of the dredging disposal location for adult fish to safely pass. Further, the port's narrow access channel would prevent most adult fish from entering the CWD dredge area. In the unlikely event these adult fish enter the CWD they are not likely to come within proximity of the dredge operation, due to their strong swimming ability. Adult salmonids are able to avoid the suction dredge intake with no likelihood of entrainment. These conditions, coupled with the adult run-timing previously discussed, result with few adult salmon, of any species, being exposed to dredging equipment operations. Operation of equipment used for disposal of the dredged material has minimal risk to adult salmonids because of their strong swimming ability which allows for avoidance of entrainment and turbidity plumes (see below) generated by the dredging operation during their upstream migrations, we anticipate adult salmonids will pass through the action area without experiencing adverse effects.

Exposure and Response to Turbid Conditions: Given that adult salmonid migration rates range up to a few miles per hour (Matter and Sandford, 2003), we expect adult ESA-listed salmonids that do encounter the turbidity associated dredge or dredge material disposal operations, to be moving upstream at such a rate as to limit exposure to a matter of minutes. Studies show that salmonids are able to detect and distinguish turbidity and other water quality gradients (Bisson and Bilby 1982), and that larger salmonids are more tolerant to suspended sediment than smaller juveniles (Servizi and Martens 1991, 1992). As salmonids grow and their swimming ability increases, their dependence on shallow nearshore habitat declines rapidly (Groot and Margolis 1991). Adult salmonids will typically be in the main river channel at depths of 10 to 20 feet below the water surface and off the bottom (Johnson *et al.* 2005). Larger adult salmon readily respond by avoiding waters affected by suspended sediment to find refuge and/or passage conditions within unaffected adjacent areas. Thus, to the extent that any adults are exposed to turbidity generated by project activities, they are expected to respond by avoiding excessively turbid conditions and find passage within unaffected adjacent areas. Specifically, we do not expect these fish to move into the confined CWD space where dredging will occur. These fish may experience some turbidity near the entrance of the CWD or within 300 ft. of the sediment discharge pipe located within the main-stem Columbia River where sediments are actively settling out. In both cases, we anticipate adult salmonids will pass through the action area without experiencing adverse effects due to the brevity of exposure.

Juvenile salmonids. Dredging around the ports slips and piers in fall through mid-winter will occur when juvenile salmonids are present, but at very low density (Roegner *et al.* 2012), and at depths ranging from approximately -18' to -45' MLLW. These depths are deeper than juveniles preferred rearing and migratory habitats. Removal of dredged material will temporarily and minimally alter the river bed, yet would be within the normal range of seasonal changes to the river bed from typical bed load transport. The level of exposure juvenile salmonids will have to the effects of the action will vary and depend on species and life history, along with the location,

timing, and depth of the activities. Among those exposed, specific species will be more vulnerable due to their age/size when they are experiencing the effects of the action.

Juvenile ESA-listed species migrate in the vicinity of and may rear in the action area at different time periods. Juvenile salmonids are present in the action area year round, peaking during one or two periods from late winter (March) through summer, with lesser presence in the fall, and early winter. Juvenile Chinook salmon and sockeye salmon are present year round; primary timing ranges from spring to early fall, although sub-yearlings presence extends later in the fall. Juvenile chum salmon are present from winter to spring. Juvenile coho salmon are present year-round with primary timing from spring to mid-summer. Juvenile steelhead are present year-round with a primary timing range of spring to mid-summer.

Juvenile ESA-listed species migrate through the action area at different rates depending on species and life history. Numerous early life history strategies of Columbia River salmonids have been lost as a result of past management actions discussed under the environmental baseline (Bottom *et al.* 2005). Today, salmonids expected in the action area will generally exhibit either a stream-maturing or ocean-maturing life history type. Stream type juvenile salmon and steelhead typically rear in upstream tributary habitats for over a year. These include LCR Chinook salmon (spring runs), LCR steelhead, LCR coho salmon, MCR steelhead, UWR steelhead, UWR spring run Chinook salmon, SR spring/summer Chinook salmon, UCR Chinook salmon, SR steelhead, SR sockeye, and UCR steelhead. These fish will migrate through the action area as smolts. These juveniles tend to be 100 to 200 mm in size, move quickly downstream, and will be through the action area within 1 - 2 days. Ocean-type juvenile salmon tend to move out of spawning streams and migrate towards the lower Columbia River estuary as sub-yearlings and are actively rearing within the Lower Columbia River. These include LCR Chinook salmon (fall runs), CR Chum salmon, and SR fall-run Chinook salmon. These fish are smaller in size (less than 100 mm) and more likely to spend days to weeks in the action area foraging (Carter *et al.* 2009).

Juvenile ESA-listed species have a wide horizontal and vertical distribution related to size and life history stage. Generally speaking, juvenile salmonids will occupy the action area, as well as across the width of the river, and to average depths of up to 35 feet (Carter *et al.* 2009). Smaller-sized fish use the shallow nearshore and shoreline habitats and larger fish will use the channel margins and main channel. The pattern of use generally shifts between day and night. Juvenile salmon occupy different locations within the Columbia River, and are typically in shallower water during the day, and may avoid predation by larger fish that are more likely to be in deeper water. Apparently these younger fish will venture into the deeper areas of the river away from the shoreline, moving towards the navigation channel and along the bathymetric break – or channel margin – and will be closer to the bottom of the channel. Carlson *et al.* (2001) notes there is a higher percentage of use along the channel margins than either the shallow nearshore or channel, which indicates potential underestimates for nearshore sub-yearlings. Juvenile salmon position in open water tends to be about 3 meters below the surface (Carter *et al.* 2009), a minimum of 2 meters off of the bottom in shallow areas, 3 to 10 meters off the bottom on the channel margins, and 5 to 15 meters off the bottom in the main channel (Carlson 2001) with sub-yearlings being closer to the bottom than older 1+ year-old fish (Carter *et al.* 2009). The smaller sub-yearling salmonids will likely congregate along the nearshore areas in shallow water and extend into the channel margins (Bottom *et al.* 2011). Yet, as Carlson *et al.* (2001) indicated,

there is higher use of the channel margins than previously thought and considering the parameters above, relative juvenile position in the water column suggests higher potential sub-yearling use in areas of 20 to 30 feet deep.

Exposure and Response to Equipment Operation: Sub-yearling salmonids including LCR Chinook salmon, CR chum salmon, and to a limited extent SR fall Chinook salmon in the action area are more likely to be displaced and entrained by dredging equipment due to their smaller size (<100mm), and inferior swimming ability. The IWWW for dredging has been established when the density of sub-yearlings will be lowest, thus limiting exposure probability. At low densities (number of fish per unit area), the probability of a sub-yearling occupying the same area in which the suction dredge operating, is extremely low, as the suction dredge is highly localized to the area in which the suction head is operating (<1 cubic meter). However, any sub-yearlings that happen to encounter the suction head and are within 1-meter above the substrate actively being dredged will be subject to an increased likelihood of entrainment, and elevated turbidity (see below) leading to injury or death. In the shallower waters, sub-yearlings are closer to the bottom and are less able to escape entrainment flows. Larger, juvenile smolts (>100mm), that are actively migrating within the mainstem Columbia River, and like adult salmonids are not likely to enter the enclosed CWD during their migration. However in the event that a smolt does enter the CWD their increased swimming abilities, allow for a similar avoidance response to dredging disturbance as adults, which will further minimize but not completely eliminate entrainment and subsequent injury or death of these fish.

Exposure and Response to Turbid Conditions: The effects of suspended sediment and turbidity on fish range from beneficial to detrimental. Elevated total suspended solids (TSS) have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival, although elevated TSS have also been reported to cause physiological stress, reduce growth, and adversely affect survival (Newcombe and Jensen 1996). Fish may experience a reduction in predation from piscivorous fish and birds by occupying turbid waters (Gregory and Levings 1998), but chronic exposure to these conditions can cause physiological stress responses that can increase maintenance energy needs and reduce feeding and growth (Lloyd *et al.* 1987; Redding *et al.* 1987; Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish traverse these streams along migration routes (Lloyd *et al.* 1987). Depending on the concentrations of suspended solids and the food supply, juvenile fish will either seek refuge in adjacent areas with less turbidity, or remain in the area, taking advantage of additional cover provided by the turbid water. Death or injury to ESA-listed salmonids directly from an increase in turbidity within the CWD and the disposal pipeline is not likely. Given the small area of river affected and the low densities of ESA-listed juvenile salmonids likely to be present and exposed to elevated turbidity, only a few ESA-listed fish in the action area are likely to experience any of the beneficial or the adverse effects caused by suspended solids as described above.

Exposure and Response to Reduced Benthic Prey: Sub-yearling salmonids in the action area are also likely to be exposed to a slight reduction in forage, described above in the effects on Critical Habitat. Sub-yearlings are actively feeding as they move downstream. Benthic invertebrates provide the primary food source for these fish – dominated by families of midges (Johnson *et al.* 2011). Loss of forage will occur where frequency and duration of the dredging delays natural

recolonization, as dredging operations will disturb benthic habitat and reduce benthic productivity temporarily. Because disturbance to the benthos will be localized and infrequent recolonization of the benthic habitat is relatively rapid – within weeks to months (McCabe *et al.* 1998), and prey availability nearby undisturbed sites will remain unaffected, we expect fish to not have noticeably diminished growth or fitness. The limited and localized loss of prey is not likely to reduce available forage for rearing salmonids in sufficient degree to have an impact on juvenile fish survival. However, juvenile salmonids in the Columbia River estuary primarily feed visually on small invertebrates (i.e., *Dipterans*, *Psychosidadae*, and *Corophium*) (Roegner *et al.* 2004), so their ability to effectively feed will decline with elevated turbidity. This will likely reduce growth, lipid stores, and ultimately fitness and survival in a small number of sub-yearling juvenile fish, which are more likely to be rearing within the CWD.

Summary of Salmonid Response to Effects

When adults and juveniles are considered together, it remains likely that some individual fish will encounter the dredge within their migration corridor, and of these most should not alter their pathway or delay their rate of migration. Adult fish are intent on moving upstream and a small deviation from the migration path will not significantly change overall distribution or risk of predation. Migrating juvenile salmonids will largely avoid the dredging and can move in and out of the turbidity plume. This level of avoidance will be minor and within the normal migration patterns, and thus not likely to increase the risk of predation or otherwise harm these fish, especially adults.

Adult salmonids will easily escape entrainment flows. However, sub-yearling salmonids are less able to escape entrainment and are subject to a wider zone of potential entrainment due to less swimming stamina and speed. Dredging in channel margins and shallows where sub-yearling salmonids congregate is likely to entrain sub-yearlings. The zone of potential entrainment extends one meter from the suction dredge. A few sub-yearling salmonids, including fall LCR Chinook salmon, SR fall Chinook salmon, and CR chum salmon are reasonably certain to be injured or killed over for the 10-year duration of the permit. We cannot quantify the number of sub-yearling salmonids that will be killed from entrainment but expect the numbers to be low based on BMPs that restrict the suction dredge being operated within the water column. However, because the number of sub-yearling salmonids killed or injured will be minimal, entrainment will not meaningfully decrease the abundance or productivity of any of the populations considered in this opinion.

Salmonid foraging in the action area occurs exclusively among juveniles. Few if any individual fish will experience a reduction of food or foraging opportunities due to elevated TSS. Benthic habitat disturbance will be of limited extent, and temporary in nature. However, because the action is essentially repetitive annually and will occur in shallow water preferred by juvenile salmonids, we expect the forage base to be slightly diminished within the action area relative to unaffected adjacent shallow water habitats. The availability of alternative feeding areas and upstream food sources is plentiful so that the cohort of fish present during and for several weeks after the action occurs will not be adversely affected.

Green Sturgeon and Eulachon Exposure and Effects

Green Sturgeon. Few, if any, green sturgeon are likely to be present within the action area during the period in which the action is proposed because they are not known to use the estuary habitat for rearing except during the summer and early fall months (Moser and Lindley 2007). As cited by these authors, commercial catches of green sturgeon peak in October in the Columbia River estuary, and records from other estuarine fisheries (Willapa Bay and Grays Harbor, Washington) support the idea that sturgeon are only present in these estuaries from June until October. However, comprehensive fishery sampling has not been conducted year-round in the Columbia River estuary, and some overlap with sub-adult green sturgeon presence with the proposed dredge timing is therefore possible. In the event that green sturgeon are present during dredging actions in the action area, they are likely to be larger sub-adults that are extremely unlikely to be present within the mostly enclosed CWD. Further, even those that may be present will easily be able to avoid the dredge head without adverse effects from entrainment. Notwithstanding, unpublished photographic evidence of sub-adult sturgeon entrainments from dredging operations elsewhere along the West Coast (maintained on file at NMFS) supports the possibility that green sturgeon could become entrained, as does other published and contractual reports (Buell 1992). Thus, the potential entrainment of green sturgeon by dredging cannot be discounted, even though their co-occurrence within the CWD where dredging will occur is extremely unlikely.

Green sturgeon, if present in the main-stem Columbia River, may encounter the turbid conditions created by the proposed action. Green sturgeon are typically found in turbid conditions and forage in the benthos by stirring up the sediment to access benthic prey such as burrowing shrimp and are thus relatively tolerant of higher suspended sediment concentrations. As such, in the unlikely event that individual green sturgeon are present to encounter turbidity and elevated total suspended solids related to the project, effects on green sturgeon are not expected to rise to the level of take. This conclusion is supported further by recent results in the closely related Atlantic sturgeon, wherein juveniles were experimentally exposed to 100, 250 or 500 mg/L TSS for three consecutive days and found to exhibit no significant effects on survival or swimming performance even while prevented from seeking cleaner waters in the tests (Wilkins *et al.* 2015).

Eulachon. Adult eulachon may be exposed to the effects of the dredging during their annual winter spawning migration through the action area, but the peak of their migration occurs during the latter portion of the IWWW and after (February- March). Migrating adult eulachon will respond similarly to the turbidity as adult salmonids (discussed above), as few individual fish will encounter the dredge within their migration corridor, and of these most will not alter their pathway or delay their rate of migration. The vast majority of eulachon spawning takes place in Washington State tributaries, including the Cowlitz, Elochoman, Kalama, and others. Spawning takes place atop sand and fine gravel substrates to which the eggs adhere and mature, often being transported downstream through this maturation process through sediment transport processes that occur along the riverine corridor. Once eggs are hatched, typically after about 30 days, the larvae disperse throughout the water column and are widely distributed as they drift downstream passively. The proposed work window for this project ends in late February, prior to the peak of eulachon larval outmigration (which occurs from April through June). Thus, outmigration

timing, along with the partially enclosed CWD, significantly reduces the potential of eulachon eggs and larvae to be present in the action area during the dredging and disposal activities.

2.6 Cumulative Effects

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

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

For this action, state or private activities in the vicinity of the project location are expected to cause cumulative effects in the action area. Additionally, future state and private activities in upstream areas are expected to cause habitat and water quality changes that are expressed as cumulative effects in the action area. Our analysis considers: (1) how future activities in the Columbia River basin are likely to influence habitat conditions in the action area; and (2) cumulative effects caused by specific future activities in the vicinity of the project location.

Approximately 6 million people live in the Columbia River basin, concentrated largely in urban centers. The effect of that population is expressed as changes to physical habitat and loadings of pollutants contributed to the Columbia River. These changes were caused by residential, commercial, industrial, agricultural, and other land uses for economic development, and are described in the Environmental Baseline (Section 2.3). The collective effects of these activities tend to be expressed most strongly in lower river systems where the impacts of numerous upstream land management actions aggregate to influence natural habitat processes and water quality. As such, these effects accrue within this action area, though most are generated from actions upstream of the action area. As human population grows, the range of effects described here are likely to intensify.

Resource-based industries (*e.g.*, agriculture, hydropower facilities, timber harvest, fishing, and metals and gravel mining) caused many long-lasting environmental changes that harmed ESA-listed species and their critical habitats, such as basin-wide loss or degradation of stream channel morphology, spawning substrates, instream roughness and cover, estuarine rearing habitats, wetlands, floodplains, riparian areas, water quality (*e.g.*, temperature, sediment, dissolved oxygen, contaminants), fish passage, and habitat refugia. Those changes reduced the ability of populations of ESA-listed species to sustain themselves in the natural environment by altering or interfering with their behavior in ways that reduce their survival throughout their life cycle. The environmental changes also reduced the quality and function of critical habitat PBFs that are necessary for successful spawning, production of offspring, and migratory access necessary for

adult fish to swim upstream to reach spawning areas and for juvenile fish to proceed downstream and reach the ocean. Without those features, the species cannot successfully spawn and produce offspring.

While widespread degradation of aquatic habitat associated with intense natural resource extraction is no longer common, ongoing and future land management actions are likely to continue to have a depressive effect on aquatic habitat quality in the Columbia River basin and within the action area. As a result, recovery of aquatic habitat is likely to be slow in most areas and cumulative effects from basin-wide activities are likely to have a slightly negative impact on population abundance trends and the quality of critical habitat PBFs into the future.

2.7 Integration and Synthesis

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

Most of the component populations of LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, UWR spring-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead, southern green sturgeon, Pacific eulachon, and SRKW are at a low level of persistence, or, at risk of extinction. Individuals from all ESA listed populations are likely to move through or utilize the action area at some point during their life history.

Factoring the current environmental baseline, fish from the component populations that move through and/or use the action area encounter habitat conditions that have been degraded by restricted natural flows, reduced water quality from substantial chemical pollution, loss of functioning floodplains and secondary channels, and loss of vegetated riparian areas and associated shoreline cover. The significance of the degradation is reflected in the limiting factors identified above including habitat access to floodplain and secondary channels, degraded habitat, loss of spawning and rearing space, pollution, juvenile fish stranding, and increased predation, highlighting the importance of protecting current functioning habitat and limiting water quality degradation, minimizing entrainment, and reducing potential predation of ESA-listed fish.

Within this context, the proposed action will create an annual four-month physical disturbance in the water column, and redistribute material from the bottom of the Columbia River. The modified bathymetry within the CWD will be maintained for the duration of the 10-year permit. These habitat alterations will cause displacement of a small number of adult and juvenile fish, as they avoid the dredging operation (entrainment and elevated turbidity), plus a short-term (*weeks* -

month) period in which fish have reduced prey as the benthic biological productivity is reduced, and then re-establishes, in the vicinity of the dredge prism. These alterations will occur each year of the 10-year permit, during the 120-day work window. Finally, entrainment of a few juvenile salmonids is reasonably certain to occur.

The last element in the integration of effects includes a consideration of the cumulative effects anticipated in the action area. Primarily, the recovery of aquatic habitat from the degraded baseline conditions is likely to be slow in most of the action area, and cumulative effects (from continued or increasing uses of the action area) are likely to have a negative impact on habitat conditions, which in turn may cause slight negative pressure on population abundance trends in the future.

However, even when we consider the current status of the threatened and endangered fish populations and degraded environmental baseline within the action area, the proposed action itself is not expected to affect abundance, distribution, diversity, or productivity of any of the component populations of the ESA-listed species, nor further degrade baseline conditions or limiting factors. The effects of the action will be too minor to have a measurable impact on the affected populations. Because the proposed action will not reduce the abundance, productivity, spatial structure, or diversity of the affected populations, the action, when combined with a degraded environmental baseline and additional pressure from cumulative effects, will not appreciably reduce the survival or recovery of any of the listed species considered in this opinion.

In the context of the status of designated critical habitat and the specific baseline conditions of PBFs in the action area, the proposed action will not obstruct the passage of migrating fish, reduce cover, remove riparian vegetation, alter flows, destabilize the channel or change its characteristics, alter water temperature, or substantially reduce available forage. However, the proposed action will temporarily effect safe migration corridors, forage, and water quality PBFs within the action area. When considering the cumulative effects of non-federal actions, recovery of aquatic habitat is likely to be slow in most of the action area and cumulative effects from basin-wide activities are likely to have a slightly negative impact on the quality of critical habitat PBFs.

As a whole, the critical habitat for migration and rearing is functioning moderately under the current environmental baseline in the action area. Given that the proposed action will have low-level and periodic but largely temporary effects on the PBFs for migration and rearing for salmonids and estuarine areas for eulachon and green sturgeon, even when considered as an addition to the baseline conditions, the proposed action is not likely to appreciably diminish the value of designated critical habitat for the conservation of subject species of this consultation.

In summary, ESA listed salmon and steelhead, eulachon, and green sturgeon occupying the action area will be exposed to suspended sediment that originates from the suction dredge and a reduction in benthic prey availability. Dredging-caused entrainment, turbidity, and loss of benthic prey are of limited duration, and we expect BMPs to lower intensity. NMFS analysis did not identify entrainment, turbidity or reduced prey availability effects with intensities or durations that would result in a reduction of the conservation value of designated critical habitats or reductions in abundance and productivity of exposed populations, thus the survival and

recovery of ESA listed species are also not reduced. As such, the proposed action will not reduce the survival or recovery of ESA-listed species within the Columbia River.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, UWR spring-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead, southern DPS of green sturgeon, or southern DPS of eulachon or destroy or adversely modify its designated critical habitat. The USACE can confirm this conclusion if the affected area is included in the final designation.

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.

NMFS has not yet promulgated an ESA section 4(d) rule prohibiting take of threatened eulachon. Therefore to the extent this ITS contains RPMs and terms and conditions that address requirements other than monitoring, those are voluntary until any future 4(d) rule goes into effect. However, our jeopardy analysis is based on anticipated levels of eulachon incidental take and so we have included a take indicator for eulachon that will function as a reinitiation check on that jeopardy conclusion. Monitoring requirements related to the take indicator go into effect immediately so that there is a way to know if the reinitiation trigger has been exceeded [50 CFR 402.14(i)(3)].

2.9.1 Amount or Extent of Take

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

The proposed dredging will take place when juvenile and/or adult individuals of LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, UWR Chinook salmon, Columbia River chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SR steelhead, UWR steelhead and eulachon are reasonably certain (or conservatively assumed—green sturgeon) to be present.

Incidental take caused by the adverse effects of the proposed action will include injury or death of a small number of ESA-listed fish due to entrainment during suction dredging, and behavioral avoidance response effects due to a temporary localized increased turbidity during dredging and disposal. Take by these mechanisms will affect juvenile ESA-listed salmon and steelhead (entrainment, turbidity, and forage), sub-adult green sturgeon (forage) and Pacific eulachon (egg/larvae entrainment, all life stages turbidity).

Due to the overall nature of the proposed action, a definitive number of ESA-listed fish that will be killed, injured or otherwise adversely affected cannot be determined and/or adequately detected. Instead NMFS will use a habitat-based surrogate to account for the amount of take, which is called an “extent” of take. For this proposed action, the potential for entrainment, being exposed to elevated turbidity and reductions in forage for juvenile salmonids, sub-adult green sturgeon, and eggs/larvae of Pacific eulachon is directly related to the amount of time that the suction dredge is operating. Since the potential for ESA listed fish to be entrained, exposed to elevated turbidity, and experience reduced foraging opportunities is most directly measured by the amount of time the dredge is actively operating, the extent of take identified for the proposed action has been related to the number of days of dredging per year. For the proposed action, this is up to 120 days of dredging per calendar year for 10 years during IWWW, dredging operations that exceed 120 days or are outside of IWWW, and increase the probability of more individuals being exposed to the effects of the action described above. The number of days of dredging per year is a threshold for reinitiating consultation. Exceeding this indicator for extent of take will trigger the reinitiation provisions of this opinion.

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).

1. Minimize incidental take by minimizing entrainment during dredging;
2. Minimize incidental take by minimizing turbidity; and
3. Ensure completion of an annual monitoring and reporting program to confirm 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 USACE or the Port of Astoria must comply with them in order to implement the RPMs (50 CFR 402.14). The USACE or the Port of Astoria has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

- 1) The following term and condition implements reasonable and prudent measure 1, minimize entrainment during dredging:
 - a) The Port of Astoria shall ensure that during dredging and active pumping of sediment, the suction dredge will remain in contact with the river bottom to the maximum extent possible, and will be raised no more than 1 meter above the bottom so as to reduce the likelihood of pulling fish from the water column into the dredge.
 - b) USACE shall ensure in-water work will be performed in accordance with permit conditions, which set timing restriction for in-water work of November 1 – February 28.
- 2) The following term and condition implements reasonable and prudent measure 2, minimize turbidity during dredge disposal:
 - a) Port of Astoria, shall ensure turbidity remains at background levels 300 ft downstream during dredging and placement operations by adhering to dredge management protocols including monitoring and compliance reporting of turbidity levels observed during dredging operations.
- 3) The following term and condition implements reasonable and prudent measure 3, monitoring and reporting:
 - a) Action Monitoring. The applicant shall submit a monitoring report to NMFS by March 31 of each year summarizing the following for the previous calendar year:
 - i) Hours of dredging for each day dredging occurred
 - ii) The number of days dredging occurred each month
 - iii) The number of days of dredging occurred for the previous calendar year
 - iv) The extent and depth of dredging conducted for the calendar year
 - v) Whether turbidity compliance was met.
 - b) Monitoring reports shall be submitted to:
 - i) National Marine Fisheries Service
Oregon Washington Coastal Office
Attn: Joshua Ashline (WCRO-2019-02481)
510 Desmond Drive SE, Suite 103
Lacey, Washington 98503

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding

discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

The following conservation recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the USACE:

1. Use floating silt curtains around the in-water dredge area to minimize the dispersion of suspended sediment thereby reducing turbidity.
2. The USACE should conduct an analysis of the entrainment of eulachon during hydraulic dredging, and of the potential modifications of dredging practices to further minimize entrainment of these species.
3. The USACE should develop and carry out a monitoring and reporting program to develop basic data on eulachon presence and timing in proximity within the Lower Columbia River during winter dredging.
 - a. Should conservation recommendation 2 be implemented, we request the following information.
 - i. Name, address, and qualifications of the supervising biologist.
 - ii. River temperature and discharge at time of sampling.
 - iii. Methods used to capture eggs and larvae.
 - iv. Methods used to process content sampled.
 - v. For each sample:
 - (1) Date sampled.
 - (2) Location sampled.
 - (3) Sampling starting and ending times.
 - (4) Starting and ending flow meter values.
 - (5) River temperature.
 - (6) Field observations
 - (7) Number of eggs and larvae collected by date and sample number.
 - (8) For each date sampled, indicate if pumping also occurred that date.
 - (9) Please send the requested information to:
National Marine Fisheries Service, Oregon-Washington Coastal Area Office, Attn: Joshua Ashline (WCRO-2019-02481), 510 Desmond Drive Southeast, Suite 103, Lacey, Washington 98503-1263.

Please notify NMFS if the USACE carries out either of these recommendations 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 Port of Astoria Maintenance Dredging.

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

2.12 “Not Likely to Adversely Affect” Determinations

Southern Resident Killer Whale

SRKW move into the coastal waters along the outer coast from the Queen Charlotte Islands south to central California, including coastal Oregon and off the Columbia River although they do not have critical habitat designated in Oregon (NMFS, 2008). SRKW have been documented in the Columbia River plume (Zamon *et al.*, 2007). SRKW primarily eat salmon, and prefer Chinook salmon (Hanson *et al.*, 2010; NMFS, 2008; Ford 2013).

There are only two confirmed cases of SRKW injuries and deaths due to boat strikes since 2005 (Carretta *et al.* 2019; Gaydos and Raverty 2007). There was documentation of a whale-boat collision in Haro Strait (Puget Sound) in 2005 which resulted in a minor injury to a whale. In 2006, whale L98 was killed during a vessel interaction. It is important to note that L98 had become habituated to regularly interacting with vessels during its isolation in Nootka Sound. Both of these collisions were from small vessels. There are two other cases that may or may not be caused by boat strike, but for purposes of this biological opinion (assuming worst-case scenario) we will assume they are. In 2012, a moderately decomposed juvenile female (L-112) was found dead near Long Beach, WA. A full necropsy determined the cause of death was blunt force trauma to the head, however the source of the trauma could not be established (Carretta *et al.* 2019). Similarly, in 2016, a young adult male (J34) was found dead in the northern Georgia Strait. His injuries were consistent with those incurred during a vessel strike, though a final determination has not been made (Carretta *et al.* 2019).

From 1982-2016, there were 49 confirmed sightings of SRKW in coastal waters off the western U.S. No documented SRKW deaths or strandings have occurred near the action area. The relatively small action area, low presence of SRKW in the action area, and the lack of interactions with large ships through reporting or the stranding network, with none near the action area, leads us to conclude that risk of collision from vessels is discountable.

The sound from OGVs is largely low frequency sound that does not overlap with the most sensitive hearing range of SRKW (Gordon and Moscrop 1996; Holt 2008; Richardson *et al.* 1995). Vessel sound may still be audible to the whales, but any disturbance from the sound of passing OGVs is expected to be short-term, transitory, and insignificant. Therefore, acoustic effects of the proposed action will be insignificant on SRKW and proposed SRKW critical habitat.

The proposed action may affect SRKW indirectly by reducing availability of their primary prey, Chinook salmon. The proposed activities are not expected to produce a measurable effect on the abundance, distribution, diversity, or productivity of Chinook salmon at either the population or species level. Given the total quantity of prey available to SRKW throughout their range, this reduction in prey is extremely small, and is not anticipated to be different from zero by multiple decimal places (based on NMFS previous analyses of the effects of in-river salmon harvest on SRKW, e.g. NMFS No. WCR-2017-7164). Because the reduction is so small, there is also a low probability that any juvenile Chinook salmon killed by the proposed activities would have later (in 3-5 years' time) been intercepted by the SRKW across their vast range in the absence of the proposed activities. Therefore, the anticipated reduction of salmonids associated with the proposed action would result in an insignificant reduction in adult equivalent prey resources for SRKW and an insignificant effect on proposed SRKW critical habitat.

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

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects 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) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by the USACE and descriptions of EFH for Pacific Coast salmon (PFMC 2014), and Pacific Coast groundfish (PFMC 2005) 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

As part of the information provided in the request for ESA concurrence, the USACE determined that the proposed action may have an adverse effect on EFH designated for Pacific Coast Salmon, Pacific Coast groundfish, specifically the habitat areas of particular concern (HAPC) include, coastal estuary habitats. The effects of the proposed action on EFH are the same as those

described above in the ESA portion of this document and NMFS concurs with the findings in the EFH assessment.

3.2 Adverse Effects on Essential Fish Habitat

The proposed dredging will temporarily disturb benthic habitat and create turbidity affecting forage production and local hydraulic conditions. Overall, the area of disturbance is relatively small in relation to the Columbia River Estuary, partially disconnected/isolated from the main-stem Columbia River, the disturbance will be short-lived, will maintain current conditions, and will not change the functional characteristics of the habitat.

3.3 Essential Fish Habitat Conservation Recommendations

The effects of the proposed dredging activity will be contained and turbidity minimized by use of the suction dredge and monitoring and controlling discharge of return waters at the material disposal site. To minimize the effects on Pacific Coast salmon and Pacific Coast groundfish EFH, including coastal estuary habitat HPAC the USACE should: (1) ensure that during dredging and active pumping of sediment, the suction dredge will remain in contact with the river bottom to the maximum extent possible, and will be raised no more than 3 feet above the bottom, and (2) ensure in-water work will be performed in accordance with permit conditions, which set timing restrictions for in-water work of November 1 to February 28.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, approximately 40 acres of designated EFH and HAPC for Pacific Coast salmon, and Pacific Coast groundfish.

3.4 Statutory Response Requirement

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

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

3.5 Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are USACE. Other interested users could include the Port of Astoria, and Campbell Environmental LLC. Individual copies of this opinion were provided to the USACE. The document will be available within two weeks at the NOAA Library Institutional Repository [<https://repository.library.noaa.gov/welcome>]. The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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US Army Corps
of Engineers®
Portland District

Compliance Certification

1. **Permit Number:** NWP-2004-369/14

2. **Permittee Name:** Port of Astoria

3. **County Location:** Clatsop County

Upon completing the activity authorized by the permit, please complete the sections below, sign and date this certification, and return it to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch. The certification can be submitted by email at cenwp.notify@usace.army.mil or by regular mail at the following address:

U.S. Army Corps of Engineers
CENWP-OD-GL
P.O. Box 2946
Portland, OR 97208-2946

4. **Corps-required Compensatory Mitigation (see permit special conditions):**

a. Mitigation Bank / In-lieu Fee Credit Transaction Documents:

☐ Not Applicable ☐ Submitted ☐ Enclosed

b. Permittee-responsible mitigation (e.g., construction and plantings) has been constructed (not including future monitoring). As-built report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

5. **Endangered Species Act – Standard Local Operating Procedures (SLOPES)**

(see permit special conditions):

a. SLOPES Action Completion Report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

b. SLOPES Fish Salvage Report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

c. SLOPES Site Restoration / Compensatory Mitigation Report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

I hereby certify the work authorized by the above-referenced permit has been completed in accordance with all of the permit terms and conditions.

Signature of Permittee

Date

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
☎ 503-986-5200

Permit No.:	19212-RF Renewal
Permit Type:	Removal/Fill
Waterway:	Columbia River
County:	Clatsop
Expiration Date:	January 24, 2031

PORT OF ASTORIA

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE REFERENCED COPY OF THE APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder shall obtain all necessary access permits or rights-of-way before entering lands owned by another. For new linear facility projects, the removal-fill activity cannot occur until the permit holder obtains either the landowner's consent, a right, title or interest with respect to the property that is sufficient to undertake the removal or fill activity, or a court order or judgment authorizing the use of the property.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action, which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. Employees of the Department of State Lands and all duly authorized representatives of the Director shall be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
6. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within twenty-one (21) calendar days of the date this permit was issued.
7. In issuing this permit, the Department of State Lands makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390, and related administrative rules.
8. Permittee shall defend and hold harmless the State of Oregon, and its officers, agents, and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.
9. Authorization from the U.S. Army Corps of Engineers may also be required.

NOTICE: If removal is from state-owned submerged and submersible land, the applicant must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 to 274.940. This permit does not relieve the permittee of an obligation to secure appropriate leases from the Department of State Lands, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact the Department of State Lands at 503-986-5200.

Robert Pennington, Aquatic Resource Coordinator
Aquatic Resource Management
Oregon Department of State Lands


Authorized Signature

12/12/2025

ATTACHMENT A

Permittee: Port of Astoria

**Project Name: Maintenance Dredging Slips 1 and 2, the Faces of Piers
1, 2 and 3 and Barge Dock**

Special Conditions for Removal/Fill Permit No. 19212-RF

READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT.

The project site may be inspected by the Department of State Lands (DSL) as part of our monitoring program. DSL has the right to stop or modify the project at any time if you are not in compliance with these conditions. A copy of this permit shall be available at the work site whenever authorized operations are being conducted.

- 1. Responsible Party:** By proceeding under this permit, Port of Astoria agrees to comply with and fulfill all terms and conditions of this permit, unless the permit is officially transferred to another party as approved by DSL.
- 2. Authorization to Conduct Removal and/or Fill:** This permit authorizes the placement of up to 525,000 cubic yards in the flow lane of the Columbia River and removal of up to 525,000 cubic yards of material in T8N R10W Section 12A, Tax Lot 100 within the Columbia River in Clatsop County, as described in the referenced renewal permit application, map and drawings, received December 3, 2025. In the event information in the application conflicts with the permit conditions, the permit conditions prevail.
- 3. Work Period in Jurisdictional Areas:** Fill or removal activities below the ordinary high water elevation of the Columbia River shall be conducted between November 1 and February 28, unless otherwise coordinated with Oregon Department of Fish and Wildlife and approved in writing by DSL.
- 4. Changes to the Project or Inconsistent Requirements from Other Permits:** It is the permittee's responsibility to ensure that all state, federal and local permits are consistent and compatible with the final approved project plans and the project as executed. Any changes made in project design, implementation and/or operating conditions to comply with conditions imposed by other permits must be approved by DSL prior to implementation.
- 5. DSL May Halt or Modify:** DSL retains the authority to temporarily halt or modify the project in case of unforeseen damage to natural resources.
- 6. DSL May Modify Conditions Upon Permit Renewal:** DSL retains the authority to modify conditions upon renewal, as appropriate, pursuant to the applicable rules in effect at the time of the request for renewal or to protect waters of this state.

Pre-Construction

- 7. Local Government Approval Required Before Beginning Work:** Issuance of this permit is contingent upon acquisition of final approval from the City of Astoria of items listed in Block 10 of the application received July 24, 2014.

General Construction Conditions

8. **Water Quality Certification:** The Department of Environmental Quality (DEQ) may evaluate this project for a Clean Water Act Section 401 Water Quality Certification (WQC). If the evaluation results in issuance of a Section 401 WQC, that turbidity condition will govern any allowable turbidity exceedance and monitoring requirements.
9. **Hazardous, Toxic, and Waste Material Handling:** Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, wood treated with leachable preservatives or other deleterious waste materials shall not be allowed to enter waters of this state. Machinery refueling is to occur at least 150 feet from waters of this state and confined in a designated area to prevent spillage into waters of this state. Barges shall have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state shall be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.
10. **Federally Listed Endangered or Threatened Species:** When listed species are present, the authorization holder must comply with the Federal Endangered Species Act. If previously unknown listed species are encountered during construction, all construction activity shall immediately cease and the permit holder must contact DSL.
11. **Archaeological Resources:** If any archaeological resources, artifacts or human remains are encountered during construction, all construction activity must immediately cease. The State Historic Preservation Office must be contacted at 503-986-0674. You may be contacted by a Tribal representative if it is determined by an affected Tribe that the project could affect Tribal cultural or archeological resources.
12. **Hazards to Recreation, Navigation or Fishing:** The activity shall be timed so as not to interfere with or create a hazard to recreational or commercial navigation or fishing.

Maintenance Dredging

13. **Extent of Dredging:** Maintenance dredging activity shall be limited to the area defined in the Application, Table 1 and Figures 4a-d.
14. **Removal Depth:** Removal depths of particular subsurface dredged material management units (DMMU) as shown on the 2024 'Authorized Dredge Depth (MLLW)' column of Table 1 of the application received December 3, 2025 are limited to depths approved for flow lane disposal (unconfined aquatic placement) by the Portland Sediment Evaluation Team in their October 31, 2024 Suitability Determination Memorandum, and October 14, 2025, Suitability Determination Memorandum, Table 4, both received by the Department December 3, 2025.
15. **Beneficial Use of State-Owned Dredged Materials:** Any beneficial reuse of dredged materials derived from State-owned submerged or submersible land may be subject to a license from, and royalty payments to, DSL.

16. **Removal by Closed Bucket:** To the extent material characteristics allow, the bucket must be sealed in the closed position to minimize sediment re-suspension. Moving material on the bottom to consolidate it before lifting is prohibited.
17. **Pipeline Hydraulic Dredge Operation:** For material removed by hydraulic pipeline dredge, the working end of the dredge ladder shall be kept buried at least 24 inches below the bottom of the river. The intake may be raised no more than 3 feet above the bed for minimum time necessary for purging or flushing.
18. **Fish Impingement or Entrainment:** The authorization holder shall immediately report any fish observed that are impinged or entrained by operations to the Oregon Department of Fish and Wildlife at (503) 657-2000. The permittee shall provide access for ODFW to enter the project site for making fish entrainment observations.

ATTACHMENT B

Permit Holder: Port of Astoria

Project Name: Maintenance Dredging Slips 1 and 2, the Faces of Piers
1, 2 and 3 and Barge Dock

Maps and Drawings for Removal-Fill Permit No. 19212-RF

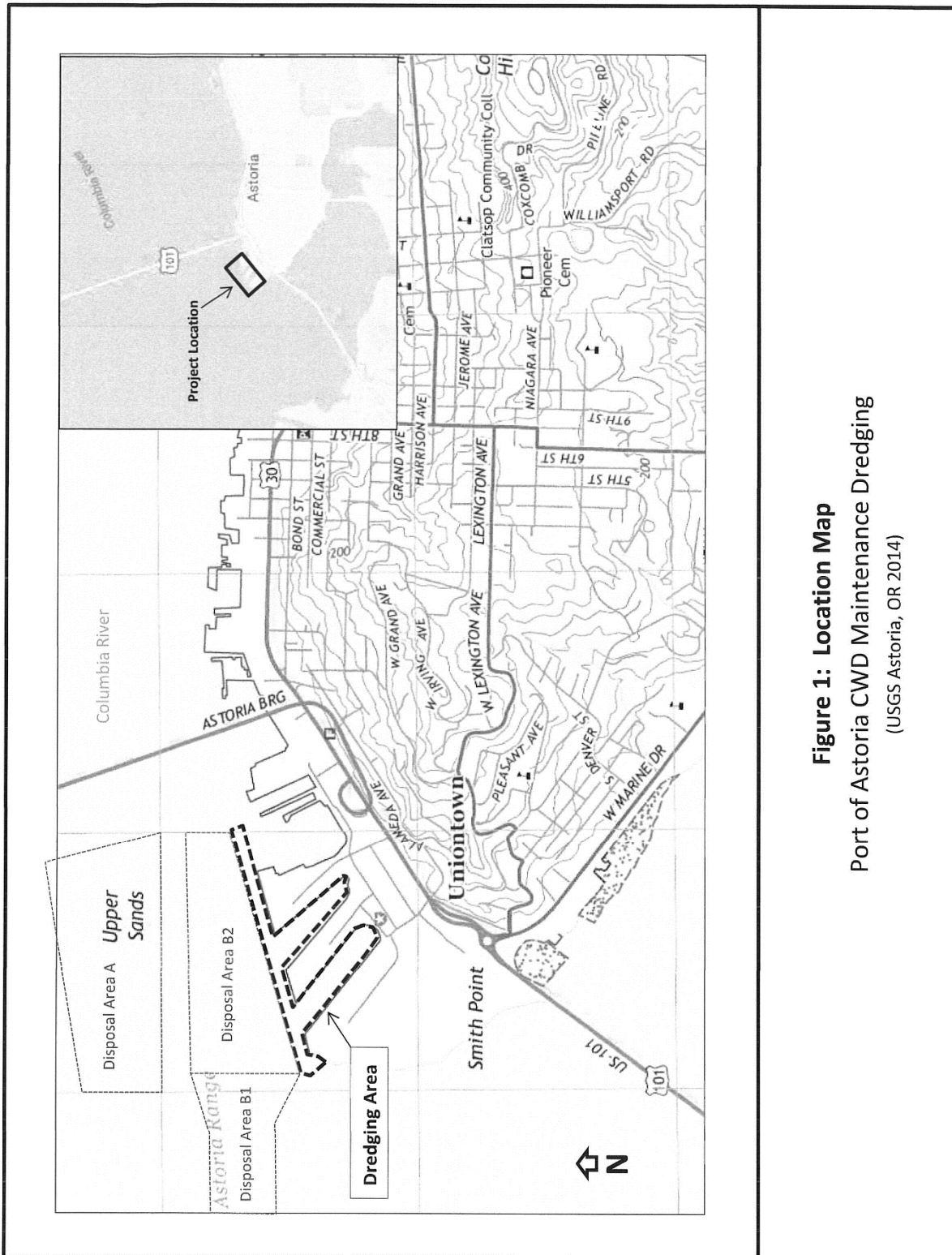


Figure 1: Location Map
Port of Astoria CWD Maintenance Dredging
(USGS Astoria, OR 2014)

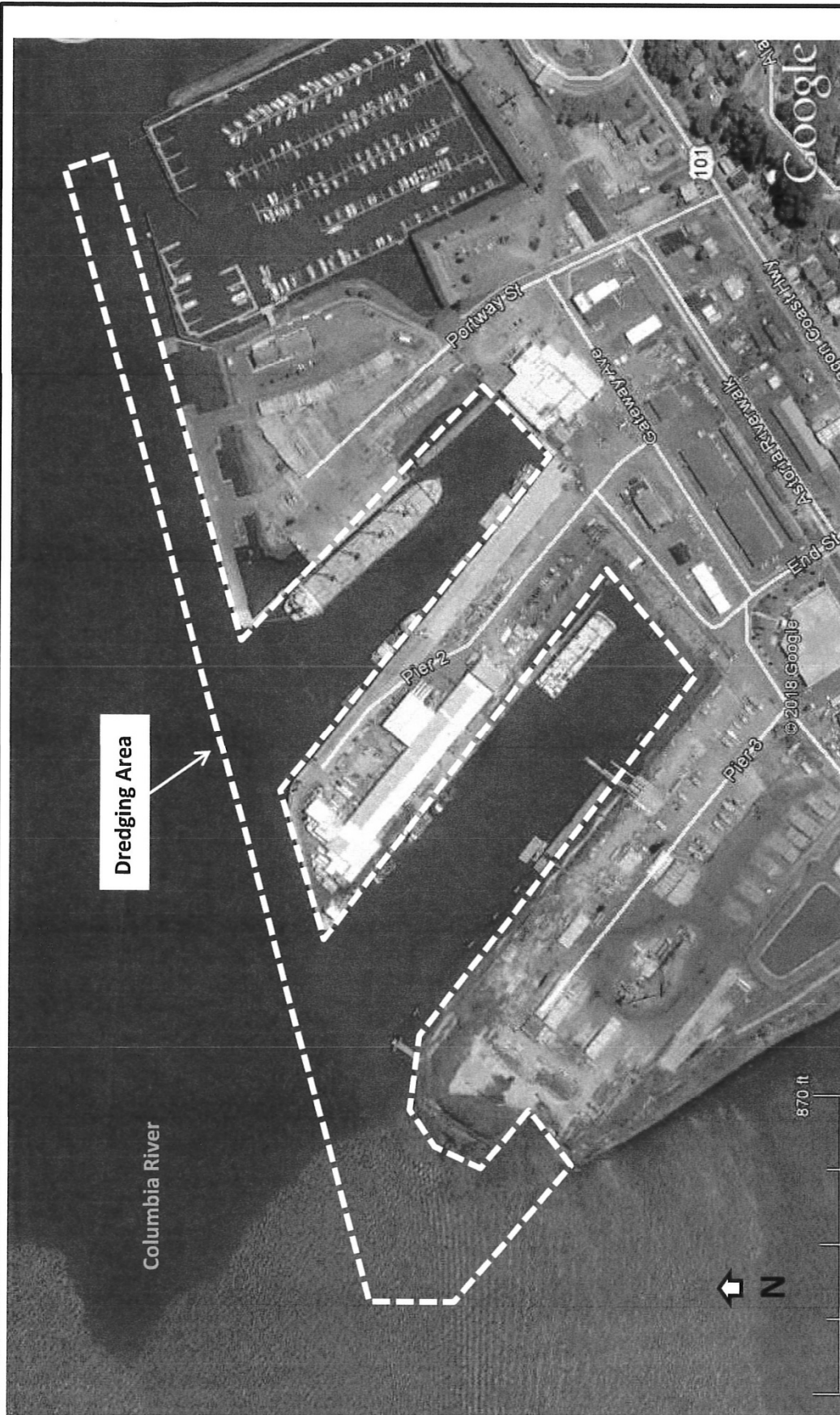


Figure 3: Aerial Photograph
Port of Astoria CWD Maintenance Dredging
(Google Earth 2018)

Table 1. Comparison of Previous (2018) and Revised (2024) DMMUs, Dredge Depths, and Quantities¹.

2018 DMMUs	Area (acres)	Dredge Volume (cu. yds.)	Dredge Depth (MLLW)	2024 DMMUs	Area (acres)	Dredge Volume (cu. yds.)	Authorized Dredge Depth (MLLW)
1A	3.7	45,000 (one time) ≤12,000 annually	-24	1A	3.7	45,000	-24
1B	3.2	39,300 (one time) ≤10,000 annually	-45	1B	3.2	60,000	-45
1C	5.9	35,000 (one time) ≤19,000 annually	-45	1C	6.1	108,000	-45
1D	2.1	5,500 (one time) ≤5,000 annually	-40	1D	2.7	33,000	-40
2	5.31	38,000 (one time) ≤17,000 annually	-43	2A – 2J	4.3	76,000	-32
2A	1.1	20,100 (one time) ≤4,000 annually	-30	2K	1.3	28,000	-28
3	3.11	20,600 (one time) ≤10,000 annually	-43	3A & 3B	3.2	80,000	-33
4	4.27	17,700 (one time) ≤14,000 annually	-38	4B	2.0	55,000	-33
				4C	n/a	no dredging	n/a
4A	2.4	5,200 (one time) ≤8,000 annually ²	-25	4A	2.1	40,000	-25
5	.37	4,000 (one time) ≤1,000 annually ²	-18	5	n/a	no dredging	n/a
Total	31.46	230,400 (one time) ≤100,000 annually		Total	28.6	525,000 (~100,000 annually)	Total

¹ART (Advanced Remediation Technologies). 2024.

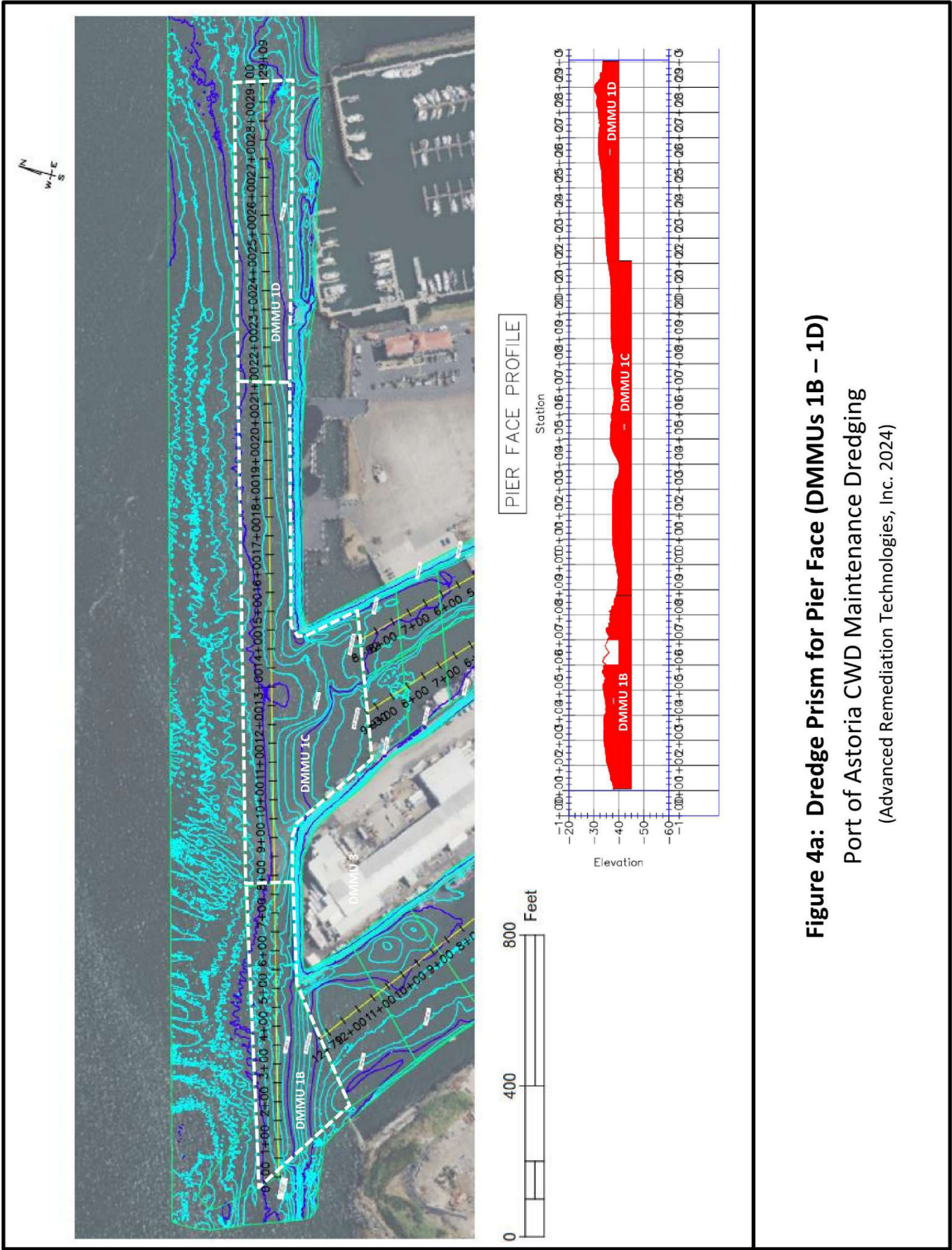


Figure 4a: Dredge Prism for Pier Face (DMMUs 1B – 1D)
Port of Astoria CWD Maintenance Dredging
(Advanced Remediation Technologies, Inc. 2024)

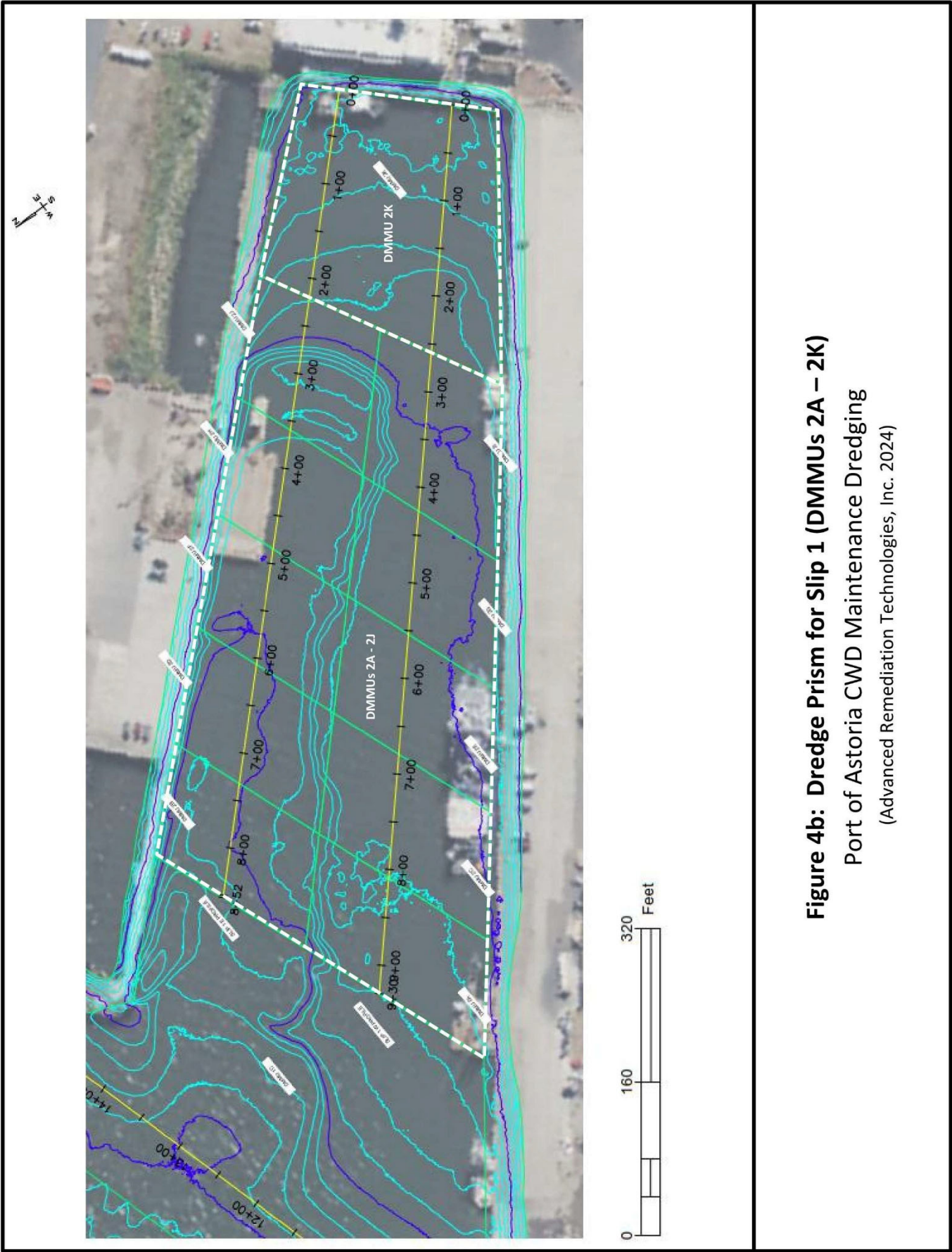


Figure 4b: Dredge Prism for Slip 1 (DMMUs 2A – 2K)
Port of Astoria CWD Maintenance Dredging
(Advanced Remediation Technologies, Inc. 2024)

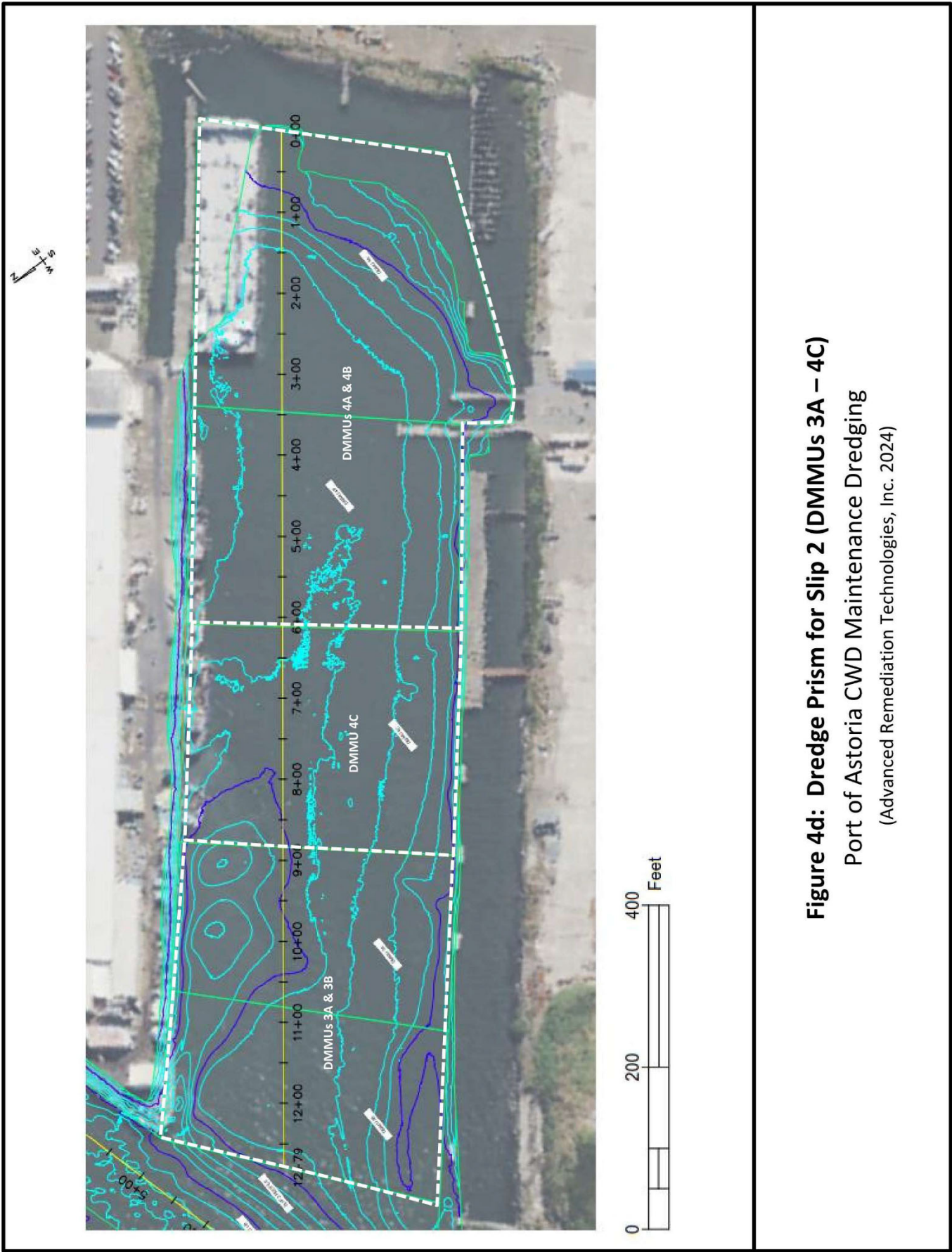
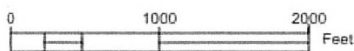
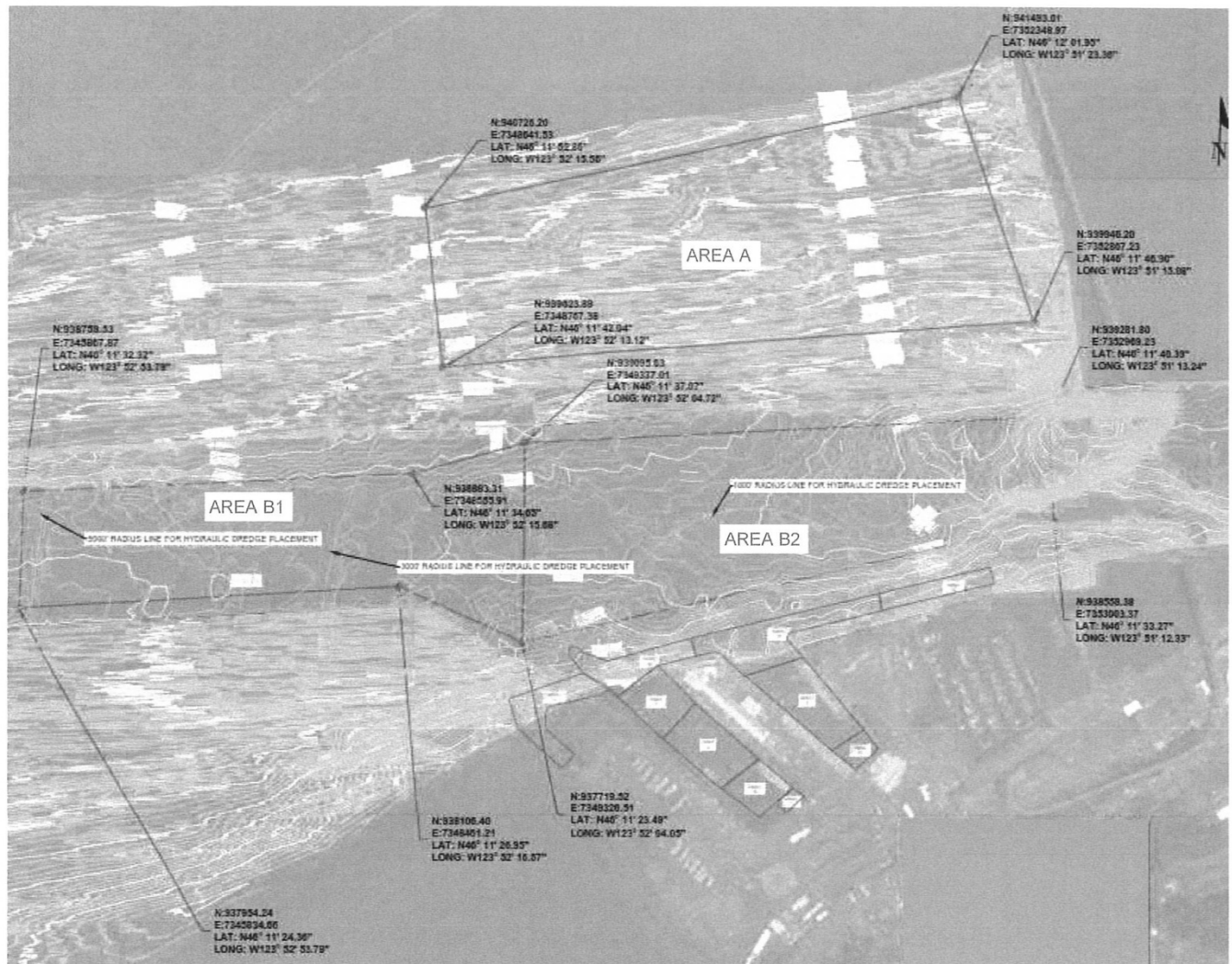


Figure 4d: Dredge Prism for Slip 2 (DMMUs 3A – 4C)
Port of Astoria CWD Maintenance Dredging
(Advanced Remediation Technologies, Inc. 2024)



NOTE:

DREDGE MATERIAL PLACEMENT AREA (A) IS APPROXIMATELY 121 ACRES. AREA CAN ACCEPT UP TO 411,400 YD³, ASSUME 70% USAGE OF THE AREA (85 ACRES) PLACEMENT DEPTH OF 3 FT MAXIMUM. 500 FT DOWNSTREAM OF BRIDGE.

HYDRAULIC DREDGE PLACEMENT CENTERED FROM FACE OF SLIP 1. FLOWLANE PLACEMENT AT DEPTHS GREATER THAN -45 MLLW (AREA B1: APPROXIMATELY 68.5 ACRES, AREA B2: 88.2 ACRES).

Figure 5: Proposed Dredge Disposal Locations
Port of Astoria CWD Maintenance Dredging
(Advanced Remediation Technologies, Inc. 2019)

West Basin Marina Permits

U.S. Army Corps of Engineers Permit NWP-2009-565-1 (issued October 11, 2022)

Oregon Department of State Lands Permit 60404-RF (issued August 9, 2022).

DEPARTMENT OF THE ARMY PERMIT

Permittee: Port of Astoria (Shane Jensen)

Permit No: NWP-2009-565-1

Issuing Office: U.S. Army Corps of Engineers, Portland District

NOTE: The term "you" and its derivatives as used in this permit means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The West Basin Marina maintenance dredging project involves dredging up to 109,000 cubic yards of accumulated sediment from approximately 11.26 acres within the West Basin Marina over the course of 10 years in order to maintain the required moorage depth.

Up to 54,500 cubic yards of accumulated sediment would be dredged during the first year of the permit and up to 54,500 additional cubic yards would be dredged over the remaining 9 years of the requested 10 year permit.

The dredge depth will range from -6.0 to -17.0 feet Mean Lower Low Water (MLLW). The applicant will utilize a suction dredge operating from a floating barge while disposing of the dredged material in the flow lane of the Columbia River via a submerged pipe.

Purpose: Maintenance dredging.

Project Location: The project site is located at the West Basin Marina on the Columbia River, River Mile 13.5, Astoria, Clatsop County, Oregon. The site is in Section 7, Township 8 North, Range 9 West (Latitude North: 46.1895°, Longitude West: -123.855078°).

Drawings: Eight (8) drawings/maps (Enclosure 1).

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on November 15, 2027. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition No. 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. A conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions (Enclosure 2).
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

- a. The permittee understands and agrees that if future operations by the United States require the removal, relocation, or other alteration of the structure or work herein authorized, or if in the opinion of the Secretary of the Army or their authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required upon due notice from the U.S Army Corps of Engineers to remove, relocate, or alter the structural work or obstructions caused thereby without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.
- b. Upon starting the activities authorized in this permit letter, Permittee shall notify the U.S. Army Corps of Engineers, Portland District, Regulatory Branch the work has started. Notification shall be provided by telephone at (503) 808-4368 or sent by e-mail to: cenwp.notify@usace.army.mil and the e-mail subject line shall include: Corps No.: NWP-2009-565-1 and Clatsop County.
- c. Permittee shall comply with the conditions specified in the Oregon Department of Land Conservation and Development coastal zone management consistency determination dated November 14, 2017 (Enclosure 3).

- d. Permittee shall perform all in-water work, including temporary fills or structures, during the in-water work window of November 1 to February 28, to minimize impacts to aquatic species unless coordinated with and subsequently approved by the Corps.
- e. During maintenance dredging, the transition zone between the depths of Dredged Material Management Unit (DMMU) 4 and DMMU 5 shall be maintained at a slope of 2 to 1 (horizontal to vertical) to minimize sloughing of potentially contaminated material from DMMU 5 into DMMU 4.
- f. The data recency determination requires sediment resampling of DMMU 5 by November 2019 and of DMMU's 1-4 by November 2021.
- g. Permittee shall dispose of dredged material in the designated location shown on Enclosure 1. No material shall be placed during the slack following ebb tide. After each 10,000 cubic yards of material placement, the end of the discharge pipe shall be moved a minimum of 500-600 feet from its previous location. In addition, the location of the discharge pipe shall alternate from one side of the placement area to the other for each move.
- h. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify NMFS' Office of Law Enforcement at 503-231-6240 or 206-526-6133. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by the Office of Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.
- i. Permittee shall comply with the all of the Reasonable and Prudent Measures (RPMs) and Nondiscretionary Terms and Conditions (T&C) contained in National Marine Fisheries Service (NOAA Fisheries) biological opinion (BiOp) dated October 31, 2017 (Enclosure 4). The RPM's and T&C's are found on pages 38 and 39 of the BiOp.
- j. Permittee shall provide a copy of this permit to all contractors. The permit shall be available on the vessels used for dredging and authorized transportation and disposal of dredged material.
- k. Permittee shall conduct pre-dredge surveys, post-dredge surveys and placement surveys and reports within 60 days of dredging/placement. Reports will contain figures and will include the following information: dredging/placement dates, locations, volumes, acreages, dredge depths, placement thickness, photographs, debris and biological observations, and hydrosurveys.
- l. Permittee shall submit an after-action completion report for each dredging event authorized by the Corps, to the Corps and NMFS within 60 days of completing all work below ordinary high water. If annual or bi-annual actions are carried out during the life of the Corps authorization, action completion reporting shall occur following each event along with a table summarizing the amount of material per dredge event and totaled to date. Notification shall be

sent by email to cenwp.notify@usace.army.mil.

m. Permittee shall notify the U.S. Army Corps of Engineers, Portland District, Channels and Harbors, Waterways Maintenance Branch in writing 15 days prior to the start of dredging. Written correspondence must be addressed to:

ATTN: CENWP-OD-NW
PO Box 2946
Portland, Oregon 97208-2946

n. Permittee shall notify the U.S. Coast Guard District Thirteen of the project by e-mail at D13-PF-LNM@uscg.mil at least 14 days prior to commencing dredging operations, so the project information can be issued in the Local Notice to Mariners.

o. Permittee shall submit a signed certification regarding the completed work and any required mitigation. A "Compliance Certification" is provided (Enclosure 5).

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

- (X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
- (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
- () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this Authorization:

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

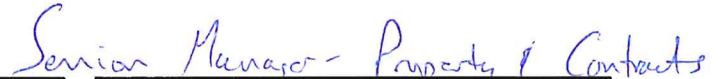
6. Extensions: General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.


(PERMITTEE SIGNATURE)


(DATE)


(PRINTED NAME)


(TITLE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

**FOR THE COMMANDER, AARON L. DORF, COLONEL, CORPS OF ENGINEERS,
DISTRICT COMMANDER:**

(DISTRICT COMMANDER)

(DATE)

Shawn H. Zinszer
Chief, Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign below.

PERMIT TRANSFEREE:

Transferee Signature

DATE

Name (Please print)

Address

City, State, and Zip Code

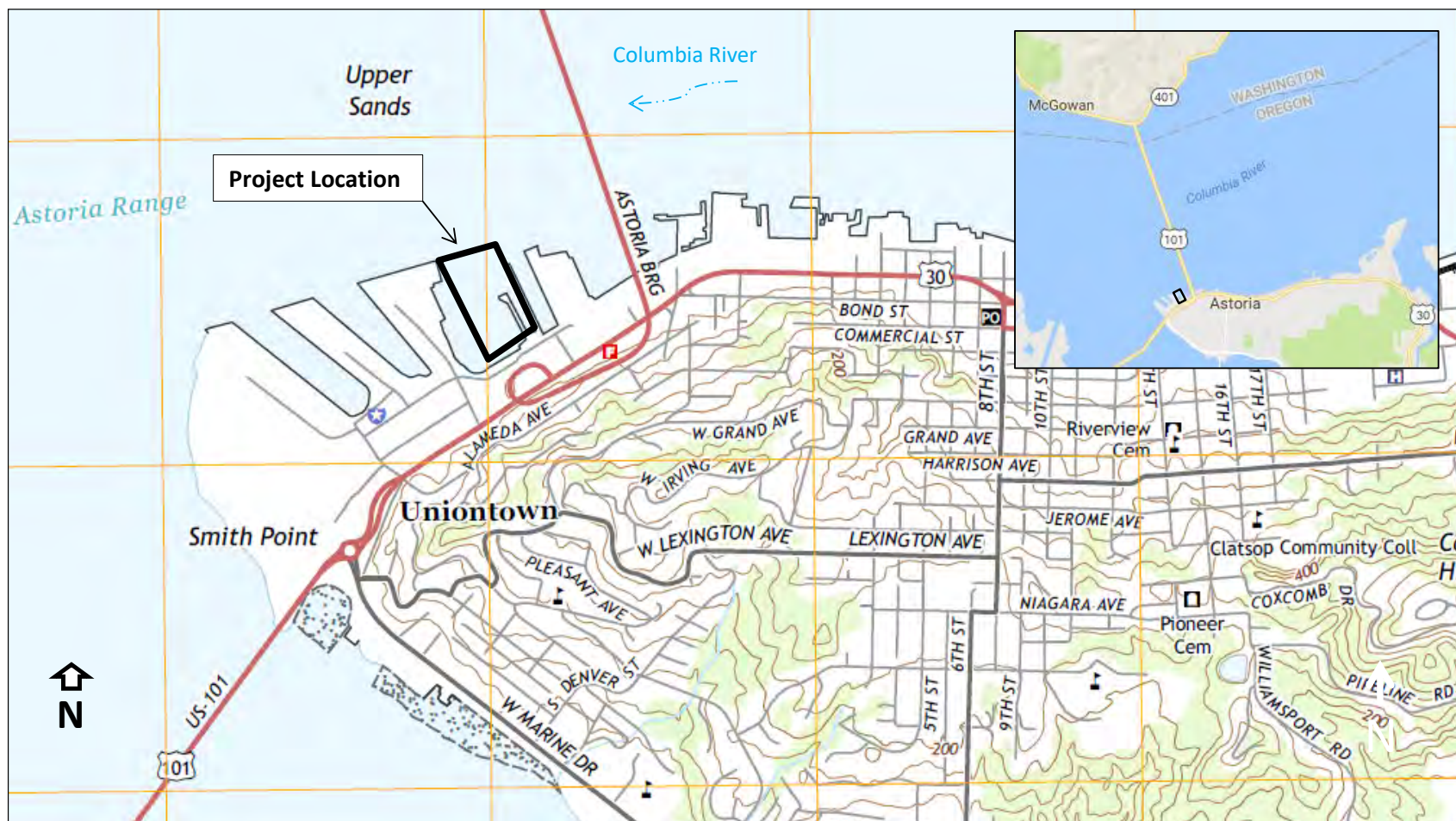


Figure 1: Location Map
 West Basin Marina Maintenance Dredging
 (USGS Astoria, OR 2014)



Figure 2: Tax Lot Map
West Basin Marina Maintenance Dredging
(ORMAP 2017)



Figure 3: Aerial Photograph
 West Basin Marina Maintenance Dredging
 (Google Earth 2017)

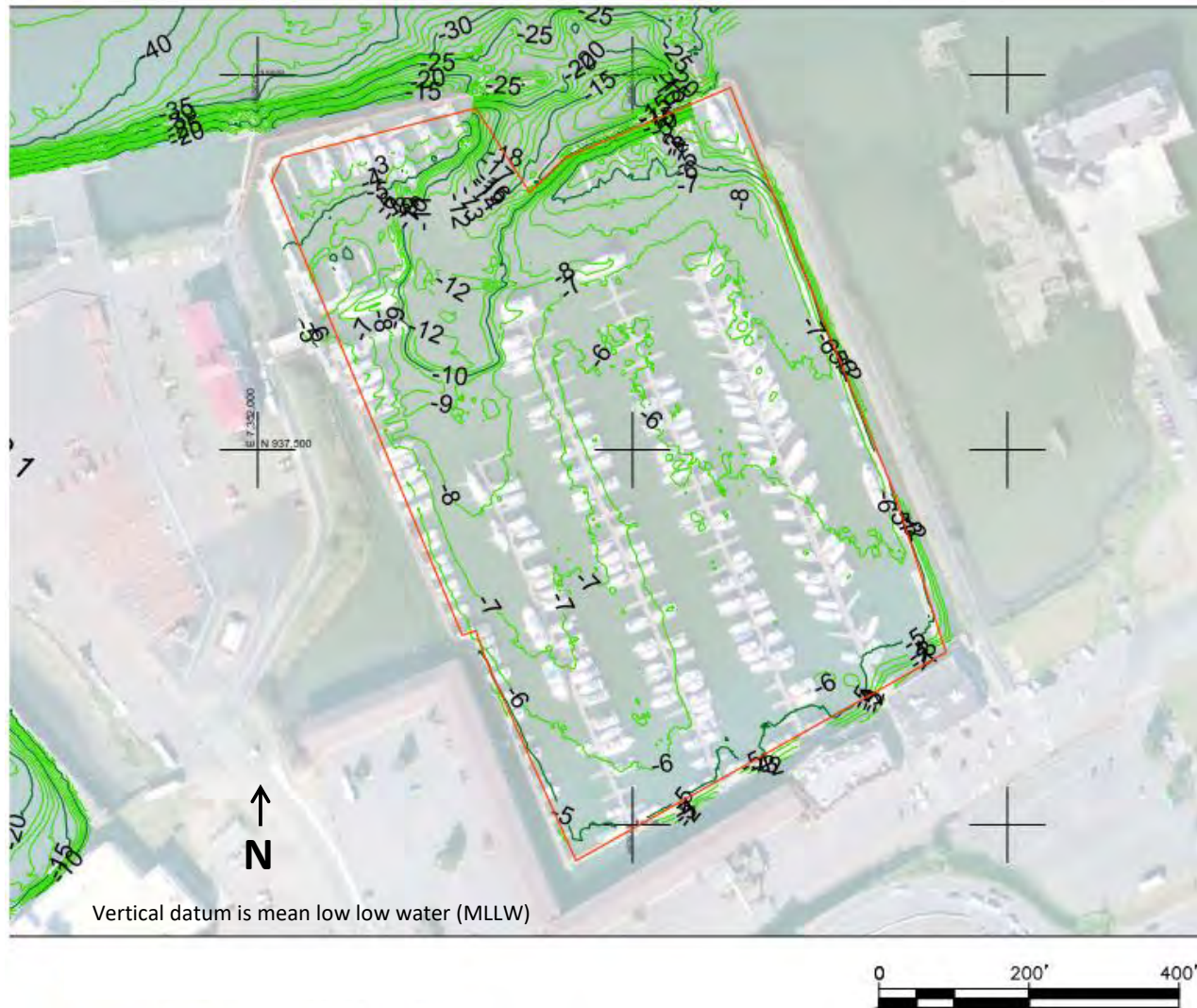


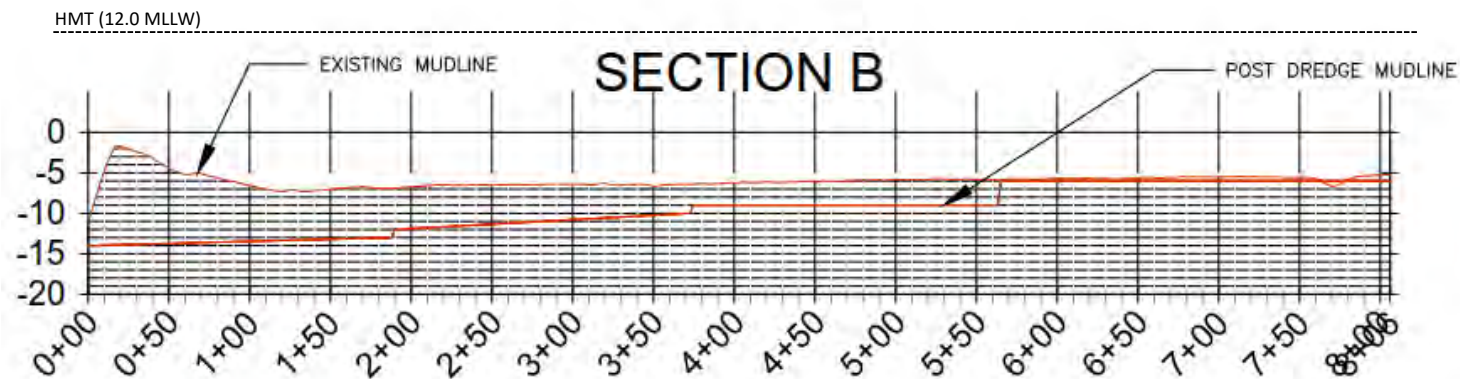
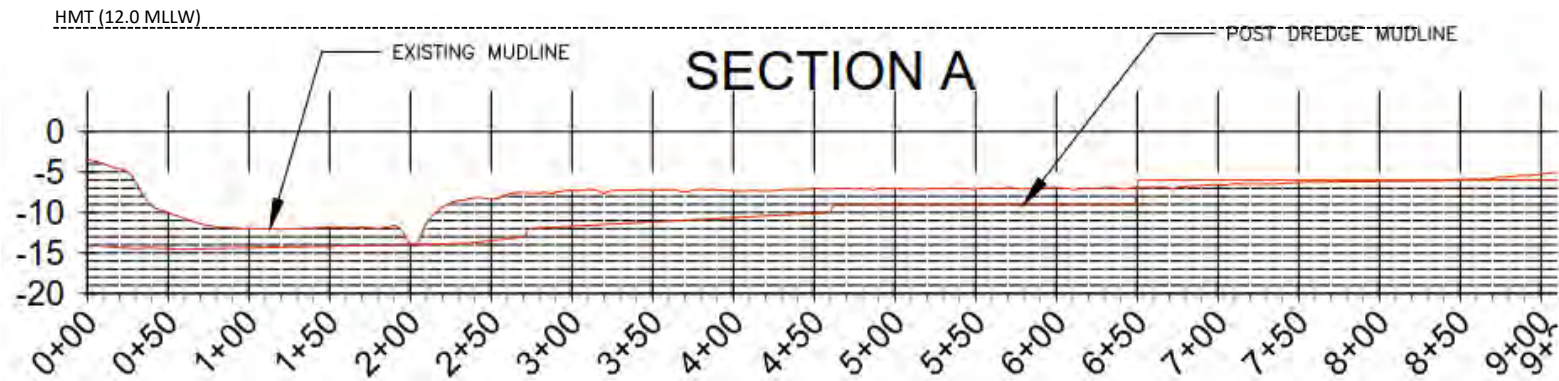
Figure 4A: Pre-Dredging Surface (2016 Bathymetry)
West Basin Marina Maintenance Dredging
(Advanced Remediation Technologies, Inc. 2017)



Figure 4B: Dredging Plan (Post-Dredging Surface)

West Basin Marina Maintenance Dredging

(Advanced Remediation Technologies, Inc. 2017)



HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (2011). OREGON STATE PLANE COORDINATE SYSTEM NORTH ZONE, US SURVEY FEET.

VERTICAL DATUM IS MEAN LOWER LOW WATER (MLLW), HOLDING MLLW ELEVATION AT 943 9040 TIDAL 12.

MLLW TO NAVD'88 OFFSETS COMPUTED AT TIDAL 12 (RM 17.5) AND THE PROJECT SITE (RM 13.0) WERE -0.29 AND -0.12 RESPECTIVELY BASED ON USACE PORTLAND DISTRICT CHARTS CL_05_TNGX_20150226 "TONGUE POINT CROSSING" DATED FEB 26 2015 AND CL_03_FLVX_20150225 "FLAVEL BAR" DATED FEB 25, 2015.

Figure 4C: Dredging Cross Sections
West Basin Marina Maintenance Dredging
 (Advanced Remediation Technologies, Inc. 2017)

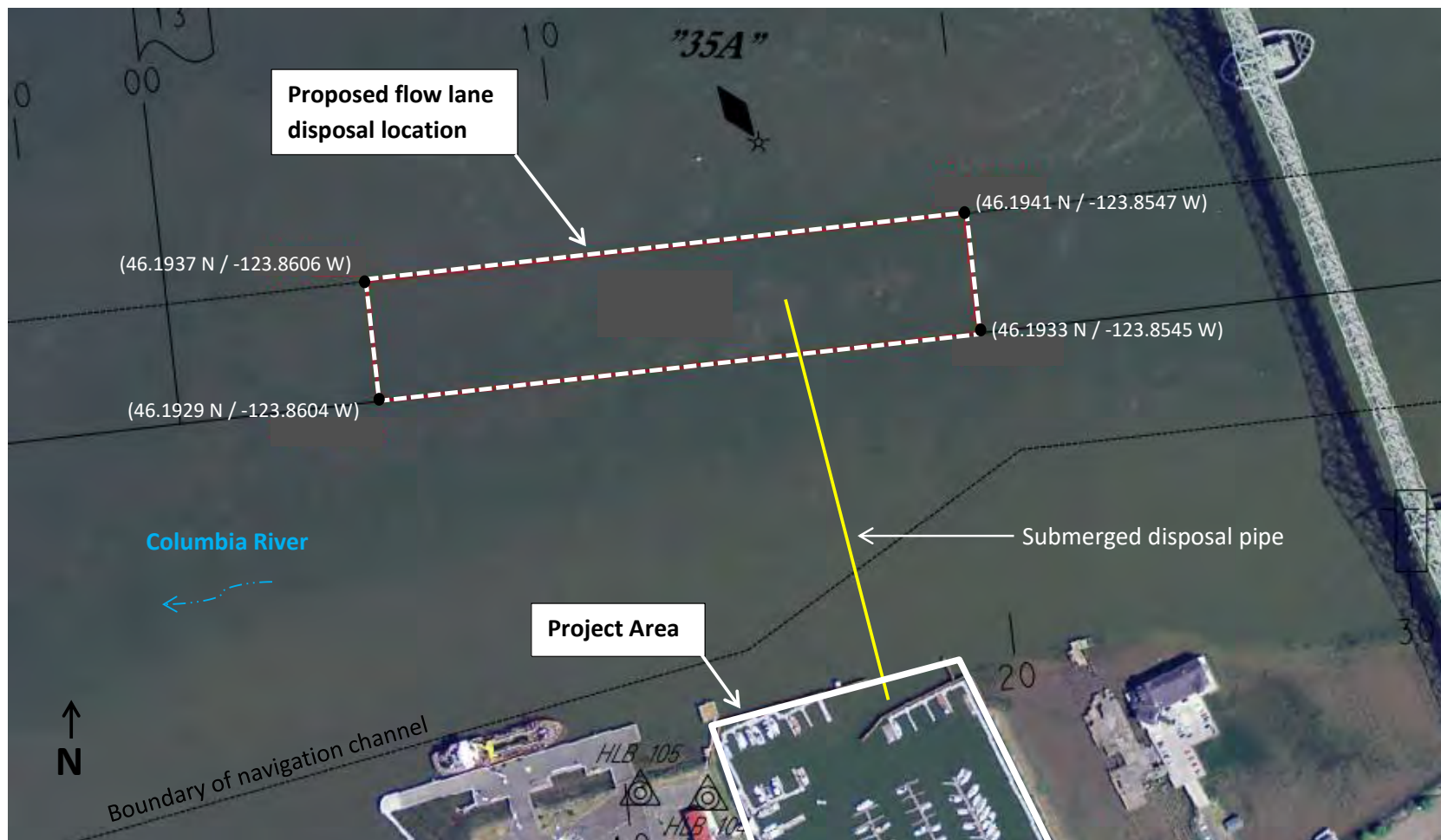


Figure 5A: Dredge Material Disposal Location
 West Basin Marina Maintenance Dredging
 (Disposal location provided by Jon Gornick [Corps Technical Manager for Dredging])

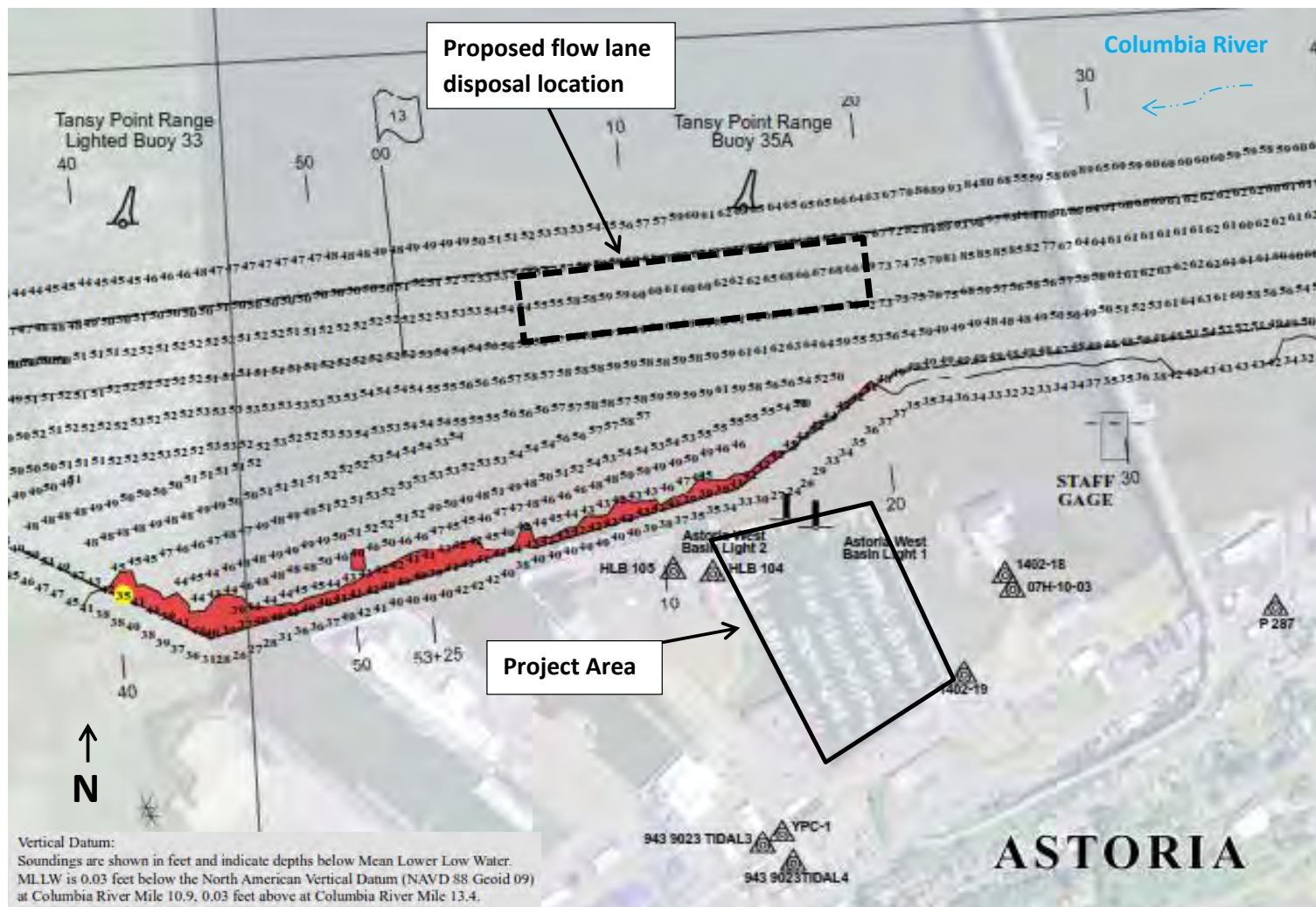


Figure 5B: Bathymetry of Disposal Location
 West Basin Marina Maintenance Dredging
 (U.S. Army Corps of Engineers 2017)



Oregon

Kate Brown, Governor

Department of Environmental Quality

Northwest Region

700 NE Multnomah Street, Suite 600

Portland, OR 97232

(503) 229-5263

FAX (503) 229-6945

TTY 711

November 14, 2017

Attention: Shane Jensen
Port of Astoria
10 Pier One, Suite 305
Astoria, OR 97103

RE: 2009-00565-1; Port of Astoria West Basin Marina 401 Water Quality Certification

The Department of Environmental Quality (DEQ) has reviewed the U.S. Army Corps of Engineers (USACE) Permit application #2009-00565-1, pursuant to a request for a Clean Water Act Section 401 Water Quality Certification (WQC) received on August 4, 2017. DEQ's 401 WQC public comment opportunity was circulated with the USACE public notice, and DEQ received no water quality comments.

According to the application, the Port of Astoria ("the Applicant") proposes to impact the Columbia River in order to perform maintenance dredging. The project is located in the Columbia River, in the City of Astoria, Clatsop County, Oregon (Section 7, T8N/R9W).

Project Description: The project is for maintenance dredging of up to a total of 109,000 cubic yards of sediment within the Port of Astoria West Marina moorage facility over ten years. Up to 54,500 cubic yards of sediment would be dredged during the first year and up to 54,500 cubic yards of sediment would be dredged over the remaining nine years. The dredge area is 11.26 acres and the dredge depth ranges from -6.0 to -17.0 feet mean lower low water (MLLW). Sediment will be dredged using a suction dredge and the dredged material will be deposited along the flow lane of the Columbia River using a submerged pipe.

Status of Affected Waters of the State: The Columbia River is classified as water quality limited under the federal Clean Water Act. The Columbia River at river mile 13.5 is on the Section 303(d) list of impaired water bodies for arsenic, DDE, fecal coliform, PCBs, and temperature and has EPA approved Total Maximum Daily Loads (TMDLs) that have been developed for 2,3,7,8 TCDD and total dissolved gas.

The above listed parameters impair the following beneficial uses in the Columbia River: public domestic water supply, private domestic water supply, fish & aquatic life, and salmon & steelhead migration corridor. Other beneficial uses in the Columbia River include industrial water supply, irrigation, livestock watering, wildlife & hunting, fishing, boating, water contact recreation, aesthetic quality, hydro power, and commercial navigation & transportation.

Certification Decision: Based on the information provided by the Applicant and the USACE, DEQ is reasonably assured that implementation of the project will be consistent with applicable provisions of Sections 301, 302, 303, 306, and 307 of the federal Clean Water Act, state water quality standards set forth in Oregon Administrative Rules Chapter 340 Division 41, and other

appropriate requirements of state law, provided the following conditions are strictly adhered to by the Applicant.

401 WQC GENERAL CONDITIONS

- 1) **Responsible parties:** This 401 WQC applies to the Applicant. The Applicant is responsible for the work of its contractors and sub-contractors, as well as any other entity that performs work related to this WQC.
- 2) **Work Authorized:** Work authorized by this 401 WQC is limited to the work described in the Joint Permit Application signed on May 10, 2017 and additional application materials (hereafter "the permit application materials"), unless otherwise authorized by DEQ. If the project is operated in a manner not consistent with the project description contained in the permit application materials, the Applicant is not in compliance with this 401 WQC and may be subject to enforcement.
- 3) **Duration of Certificate:** This 401 WQC for impacts to waters, including dredge and fill activities, is valid for ten years from the date of issuance of the USACE 404 permit. A new or modified 401 WQC must be requested prior to any modification of the USACE 404 permit.
- 4) A copy of this 401 WQC letter must be kept on the job site and readily available for reference by the Applicant and its contractors, as well as by DEQ, USACE, National Marine Fisheries Service (NMFS), Oregon Department of Fish and Wildlife (ODFW), and other appropriate state and local government inspectors.
- 5) **Modification:** Any approved modifications to this 401 WQC will incur a Tier 1 fee of \$985 at a minimum. Complex modifications may be charged a higher fee.
- 6) The Applicant must notify DEQ of any change in ownership or control of this project and obtain DEQ review and approval before undertaking any change to the project that might affect water quality.
- 7) DEQ may modify or revoke this 401 WQC, in accordance with OAR 340-048-0050, if the project changes or project activities are having an adverse impact on state water quality or beneficial uses, or if the Applicant is otherwise in violation of the conditions of this certification.
- 8) The Applicant and its contractors must allow DEQ access to the project site, staging areas, and mitigation sites to monitor compliance with these 401 WQC conditions, including
 - a. Access to any records, logs, and reports that must be kept under the conditions of this 401 WQC;
 - b. To inspect best management practices (BMPs), monitoring or operational equipment or methods;
 - c. To collect samples or monitor any discharge of pollutants.
- 9) Failure of any person or entity to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.

CONSTRUCTION SPECIFIC CONDITIONS

- 10) **Spill Prevention:** The Applicant must fuel, operate, maintain and store vehicles and equipment, and must store construction materials, in areas that will not disturb habitat either directly or result in potential discharges. In addition, the following specific requirements apply:
- a. Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area placed 150 feet or more from any waters of the state. An exception to this distance may be authorized upon written approval by DEQ if all practicable prevention measures are employed and this distance is not possible because of any of the following site conditions:
 - i. Physical constraints that make this distance not feasible (e.g., steep slopes, rock outcroppings);
 - ii. Natural resource features would be degraded as a result of this setback; or
 - iii. Equal or greater spill containment and effect avoidance is provided even if staging area is less than 150 feet of any waters of the state.
 - b. If staging areas are within 150 feet of any waters of the state, as allowed under subsection (a)(iii) of this condition, full containment of potential contaminants must be provided to prevent soil and water contamination, as appropriate.
 - c. All vehicles operated within 150 feet of any waters of the state must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected in the vehicle staging area must be repaired before the vehicle resumes operation.
 - d. Before operations begin and as often as necessary during operation, equipment must be steam cleaned (or undergo an approved equivalent cleaning) until all visible external oil, grease, mud, and other visible contaminants are removed if the equipment will be used below the bank of a waterbody.
 - e. All stationary power equipment (e.g., generators, cranes, stationary drilling equipment) operated within 150 feet of any waters of the state must be covered by an absorbent mat to prevent leaks, unless other suitable containment is provided to prevent potential spills from entering any waters of the state.
 - f. An adequate supply of materials (such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials) needed to contain spills must be maintained at the project site and deployed as necessary.
 - g. All equipment operated in state waters must use bio-degradable hydraulic fluid.
 - h. A maintenance log documenting equipment maintenance inspections and actions must be kept on-site and available upon request.
- 11) **Spill & Incident Reporting:**
- a. In the event that petroleum products, chemicals, or any other deleterious materials are discharged into state waters, or onto land with a potential to enter state waters, the Applicant must promptly report the discharge to the Oregon Emergency Response System (OERS, 1-800-452-0311). The Applicant must immediately begin containment and complete cleanup as soon as possible.
 - b. If the project operations cause a water quality problem which results in distressed or dying fish, the Applicant must immediately do the following: cease operations;

take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ, ODFW and other appropriate regulatory agencies.

SPECIFIC CONDITIONS FOR IN-STREAM WORK

- 12) **Fish protection/ Oregon Department of Fish and Wildlife timing:** The Applicant must perform in-water work only within the ODFW preferred time window as specified in the *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, or as authorized otherwise under a Department of State Lands removal/fill permit. Exceptions to the timing window must be recommended by ODFW and/or the NMFS as appropriate.
- 13) **Aquatic life movements:** Any activity that may disrupt the movement of aquatic life living in the water body, including those species that normally migrate through the area, is prohibited. The Applicant must provide unobstructed fish passage at all times during any authorized activity. Exceptions must be reviewed and recommended by Oregon Department of Fish Wildlife and/or NMFS as appropriate.
- 14) **Turbidity:** The Applicant must implement best management practices (BMPs) to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidities is prohibited except as specifically provided below:
 - a. **Monitoring:** Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two hour intervals each day during daylight hours when in-water work is being conducted. A properly calibrated turbidimeter is required.
 - i. **Representative Background Point:** The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area 100 feet upcurrent from the in-water disturbance, in order to establish background turbidity levels. The background turbidity, location, date, tidal stage, and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.
 - ii. **Compliance Point:** The Applicant must monitor every two hours, 300 feet downcurrent from the disturbance, at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage, and time must be recorded for each measurement.
 - b. **Compliance:** The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two-hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances are allowed as follows:

MONITORING WITH A TURBIDIMETER EVERY 2 HOURS	
<i>TURBIDITY LEVEL</i>	<i>Restrictions to Duration of Activity</i>
0 to 5 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue for a maximum of 4 Hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
30 to 49 NTU above background	Work may continue for a maximum of 2 Hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-5 above background.
50 NTU or more above background	Stop work immediately and inform DEQ

- c. **Reporting:** The Applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. The Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request. An example turbidity log is attached to this certification.

SPECIFIC CONDITIONS FOR DREDGING

- 15) **Sediment Characterization:** Sediment characterization has been conducted in accordance with the 2016 *Sediment Evaluation Framework for the Pacific Northwest*, [USACE, NMFS, U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (EPA), DEQ, Washington Department of Natural Resources, Washington Department of Ecology, and Idaho Department of Environmental Quality]. The applicant must follow all recommendations of the Portland Sediment Evaluation Team (PSET) Suitability Determination Memorandum dated September 19, 2017. The PSET Suitability Determination Memorandum states that the dredge prism in dredged material management units (DMMUS) 1-4 is suitable for in-water disposal, the dredge prism in DMMU 5 is suitable for in-water disposal from the mudline to -6 ft MLLW, the post-dredge surface in DMMUs 1-4 is suitable for long-term exposure, and the post-dredge surface in DMMU 5 is suitable for long term exposure at depths of -6 ft MLLW or less.
- 16) **Pre-Dredging Plans and Meetings:** At least two weeks prior to dredging, perform the following:
- Notify DEQ and PSET to arrange a meeting to take place at least seven days prior to dredging;
 - Submit a mercury sampling plan to PSET and 401 for the post-dredge surface in

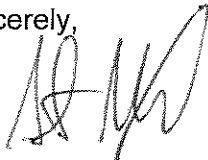
- DMMU 5 in case unauthorized dredging below -6 ft MLLW occurs in DMMU 5; and
- c. Submit a dredging and disposal quality control plan to DEQ and PSET that provides assurance that the dredging and post-dredge surface sampling plan will be properly implemented.
- 17) **Dredging and Disposal Methods:** The PSET determination provides recommendations regarding the suitability for sediment disposal in water. The Applicant and its contractors must follow these recommendations and the following additional conditions:
- a. Suitable for Unconfined In-Water Disposal
 - i. Disposal locations are confined to those proposed in the application.
 - ii. Dredging method is limited to the method proposed in the application, unless otherwise authorized by DEQ.
 - iii. Dredged material disposal may not interfere with navigation.
 - iv. For dredged material proposed to be placed upland, a DEQ Solid Waste Letter of Authorization, or clean fill determination or other DEQ solid waste approval is required prior to placing material.
 - v. Dredged material may not be placed in wetlands, and return water must not cause harm to freshwater wetlands or other freshwater environments.
 - b. Containment of in-water work areas from the active flowing stream by using silt curtains, or similar material is required, unless otherwise authorized by DEQ. The Applicant or its contractors is referred to DEQ's *Oregon Sediment and Erosion Control Manual*, April 2005, for isolation techniques (see <http://www.deq.state.or.us/wq/stormwater/docs/escmanual/appxd.pdf>).
 - c. The Applicant or its contractors must employ the following techniques to minimize sediment disturbance and distribution through the water column.
 - i. Sequence or phase work activities to minimize the extent and duration of in-water disturbances;
 - ii. Employ an experienced equipment operator;
 - iii. Implement suction dredge control techniques, such as the following:
 1. Operate with the intake head at or below the surface of the sediments being removed during all periods of active dredging.
 2. Slow cutter head rotation or lessen horsepower.
 3. Slow swing arm speed.
 4. Clean out slurry by pumping in river water before shutting down rather than purging.
 5. If purging becomes necessary, raise intake line no more than 3 feet from the bottom.
 - d. Dredging in DMMU 5 below a depth of -6 ft MLLW is not authorized.
 - e. The Applicant must provide a 2:1 or shallower slope in DMMU 4 adjacent to DMMU5 when dredging DMMU 4 to prevent side slope sloughing of unsuitable material from DMMU 5 into DMMU 4.
 - f. Dredging of holes or sumps below maximum depth and subsequent redistribution of sediment by dredging, dragging, or other means is prohibited.

- g. All anthropogenic debris greater than 1 foot in dimension must be removed from dredged sediments prior to flow lane disposal and transported to an appropriate upland disposal site.
 - h. In-Water Disposal:
 - i. Flowlane disposal sites must be selected so that the material disposed:
 - 1. Disperses into or immediately adjacent to the mainstream navigational channel;
 - 2. Is not likely to cause significantly increased shoaling in downstream side channels or to shoreline facilities such as docks, wharfs, vessel slips and marinas; and
 - 3. Is not likely to cause significant adverse alteration of bottom habitats.
 - ii. Flowlane disposal via pipeline must employ BMPs including fitting the pipeline end scow with a twenty (20) foot downspout so that discharge occurs at least twenty (20) feet below the surface of the water.
 - iii. In-water disposal of sediment in areas supporting populations of Dungeness crab should minimize impacts to these populations.
- 18) **Dredged Material and Leave Surface Management:** The applicant must implement the following requirements.
- a. Provide a pre-dredge hydrographic survey and post-dredge hydrographic survey of the dredge area for each dredging cycle.
 - b. Within 45 days of the completion of each dredge cycle, the applicant must acquire bathymetry of the newly dredged prism and submit results to DEQ and PSET.
 - c. If the bathymetry indicates that DMMU 5 was dredged deeper than proposed in the joint permit application, DEQ may require implementation of the PSET-approved mercury sampling plan and placement of cover material.
 - d. If the bathymetry indicates a steeper than 2:1 slope in DMMU 4 adjacent to DMMU 5, DEQ may require monitoring and placement of cover material.
- 19) **Post-Dredging Submittal:** Within 60 days of each dredging/placement cycle, submit a post-dredge and disposal report with figures to the DEQ 401 Program and PSET that includes dredging dates, locations, volumes, acreages, dredge depths, photographs, debris and biological observations, any post-dredge surface sampling results, and hydrosurveys.
- 20) **Dredged Material Re-evaluation:** The Applicant must coordinate with the PSET regarding the validity of the September 19, 2017 Suitability Determination Memorandum by February 2019 for any dredging in DMMU 5 that will take place after November 2019 and by February 2021 for any dredging in DMMUs 1-4 that will take place after November 2021. If PSET determines sediment must be re-evaluated, follow the recommendations of the PSET and submit the PSET technical memorandum determining in-water disposal suitability to DEQ at least 30 days prior to dredging. DEQ may request additional information, require additional monitoring and/or add conditions to this certification in accordance with the PSET recommendations.

If the Applicant is dissatisfied with the conditions contained in this certification, a contested case hearing may be requested in accordance with OAR 340-048-0045. Such request must be made in writing to the DEQ Office of Compliance and Enforcement at 811 SW 6th Avenue, Portland Oregon 97204 within 20 days of the mailing of this certification.

The DEQ hereby certifies this project with the above conditions in accordance with the Clean Water Act and state rules. If you have any questions, please contact Amy Simpson at simpson.amy@deq.state.or.us, by phone at 503-229-5051, or at the address on this letterhead.

Sincerely,

A handwritten signature in black ink, appearing to read 'Steve Mrazik', written over a horizontal line.

Steve Mrazik
Water Quality Manager
Northwest Region

2009-565-1 West Basin Marina 401WQC.docm

cc: Danielle Erb, USACE
Dan Cary, DSL
Scott Sebring, NOAA Fisheries
Eric Campbell, Campbell Environmental
Elizabeth Ruther, Coastal Zone Management Program



Oregon

Kate Brown, Governor

Oregon Coastal Management Program
Department of Land Conservation and Development
635 Capitol Street, Suite 150
Salem, Oregon 97301-2540
Phone (503) 373-0050
FAX (503) 378-6033
www.oregon.gov/LCD/OCMP

November 14, 2017

Port of Astoria
Attention: Shane Jensen
10 Pier One, Suite 305
Astoria, OR 97103
Email: sjensen@portofastoria.com

Permit #: NWP-2009-0565-01
Applicant: Port of Astoria
Location: West Basin Marina, RM 13.5, Columbia River
Description: Maintenance Dredging

Dear Mr. Jensen:

Any federal action in the coastal zone including administering a federal permit or license, like the Section 404/401 permits under the Clean Water Act, triggers a federal consistency review to comply with the federal Coastal Zone Management Act (CZMA). The Department of Land Conservation and Development (DLCD) has reviewed the above referenced permit for consistency with the Oregon Coastal Management Program (OCMP) which has been accepted by the National Ocean and Atmospheric Administration (NOAA) under the CZMA.

To be consistent with the OCMP, the proposed project must be consistent with: 1) the statewide planning goals; 2) the applicable acknowledged city or county comprehensive plan; and 3) selected state authorities (e.g. those governing removal-fill, water quality, and fish & wildlife protections).

The following enforceable policies in Table 1 were determined to apply to this project in whole or in part by the project applicant and DLCD. Complying with these policies and associated permits/certifications will ensure the project is consistent with the OCMP.

Table 1. Matrix of applicable enforceable policies for reference project. A list of enforceable policies available at: http://www.oregon.gov/LCD/OCMP/Pages/OCMP_Enforceable-Policies.aspx

Local Government Plan / Land Use Regulations (Statewide Planning Goals 1-18)			
Authority	Applicable Enforceable Policy(ies)	Coastal Effect	How Project Complies (list dates if available)
EXAMPLE: Clatsop County Comprehensive	Goal 5, Wetlands, Policy 3	Dredge and fill of wetland	Signature of Compliance by Local Planner or Local Land

<i>Plan</i>			<i>Use Permit</i> <i>Signature / Permit received Date</i> <i>Application Submission Date</i>
<i>City of Astoria Comprehensive Plan</i>	<i>CP.130 Columbia River Estuary Land and Water Use; CP.445 Natural Resource Considerations</i>	<i>Dredging and placement of dredge material in the lower Columbia River estuary.</i>	<i>Local Land Use Compatibility Statement (JPA Block 10): Signed 5/8/2017 by Hannah Dankbar, CREST</i>
Statewide Planning Goals (Goal 19 Only)			
<i>EXAMPLE: Oregon Territorial Sea Plan</i>	<i>Part 2, Sections A, B, and C</i>	<i>Fiber-optic telecommunication cable crossing ocean floor</i>	<i>DSL Permit approval</i>
<i>NA</i>			
State Agency Authorities			
<i>EXAMPLE: ORS Chapter 196 (Removal-Fill)</i>	<i>196.682, 196.687, 196.800, 196.805, 196.810, 196.815, 196.816, 196.817, 196.818, 196.825, 196.830, 196.845, 196.850, 196.855, 196.880, 196.905</i>	<i>Dredge and fill of wetland</i>	<i>DSL Removal-Fill Permit approval</i> <i>Permit received or Application Submitted Date</i>
<i>ORS Chapter 196 (Removal-Fill)</i>	<i>196.800, 196.805, 196.810, 196.815, 196.816, 196.817, 196.825, 196.830, 196.845, 196.850, 196.855, 196.880, 196.905, 196.910</i>	<i>Removal and placement of material within an estuary.</i>	<i>Department of State Lands (DSL) Permit approval; Permit No.: 60404-RF DSL Coordinator: Dan Cary; Date Issued: October 30, 2017.</i>
<i>ORS Chapter 468B (Water Quality)</i>	<i>Entire Chapter</i>	<i>Turbidity in estuary, potential reduction in water quality.</i>	<i>401 Water Quality Certification (WQC) #2009-00565-1 Coordinator: Amy Simpson; Date Issued: November 14, 2017</i>
<i>ORS Chapter 496 (Wildlife Administration)</i>	<i>496.004, 496.009, 496.012, 496.171, 496.182</i>	<i>Temporary impacts to indigenous fish species from dredging</i>	<i>Will adhere to ODFW In-water Work Window for the lower Columbia River estuary (November 1 – February 28).</i>

Findings

- This project is under consideration for an authorization to work in waters of the United States from the Army Corps of Engineers under Section 404 of the Clean Water Act.
- The applicant has certified that to the best of their knowledge and belief, the project complies with the Oregon Coastal Management Program and will be completed in a manner consistent with the program. The Coastal Zone Certification was signed by Shane Jensen on May 09, 2017.
- Clatsop County has determined that the project is consistent with their comprehensive plan and land use regulations and signed Block 10 of the Joint Permit Application on May 08, 2017.
- The Department of State Lands issued the removal-fill authorization on October 30, 2017 and DLCD received a copy of this authorization on November 02, 2017.

- The Department of Environmental Quality has provided CWA Section 401 water quality pre-certification dated November 14, 2017. DLCD received a copy of this certification on the same day.
- The applicant agrees to utilize In-Water Work Window guidelines to reduce impacts to fish species.

Consistency Finding

Pursuant to the applicant's receipt of and compliance with conditions of all necessary local, state, and federal permits, and with the standard conditions listed in Attachment 1, DLCD **concurs** with the applicant's certification that the proposal is consistent with the Oregon Coastal Management Program. Failure to obtain and abide by required local, state, or federal permits may constitute a violation of local, state, and/or federal law and subject the applicant to one or more enforcement actions.

Right of Appeal (To Special Conditions)

If the applicant objects to the above conditions, all parties shall treat DLCD's concurrence as an objection. Pursuant to 15 CFR § 930.63(e), and within 30 days from receipt of this letter, the applicant may request that the Secretary of Commerce override DLCD's special condition/objection. In order to grant an override request, the Secretary must find that the activity is consistent with the objectives or purposes of the Coastal Zone Management Act, or is necessary in the interest of national security. A copy of the request and supporting information must be sent to the Oregon Coastal Management Program and the federal permitting or licensing agency. The Secretary may collect fees from the applicant for administering and processing their request. (15 CFR 930.63)

If you have any questions or comments regarding this coastal zone management consistency finding or the consistency review process, please contact me at (503) 934-0029 or by e-mail at: elizabeth.j.ruther@state.or.us.

Sincerely,



Elizabeth J. Ruther
Coastal State-Federal Relations Coordinator
Department of Land Conservation and Development

Cc: Danielle Erb, USACE
Dan Cary, DSL
Amy Simpson, DEQ
Hannah Dankbar, CREST
Eric Campbell, Campbell Env. LLC

Attachment 1

Standard Oregon Coastal Management Program (OCMP) Coastal Zone Conditions

The federal Coastal Zone Management Act provides that federal actions affecting any use or resource of the coastal zone,* including projects permitted by the U.S. Army Corps of Engineers (USACE), must be consistent with the enforceable policies of a State's federally approved coastal management program. Oregon's approved program, the Oregon Coastal Management Program (OCMP), is a "networked" program that integrates authorities of local governments and other state agencies. The coastal zone conditions contained in this document reflect the networked nature of the OCMP, and reference the specific applicable enforceable policies.

In addition to all USACE national and regional permit conditions, permitted projects in Oregon's coastal zone must comply with the following coastal zone conditions.

If an applicant chooses not to follow one or more of the coastal zone conditions, DLCD will object to the permit issuance pursuant to 15 CFR § 930.63(e). In that instance, the permittee may appeal the state's objection by requesting that the Secretary of Commerce override the objection pursuant to 15 CFR 930, subpart H, within 30 days of receipt of the letter informing the applicant of the OCMP's objection. In order to grant an override request, the Secretary must find that the activity is consistent with the objectives or purposes of the Coastal Zone Management Act, or is necessary in the interest of national security. A copy of the request and supporting information must be sent to the OCMP and the USACE. The Secretary may collect fees from the permittee for administering and processing the override request.

*Oregon's coastal zone generally includes the area lying between the Oregon/Washington border on the north, to the Oregon/California border on the south, seaward to the extent of the state's jurisdiction as recognized by federal law, and inland to the crest of the Coast Range Mountains, excepting:

- (a) The Umpqua River basin, where the coastal zone extends to Scottsburg;
- (b) The Rogue River basin, where the coastal zone extends to Agness; and
- (c) The Columbia River basin, where the coastal zone extends to the downstream end of Puget Island.

CZ Condition 1. Consistency with Local Comprehensive Plans

(1) Permitted projects must be consistent with or not subject to the applicable local comprehensive plan and implementing land use regulations, including the applicable estuary management plan, or the statewide land use planning goals where applicable. Permittee must obtain required permits or other authorizations from the applicable local government before initiating work under any USACE permit. Permittee must provide USACE and the OCMP with verification of the local jurisdiction's approval in the form of a completed block seven (7) of the Joint Permit Application. All appeals of the local jurisdiction's decision(s) must be resolved before any regulated work may begin.

(2) All conditions placed on an authorization or permit by the local government are incorporated by reference into the OCMP coastal zone conditions.

[Enforceable Policy: ORS chapter 197, Comprehensive Land Use Planning Coordination]

CZ Condition 2. Consistency with Removal-Fill Law

(1) Permitted projects must be consistent with or not subject to the state requirements governing removal-fill in waters of the state. Permittee must obtain required permits or other authorizations from the Oregon Department of State Lands (DSL) before any regulated work may begin.

(2) Projects requiring a DSL removal-fill permit must compensate for reasonably expected adverse impacts by complying to the full extent with DSL's compensatory mitigation requirements.

(3) Where DSL finds a project not subject to the Removal/Fill Law, permittee must submit to DSL any changes in project design or implementation that may reasonably be expected to require application of the Removal/Fill Law.

(4) All conditions placed on a Removal-Fill permit by DSL are incorporated by reference into the OCMP coastal zone conditions.

[Enforceable Policy: ORS chapter 196, Removal of Material; Filling]

CZ Condition 3. Leases of State Lands

(1) Permitted projects must be consistent with or not subject to state requirements governing use of state lands. Permittee must obtain any required lease, license, or other authorization for the use of state lands or waters from the Oregon Department of State Lands (DSL) before any regulated work may begin.

(2) All conditions placed on a lease, license, or authorization by DSL are incorporated by reference into the OCMP coastal zone conditions.

[Enforceable Policy: ORS chapter 274, Submersible and Submerged Lands]

CZ Condition 4. Department of Environmental Quality

(1) Permitted projects must be consistent with or not subject to the state requirements governing water quality. Permittee must obtain certification, if required, from the Oregon Department of Environmental Quality (DEQ) through its 401 Water Quality Certification process before any regulated work may begin.

(2) All conditions placed on a license, permit, or authorization by DEQ are incorporated by reference into the OCMP coastal zone conditions.

[Enforceable Policy: ORS chapter 468B, Water Quality]

CZ Condition 5. Fish and Aquatic Life Passage

(1) Where applicable, all authorized projects shall be in conformance with ODFW standards for fish passage (<http://www.dfw.state.or.us/fish/passage/>). Decisions to abrogate ODFW fish passage standards shall be accompanied by written approval from ODFW.

(2) No work shall be authorized that does not provide for adequate passage of "aquatic life." Aquatic life shall be interpreted to include amphibians, reptiles, and mammals whose natural habitat includes waters of this state and which are generally present in or around, or pass through the project site.

(3) This condition is effective only where ODFW regulations apply.

[Enforceable Policy: ORS chapter 509, Additional Fishery Requirements]

CZ Condition 6. Ocean Shore

(1) Permitted projects must be consistent with or not subject to state requirements governing use of the ocean shore. Permittee must obtain, if required, an ocean shore permit from the Oregon Parks and Recreation Department (OPRD) before any regulated work may begin.

(2) All conditions placed on an Ocean Shore permit by OPRD are incorporated by reference into the OCMP coastal zone conditions.

[Enforceable Policy: ORS chapter 390, Ocean Shores]

CZ Condition 7. Aquaculture

(1) Permitted projects must be consistent with or not subject to state requirements governing commercial aquaculture or mariculture cultivation of oysters, clams, and mussels. Permittee must obtain, if required, authorization from the Oregon Department of Agriculture (ODA) for use of state submerged and submersible lands for aquaculture purposes.

(2) All conditions placed on an aquaculture or mariculture operation by the ODA are incorporated by reference into the OCMP coastal zone conditions.

[Enforceable Policy: ORS chapter 622, Shellfish]



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

Refer to NMFS No:
WCR-2017-7450

October 31, 2017

Shawn H. Zinszer
U.S. Army COE of Engineers
Regulatory Branch, CENWP-CO-GP
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Biological Opinion and Magnuson-Stevens
Fishery Conservation and Management Act Essential Fish Habitat Consultation for the
Port of Astoria Maintenance Dredge Project, (12th field HUC 170800060500 Baker Bay-
Columbia River), Clatsop County, Oregon (COE No.: NWP-2009-565-1)

Dear Mr. Zinszer:

Thank you for your letter of July 28, 2017, requesting initiation of formal consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) to conduct maintenance dredging at the Port of Astoria's West Basin Marina in Clatsop County, Oregon. The enclosed document contains a biological opinion (opinion) prepared by the NMFS pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the proposed action proceeding under the authority of the U.S. Army COE of Engineers (COE) Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act permits.

In this opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Snake River (SR) fall-run Chinook salmon, SR spring/summer run Chinook salmon, Upper Columbia River (UCR) spring-run Chinook salmon, Upper Willamette River (UWR) Chinook salmon, Columbia River (CR) chum salmon (*O. keta*), LCR coho salmon (*O. kisutch*), SR sockeye salmon (*O. nerka*), LCR steelhead (*O. mykiss*), Middle Columbia River (MCR) steelhead, UCR steelhead, Snake River Basin steelhead, UWR steelhead, southern designated population segment (DPS) of green sturgeon (*Acipenser medirostris*), or southern DPS of eulachon (*Thaleichthys pacificus*), or result in the destruction or adverse modification of critical habitats.

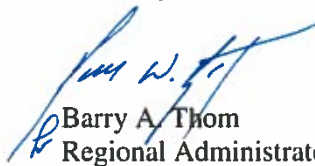
As required by section 7 of the ESA, NMFS is providing an incidental take statement with the opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal action agency must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes 1 conservation recommendation to avoid, minimize, or otherwise offset potential adverse effects on EFH. This conservation recommendation is a subset of the ESA take statement's terms and conditions. Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendation, the Federal action agency must explain why the recommendation will not be followed, including the scientific justification for any disagreements over the effects of the action and the recommendation. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify if the conservation recommendations are accepted.

Please contact Scott Sebring, Oregon Washington Coastal Area Office in Lacey, Washington, 360-753-9887, scott.sebring@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Barry A. Thom
Regional Administrator

cc: Danielle Erb, COE

WCR-2017-7450

NWP-2009-565-1

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

Port of Astoria Maintenance Dredge Project
Clatsop County, Oregon (HUC 170800060500; Baker Bay - Columbia River)
(COE No.: NWP-2009-565-1)

NMFS Consultation Number: WCR-2017-7450

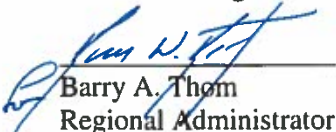
Action Agency: U.S. Army Corps of Engineers

Affected Species and Action Agency Determinations:

ESA-Listed Species	ESA Status	Is the action likely to adversely affect the species	Is the action likely to adversely affect the critical habitat?	Is the action likely to jeopardize the species?	Is the action likely to destroy or adversely modify critical habitat
Lower Columbia River (LCR) Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	T	Yes	Yes	No	No
Upper Columbia River (UCR) spring-run Chinook salmon	E	Yes	Yes	No	No
Upper Willamette River (UWR) spring-run Chinook salmon	T	Yes	Yes	No	No
Snake River (SR) spring/summer run Chinook salmon	T	Yes	Yes	No	No
SR fall-run Chinook salmon	T	Yes	Yes	No	No
Columbia River (CR) chum salmon (<i>O. keta</i>)	T	Yes	Yes	No	No
LCR coho salmon (<i>O. kisutch</i>)	T	Yes	Yes	No	No
SR sockeye salmon (<i>O. nerka</i>)	E	Yes	Yes	No	No
LCR steelhead (<i>O. mykiss</i>)	T	Yes	Yes	No	No
Middle Columbia River (MCR) steelhead	T	Yes	Yes	No	No
UCR steelhead	T	Yes	Yes	No	No
UWR steelhead	T	Yes	Yes	No	No
Snake River Basin (SRB) steelhead	T	Yes	Yes	No	No
Southern DPS of green sturgeon (<i>Acipenser medirostris</i>)	T	Yes	Yes	No	No
Southern DPS of Pacific eulachon (<i>Thaleichthys pacificus</i>)	T	Yes	Yes	No	No

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

Consultation Conducted By: National Marine Fisheries Service
West Coast Region

Issued by: 
Barry A. Thom
Regional Administrator

Date Issued: October 31, 2017

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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 portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, et seq.), and implementing regulations at 50 CFR 402.

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

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

1.2 Consultation History

This opinion is based on the July 28, 2017 request for formal consultation from U.S. Army Corps of Engineers (COE) authorizing the proposed action under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Included in this request from the applicant, the Port of Astoria, and their agent, Campbell Environmental Consulting, LLC was a biological assessment, and supplemental information. The NMFS notified the COE on August 8, 2017 that review of the proposed action would occur by mid-August. NMFS reviewed the project and determined that no additional information was necessary and initiated formal consultation on August 18, 2017.

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 COE proposes to permit dredging and deepwater disposal of dredged sediment within the Columbia River. The action area consists of the West Basin Marina and adjacent areas to the Port’s Marine Terminal where dredging and placement of sediment will occur. All portions of

the proposed action are located in the Columbia River adjacent to the city of Astoria, Oregon (Figure 1). The marina is used primarily to moor private fishing and recreational vessels.

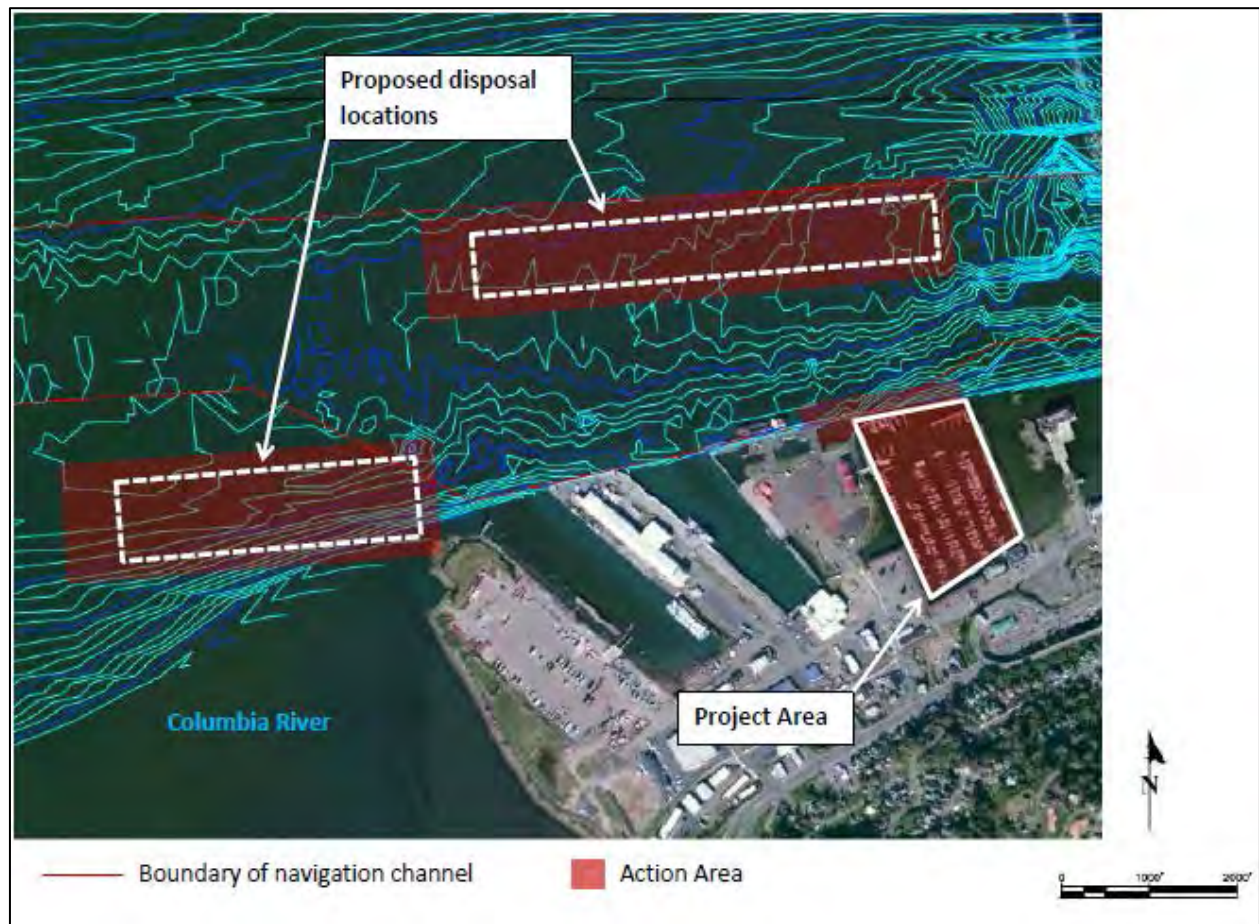


Figure 1. Action area (Campbell Environmental, LLC).

The Port is requesting a 10-year permit to conduct maintenance dredging of a maximum of 109,000 cubic yards of sediment from approximately. The proposed dredge prism is 11.26 acres at depths ranging from -6.0 to -17.0 feet MLLW. The Port proposes to remove up to 54,500 cubic yards (CY) of accumulated sediment during the first year of the permit, leaving the 54,500 CY to be removed over the course of the ensuing years of the 10-year permit. All resulting dredge material will be deposited in the flow lane of the Columbia River at two locations noted in Figure 1. The Portland Sediment Evaluation Team (PSET) has reviewed the Sediment Characterization Report for the proposed dredging site and has approved the associated dredge material for unconfined, aquatic disposal. The applicant is awaiting the final PSET memorandum. The applicant proposes to conduct dredging using a hydraulic suction cutterhead. All construction equipment will be operated from a floating barge. Dredged sediments will be discharged from a pipeline into the Columbia River to the designated disposal location adjacent to the navigation channel.

Conservation measures:

- Where feasible, floating silt curtains will be placed around the in-water dredge area to minimize the dispersion of suspended sediment.
- All work conducted below the HMT of the Columbia River will occur during the Oregon Department of Fish and Wildlife (ODFW) – preferred in-water work window (IWWW) for the Columbia River estuary (November 1 – February 28), a period when ESA-listed species are less likely to be present within the project action area.
- All construction equipment will access the project site via existing roadways and floating barges.
- All dredged materials and leave surface will be suitable and approved for in-water disposal based on the Sediment Evaluation Framework.
- All dredged sediment will be deposited in the flow lane of the Columbia River, where it will be recruited by the next high flow event and provide aquatic habitat functions.
- Dredge material will be deposited primarily during the ebb tide in the upper half of the water column to promote dispersal and prevent mounding. Proposed dredging will not alter the character, scope, or size of the project area.
- Where feasible, floating silt curtains will be placed around the in-water dredge area.
- Pollution Control Plan (PCP) will be prepared by the Contractor and carried out commensurate with the scope of the project that includes best management practices (BMPs) to confine, remove, and dispose of construction waste.
- Procedures to contain and control a spill of any hazardous material.
- All conditions of ODEQ's 401 Water Quality Certification will be followed.
- All equipment will be inspected daily for fluid leaks, any leaks detected will be repaired before operation is resumed.
- Stationary power equipment operated within 150 feet of the Columbia River will be diapered to prevent leaks.
- Operation of a hydraulic intake below the mudline, and/or slow operation of a clam shell or excavator will minimize the potential for entrainment during dredging activities.

1.4 Action Area

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

The action area is located on the Columbia River within the 12th field HUC 170800060500. Specifically, the action area includes approximately 11.26 acres inside the marina where dredging will occur in addition to the flow-lane disposal sites. The action area is used by 13 listed species of salmon and steelhead, the southern DPS of eulachon, and the southern DPS of green sturgeon (Table 1). The area is also EFH for Pacific salmon.

Table 1. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register (FR) decision notices for ESA-listed species considered in this opinion. Listing status: ‘T’ means listed as threatened under the ESA; ‘E’ means listed as endangered; ‘P’ means proposed for listing or designation.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)			
Lower Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River spring-run	E 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	ESA section 9 applies
Snake River spring/summer-run	T 6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Snake River fall-run	T 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Upper Willamette	T 8/15/11; 76 FR 50448	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Chum salmon (<i>O. keta</i>)			
Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Coho salmon (<i>O. kisutch</i>)			
Lower Columbia River	T 6/28/05; 70 FR 37160	2/24/16; 81 FR 9251	6/28/05; 70 FR 37160
Sockeye salmon (<i>O. nerka</i>)			
Snake River	E 8/15/11; 70 FR 37160	12/28/93; 58 FR 68543	ESA section 9 applies
Steelhead (<i>O. mykiss</i>)			
Lower Columbia River	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Middle Columbia River	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Columbia River	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	2/1/06; 71 FR 5178
Snake River Basin	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River	T 8/15/11; 76 FR 50448	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Green sturgeon (<i>Acipenser medirostris</i>)			
Southern DPS	T 4/07/06; 71 FR 17757	10/09/09; 74 FR 52300	6/2/10; 75 FR 30714
Eulachon (<i>Thaleichthys pacificus</i>)			
Southern DPS	T 3/18/10; 75 FR 13012	10/20/11; 76 FR 65324	Not applicable

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. Section 7(a)(2) of the ESA requires Federal agencies to consult with the United States Fish and Wildlife Service, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Section 7(b)(3) requires that at the conclusion of consultation, the Service provide an opinion stating how the agencies’ actions will affect listed species and their critical habitat. If incidental take is expected, section 7(b)(4) requires the consulting agency to provide an incidental take statement (ITS) that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts.

2.1 Analytical Approach

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of “to jeopardize the continued existence of a listed species,” which is “to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species. This biological opinion also relies on the definition of “destruction or adverse modification”, which “means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features” (81 FR 7414).

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

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

- Identify the rangewide status of the species and critical habitat likely 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 to assess the risk that the proposed action poses to species and critical habitat.
- Reach jeopardy and adverse modification conclusions.
- If necessary, define a reasonable and prudent alternative (RPA) to the proposed action.

2.2 Rangewide Status of the Species and Critical Habitat

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

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

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic habitat at large, is climate change. Climate change is likely to play an increasingly important role in determining the abundance and distribution of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. The largest hydrologic responses are expected to occur in basins with significant snow accumulation, where warming decreases snow pack, increases winter flows, and advances the timing of spring melt (Mote et al. 2014, Mote 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). 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). 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 ESUs (NWFSC 2015). New stressors generated by climate change, or existing stressors with effects that have been amplified by climate change, may also have synergistic impacts on species and ecosystems (Doney et al. 2012). These conditions will possibly intensify the climate change stressors inhibiting recovery of ESA-listed species in the future.

2.2.1 Status of the Species

Table 2, below provides a summary of listing and recovery plan information, status summaries and limiting factors for the species addressed in this opinion. More information can be found in recovery plans and status reviews for these species. These documents are available on the NMFS West Coast Region website (<http://www.westcoast.fisheries.noaa.gov/>).

Table 2. Listing classification and date, recovery plan reference, most recent status review, status summary, and limiting factors for each species considered in this opinion.

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

Snake River spring/summer-run Chinook salmon	Threatened 6/28/05	NMFS 2016a (draft)	NWFSC 2015	This ESU comprises 28 extant and four extirpated populations. All except one extant population (Chamberlin Creek) are at high risk. Natural origin abundance has increased over the levels reported in the prior review for most populations in this ESU, although the increases were not substantial enough to change viability ratings. Relatively high ocean survivals in recent years were a major factor in recent abundance patterns. While there have been improvements in abundance and productivity in several populations relative to prior reviews, those changes have not been sufficient to warrant a change in ESU status.	• Degraded freshwater habitat • Effects related to the hydropower system in the mainstem Columbia River, • Altered flows and degraded water quality • Harvest-related effects • Predation
Upper Willamette River Chinook salmon	Threatened 6/28/05	NMFS 2011	NWFSC 2015	This ESU comprises seven populations. Five populations are at very high risk, one population is at moderate risk (Clackamas River) and one population is at low risk (McKenzie River). Consideration of data collected since the last status review in 2010 indicates the fraction of hatchery origin fish in all populations remains high (even in Clackamas and McKenzie populations). The proportion of natural origin spawners improved in the North and South Santiam basins, but is still well below identified recovery goals. Abundance levels for five of the seven populations remain well below their recovery goals. Of these, the Calapooia River may be functionally extinct and the Molalla River remains critically low. Abundances in the North and South Santiam rivers have risen since the 2010 review, but still range only in the high hundreds of fish. The Clackamas and McKenzie populations have previously been viewed as natural population strongholds, but have both experienced declines in abundance despite having access to much of their historical spawning habitat. Overall, populations appear to be at either moderate or high risk, there has been likely little net change in the VSP score for the ESU since the last review, so the ESU remains at moderate risk.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats • Altered food web due to reduced inputs of microdetritus • Predation by native and non-native species, including hatchery fish • Competition related to introduced salmon and steelhead • Altered population traits due to fisheries and bycatch

Snake River fall-run Chinook salmon	Threatened 6/28/05	NMFS 2015a (draft)	NWFSC 2015	This ESU has one extant population. Historically, large populations of fall Chinook salmon spawned in the Snake River upstream of the Hells Canyon Dam complex. The extant population is at moderate risk for both diversity and spatial structure and abundance and productivity. The overall viability rating for this population is ‘viable.’ Overall, the status of Snake River fall Chinook salmon has clearly improved compared to the time of listing and compared to prior status reviews. The single extant population in the ESU is currently meeting the criteria for a rating of ‘viable’ developed by the ICTRT, but the ESU as a whole is not meeting the recovery goals described in the recovery plan for the species, which require the single population to be “highly viable with high certainty” and/or will require reintroduction of a viable population above the Hells Canyon Dam complex.	• Degraded floodplain connectivity and function • Harvest-related effects • Loss of access to historical habitat above Hells Canyon and other Snake River dams • Impacts from mainstem Columbia River and Snake River hydropower systems • Hatchery-related effects • Degraded estuarine and nearshore habitat.
Puget Sound Chinook salmon	Threatened 6/28/05	Shared Strategy for Puget Sound 2007 NMFS 2006	NWFSC 2015	This ESU comprises 22 populations distributed over five geographic areas. Most populations within the ESU have declined in abundance over the past 7 to 10 years, with widespread negative trends in natural-origin spawner abundance, and hatchery-origin spawners present in high fractions in most populations outside of the Skagit watershed. Escapement levels for all populations remain well below the TRT planning ranges for recovery, and most populations are consistently below the spawner-recruit levels identified by the TRT as consistent with recovery.	• Degraded floodplain and in-river channel structure • Degraded estuarine conditions and loss of estuarine habitat • Degraded riparian areas and loss of in-river large woody debris • Excessive fine-grained sediment in spawning gravel • Degraded water quality and temperature • Degraded nearshore conditions • Impaired passage for migrating fish • Severely altered flow regime

Columbia River chum salmon	Threatened 6/28/05	NMFS 2013	NWFSC 2015	Overall, the status of most chum salmon populations is unchanged from the baseline VSP scores estimated in the recovery plan. A total of 3 of 17 populations are at or near their recovery viability goals, although under the recovery plan scenario these populations have very low recovery goals of 0. The remaining populations generally require a higher level of viability and most require substantial improvements to reach their viability goals. Even with the improvements observed during the last five years, the majority of populations in this ESU remain at a high or very high risk category and considerable progress remains to be made to achieve the recovery goals.	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Degraded stream flow as a result of hydropower and water supply operations • Reduced water quality • Current or potential predation • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
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Lower Columbia River coho salmon	Threatened 6/28/05	NMFS 2013	NWFSC 2015	Of the 24 populations that make up this ESU, 21 populations are at very high risk, 1 population is at high risk, and 2 populations are at moderate risk. Recent recovery efforts may have contributed to the observed natural production, but in the absence of longer term data sets it is not possible to parse out these effects. Populations with longer term data sets exhibit stable or slightly positive abundance trends. Some trap and haul programs appear to be operating at or near replacement, although other programs still are far from that threshold and require supplementation with additional hatchery-origin spawners. Initiation of or improvement in the downstream juvenile facilities at Cowlitz Falls, Merwin, and North Fork Dam are likely to further improve the status of the associated upstream populations. While these and other recovery efforts have likely improved the status of a number of coho salmon populations, abundances are still at low levels and the majority of the populations remain at moderate or high risk. For the Lower Columbia River region land development and increasing human population pressures will likely continue to degrade habitat, especially in lowland areas. Although populations in this ESU have generally improved, especially in the 2013/14 and 2014/15 return years, recent poor ocean conditions suggest that population declines might occur in the upcoming return years	• Degraded estuarine and near-shore marine habitat • Fish passage barriers • Degraded freshwater habitat: Hatchery-related effects • Harvest-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
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Snake River sockeye salmon	Endangered 6/28/05	NMFS 2015	NWFSC 2015	This single population ESU is at very high risk due to small population size. There is high risk across all four basic risk measures. Although the captive brood program has been successful in providing substantial numbers of hatchery produced fish for use in supplementation efforts, substantial increases in survival rates across all life history stages must occur to re-establish sustainable natural production. In terms of natural production, the Snake River Sockeye ESU remains at extremely high risk although there has been substantial progress on the first phase of the proposed recovery approach – developing a hatchery based program to amplify and conserve the stock to facilitate reintroductions.	• Effects related to the hydropower system in the mainstem Columbia River • Reduced water quality and elevated temperatures in the Salmon River • Water quantity • Predation
Upper Columbia River steelhead	Threatened 1/5/06	Upper Columbia Salmon Recovery Board 2007	NWFSC 2015	This DPS comprises four independent populations. Three populations are at high risk of extinction while 1 population is at moderate risk. Upper Columbia River steelhead populations have increased relative to the low levels observed in the 1990s, but natural origin abundance and productivity remain well below viability thresholds for three out of the four populations. The status of the Wenatchee River steelhead population continued to improve based on the additional year's information available for the most recent review. The abundance and productivity viability rating for the Wenatchee River exceeds the minimum threshold for 5% extinction risk. However, the overall DPS status remains unchanged from the prior review, remaining at high risk driven by low abundance and productivity relative to viability objectives and diversity concerns.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded floodplain connectivity and function, channel structure and complexity, riparian areas, large woody debris recruitment, stream flow, and water quality • Hatchery-related effects • Predation and competition • Harvest-related effects

Lower Columbia River steelhead	Threatened 1/5/06	NMFS 2013	NWFSC 2015	This DPS comprises 23 historical populations, 17 winter-run populations and six summer-run populations. Nine populations are at very high risk, 7 populations are at high risk, 6 populations are at moderate risk, and 1 population is at low risk. The majority of winter-run steelhead populations in this DPS continue to persist at low abundances. Hatchery interactions remain a concern in select basins, but the overall situation is somewhat improved compared to prior reviews. Summer-run steelhead populations were similarly stable, but at low abundance levels. The decline in the Wind River summer-run population is a source of concern, given that this population has been considered one of the healthiest of the summer-runs; however, the most recent abundance estimates suggest that the decline was a single year aberration. Passage programs in the Cowlitz and Lewis basins have the potential to provide considerable improvements in abundance and spatial structure, but have not produced self-sustaining populations to date. Even with modest improvements in the status of several winter-run DIPs, none of the populations appear to be at fully viable status, and similarly none of the MPGs meet the criteria for viability.	• Degraded estuarine and nearshore marine habitat • Degraded freshwater habitat • Reduced access to spawning and rearing habitat • Avian and marine mammal predation • Hatchery-related effects • An altered flow regime and Columbia River plume • Reduced access to off-channel rearing habitat in the lower Columbia River • Reduced productivity resulting from sediment and nutrient-related changes in the estuary • Juvenile fish wake strandings • Contaminants
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Upper Willamette River steelhead	Threatened 1/5/06	NMFS 2011	NWFSC 2015	This DPS has four demographically independent populations. Three populations are at low risk and one population is at moderate risk. Declines in abundance noted in the last status review continued through the period from 2010-2015. While rates of decline appear moderate, the DPS continues to demonstrate the overall low abundance pattern that was of concern during the last status review. The causes of these declines are not well understood, although much accessible habitat is degraded and under continued development pressure. The elimination of winter-run hatchery release in the basin reduces hatchery threats, but non-native summer steelhead hatchery releases are still a concern for species diversity and a source of competition for the DPS. While the collective risk to the persistence of the DPS has not changed significantly in recent years, continued declines and potential negative impacts from climate change may cause increased risk in the near future.	• Degraded freshwater habitat • Degraded water quality • Increased disease incidence • Altered stream flows • Reduced access to spawning and rearing habitats due to impaired passage at dams • Altered food web due to changes in inputs of microdetritus • Predation by native and non-native species, including hatchery fish and pinnipeds • Competition related to introduced salmon and steelhead • Altered population traits due to interbreeding with hatchery origin fish
Middle Columbia River steelhead	Threatened 1/5/06	NMFS 2009b	NWFSC 2015	This DPS comprises 17 extant populations. The DPS does not currently include steelhead that are designated as part of an experimental population above the Pelton Round Butte Hydroelectric Project. Returns to the Yakima River basin and to the Umatilla and Walla Walla Rivers have been higher over the most recent brood cycle, while natural origin returns to the John Day River have decreased. There have been improvements in the viability ratings for some of the component populations, but the DPS is not currently meeting the viability criteria in the MCR steelhead recovery plan. In general, the majority of population level viability ratings remained unchanged from prior reviews for each major population group within the DPS.	• Degraded freshwater habitat • Mainstem Columbia River hydropower-related impacts • Degraded estuarine and nearshore marine habitat • Hatchery-related effects • Harvest-related effects • Effects of predation, competition, and disease

Snake River basin steelhead	Threatened 1/5/06	NMFS 2016 (draft)	NWFSC 2015	This DPS comprises 24 populations. Two populations are at high risk, 15 populations are rated as maintained, 3 populations are rated between high risk and maintained, 2 populations are at moderate risk, 1 population is viable, and 1 population is highly viable. Four out of the five MPGs are not meeting the specific objectives in the draft recovery plan based on the updated status information available for this review, and the status of many individual populations remains uncertain. A great deal of uncertainty still remains regarding the relative proportion of hatchery fish in natural spawning areas near major hatchery release sites within individual populations.	• Adverse effects related to the mainstem Columbia River hydropower system • Impaired tributary fish passage • Degraded freshwater habitat • Increased water temperature • Harvest-related effects, particularly for B-run steelhead • Predation • Genetic diversity effects from out-of-population hatchery releases
Southern DPS of green sturgeon	Threatened 4/7/06	In development	NMFS 2015c	The Sacramento River contains the only known green sturgeon spawning population in this DPS. The current estimate of spawning adult abundance is between 824-1,872 individuals. Telemetry data and genetic analyses suggest that Southern DPS green sturgeon generally occur from Graves Harbor, Alaska to Monterey Bay, California and, within this range, most frequently occur in coastal waters of Washington, Oregon, and Vancouver Island and near San Francisco and Monterey bays. Within the nearshore marine environment, tagging and fisheries data indicate that Northern and Southern DPS green sturgeon prefer marine waters of less than a depth of 110 meters.	• Reduction of its spawning area to a single known population • Lack of water quantity • Poor water quality • Poaching

Southern DPS of eulachon	Threatened 3/18/10	NMFS 2016d (draft)t	Gustafson et al. 2016	The Southern DPS of eulachon includes all naturally-spawned populations that occur in rivers south of the Nass River in British Columbia to the Mad River in California. Sub populations for this species include the Fraser River, Columbia River, British Columbia and the Klamath River. In the early 1990s, there was an abrupt decline in the abundance of eulachon returning to the Columbia River. Despite a brief period of improved returns in 2001-2003, the returns and associated commercial landings eventually declined to the low levels observed in the mid-1990s. Although eulachon abundance in monitored rivers has generally improved, especially in the 2013-2015 return years, recent poor ocean conditions and the likelihood that these conditions will persist into the near future suggest that population declines may be widespread in the upcoming return years	• Changes in ocean conditions due to climate change, particularly in the southern portion of the species' range where ocean warming trends may be the most pronounced and may alter prey, spawning, and rearing success. • Climate-induced change to freshwater habitats • Bycatch of eulachon in commercial fisheries • Adverse effects related to dams and water diversions • Water quality, • Shoreline construction • Over harvest • Predation
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2.2.2 Status of the Critical Habitat

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

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

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

For southern DPS eulachon, critical habitat includes portions of 16 rivers and streams in California, Oregon, and Washington (USDC 2011). We designated all of these areas as migration and spawning habitat for this species.

A summary of the status of critical habitats, considered in this opinion, is provided in Table 3, below.

Table 3. Critical habitat, designation date, federal register citation, and status summary for critical habitat considered in this opinion

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Lower Columbia River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 47 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some, or high potential for improvement. We rated conservation value of HUC5 watersheds as high for 30 watersheds, medium for 13 watersheds, and low for four watersheds.
Upper Columbia River spring-run Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses four subbasins in Washington containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. We rated conservation value of HUC5 watersheds as high for 10 watersheds, and medium for five watersheds. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Snake River spring/summer-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers (except the Clearwater River) presently or historically accessible to this ESU (except reaches above impassable natural falls and Hells Canyon Dam). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Willamette River Chinook salmon	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Oregon containing 56 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some, or high, potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 22 watersheds, medium for 16 watersheds, and low for 18 watersheds.
Snake River fall-run Chinook salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers, and all tributaries of the Snake and Salmon rivers presently or historically accessible to this ESU (except reaches above impassable natural falls, and Dworshak and Hells Canyon dams). Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Columbia River chum salmon	9/02/05 70 FR 52630	Critical habitat encompasses six subbasins in Oregon and Washington containing 19 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 16 watersheds, and medium for three watersheds.

Species	Designation Date and Federal Register Citation	Critical Habitat Status Summary
Lower Columbia River coho salmon	2/24/16 81 FR 9252	Critical habitat encompasses 10 subbasins in Oregon and Washington containing 55 occupied watersheds, as well as the lower Columbia River and estuary rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 34 watersheds, medium for 18 watersheds, and low for three watersheds.
Snake River sockeye salmon	10/25/99 64 FR 57399	Critical habitat consists of river reaches of the Columbia, Snake, and Salmon rivers; Alturas Lake Creek; Valley Creek; and Stanley, Redfish, Yellow Belly, Pettit and Alturas lakes (including their inlet and outlet creeks). Water quality in all five lakes generally is adequate for juvenile sockeye salmon, although zooplankton numbers vary considerably. Some reaches of the Salmon River and tributaries exhibit temporary elevated water temperatures and sediment loads that could restrict sockeye salmon production and survival (NMFS 2015b). Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Upper Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 10 subbasins in Washington containing 31 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 20 watersheds, medium for eight watersheds, and low for three watersheds.
Lower Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses nine subbasins in Oregon and Washington containing 41 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of HUC5 watersheds as high for 28 watersheds, medium for 11 watersheds, and low for two watersheds.
Upper Willamette River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses seven subbasins in Oregon containing 34 occupied watersheds, as well as the lower Willamette/Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. Watersheds are in good to excellent condition with no potential for improvement only in the upper McKenzie River and its tributaries (NMFS 2005). We rated conservation value of HUC5 watersheds as high for 25 watersheds, medium for 6 watersheds, and low for 3 watersheds.
Middle Columbia River steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 15 subbasins in Oregon and Washington containing 111 occupied watersheds, as well as the Columbia River rearing/migration corridor. Most HUC5 watersheds with PCEs for salmon are in fair-to-poor or fair-to-good condition (NMFS 2005). However, most of these watersheds have some or a high potential for improvement. We rated conservation value of occupied HUC5 watersheds as high for 80 watersheds, medium for 24 watersheds, and low for 9 watersheds.
Snake River basin steelhead	9/02/05 70 FR 52630	Critical habitat encompasses 25 subbasins in Oregon, Washington, and Idaho. Habitat quality in tributary streams varies from excellent in wilderness and roadless areas, to poor in areas subject to heavy agricultural and urban development (Wissmar et al. 1994). Reduced summer stream flows, impaired water quality, and reduced habitat complexity are common problems. Migratory habitat quality in this area has been severely affected by the development and operation of the dams and reservoirs of the Federal Columbia River Power System.
Southern DPS of green sturgeon	10/09/09 74 FR 52300	Critical habitat has been designated in coastal U.S. marine waters within 60 fathoms depth from Monterey Bay, California (including Monterey Bay), north to Cape Flattery, Washington, including the Strait of Juan de Fuca, Washington, to its United States boundary; the Sacramento River, lower Feather River, and lower Yuba River in

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

On the mainstem of the Columbia River, hydropower projects, including the Federal Columbia River Hydropower System (FCRPS), have significantly degraded salmon and steelhead habitats (Bottom *et al.* 2005; Fresh *et al.* 2005; NMFS 2011d; NMFS 2013a). The PBFs for adult and juvenile salmonids include:

- abundant prey
- suitable substrate
- streams free of obstructions
- natural cover
- adequate water depth and flows
- cool water free of toxic pollutants

Snake River salmonids have a differently described list of PBFs:

- cover
- food source
- riparian vegetation
- safe passage
- space to swim
- substrate that provides channel stability
- water quantity for adequate depth and flows
- cool clean water

The series of dams and reservoirs that make up the FCRPS block an estimated 12 million cubic yards of debris and sediment that would otherwise naturally flow down the Columbia River and replenish shorelines along the Washington and Oregon coasts, modifying and eliminating a suite of habitat conditions and processes to which salmonids were adapted. The Columbia River estuary is also notably modified. It has lost a significant amount of the tidal marsh and tidal swamp habitats that are critical to juvenile salmon and steelhead, particularly small or ocean-type species (Bottom *et al.* 2005; Fresh *et al.* 2005; NMFS 2011d; NMFS 2013a). Edges of marsh areas provide sheltered habitats for juvenile salmon and steelhead where food, in the form of amphipods or other small invertebrates which feed on marsh detritus, is plentiful, and larger predatory fish can be avoided. Historically, floodwaters of the Columbia River inundated the margins and floodplains along the estuary, allowing juvenile salmon and steelhead access to a wide expanse of low-velocity marshland and tidal channel habitats. In general, the riverbanks were gently sloping, with riparian and wetland vegetation at the higher elevations of the river floodplain becoming habitat for salmon and steelhead during flooding river discharges or flood tides. Sherwood *et al.* (1990) estimated that the Columbia River estuary lost 20,000 acres of tidal swamps, 10,000 acres of tidal marshes, and 3,000 acres of tidal flats between 1870 and 1970. This study further estimated an 80% reduction in emergent vegetation production and a 15% decline in benthic algal production. Habitat and food-web changes within the estuary, and other factors affecting salmon population structure and life histories, have altered the estuary's capacity to support juvenile salmon (Bottom *et al.* 2005; Fresh *et al.* 2005; NMFS 2011d; NMFS 2013a). Diking and filling have reduced the tidal prism and eliminated emergent and forested wetlands and floodplain habitats. These changes have likely reduced the estuary's salmon-rearing capacity. Moreover, water and sediment in the Lower Columbia River and its tributaries

have toxins that are harmful to aquatic resources (Lower Columbia River Estuary Partnership 2007). Contaminants of concern include dioxins and furans, heavy metals, polychlorinated biphenyls (PCBs) and organochlorine pesticides such as DDT. Table 4 below delineates the physical and biological features for Southern DPS green sturgeon.

Table 4. Physical and biological features of critical habitat designated for southern DPS green sturgeon and corresponding species life history events.

Physical or Biological Features		Species Life History Event
Site Type	Site Attribute	
Freshwater riverine system	Food resources Migratory corridor Sediment quality Substrate type or size Water depth Water flow Water quality	Adult spawning Embryo incubation, growth and development Larval emergence, growth and development Juvenile metamorphosis, growth and development
Estuarine areas	Food resources Migratory corridor Sediment quality Water flow Water depth Water quality	Juvenile growth, development, seaward migration Subadult growth, development, seasonal holding, and movement between estuarine and marine areas Adult growth, development, seasonal holding, movements between estuarine and marine areas, upstream spawning movement, and seaward post-spawning movement
Coastal marine areas	Food resources Migratory corridor Water quality	Subadult growth and development, movement between estuarine and marine areas, and migration between marine areas Adult sexual maturation, growth and development, movements between estuarine and marine areas, migration between marine areas, and spawning migration

Finally, critical habitat for eulachon includes portions of 16 rivers and streams in California, Oregon, and Washington (USDC 2011). All of these areas are designated as migration and spawning habitat for this species. In Oregon, 24.2 miles of the lower Umpqua River, 12.4 miles of the lower Sandy River, and 0.2 miles of Tenmile Creek have been designated. The mainstem Columbia River from the mouth to the base of Bonneville Dam, a distance of 143.2 miles is also designated as critical habitat. Table 7 details eulachon PBFs.

The range of eulachon in the Pacific Northwest completely overlaps with the range of several ESA-listed stocks of salmon and steelhead as well as green sturgeon. Although the habitat requirements of these fishes differ somewhat from eulachon, efforts to protect habitat generally focus on the maintenance of watershed processes that would be expected to benefit eulachon. The BRT identified dams and water diversions as moderate threats to eulachon in the Columbia

and Klamath rivers where hydropower generation and flood control are major activities. Degraded water quality is common in some areas occupied by southern DPS eulachon. In the Columbia and Klamath systems, large-scale impoundment of water has increased winter water temperatures, potentially altering the water temperature during eulachon spawning periods.

Table 5. Physical or biological features of critical habitats designated for eulachon and corresponding species life history events.

Physical or biological features		Species Life History Event
Site Type	Site Attribute	
Freshwater spawning and incubation	Flow Water quality Water temperature Substrate	Adult spawning Incubation
Freshwater migration	Flow Water quality Water temperature Food	Adult and larval mobility Larval feeding

Numerous chemical contaminants are also present in spawning rivers, but the exact effect these compounds have on spawning and egg development is unknown (Gustafson *et al.* 2010). The lower Columbia River mainstem provides spawning and incubation sites, and a large migratory corridor to spawning areas in the tributaries. Prior to the construction of Bonneville Dam, eulachon ascended the Columbia River as far as Hood River, Oregon. Major tributaries that support spawning runs include the Grays, Skamokawa, Elochoman, Kalama, Lewis and Sandy rivers.

Although the majority of spawning by eulachon within the LCR typically occurs in larger tributaries such as the Cowlitz River, Grays River, Kalama River, Lewis River, and Sandy River, infrequent use is also noted in smaller tributaries, such as the Elochoman River and Skamokawa Creek. The numbers, and locations, where individuals return to spawn can be highly variable though fish generally tend to congregate in greatest numbers in the Cowlitz River.

2.3 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).

As with the overall status of critical habitat, presented above, the current state of the lower Columbia River in the action area is reduced and habitat quality and quantity due to a broad number of human activities that have increased over time with human population growth and

urbanization, e.g., roads, diking, fishing pressure, flood control, irrigation dams, pollution, municipal and industrial water use, introduced species, and hatchery production (NRC 1996, NMFS 2013). In addition, salmon and eulachon populations have been strongly affected by ocean and climate conditions. The quality and quantity of habitat in many Columbia River basin watersheds have declined dramatically in the last 150 years including loss of connectivity with floodplains and feeding and resting habitat for juvenile salmonids in the form of low-velocity marshland and tidal channel habitats (Bottom et al. 2005). Water quality throughout the action area is degraded by urban, industrial, and agricultural practices across the basin that contribute multiple pollutants at levels above natural conditions. Habitat degradation has generally reduced the quality of this important rearing and migration habitat for salmon and steelhead. Survival through this reach has declined for both juveniles and adults resulting in reduced population productivity and abundance. The impact of habitat degradation on eulachon and green sturgeon is less understood.

In addition, the environmental baseline includes the impacts from deep water dredging to maintain the FNC for large commercial vessel traffic and shallow water dredging to maintain marinas for recreational vessels. Therefore, dredging activities occur across numerous areas and microhabitats within the Lower Columbia River include sloughs, secondary channels, and floodplain wetlands. All of these habitat areas provide rearing space for ESA-listed fish, and all have been degraded by shore-based development and construction and maintenance of marinas. Floodplain and off-channel sloughs have been cut off by dikes and flood control levees, limiting potential refuge areas and forage sites for juvenile salmonids. The dredge sediment disposal in the Lower Columbia River has had adverse effects, including displacement of seasonally-flooded wetlands and creation of attractive nesting habitat for avian predator species.

2.4 Effects of the Action on the Species and Designated Critical Habitat

“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.

2.4.1 Critical Habitat Effects

The proposed action will affect designated critical habitat for LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, UWR spring-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, UWR steelhead, green sturgeon, and eulachon. Given the location of the proposed action and life history expression, all of the species considered in this opinion use this area for migration/rearing.

Of the PBFs for migration of adult and juvenile salmonids mentioned above, only some are likely to be affected by the proposed action:

- streams free of obstructions

- cool clean water free of toxic pollutants
- food source
- safe passage
- space to swim

The proposed action will not obstruct the Columbia River or decrease safe passage, except in a small area around the cutterhead, as the operation will occur during the November 1 to February 28 in-water work window. The project will not reduce or otherwise affect riparian vegetation, will not permanently restrict space to swim, will not destabilize the river channel, will not decrease channel depth or otherwise affect flow, and the overall increase in the depth of the dredge area, an ultimate outcome of the action, should also have no short or long term effects on the area to serve either upstream migration, or downstream migration. The project will not raise water temperature or otherwise increase water pollution, with the exception of a brief period of turbidity near the active dredge. The majority of turbidity produced by the dredge is expected to stay within the 11-acre marina. As such, only minor turbidity is expected to move through the access channel into the Columbia River.

The proposed action will reduce food production in a limited area within the marina, but available forage from sources outside of the action area will remain plentiful. Benthic invertebrates provide the primary food source for these fish – dominated by families of midges (Johnson *et al.* 2011). The aquatic invertebrates occupy the upper surface of the river bottom with a life cycle of many weeks to months before emerging into the water column. The proposed dredging operation will disturb benthic habitat and reduce benthic productivity. The level and nature of the disturbance is not unlike natural processes that continually move river bottom sediments, burying or eroding benthic habitat. Recolonization of the benthic habitat is rapid – within weeks to months (McCabe et al. 1998). Loss of forage will occur where the frequency and duration of the dredging delays natural recolonization.

For eulachon, the PBFs for freshwater spawning and migration (including the incubation of eggs and larval mobility and feeding) include:

- Unrestricted flow
- Cool water free of toxic pollutants
- Fine grained substrate
- Food

As described above, the proposed action will not restrict flow, will not raise water temperature or otherwise increase toxic pollution discharge, will not alter the substrate that eulachon rely on, and will not limit food availability, as the effect on prey base is limited temporally and spatially.

Critical Habitat Summary. For all designated critical habitats, the three effects of the proposed action are 1) the temporary disturbance from the dredge equipment operation in the migratory corridor, 2) degradation of water clarity as fine sediments and organic matter are re-suspended, and 3) temporary reduction in quantity of food organisms and benthic productivity. The proposed action will not cause any significant loss of critical habitat quality with the action area because

each feature of habitat impaired will ameliorate within minutes (operations disturbance), hours (water quality), or weeks (benthic prey).

2.4.2 Species Effects

Effects from the action on species is based on exposure to the effects occurring to the fish themselves, or experienced by fish as a result of habitat changes, as described above. In this case, thirteen ESA-listed fish species of the upper and lower Columbia basins will pass through the action area and we assumed they will be exposed to the effects of the action.

The potential effects anticipated to ESA-listed fish species exposed in the action area are associated with the habitat effects described above (i.e., short-term alterations in water quality from the action, potential short-term changes in benthic forage), and entrainment of fish by the dredge equipment. The level of exposure varies by timing and location of activity when different densities and life history stages of the ESA-listed fish will be present. The magnitude of exposure experienced by ESA-listed fish species is directly related to the amount of time the dredge is actively removing material from the benthos, as approximated by days of operation per year. In this case, dredging will occur for up to 120 days per year over a 10-year period. Exposure of adult and juvenile fish will increase with greater duration and frequency of dredging. Greatest exposure for juvenile salmonids will occur during activities in water depths typically less than -25 feet where youngest fish tend to forage. While the area to be dredged is shallower than -25 feet, the Port's marina is mostly enclosed by a 90-foot ingress and egress channel. This would likely preclude most, but certainly not all, fish passing by from entering the area where the majority of dredging will occur.

Salmonid Exposure and Effects

Adult salmonids. Though peak migratory periods vary by species, some adult Columbia River salmonids are reasonably certain to be present in the action area year round, and are therefore susceptible to exposure to the effects of the action. Adult Chinook salmon presence in the action area is most likely from late spring through the fall. Coho salmon presence is most likely in late summer through early winter. Chum salmon primarily occur during the fall. Adult sockeye salmon presence will most likely range from late spring to late summer. Steelhead presence will most likely range from early summer to early fall (from passage data at Bonneville Dam 10-year average, http://www.cbr.washington.edu/dart/adult_hrt.html). Based on the broad run timing of these species, and the proposed work period of November 1 - February 28, exposure is extremely unlikely for adult SR sockeye salmon. All other Columbia River species of adult salmonids have at least some potential for exposure to the effects of the dredging action.

Exposure and Response to Equipment Operation: Although the presence of adult Columbia River salmonids in the action area is not discountable, the likelihood of adult fish experiencing adverse effects from the action is unlikely due to: (1) the limited footprint of the operation relative to the size of the Columbia River estuary (limiting probability of exposure to individual fish); (2), the intermittent nature of the action; and (3) the migratory and avoidance behaviors inherent to adult salmon and steelhead. The Columbia River estuary is a massive body of water that presents no current migratory obstacles beyond high water temperatures that can occur during late summer

(outside of the proposed work period); thus, migrating adult salmon are typically widely dispersed in the estuary. The action area is an extremely limited portion of the Columbia River estuary, with sufficient space to either side of the dredge for adult fish to pass. Further, the port's narrow access channel would prevent most fish from entering the dredge area. These conditions, coupled with the adult run-timing previously discussed, lead to the conclusion that few adult salmon of any species would be exposed to the disturbance of habitat created by the dredge operation. Furthermore, in the extremely unlikely event these fish enter the marina they are not likely to come near within proximity of the dredge operation. At most due to their strong swimming ability, adult salmonids are able to avoid the cutterhead and dredge intake with no likelihood of entrainment. An overall increase in the depth of the dredge area, an ultimate outcome of the action, should also have no short or long term effects on the upstream migration of adults.

Exposure and Response to Turbid Conditions: Given that adult salmonid migration rates range up to a few miles per hour (Matter and Sandford, 2003), we expect adult ESA-listed salmonids that do encounter the dredge or dredge material disposal operations, manifest as a turbidity plume, to be moving upstream at such a rate as to limit this exposure to a matter of minutes. Studies show that salmonids are able to detect and distinguish turbidity and other water quality gradients (Bisson and Bilby 1982), and that larger salmonids are more tolerant to suspended sediment than smaller juveniles (Servizi and Martens 1991, 1992). As salmonids grow and their swimming ability increases, their dependence on shallow nearshore habitat declines rapidly (Groot and Margolis 1991). Adult salmonids will typically be in the main river channel at depths of 10 to 20 feet below the water surface and off the bottom (Johnson et al. 2005). Larger adult salmon readily respond by avoiding waters affected by suspended sediment to find refuge and/or passage conditions within unaffected adjacent areas. Thus, to the extent that any adults are exposed to turbidity generated by project activities, they are expected to respond by avoiding excessively turbid conditions and find passage within unaffected adjacent areas. Specifically, we do not expect these fish to move into the confined marina space where dredging will occur. These fish may experience some low-level turbidity near the entrance of the marina or the sediment discharge pipe located along the bottom of the Columbia River. In both cases, we anticipate adult salmonids will pass through the action area without experiencing adverse effects due to the brevity of exposure. .

Juvenile salmonids. Dredging around the ports slips and piers in fall through mid-winter at depths ranging from approximately -8' to -10' CRD will occur when juvenile salmon are present, but at very low density (Roegner et al. 2012). Removal of dredged material will temporarily and minimally alter the river bed, yet would be within the normal range of seasonal changes to the river bed from typical bed load transport. The level of exposure juvenile salmonids will have to the effects of the action will vary and depend on species and life history, along with the location, timing, and depth of the activities.

Juvenile ESA-listed species migrate in the vicinity of and may rear in the action area at different time periods. Juvenile salmonids are present in the action area year round, peaking during one or two periods from late winter through summer, with lesser presence in the fall. Juvenile Chinook salmon are present year round; primary timing ranges from spring to early fall, although subyearlings presence extends later in the fall. Juvenile chum salmon are present from winter to

spring. Juvenile coho salmon are present year-round with primary timing from spring to mid-summer. Juvenile sockeye are present mid-spring to late summer. Juvenile steelhead are present year-round with a primary timing range of spring to mid-summer (ODFW 2003).

Juvenile ESA-listed species migrate through the action area at different rates depending on species and life history. Numerous early life history strategies of Columbia River salmonids have been lost as a result of past management actions discussed under the environmental baseline (Bottom *et al.* 2005). Today, salmonids expected in the action area will generally exhibit either a stream-maturing or ocean-maturing life history type. Stream type juvenile salmon and steelhead typically rear in upstream tributary habitats for over a year. These include LCR Chinook salmon (spring runs), LCR steelhead, LCR coho salmon, MCR steelhead, UWR steelhead, UWR spring run Chinook salmon, SR spring/summer Chinook salmon, UCR Chinook salmon, SR steelhead, SR sockeye, and UCR steelhead. These fish will migrate through the action area as smolts. These juveniles tend to be 100 to 200 mm in size, move quickly downstream, and will be through the action area within 1 - 2 days. Ocean-type juvenile salmon tend to move out of spawning streams and migrate towards the lower Columbia River estuary as subyearlings and are actively rearing within the Lower Columbia River. These include LCR Chinook salmon (fall runs), CR Chum salmon, and SR fall-run Chinook salmon. These fish are smaller in size (less than 100 mm) and more likely to spend days to weeks in the action area foraging (Carter *et al.* 2009).

Juvenile ESA-listed species have a wide horizontal and vertical distribution related to size and life history stage. Generally speaking, juvenile salmonids will occupy the action area across the width of the river and to average depths of up to 35 feet (Carter *et al.* 2009). Smaller-sized fish use the shallow inshore habitats and larger fish will use the channel margins and main channel. The pattern of use generally shifts between day and night. Juvenile salmon occupy different locations within the Columbia River, and are typically in shallower water during the day, and may avoid predation by larger fish that are more likely to be in deeper water. Apparently these younger fish will venture into the deeper areas of the river away from the shoreline, moving towards the navigation channel and along the bathymetric break – or channel margin – and will be closer to the bottom of the channel. Carlson *et al.* (2001) notes there is a higher percentage of use along the channel margins than either the shallow nearshore or channel, which indicates potential underestimates for nearshore subyearlings. Juvenile salmon position in open water tends to be about 3 meters below the surface (Carter *et al.* 2009), a minimum of 2 meters off of the bottom in shallow areas, 3 to 10 meters off the bottom on the channel margins, and 5 to 15 meters off the bottom in the main channel (Carlson 2001) with subyearlings being closer to the bottom than older 1+ year-old fish (Carter *et al.* 2009). The smaller subyearling salmonids will likely congregate along the nearshore areas in shallow water and extend into the channel margins (Bottom *et al.* 2011). Yet, as Carlson *et al.* (2001) indicated, there is higher use of the channel margins than previously thought and considering the parameters above, relative juvenile position in the water column suggests higher potential subyearling use in areas of 20 to 30 feet deep.

Exposure and Response to Equipment Operation: Subyearling salmonids including LCR Chinook salmon, CR chum salmon, and to a limited extent LCR steelhead in the action area are more likely to be displaced and entrained than yearlings. The restricted time frame for dredging when the density of subyearlings will be low, which will limit the exposure. As such, most subyearlings will pass by the dredge without being affected. For those that do encounter the

dredge, most of those fish will move around the dredging operation. Some subyearlings that encounter the dredge will likely be within the critical zone of 1-meter above the bottom, and subject to an increased likelihood of entrainment. In the shallower waters, subyearlings are closer to the bottom and are less able to escape entrainment flows. Fish entrained by the dredge are likely to be injured or killed. The subyearlings are expected to exhibit the same avoidance response to disturbance and turbidity around the cutterhead as adults, which will minimize but not eliminate entrainment of these younger fish.

Of key importance in considering the detrimental effects of total suspended solids (TSS) on fish are the frequency and the duration of the exposure, as well as the TSS concentration and extent of the plume. In this case, the majority of elevated turbidity from the dredge operation is expected to stay within the marina and minimized by the use of BMPs, reducing the extent and intensity of the turbidity plume moving into the Columbia River FNC. As such, only fish occurring in the partially enclosed marina will be exposed to turbidity. As with exposure to dredge entrainment discussed above, we anticipate only subyearling salmonids will be subjected to conditions of high suspended sediments and turbidity from the proposed action.

Exposure and Response to Turbid Conditions: The effects of suspended sediment and turbidity on fish range from beneficial to detrimental. Elevated TSS have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival, although elevated TSS have also been reported to cause physiological stress, reduce growth, and adversely affect survival (Newcombe and Jensen 1996). Fish may experience a reduction in predation from piscivorous fish and birds by occupying turbid waters (Gregory and Levings 1998), but chronic exposure to these conditions can cause physiological stress responses that can increase maintenance energy needs and reduce feeding and growth (Lloyd *et al.* 1987; Redding *et al.* 1987; Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish traverse these streams along migration routes (Lloyd *et al.* 1987). Depending on the concentrations of suspended solids and the food supply (Quigley 1994), juvenile fish will either seek refuge in adjacent areas with less turbidity, or remain in the area, taking advantage of additional cover provided by the turbid water. Death or injury to ESA-listed salmonids directly from an increase in TSS is not likely. However, juvenile salmonids in the Columbia River estuary primarily feed visually on small invertebrates (i.e., *Dipterans*, *Psychosidadae*, and *Corophium*) (Roegner *et al.* 2004), so their ability to feed will decline where suspended sediments have been elevated. This will likely reduce growth, lipid stores, and ultimately fitness and survival in a small number of juvenile fish. Again, to the extent that the effects of turbidity and sediment deposition will be limited to the area within an area with degraded benthic fauna (i.e., marina). Given the small area of river affected and the small number of ESA-listed salmonids likely to be present and exposed to elevated TSS, only a few ESA-listed fish in the action area are likely to experience any of the beneficial or the adverse effects caused by suspended solids as described above.

Exposure and Response to Reduced Benthic Prey: Subyearling salmonids in the action area are also likely to be exposed to a slight reduction in forage, described above in the effects on Critical Habitat. Subyearlings are actively feeding as they move downstream. Benthic invertebrates provide the primary food source for these fish – dominated by families of midges (Johnson *et al.* 2011). Loss of forage will occur where frequency and duration of the dredging delays natural

recolonization, as dredging operations will disturb benthic habitat and reduce benthic productivity temporarily. Because recolonization of the benthic habitat is rapid – within weeks to months (McCabe *et al.* 1998), and prey availability nearby is unaffected, we expect fish to not have noticeably diminished growth or fitness. The limited and localized loss of prey is not likely to reduce available forage for rearing salmonids in sufficient degree to have an impact on juvenile fish survival.

Summary of Salmonid Response to Habitat Effects in Migration Corridor. When adults and juveniles are considered together, it remains likely that few individual fish will encounter the dredge within the migration corridor, and of these most will not alter their pathway or delay their rate of migration. Adult fish are intent on moving upstream and a small deviation from the migration path will not significantly change overall distribution or risk of predation. Juvenile salmonids will largely avoid the dredging and can move in and out of the turbidity plume. This level of avoidance will be minor and within the normal migration patterns, and thus not likely to increase the risk of predation or otherwise harm these fish.

Summary of Salmonid Entrainment Effects. Only a few individual fish will encounter the suction cutterhead. Adult salmonids will easily escape entrainment flows. Salmonid smolts within a couple of feet of the cutterhead could become entrained, but most would be able to avoid the entrainment. Subyearling salmonids are less able to escape entrainment and are subject to a wider zone of potential entrainment due to less swimming stamina and speed. Dredging in channel margins and shallows where subyearling salmonids congregate will likely entrain fish. The zone of potential entrainment extends several feet from the cutterhead. A few subyearling salmonids, including fall LCR Chinook salmon, LCR steelhead, and CR chum salmon are reasonably certain to be injured or killed each year for the 10-year duration of the permit. We cannot quantify the number of subyearling salmonids that will be killed from entrainment but expect the numbers to be low based on operation techniques that reduce the chance that the cutterhead will be in the water column. If any subyearlings are entrained, the source populations of those fish will be impossible to predict. However, because the number of juvenile fish killed or injured will be very few, we find this potential source of injury or death will be insufficient to significantly affect any of the abundance or productivity of any of the populations considered in this opinion.

Summary of Salmonid Foraging Effects. Salmonid foraging in the action area occurs almost exclusively among juveniles. Few if any individual fish will experience a reduction of food or foraging opportunities. Benthic habitat disturbance will be of limited extent, and temporary in nature. However, because the action is essentially repetitive annually and will occur in shallow water preferred by juvenile salmonids, we expect the forage base to be slightly diminished within the action area relative to unaffected adjacent shallow water habitats. The ability of juvenile salmonids to achieve sufficient nutrition within the action area is therefore expected to be nominally, but adversely affected. The availability of alternative feeding areas and upstream food sources is plentiful so that the cohort of fish present during and for several weeks after the action occurs will not be adversely affected.

Green Sturgeon and Eulachon Exposure and Effects

Green Sturgeon. Few, if any, green sturgeon are likely to be present within the action area during the period in which the action is proposed because they are not known to use the estuary habitat for rearing except during the summer and early fall months (Moser and Lindley 2007). As cited by these authors, commercial catches of green sturgeon peak in October in the Columbia River estuary, and records from other estuarine fisheries (Willapa Bay and Grays Harbor, Washington) support the idea that sturgeon are only present in these estuaries from June until October. However, comprehensive fishery sampling has not been conducted year-round in the Columbia River estuary, and some overlap with sub-adult green sturgeon presence with the proposed dredge timing is therefore possible. In the event that green sturgeon are present during dredging actions in the action area, they are likely to be larger subadults that are extremely unlikely to be present within the mostly enclosed marina. Further, even those that may be present will easily be able to avoid the dredge head without adverse effects from entrainment. Notwithstanding, unpublished photographic evidence of sub-adult sturgeon entrainments from dredging operations elsewhere along the West Coast (maintained on file at NMFS) supports the possibility that green sturgeon could become entrained, as does other published and contractual reports (Hoover et al. 2011; Buell 1992). Thus, the potential incidental take of green sturgeon by dredging entrainment cannot be discounted, even though their co-occurrence within the marina where dredging will occur is extremely unlikely.

Green sturgeon, if present in the mainstem Columbia River, may encounter the turbid conditions created by the proposed action. Green sturgeon are typically found in turbid conditions and forage in the benthos by stirring up the sediment to access benthic prey such as burrowing shrimp and are thus relatively tolerant of higher suspended sediment concentrations. As such, in the unlikely event that individual green sturgeon are present to encounter turbidity and elevated total suspended solids related to the project, effects on green sturgeon are not expected to rise to the level of take. This conclusion is supported further by recent results in the closely related Atlantic sturgeon, wherein juveniles were experimentally exposed to 100, 250 or 500 mg/L TSS for three consecutive days and found to exhibit no significant effects on survival or swimming performance even while prevented from seeking cleaner waters in the tests (Wilkins et al. 2015).

Eulachon. Eulachon may be exposed to the effects of the dredging during their annual winter spawning migration through the action area. Eggs or larvae of eulachon that are within the immediate vicinity of the dredge cutterhead are likely to be entrained and killed in the process. Even during years of poor eulachon runs, there are likely millions if not hundreds of millions of eulachon eggs and larvae in the Columbia River during late winter and spring. The vast majority of eulachon spawning takes place in Washington State tributaries, including the Cowlitz, Elochoman, Kalama, and others. Spawning takes place atop sand and fine gravel substrates to which the eggs adhere and mature, often being transported downstream through this maturation process through sediment transport processes that occur along the riverine corridor. Once eggs are hatched, typically after about 30 days, the larvae disperse throughout the water column and are widely distributed as they drift downstream passively. The proposed work window for this project ends in late February, prior to the peak of eulachon larval outmigration (which occurs from March through June). Thus, timing, along with the partially enclosed action area, reduces

the likely abundance of eulachon eggs and larvae in the action area during the dredging, but does not eliminate the potential for eulachon entrainment from the proposed dredging.

In order to make a conservative estimate upon which to base a valid jeopardy analysis, we did not include either of these factors when we calculated the rough estimate of Columbia River egg/larval density in waters and sediments around the Port of Astoria's marina. We relied on Howell's general estimated densities (of larvae sampled from the Columbia River at Price Island and Clifton Channel, nearly 20 miles upstream of the Port), which indicate the average egg and larval density (at Price Island and Clifton Channel) is 7 eggs/larvae per cubic meter (Howell et al. 2001). We note again that this estimate is likely to be higher than will actually occur in the action area because of the reasons above. However, because the Columbia River is approximately 1 mile wide where Howell's sampling occurred, and the Columbia River is nearly 4 miles wide from the action area to the Washington side and is downstream of the confluence with multiple tributaries not known to be eulachon spawning areas, we reduced the anticipated density by a factor of 4. We used a density of 1.75 larvae/m³ to estimate larval and egg densities within the dredging area at the port. Hydraulic suction dredges are generally operated to draw material at a 1:4 to sediment to water ratio (Jones-Lee and Lee 2005). Assuming the dredge engineer operates equipment according to these guidelines, the maximum annual removal of 54,500 cubic yards of sediment yields a maximum of 218,000 cubic yards of water drawn into the dredge intake annually. If eggs/larvae are present at a density of 1.75 per cubic meter (1.34 per cubic yard), 80,000 cubic yards of water would contain approximately 292,000 eggs and/or larvae that would be killed or injured annually. This estimate does not include the fact that densities likely are lower within the partially-enclosed marina. Eulachon females produce approximately 30,000 eggs per female. Relative to recent annual adult eulachon spawners, which fluctuate in the range of hundreds of millions of fish (Gustafson et al. 2010), the amount of eggs and/or larvae that will be injured or killed by the proposed action is fractional, and unlikely to alter productivity or population trends.

2.5 Cumulative Effects

"Cumulative effects" are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). 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.

For this action, state or private activities in the vicinity of the project location are expected to cause cumulative effects in the action area. Additionally, future state and private activities in upstream areas are expected to cause habitat and water quality changes that are expressed as cumulative effects in the action area. Our analysis considers: (1) how future activities in the Columbia River basin are likely to influence habitat conditions in the action area, and (2) cumulative effects caused by specific future activities in the vicinity of the project location.

Approximately 6 million people live in the Columbia River basin, concentrated largely in urban centers. The effect of that population is expressed as changes to physical habitat and loadings of pollutants contributed to the Columbia River. These changes were caused by residential,

commercial, industrial, agricultural, and other land uses for economic development, and are described in the Environmental Baseline (Section 2.3). The collective effects of these activities tend to be expressed most strongly in lower river systems where the impacts of numerous upstream land management actions aggregate to influence natural habitat processes and water quality. As such, these effects accrue within this action area, though most are generated from actions upstream of the action area. As human population grows, the range of effects described here are likely to intensify.

Resource-based industries (*e.g.*, agriculture, hydropower facilities, timber harvest, fishing, and metals and gravel mining) caused many long-lasting environmental changes that harmed ESA-listed species and their critical habitats, such as basin-wide loss or degradation of stream channel morphology, spawning substrates, instream roughness and cover, estuarine rearing habitats, wetlands, floodplains, riparian areas, water quality (*e.g.*, temperature, sediment, dissolved oxygen, contaminants), fish passage, and habitat refugia. Those changes reduced the ability of populations of ESA-listed species to sustain themselves in the natural environment by altering or interfering with their behavior in ways that reduce their survival throughout their life cycle. The environmental changes also reduced the quality and function of critical habitat PBFs that are necessary for successful spawning, production of offspring, and migratory access necessary for adult fish to swim upstream to reach spawning areas and for juvenile fish to proceed downstream and reach the ocean. Without those features, the species cannot successfully spawn and produce offspring.

While widespread degradation of aquatic habitat associated with intense natural resource extraction is no longer common, ongoing and future land management actions are likely to continue to have a depressive effect on aquatic habitat quality in the Columbia River basin and within the action area. As a result, recovery of aquatic habitat is likely to be slow in most areas and cumulative effects from basin-wide activities are likely to have a slightly negative impact on population abundance trends and the quality of critical habitat PBFs into the future.

2.6 Integration and Synthesis

The Integration and Synthesis Section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we will add the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) 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) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2).

Considering the status of the ESA-listed species, all but two of the species considered in this opinion are threatened with extinction, and those two are endangered. Most of the component populations of LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, UWR spring-run Chinook salmon, SR fall-run Chinook salmon, chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SRB

steelhead, UWR steelhead, southern green sturgeon, and eulachon are at a low level of persistence, or, at risk of extinction. All individuals from populations of the listed species are likely to move through the action area at some point during their life history.

Factoring the current environmental baseline, fish from the component populations that move through the action area encounter habitat conditions that have been degraded by restricted natural flows, reduced water quality from substantial chemical pollution, loss of functioning floodplains and secondary channels, and loss of vegetated riparian areas and associated shoreline cover. The significance of the degradation is reflected in the limiting factors identified above including habitat access to floodplain and secondary channels, degraded habitat, loss of spawning and rearing space, pollution, juvenile fish strandings, and increased predation, highlighting the importance of protecting current functioning habitat and limiting water quality degradation, minimizing entrainment, and reducing potential predation of ESA-listed fish.

Within this context, the proposed action will create a brief physical disturbance in the water column, and remove material from the bottom of the Columbia River. The modified bathymetry will be maintained for the duration of the 10-year permit. These habitat alterations will cause displacement of a small number of adult and juvenile fish, as they avoid the dredging operation, plus a short-term (*i.e.*, months-long) period in which fish have reduced prey as the benthic biological productivity is reduced, and then re-establishes, in the vicinity of the dredge. These alterations will occur each year of the 10-year permit, during the 120-day work window. Finally, entrainment of a few juvenile salmonids and a somewhat greater number of eulachon eggs and/or larvae is reasonably certain to occur.

The last element in the integration of effects includes a consideration of the cumulative effects anticipated in the action area. Primarily, the recovery of aquatic habitat from the degraded baseline conditions is likely to be slow in most of the action area, and cumulative effects (from continued or increasing uses of the action area) are likely to have a negative impact on habitat conditions, which in turn may cause negative pressure on population abundance trends in the future.

However, even when we consider the current status of the threatened and endangered fish populations and degraded environmental baseline within the action area, the proposed action itself is not expected to affect abundance, distribution, diversity, or productivity of any of the component populations of the ESA-listed species, nor further degrade baseline conditions or limiting factors. The effects of the action will be too minor to have a measurable impact on the affected populations. Because the proposed action will not reduce the productivity, spatial structure, or diversity the affected populations, the action, when combined with a degraded environmental baseline and additional pressure from cumulative effects, will not appreciably affect any of the listed species considered in this opinion.

Critical habitat throughout the range of these species is ranked at the watershed scale. Most watersheds (or hydraulic units) have had degradation to some or all PBFs in varying degrees, but many watersheds are still ranked as having medium to high conservation value due to the importance of the role those watersheds serve for the species' life cycle.

In the context of the status of critical habitat and the specific baseline conditions of PBFs in the action area, the proposed action will not obstruct the passage of migrating fish, reduce cover, remove riparian vegetation, alter flows, destabilize the channel or change its characteristics, alter water temperature, or substantially reduce available forage. When considering the cumulative effects of non-federal actions, recovery of aquatic habitat is likely to be slow in most of the action area and cumulative effects from basin-wide activities are likely to have a neutral to negative impact on the quality of critical habitat PBFs.

As a whole, the critical habitat for migration and rearing is functioning moderately under the current environmental baseline in the action area. Given that the proposed action will have low-level and periodic but largely temporary effects on the PBFs for migration, rearing, and spawning (eulachon), even when considered as an addition to the baseline conditions, the proposed action is not likely to reduce the quality or conservation value of designated and proposed critical habitat for the subject species of this consultation.

2.7 Conclusion

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, UWR spring-run Chinook salmon, SR fall-run Chinook salmon, CR chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, UWR steelhead, southern DPS of green sturgeon, or southern DPS of eulachon, or destroy or adversely modify critical habitat designated for those species.

2.8 Incidental Take Statement

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

NMFS has not yet promulgated an ESA section 4(d) rule prohibiting take of threatened eulachon. Therefore to the extent this ITS contains RPMs and terms and conditions that address requirements other than monitoring, those are voluntary until any future 4(d) rule goes into effect. However, our jeopardy analysis is based on anticipated levels of eulachon incidental take and so we have included a take indicator for eulachon that will function as a reinitiation check on that

jeopardy conclusion. Monitoring requirements related to the take indicator go into effect immediately so that there is a way to know if the reinitiation trigger has been exceeded [50 CFR 402.14(i)(3)].

2.8.1 Amount or Extent of Take

The proposed dredging will take place when juvenile and/or adult individuals of LCR Chinook salmon, UCR spring-run Chinook salmon, SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, Columbia River chum salmon, LCR coho salmon, SR sockeye salmon, LCR steelhead, MCR steelhead, UCR steelhead, SRB steelhead, and eulachon are reasonably certain (or conservatively assumed—green sturgeon) to be present.

Incidental take caused by the adverse effects of the proposed action will include injury or death of a small number of ESA-listed fish due to entrainment. Take by this mechanism will affect eulachon, juvenile ESA-listed salmon and steelhead (most likely CR chum and LCR Chinook salmon ESUs), and sub-adult green sturgeon of the southern DPS. For eulachon, we estimate approximately 282,000 eggs and/or larvae will be killed by entrainment. This estimate is conservative as it does not include the fact that densities likely are lower within the partially enclosed 11.26-acre action area within the Port of Astoria's marina.

Due to the overall nature of the proposed action, a definitive number of ESA-listed fish that will be killed, injured or otherwise adversely affected cannot be determined. Instead NMFS will use a habitat-based surrogate to account for the amount of take, which is called an "extent" of take. For this proposed action, the potential to entrain juvenile salmonids and eulachon is directly related to the amount of time that the suction dredge is operating. Since the potential to entrain ESA-listed fish is most directly measured by the amount of time the dredge is actively operating, the extent of take identified for the proposed action has been related to the number of days of dredging per year. For the proposed action, this is up to 120 days of dredging per calendar year. The number of days of dredging per year is a threshold for reinitiating consultation. Exceeding this indicator for extent of take will trigger the reinitiation provisions of this opinion.

2.8.2 Effect of the Take

In Section 2.7, NMFS determined that the level of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species.

2.8.3 Reasonable and Prudent Measures and Terms and Conditions

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

1. Minimize incidental take by minimizing entrainment during dredging.
2. Ensure completion of a monitoring and reporting program to confirm 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.

2.8.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the COE or any applicant must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). The COE or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14). If the following terms and conditions are not complied with, the protective coverage of section 7(o)(2) will likely lapse.

1. To implement reasonable and prudent measure number 1 (minimize dredging entrainment), the COE shall ensure that during dredging and active pumping of sediment, the suction cutterhead will remain in contact with the river bottom to the maximum extent possible, and will be raised no more than 3 feet above the bottom so as to reduce the likelihood of pulling fish from the water column into the dredge. Additionally, the COE shall ensure in-water work will be performed in accordance with permit conditions, which set timing restrictions for in-water work of November 1 to February 28.
2. To implement reasonable and prudent measure number 2 (monitoring), the COE shall ensure that the following is completed and submitted:
 - a. Action Monitoring. The applicant shall submit a monitoring report to NMFS by March 31 of each year summarizing the following for the previous calendar year:
 - i. Hours of dredging for each day that dredging occurred
 - ii. The number of days of dredging that occurred each month
 - iii. The number of days of dredging that occurred for the previous calendar year (extent of take indicator).
 - iv. The areal extent and depth of dredging conducted.
 - b. Monitoring reports shall be submitted to:

National Marine Fisheries Service
Oregon-Washington Coastal Area Office
Attn: Scott Sebring
WCR-2017-7450
510 Desmond Drive SE, Suite 103
Lacey, Washington 98503

2.9 Conservation Recommendations

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

The following two conservation recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the COE:

1. The COE should conduct an analysis of the entrainment of eulachon during hydraulic dredging, and of the potential modifications of dredging practices to further minimize entrainment of these species.
2. The COE should develop and carry out a monitoring and reporting program to develop basic data on eulachon presence and timing in proximity within the Lower Columbia River during winter dredging.
 - a. Should conservation recommendation 2 be implemented, we request the following information.
 - i. Name, address, and qualifications of the supervising biologist.
 - ii. River temperature and discharge at time of sampling.
 - iii. Methods used to capture eggs and larvae.
 - iv. Methods used to process content sampled.
 - v. For each sample:
 - (1) Date sampled.
 - (2) Location sampled.
 - (3) Sampling starting and ending times.
 - (4) Starting and ending flow meter values.
 - (5) River temperature.
 - (6) Field observations
 - (7) Number of eggs and larvae collected by date and sample number.
 - (8) For each date sampled, indicate if pumping also occurred that date.
 - (9) Please send the requested information to National Marine Fisheries Service, Oregon-Washington Coastal Area Office, Attention: Scott Sebring, 510 Desmond Drive Southeast, Suite 103, Lacey, Washington 98503-1263. Include the NMFS Tracking Number: WCR-2017-7450 on the report.

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

2.10 Reinitiation of Consultation

As provided in 50 CFR 402.16, 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 take 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 to 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.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of 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 effects include the direct or indirect physical, chemical, or biological alterations 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 EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by the Federal action agency and descriptions of EFH contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce for Chinook salmon and coho salmon (PFMC 1999).

3.1 Essential Fish Habitat Affected by the Project

As part of the information provided in the request for ESA concurrence, the COE determined that the proposed action may have an adverse effect on EFH designated for Chinook and coho salmon. The effects of the proposed action on EFH are the same as those described above in the ESA portion of this document and NMFS concurs with the findings in the EFH assessment.

3.2 Adverse Effects on Essential Fish Habitat

The proposed dredging will temporarily disturb benthic habitat and create turbidity affecting forage production and local hydraulic conditions. Overall, the area of disturbance is small, and the disturbance will be short-lived, will maintain current conditions, and will not change the functional characteristics of the habitat.

3.3 Essential Fish Habitat Conservation Recommendations

1. The effects of the proposed dredging activity will be contained and turbidity minimized by use of the suction dredge and monitoring and controlling discharge of return waters at the material disposal site. To minimize the effects on EFH the COE should: ensure that during dredging and active pumping of sediment, the suction cutterhead will remain in contact with the river bottom to the maximum extent possible, and will be raised no more than 3 feet above the bottom and ensure in-water work will be performed in accordance with permit conditions, which set timing restrictions for in-water work of November 1 to February 28.

NMFS expects that fully implementing this EFH conservation recommendation would protect, by minimizing adverse effects described in Section 3.2 above, approximately 11.26 acres of EFH.

3.4 Statutory Response Requirement

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

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

3.5 Supplemental Consultation

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

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users are the COE and applicant.

An individual copy was provided to the COE and to the applicant. 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 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/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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US Army Corps
of Engineers®
Portland District

Compliance Certification

1. **Permit Number:** NWP-2009-565-1

2. **Permittee Name:** Port of Astoria

3. **County Location:** Clatsop

Upon completing the activity authorized by the permit, please complete the sections below, sign and date this certification, and return it to the U.S. Army Corps of Engineers, Portland District, Regulatory Branch. The certification can be submitted by email at cenwp.notify@usace.army.mil or by regular mail at the following address:

U.S. Army Corps of Engineers
CENWP-OD-GL
P.O. Box 2946
Portland, OR 97208-2946

4. **Corps-required Compensatory Mitigation (see permit special conditions):**

a. Mitigation Bank / In-lieu Fee Credit Transaction Documents:

☐ Not Applicable ☐ Submitted ☐ Enclosed

b. Permittee-responsible mitigation (e.g., construction and plantings) has been constructed (not including future monitoring). As-built report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

5. **Endangered Species Act – Standard Local Operating Procedures (SLOPES)**
(see permit special conditions):

a. SLOPES Action Completion Report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

b. SLOPES Fish Salvage Report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

c. SLOPES Site Restoration / Compensatory Mitigation Report:

☐ Not Applicable ☐ Submitted ☐ Enclosed

I hereby certify the work authorized by the above-referenced permit has been completed in accordance with all of the permit terms and conditions.

Signature of Permittee

Date

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Port of Astoria		File Number: NWP-2009-565-1	Date: November 15, 2017
Attached is:			See Section below
X	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
	PERMIT DENIAL	C	
	APPROVED JURISDICTIONAL DETERMINATION	D	
	PRELIMINARY JURISDICTIONAL DETERMINATION	E	

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found in Corps regulations at 33 CFR Part 331, or at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/FederalRegulation.aspx>

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Mr. Shawn H. Zinszer
U.S. Army Corps of Engineers
Portland District Office
PO Box 2946
Portland, OR 97208-2946 Telephone: (503)808-4373

If you only have questions regarding the appeal process you may also contact:

Melinda M. Witgenstein, Regulatory Appeals Review Officer
U.S. Army Corps of Engineers, Northwestern Division
P.O. Box 2870
Portland, OR 97208-2870 Telephone: (503) 808-3888

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.

Date:

Telephone number:

Department of State Lands
775 Summer Street, Suite 100
Salem, OR 97301-1279
☎ 503-986-5200

Permit No.:	60404-RF Modified
Permit Type:	Removal/Fill
Waterway:	Columbia River
County:	Clatsop
Expiration Date:	October 30, 2027

PORT OF ASTORIA

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE ATTACHED COPY OF THE APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder shall obtain all necessary access permits or rights-of-way before entering lands owned by another. For new linear facility projects, the removal-fill activity cannot occur until the permit holder obtains either the landowner's consent, a right, title or interest with respect to the property that is sufficient to undertake the removal or fill activity, or a court order or judgment authorizing the use of the property.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit shall comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action, which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. Employees of the Department of State Lands (DSL) and all duly authorized representatives of the Director shall be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
6. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within twenty-one (21) calendar days of the date this permit was issued.
7. In issuing this permit, DSL of State Lands makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390, and related administrative rules.
8. Permittee shall defend and hold harmless the State of Oregon, and its officers, agents and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.
9. Authorization from the U.S. Army Corps of Engineers may also be required.

NOTICE: If removal is from state-owned submerged and submersible land, the permittee shall comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you shall comply with ORS 274.905 to 274.940 if you want a transfer of title; public rights to such filled lands are not extinguished by issuance of this permit. This permit does not relieve the permittee of an obligation to secure appropriate leases from DSL of State Lands, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact Department of State Lands, 503-986-5200.

Robert Pennington, Aquatic Resource Coordinator
Aquatic Resource Management
Oregon Department of State Lands


Authorized Signature

5/22/2026
Date

ATTACHMENT A

Permit Holder: Port of Astoria

Project Name: West Basin Marina Maintenance Dredging

Special Conditions for Removal/Fill Permit No. 60404-RF

READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT.

The project site may be inspected by the Department of State Lands (DSL) as part of our monitoring program. DSL has the right to stop or modify the project at any time if you are not in compliance with these conditions. A copy of this permit shall be available at the work site whenever authorized operations are being conducted.

1. **Responsible Party:** By proceeding under this permit, Port of Astoria agrees to comply with and fulfill all terms and conditions of this permit, unless the permit is officially transferred to another party as approved by DSL.
2. **Authorization to Conduct Removal and/or Fill:** This permit authorizes the placement of up to a total of 109,004 cubic yards (109,000 cubic yards permanent and 4 cubic yards temporary) and removal of up to a total of 109,004 cubic yards (109,004 cubic yards permanent and 4 cubic yards temporary) of material in T8N R9W Section 7CB, Tax Lot 100, Latitude 46.1895, Longitude -123.855078 (removal site), a rectangle bounded by Latitude 46.1923, Longitude -123.8461, Latitude 46.1928, Longitude -123.8461, Latitude 46.1926, Longitude -123.8488 and Latitude 46.1922, Longitude -123.8486 (disposal site) within the Columbia River, in Clatsop County, as described in the revised permit application, map and drawings, received April 29, 2026. In the event information in the application conflicts with these permit conditions, the permit conditions prevail. See Attachment B for project locations.
3. **Work Period in Jurisdictional Areas:** Fill or removal activities below the ordinary high water elevation of the Columbia River shall be conducted between November 1 and February 28, unless otherwise coordinated with Oregon Department of Fish and Wildlife and approved in writing by DSL. Work is prohibited when fish eggs are present within the reach where the authorized activities are being conducted.
4. **Changes to the Project or Inconsistent Requirements from Other Permits:** It is the permittee's responsibility to ensure that all state, federal and local permits are consistent and compatible with the final approved project plans and the project as executed. Any changes made in project design, implementation and/or operating conditions to comply with conditions imposed by other permits resulting in removal/fill activity must be approved by DSL prior to implementation.
5. **DSL May Halt or Modify:** DSL retains the authority to temporarily halt or modify the project or require rectification in case of unforeseen adverse effects to aquatic resources or permit non-compliance.
6. **DSL May Modify Conditions Upon Permit Renewal:** DSL retains the authority to modify conditions upon renewal, as appropriate, pursuant to the applicable rules in effect at the time of the request for renewal or to protect waters of this state.

General Construction Conditions

7. **Water Quality Certification:** The Department of Environmental Quality (DEQ) may evaluate this project for a Clean Water Act Section 401 Water Quality Certification (WQC). If the evaluation results in issuance of a Section 401 WQC, that turbidity condition will govern any allowable turbidity exceedance and monitoring requirements.
8. **Hazardous, Toxic, and Waste Material Handling:** Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, wood treated with leachable preservatives or other deleterious waste materials shall not be allowed to enter waters of this state. Machinery refueling is to occur at least 150 feet from waters of this state and confined in a designated area to prevent spillage into waters of this state. Barges shall have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state shall be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.
9. **Federally Listed Endangered or Threatened Species:** When listed species are present, the authorization holder shall comply with the Federal Endangered Species Act. If previously unknown listed species are encountered during construction, all construction activity shall immediately cease and the permit holder shall contact DSL.
10. **Archaeological Resources:** If any archaeological resources and/or artifacts are encountered during construction, all construction activity shall immediately cease. The State Historic Preservation Office shall be contacted at 503-986-0674.
11. **Hazards to Recreation, Navigation or Fishing:** The activity shall be timed so as not to unreasonably interfere with or create a hazard to recreational or commercial navigation or fishing.
12. **Fluids, Maintenance of Equipment, and Cleaning:** All machinery operated below OHW must use vegetable-based hydraulic fluids, be steam cleaned and inspected for leaks prior to each use, and be diapered to prevent leakage of fuels, oils, or other fluids below OHW. Any equipment found to be leaking fluids must be immediately removed from and kept out of OHW until repaired. Equipment staging, cleaning, maintenance, refueling, and fuel storage must be separated from OHW and wetlands at a sufficient distance to prevent contaminants from entering waters of the state.
13. **Extent of Dredging:** Maintenance dredging activity shall be limited to the area and depths defined in the revised application, Figures 4A-C. Disposal is limited to the area shown in Figure 5.
14. **Return Wastewaters Prohibited:** This permit does not authorize the return of wastewaters from any operation employed to wash or process materials removed under this permit.
15. **Removal-General:**
 - a. To the extent practicable, maintenance dredging activity must be staged from an upland or vessel-mounted position. If necessary to achieve the removal, heavy equipment may be staged on or traverse impervious surfaces in the dry below ordinary high water or highest

measured tide. In such case, equipment must use water quality best management practices specified in the DEQ-issued Section 401 Water Quality Certification for the project.

- b. For vessel-mounted operations, vessels must not be grounded on the bed or banks at any time.
- c. Accumulated woody debris within the maintenance dredging footprint may be removed to the extent necessary to achieve the target bathymetry.

16. Removal by Hydraulic Pipeline Dredge:

- a. To the extent practicable and as material characteristics allow, the working end of the dredge ladder must be kept buried at a target depth of at least 24 inches below the bottom of the waterway. The intake may be raised no more than 3-feet above the bed for the minimum time necessary for purging or flushing. No back-flushing of the pipeline is allowed. No jetting of sediment is allowed unless approved by the Department pursuant to OAR 141-093-0260(3).
- b. The pipeline and any anchors or floats must be removed from the waterway immediately upon completion of the maintenance dredging activity unless another minimum necessary timeframe is approved by the Department. In no case will the pipeline, anchors, floats or other equipment be permanently placed in waters of this State.
- c. Pressure in the dredge pipeline must be continuously monitored during operation. In the event of a sudden and sustained pressure drop, dredging activity shall immediately stop. Any breach of the pipeline must be repaired prior to restarting dredging operation.

17. Removal by Closed Bucket: To the extent material characteristics allow, the bucket must be sealed in the closed position to minimize sediment re-suspension. Moving material on the bottom to consolidate it before lifting is prohibited.

18. Fish Entrainment: The authorization holder must immediately report any fish observed that are entrained by operations to the nearest OR Department of Fish and Wildlife office. The permittee must provide access for OR Department of Fish and Wildlife staff to enter the project site for making fish entrainment observations.

19. Material Transport: For dredged material transported by vessel or other over-water conveyance:

- a. All dredged materials must be placed in vessels or other conveyances equipped such that no dredged material discharges to waters of this State during loading, transfer and unloading activity for upland placement.
- b. Vessels must be staged such that there is no grounding on the bed or banks at any time.

20. Flowlane Placement: Flowlane placement must occur on the ebb tide or flood tide and only when there is sufficient current to disperse the material to prevent shoaling. "Flowlane" means that portion of a waterway where sufficient flow velocity and depth exists to disperse placed material and not cause shoaling.

21. DMMU1 expanded area sediment disposal suitability: Prior to any placement of all dredged material in the flowlane or territorial sea from the expanded area indicated in Figure 4A ("DMMU1") of the revised permit application dated April 29, 2026, the applicant must provide an up-to-date copy of findings from the Portland Sediment Evaluation Team, or any subsequently authorized body, approving in-water placement of the material.

22. **Post-Activity Reporting:** Within 90 days of maintenance dredging completion, the authorization holder must submit to the Department a scaled drawing illustrating the actual removal area and post-removal depths achieved using the same datum as used in the application.
23. **State-Owned Waterways:** Maintenance dredging in a state-owned waterway may be subject to a Short-Term Access Agreement with the Department.

ATTACHMENT B

Permit Holder: Port of Astoria

Project Name: West Basin Marina Maintenance Dredging

Maps and Drawings for Removal/Fill Permit No. 60404-RF

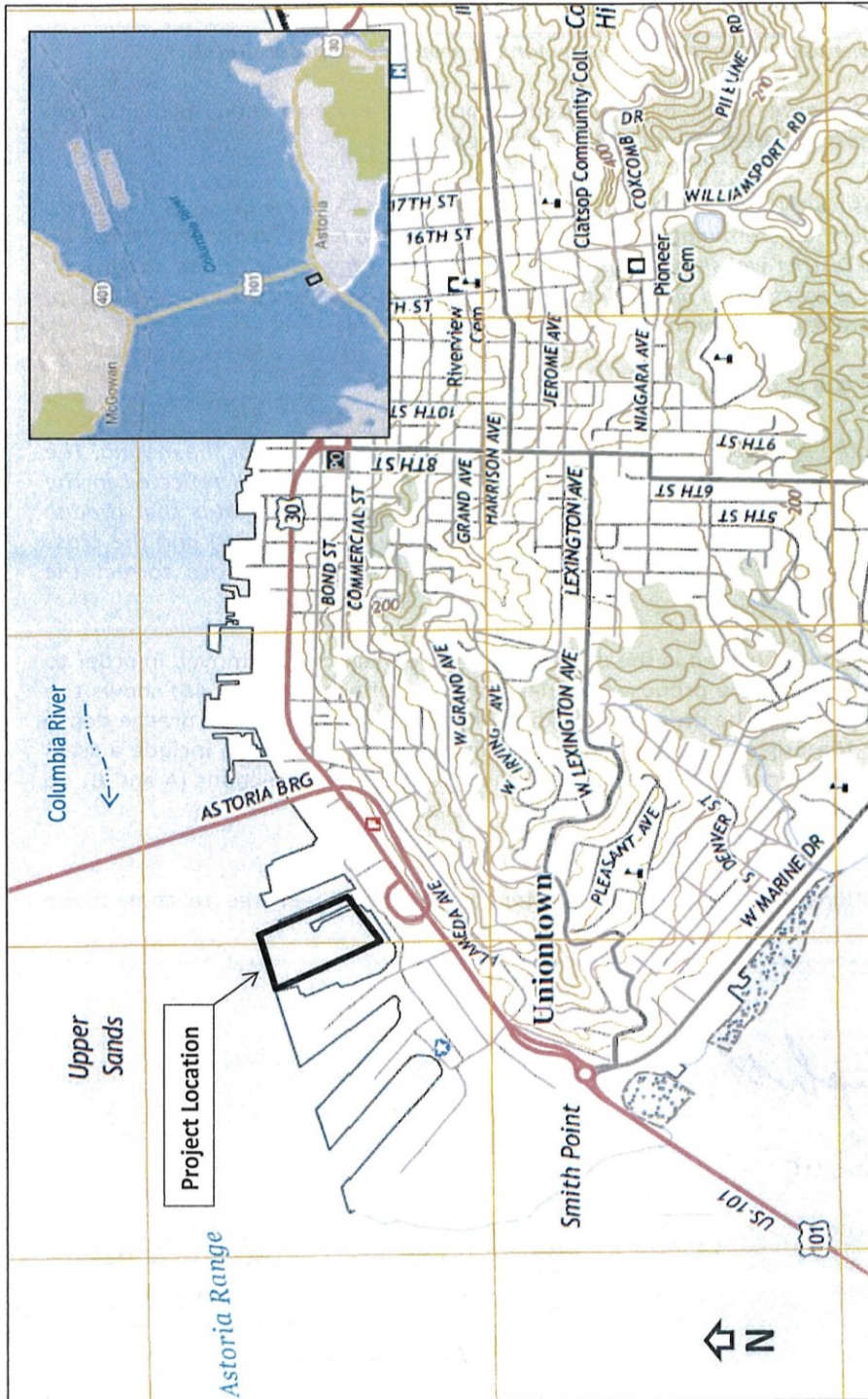


Figure 1: Location Map
West Basin Marina Maintenance Dredging
(USGS Astoria, OR 2014)

