Biological Evaluation
for
Port of Kalama
T-Barge Dock
Kalama, Washington

ESA and MSA Consultation

Applicant:
Port of Kalama
110 West Marine Drive
Kalama, Washington 98625
(360) 673-2325

Prepared by:
Ecological Land Services, Inc.
1157 3rd Avenue, Suite 220
Longview, Washington 98632
(360) 578-1371
Project Number 2367.04

March 29, 2018

SIGNATURE PAGE

The information and data in this report were compiled and prepared under the supervision and direction of the undersigned.

Lynn Simpson
Environmental Scientist

TABLE OF CONTENTS

TABLES (IN TEXT)

FIGURES (APPENDED)

APPENDICES

INTRODUCTION

CONSULTATION HISTORY

This is a new project that has not undergone previous Endangered Species Act (ESA) or Magnuson-Stevens Fisheries Management Act (MSA) consultation. A brief pre-application meeting was held at the site then proposed for this dock at the Port of Kalama (Port) on January 20, 2016. The original location proposed during that meeting was different than is described in this document; however, the project elements are essentially the same. Meeting attendees included Tabitha Reeder and Darin Sampson with the Port, Melody White and Margaret Chang with the U.S. Army Corps of Engineers (USACE) Portland District, Steve West with the Washington Department of Fish and Wildlife (WDFW), and consultants Francis Naglich and Lynn Simpson from Ecological Land Services, Inc. (ELS).

On March 1, 2018, a conference call was held with the following attendees: Tabitha Reeder and Darin Sampson with the Port, Mark Person and Adam Smee with the City of Kalama, Shandra O'Haleck with National Marine Fisheries Service (NMFS), Terry Fredrick with U.S. Fish and Wildlife Service (USFWS), Steve West with the Washington Department of Fish and Wildlife (WDFW), John Olson and Nicole White with PND Engineers, and consultants Francis Naglich and Lynn Simpson from Ecological Land Services, Inc. (ELS). A representative from the U.S. Army Corps of Engineers' (USACE) Portland District was unable to attend.

DESCRIPTION OF PROPOSED ACTION

PROPONENT, FEDERAL NEXUS, AND LOCATION

Ecological Land Services, Inc. (ELS) has completed this biological evaluation (BE) on behalf of the Port for constructing of a T-barge dock on their property on the east bank of the Columbia River at approximately river mile (RM) 75.2 near the existing marina. A federal nexus is created by applying to the U.S. Army Corps of Engineers' (Corps') Portland District for a permit to install piling, as well as overwater and floating structures, in Waters of the United States.

The project is located directly across from 380 West Marine Drive in Kalama, Washington, Cowlitz County and is in Section 17 of Township 6 North, Range 1 West of the Willamette Meridian (see Sheets 1 and 2). The project is also within the 170800030306 6th field Hydraulic Unit Code and Water Resources Inventory Area 27 (Kalama/Lewis watersheds). Project figures are attached.

PROJECT NEED AND PURPOSE

The Port of Kalama is installing a dock to support water-dependent commerce. Currently, a local commercial company serves the shipping industry by delivering ship stores and transporting crew members with small vessels between land and the ships. The small vessels are temporarily moored at the Port of Kalama marina; however, there are not enough slips, so they cannot fully operate their business. Additionally, the Port has determined that their marina will serve recreational, not commercial uses. For these reasons, the Port proposes to provide separate mooring facilities.

Most shipments come from trucks delivering cargo from Seattle to Portland or Astoria and then they are delivered to ships by boat from Portland or Astoria to the ship's location somewhere between Portland and Astoria (102 river miles apart). Boats sometimes pick up cargo in Portland and have to deliver it to Astoria, and vice versa. There is currently no certainty where the cargo will be trucked and where the boat will have to travel from to pick up and deliver their cargo.

By having their truck deliveries and boat operations in Kalama, the tenant will have one definite, central location for truck deliveries between Portland and Astoria. If this project is constructed, truck cargo from Seattle will be delivered to Kalama, saving truck mileage. The Kalama dock and location will also save fuel, river miles, and crew time to deliver cargo to the ships. The following trips are common under existing conditions, and examples of boat distances and running times are as follows: Portland to Kalama is 54 river miles round trip and takes 5 hours, Longview to Kalama is 12 river miles round trip and takes 1 hour, Astoria to Kalama is 150 river miles round trip and takes 8 hours, and Portland to Astoria is 204 river miles round trip and takes 13 hours. It is common for boats to make the trip from Portland to Astoria to pick-up truck deliveries and deliver them to ships.

PROPOSED PROJECT

The T-Barge Dock Project proposed at the Port of Kalama is intended to provide berthing and cargo loading and unloading for three to five commercial boats in the range of 40 to 65 feet long. Their drafts are shallower than the proposed T-barge dock.

After project construction, the Port will lease the dock to the local commercial company that delivers ship stores and transports crew members. Ship stores include inventory carried on-board a ship to meet its daily requirements, such as food, water, general supplies, medical supplies, safety supplies, spare parts, etc. Pedestrians and forklifts will use the pier and gangway for crew access and to safely and efficiently move ship supplies between the land and the moored vessels.

There will be no additional barge or ship traffic produced as a result of this project. This project will reduce fuel consumption and will reduce river miles travelled by the delivery boats.

PROJECT SETTING

The Port extends along the east bank of the Columbia River from RM 72 to RM 77 and is located west of Interstate 5. The proposed pier will be located near the marina at RM 75.2 on approximately 5.43 acres of land owned by the Port (parcel number 41335). The aquatic land where the dock will be moored is within Waters of the State. The Port has an aquatic lands lease with the Washington Department of Natural Resources at this location.

The upland portions of the project area have been previously filled to approximately 23 feet in elevation using the Columbia River Datum (CRD). The river bank is at about a 1:1 slope or steeper. Ordinary high water (OHW), according to the Corps is 12.0 feet CRD, and mean lower low water (MLLW) is -2.0 feet CRD. The 100-year flood elevation in the area is 19.7

feet CRD. The project area is located outside of the influence of salt water from the ocean, but it is influenced by tides. The waterward portion of the proposed dock is approximately 700 feet from the federal navigational channel.

PROJECT DESCRIPTION

Drawings and photoplates of the project are attached to this document (Sheets 1 through 10).

Upland Area

Approximately 0.03 acres of the upland parcel adjacent to the dock will be used for staff vehicle parking and a truck loading/unloading area for cargo. This area is currently graveled and will be maintained as a graveled surface. Stormwater currently drains away from the river and toward the roadway, and the proposed project will maintain this flow direction.

Pier

The proposed cast-in-place concrete wall abutment and concrete deck (90 square feet) will support the landward portion of the pier. Construction will require equipment such as excavators, dump trucks, concrete trucks, compaction machines, delivery trucks, and forklifts. The river level is lower than the work area, and BMPs will be in place so that uncured concrete will not be allowed to enter the water.

Access to the barge dock will be from a 12-foot wide, 49.5-foot long, stationary pier supported by seven, 18-inch-diameter steel pipe piles. Four of the piles will be located above OHW and three will be located below OHW. Pier framing will consist of steel beam stringers and a fully grated deck of about 516 square feet. The decking material will be specified during a later design phase and will have at least 25 percent functional grating. Pier components will likely be manufactured offsite, and assembled on site. A steel-beam pile cap will be welded to the top of the piles.

Gangway Ramp

The 11 feet, 4-inches-wide by 100-foot-long gangway with a through-truss frame, hand rails, and deck grating made of aluminum. The decking material will be specified during a later design phase and will have at least 25 percent functional grating.

T-Barge Dock

The floating structure is a "T" shaped pontoon that the Port will re-purpose. It is constructed entirely of steel with overall dimensions of about 171 feet by 67 feet with a depth of 12 feet. Its draft is between 6 and 9 feet, with a freeboard of between 3 and 6 feet. The main section's length is 151 by 20 feet, and the end tee is 67 by 20 feet for a total surface area of 4,360 square feet.

The pontoon is painted and is similar to a barge in appearance. It was originally built to transport floating sections for the new SR-520 Bridge from Grays Harbor to Lake Washington. Three 24-inch-diameter steel pipe spud piles will be used to anchor the T-barge. When the barge arrives, the spud piles will be lowered to sink into the substrate under their own weight, so they will not be driven into place. A steel-frame hoist structure and various small mechanical and electrical equipment will be mounted to the existing deck. The

barge dock will be ballasted with either City water or sand to achieve the desired draft and freeboard. Water for ballast will not be taken from or released into the Columbia River.

When water levels are at MLLW, the depth from the bottom of the barge dock to the riverbed is estimated at a minimum of 4 feet at the northeast corner. Commercial boats using the dock will be approximately 44, 55, or 63 feet long with a 4.5-foot draft, so they have drafts that are shallower than the T-barge dock. Dredging will not be necessary to maintain water depths at this time. The Port has an existing permit for maintenance dredging in this area.

Utilities

Lighting will be installed on the pier, gangway, and T-barge that will automatically turn on at night and will be directed at areas necessary for safe working conditions. There are existing street lights in the vicinity from Hendrickson Drive and from marina lighting.

A new 3-inch waterline and new electrical service will be extended from the south end of the marina and along Hendrickson Drive. Water and electrical services will extend along the pier and gangway and onto the barge dock. Electrical service will originate from a pole across the street. Potable water will originate from a water main located near the Port offices, southwest of the existing marina.

Pier, Gangway, and Piling Installation

The pier will be constructed onsite, and the gangway will be prefabricated, delivered and installed. A barge-mounted derrick crane will install the piles and will set the prefabricated gangway onto the pier and T-barge. An additional storage barge, tug boat, and small tender boat will likely be on the water during construction. It is anticipated that all seven pier piles will be installed with a vibratory hammer and then driven to depth and proofed for bearing capacity with an impact hammer. The three log-boom piles will be extracted and relocated 50 feet to the north using a vibratory hammer.

Appendix A contains a National Marine Fisheries Service (NMFS) spreadsheet summarizing impact areas from overwater/on-water structures and piling. The following table is a summary of that information and shows proposed overwater and on-water structures, area, location, as well as the type of decking material proposed for each structure.

Table 1. Project Summary

Structure	**Dimensions** (feet)	**Area** (square feet)	**Decking Material**
Waterward of OHW			
Barge Dock	(20' x 67') + (20' x 151')	4,360	Solid
Portion of Pier	12' wide (diagonal to shoreline)	300	100% Grated
Gangway	11'4" x 100' (12 ft overlap w/dock)	994	100% Grated
Move 3 Existing Piles	24" diameter	(9.4 - no net gain)	Not Applicable
Install 3 New Pier Piles	18" diameter	5.3	Not Applicable
Lower 3 Non-Driven New Spud Piles	24" diameter	9.4	Not Applicable
Reduce Log Storage Area	---	- 11,000	Not Applicable
Remove Approx. 10 Orphan Piles	1' diameter	- 8.8	Not Applicable
		***Net Area Waterward of OHW* = - 5,340.1 sf**	
Landward of OHW			
Concrete Landing and Decking	---	90 sf	Solid
Portion of Pier	---	294 sf	100 % Grated
Install 4 New Piles	18" diameter	(7.1 sf beneath pier)	Solid
		***Net Area Landward of OHW* = + 391 sf**	
Net Area of Entire Project	**= - 4,949 sf**		

Notes:
( ) = Not included in net area sum.
There will be 100% grating on the pier and gangway decks. Functional-grating area for the will be at least 25%.

Waterward of OHW

The project has proposed new overwater impact areas from the pier, gangway, and T-barge and new piling of 5,668.7 square feet. Overwater area in the log-storage area will be reduced by -11,000 square feet and proposed piling removal by -8.8 square feet for a net reduction of -11,008.8 square feet. The net reduction of on-water and in-water habitat impacts waterward of OHW is -5,648.1 square feet.

Landward of OHW

The project has proposed new impact areas for the concrete landing and a portion of the pier of 384 square feet. Proposed new piles equal 7.1 square feet. The net difference of the proposed project waterward of OHW is +391 square feet.

Total Project

The proposed project will reduce the net in-water and overwater impacts by 4,601 square feet.

Log Boom and Log Storage Area
Three, existing, 24-inch hollow steel piles and log boom on the south side of the existing log storage area will be moved 50 feet northward to create a space for the new T-barge, gangway, and pier. This will reduce the log storage area by about 11,000 square feet.

The Port estimates that the log storage area is used by the tenant at least 50 percent of the time. The log storage area will not be expanded at this location for as long as the T-barge remains at this site.

Orphan Piles
Approximately 10 orphan piles near the shoreline will be removed to construct the project. This will reduce the in-water and benthic impact areas by about 9 square feet.

Construction Sequencing
All construction will most likely be done in one continuous phase over 10 to 12 weeks. Pier piles will be driven before the pier is constructed, and the gangway cannot be installed until pier and T-barge float are in place. The contractor will determine the rest of the construction sequencing.

Concrete Details
All concrete work will comply with the 2012 International Building Code and the 2013 Washington State Amendments (IBC). Formwork and falsework will be designed by professional engineer licensed in the state of Washington and approved by the Port of Kalama's project engineer of record. The formwork will be mortar-tight. Concrete forms will be pre-fabricated to the extent possible to minimize onsite construction.

The concrete abutment and wall will be above OHW and will be constructed when river levels are below the work area. Reinforcing steel will be placed inside the forms, and the forms and reinforcing steel will be inspected prior to placing concrete. Concrete will be delivered to the site, placed, and vibrated using hand-held vibration wands to ensure a homogeneous finish. Finishing, curing and form removal will be completed per the relevant codes and specifications.

Concrete and construction materials will not enter the water because BMPs will be implemented. A boom will be placed around the work area and near the shore surrounding the abutment structure to avoid impacts to the aquatic environment.

Pile Installation Details
This project requires three existing 24-inch-diameter steel log-boom piles to be relocated, ten wooden orphan piles to be removed, and seven 18-inch-diameter hollow-steel piles to be installed to support the pier; three pier piles will be installed between OHW and MLLW, and four pier piles will be installed above OHW. Installing the 7 pier piles is estimated to occur over a period of seven days. Additionally, three 24-inch-diameter steel pipe spud piles will be used to anchor the T-barge. When the barge arrives, it will be moved into the plan location and anchored into place with the spud piles. The spud piles will not be driven, but will be lowered to sink into the substrate under their own weight.

It is anticipated that all seven pier piles will be installed with a vibratory hammer to tip elevations of about 20 feet below the mudline, then they will be driven for another 10 to 20 feet with an impact hammer to obtain bearing-capacity data (pile proofing). The designer estimates this will require an estimated 1,000 blows per pile. Each pile will also require impact-hammer proofing for about 60 minutes. A bubble curtain will be deployed when using the impact hammer to attenuate underwater sound-pressure levels (see Appendix B). No noise attenuation will be used during vibratory pile driving, because it does not generate enough noise to cause injury to listed fish or marine mammals.

A soft-start technique will be used for both vibratory and impact-hammer pile driving to allow aquatic species to leave the work area before full energy is used to drive piling. For vibratory pile driving, the contractor will initiate noise for 15 seconds at 40 to 60 percent reduced energy, followed by a 1-minute waiting period. This procedure will be repeated two additional times before full energy is applied. The soft-start procedure will be conducted prior to driving each pile if vibratory installation stops for more than 30 minutes. For impact driving, the contractor will be required to use an initial set of three strikes at 40 percent energy, followed by a 1-minute waiting period, then two subsequent three-strike sets (NMFS 2012).

Orphan Pile Removal

Orphan piles will be removed by vibrating the pile as it is extracted. If the pile breaks, the remaining portion will be removed if it is less than 2 feet below the sediment surface. Any remaining holes will be filled with clean sand. Orphan piles will be taken to an approved disposal site because they may contain creosote.

PROJECT TIMING

All construction will most likely be done in one continuous phase over 10 to 12 weeks. Pile driving and removal is the only proposed in-water work, which will take approximately 3 to 4 weeks. Most of the pile driving and all of the piling removal will be completed using the vibratory method, which does not cause injury to aquatic life. For this reason, all project work may occur during any time of the year.

Secondary Project Features

Interdependent Activities

Interdependent activities are part of a larger action, have no independent purpose, and would only occur if the project occurs. Interdependent activities associated with this project include material staging, storage, and a temporary soil storage area for soils excavated from pier abutment construction. Construction materials and supplies will be stored either on the work barge or on the upland parcel.

Excavated soil from abutment construction will be stockpiled on the upland parcel until the area around the concrete wall abutment is backfilled. The estimated 60 to 70 cubic yards of excess soils will be covered with plastic to avoid erosion during precipitation events and will eventually be removed from the site to be placed on Port property. No traffic detours will be necessary.

Interrelated Activities
Interrelated activities are a part of a larger action; however, they could be performed separately from the larger action. This includes work that is outside of Corps jurisdiction, such as work performed landward of OHW. Interrelated activities for this project are listed below:

- Permanent structures landward of OHW: concrete wall abutment and four, 18-inch-diameter steel pipe piles.
- Docked vessels: there will be moorage for three to four work vessels ranging from 44 feet to 63 feet in length.

IMPACT AVOIDANCE AND MINIMIZATION MEASURES
The project has been designed to avoid and minimize impacts to habitats and species that may potentially occur in the vicinity of the project area. This will be accomplished by using the following measures:

General

- Stormwater runoff from the upland project area will continue to be directed away from the river where it will infiltrate.
- Conditions in local, state, and federal permits will be followed.
- Any stockpiled soils from concrete abutment excavation will either be hauled away the same day or covered with plastic until it is removed from the site.
- Disturbed soils from around the abutment will be stabilized by grading and compaction to avoid impacts to the river from erosion.

In-Water

- The T-barge dock, work boats, and the derrick barge, will not "ground out" at any time. Commercial boats moored at the barge dock have drafts are shallower than the T-barge dock.
- Contractors will have a spill containment and pollution control plan, and employees will be trained in its implementation.
- The contractor will maintain an oil-absorbing floating boom around in-water and overwater work areas.
- No debris will be allowed to enter the river from the barge, boats associated with construction, or moored boats.
- Pile driving with an impact hammer to proof piles will take place within a bubble curtain.
- A soft-start technique will be used for vibratory and impact-hammer pile driving to allow any aquatic species to leave the work area before full energy is used to drive the pile. The technique was explained previously in this section.
- Pile caps will be installed on all piling associated with this project to prevent perching by birds that feed on juvenile salmon.

ACTION AREA

The action area is determined by outlining the zones of impact from the physical, chemical and biological effects of each project action. When the zones are overlain, the geographic extent of all impacts defines the action area.

NOISE ASSESSMENT

Background information involving noise-impact assessments is explained fully in the *WSDOT Biological Assessment Preparation, Advanced Training Manual, Version 02-2017* (WSDOT 2017).

In-Air Noise

Background noise data are not available for the project site. This project occurs in an area surrounded by industrial sites with the busiest railway on the west coast adjacent to the project site, the busiest interstate highway on the west coast about 250 feet east of the project, and a navigational channel in the river with relatively heavy shipping traffic, and a state highway on the Oregon shoreline. This area of the river is also a busy recreational boating and fishing area and the Port of Kalama marina is adjacent to the site. Construction and long-term operational noise are estimated to be within the range of background noise for this area. In addition, there is only one listed terrestrial species that occurs within several miles of this project. For these reasons, a detailed in-air noise assessment was not conducted, and it is assumed that there will be no impact to listed species or their critical habitat from construction or operational noise.

Underwater Noise

There are no known data at or near this site regarding underwater noise from pile driving, so underwater noise has been estimated using the *Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish* (Caltrans 2015). The Practical Spreading Loss model was used to calculate the distance that pile driving noise from both pile-driving methods will attenuate to estimated background levels.

Vibratory Pile Driving

Vibratory pile driving will be used to extract three log boom piles for relocating, removing 10 orphan piles, and installing all piles to planned depth or to refusal. The project designer estimates that for this location, vibratory pile driving will be used for installation and impact-hammer driving will be used for proofing the seven pier piles, unless an unexpected obstruction occurs. Piling have been driven into nearby areas for new docks and piers with no obstructions, so it is unlikely there are gravel layers or bedrock that would require an impact hammer to reach the desired tip elevation. The project designer estimates that approximately one pier pile can be installed each day and also estimates it will take approximately 7 days to drive and proof the seven 18-inch pier piles. Four of the pier piles are above OHW, and three of the piles are between OHW and MLLW.

The underwater noise estimate for vibratory pile driving 18-inch and 24-inch hollow steel piles was derived using guidance from the Caltrans document, which states that the vibratory hammer produces sound energy generally 10 to 20 dB lower than impact pile driving (Section 4.6.2.1 Type of Pile Driver, Caltrans 2015). As a conservative estimate, 10 dB was

subtracted from the noise value stated for driving 18-inch and 24-inch hollow steel piles with an impact hammer. No noise attenuation will be used for vibratory pile driving. Noise estimates for vibratory pile driving are shown in the table below.

Impact-Hammer Pile Driving
Noise attenuation while driving and proofing seven pier piles with an impact-hammer will be achieved with a bubble curtain. The bubble curtain will be installed at the sediment surface so the entire water column around the piles driven in the water will be enclosed. The estimated noise attenuation from using bubble curtain is 5 dB (Gayle Kreitman, NMFS, email May 1, 2013). The time it will take to drive and proof each pile is estimated at 60 minutes per pile. The engineer conservatively estimates that it will take 1,000 strikes to drive each pile 10 to 20 feet and to conduct pile proofing.

Details regarding underwater noise from pile driving with the impact hammer can be found on the spreadsheet and in the tables in Appendix C. Included are estimated strikes per pile, number of piles installed per day, strikes per day, and total number of days, as well as sound-pressure levels expected from impact-hammer driving with and without a bubble curtain. These estimates were provided by PND Engineering, the project designer. A total 7 days is estimated to install and proof the seven pier piles. Three of the pier piles are between OHW and MLLW, and four are above OHW. Underwater sound-pressure results are summarized in the table below.

Table 2. Underwater Sound-Pressure Levels for Impact-Hammer Pile Driving.

Hollow-Steel Piles	**Impact-Hammer Pile Driving, No Attenuation[1]**	**Impact-Hammer Pile Driving w/ Bubble Curtain[1]**	**Vibratory Pile Driving**
18-inch @ 10 meters	204 dB_{peak} [2] 161 dB_{RMS} [2] 178 dB_{SEL} [4] 208 $dB_{cumulativeSEL}$ [4,5]	**199 dB_{peak} [3]** **156 dB_{RMS} [3]** **173 dB_{SEL} [4]** **203 $dB_{cumulativeSEL}$ [4,5]**	**194 dB_{peak} [2,6]** **151 dB_{RMS} [2,6]** **168 dB_{SEL} [4,6]** ---

1 = Caltrans 2015, Table I.2-1.
2 = Caltrans 2015, Table I.2-1. No data shown for 18" piles; used data for 20" pile.
3 = Impact-hammer level shown in the Caltrans table minus 5 dB (Gayle Kreitman, email 05-01-13).
4 = Caltrans 2015, Table I.2-1. No data shown for 18"or 20" piles; used data for 24" pile.
5 = Calculated in NMFS spreadsheets, see Appendix E.
6 = Impact-hammer level (no attenuation) shown in the table minus 10 dB (minimum reduction as stated in Caltrans 2015, Section 4.6.2.1).

The farthest-reaching noise impact for this project will be impact-hammer pile driving within a bubble curtain. Background underwater noise levels are not available for this area, so a conservative background level is used (135 dB, Gayle Kreitman pers. comm. 2013). Using the Practical Spreading Loss Model, the farthest underwater noise for this project will extend approximately 606,095 meters (114 miles). Underwater noise extends in a linear manner and is assumed not to bend around land masses, so the impacted area was determined by drawing straight lines radiating from the piling to any land mass. This area extends a maximum of 2.6 miles and covers 744 acres (see Sheet 6).

DIRECT EFFECTS

Direct effects are those effects that take place at or near the time of construction. These effects were quantified using the NMFS Habitat Equivalency Analysis (HEA) as discussed in detail in Appendix D.

The following direct effects to the environment may occur:

Terrestrial

Terrestrial habitat in this area does not provide habitat functions. The project will not affect terrestrial habitat.

Aquatic

- Potential contaminant releases to the river from vessels used during construction.
- Intermittent, underwater noise from vibratory pile driving 6 piles in the water, estimated to extend as far as 2.6 miles from the project site for about 7 days.
- Intermittent, underwater noise from impact-hammer pile driving 2 pier piles in the water, 1,000 strikes per pile for about 2 days. Noise above background levels is estimated to extend as far as 2.6 miles from the project site for about 60 minutes per pile.
- Shading effects from the floating T-barge will be approximately 5,023 square feet.
- Minor shading effects from the fully grated gangway and pier over shallow-water habitat. At water levels between MLLW and MHHW, the pier will not be over the water. The gangway will be elevated above the water surface from about 3 to 20 feet.
- Benthic, epibenthic, and water-column impacts from three pier piles below OHW and three spud piles below OHW, totaling 14.7 square feet.
- Some additional nighttime lighting from lights directed at work areas of the barge, gangway, and pier, although this area is currently affected by light from the adjacent marina and roadway.

INDIRECT EFFECTS

Indirect effects are defined as those negative effects that are caused by the project, but occur after project completion. There will be no negative indirect effects from this project for the following reasons:

- It will not increase ship traffic in the Columbia River.
- No anticipated developments related to this project.
- There will be no additional employees required.
- The project will not create the need for new or improved roadways.

EFFECTS FROM INTERDEPENDENT ACTIONS

Interdependent actions would not occur if the project was not constructed. The upland area associated with the dock will be used as a temporary staging and stockpile area. Stockpiled materials will be located on the work barge or on the property. No traffic detours will be necessary during construction.

EFFECTS FROM INTERRELATED ACTIONS

Interrelated actions are part of the project and could possibly occur even if the project was not constructed. They are also actions that would not require a Corps permit (work above OHW, boat moorage or operation, etc.). The interrelated action from this project includes shading effects from the docked service boats in water depths of less than 20 feet.

BENEFICIAL EFFECTS

Beneficial effects are positive effects of the project. The biggest beneficial effect of the project is reducing the log storage area by 11,000 square feet. This will reduce water shading and bird perches that encourage birds and piscivorous fish to prey on listed juvenile fish. Pile caps will be placed on new and relocated piles to reduce bird perches.

The project's service boats are currently delivering material from Portland or Astoria ports to ships in the river to meet supply needs. Boat miles traveled on the river will decrease because service boats will have a central truck-delivery location thereby reducing their carbon footprint.

HEA SUMMARY

After the project is constructed, deep water habitat changes result in a net gain of +0.144 DSAYs, shallow water habitat will have a net gain of +4.324 DSAYs, ACM habitat will have a net loss of -0.085 DSAYs, and there will not be a significant habitat change above OHW that generates more than 0.000 DSAYs.

Overall, the project has a net impact of 0.13 acres and -1.535 DSAYs and a net benefit of 0.23 acres and +5.919 DSAYs for a net habitat gain of +4.384 DSAYs. Most of the habitat gains are in shallow water habitat from reducing the log storage area.

ACTION AREA BOUNDARIES

The action area is defined as all areas to be affected directly and indirectly by the project. The action area does not include terrestrial habitat because the project will take place in an industrial environment, so it will not affect in-air or terrestrial habitat. Underwater noise is estimated to extend across the river to Sandy Island and as far as 2.6 miles from the project site to the north, as shown on Sheet 6.

Beneficial effects of the project are primarily from reducing the log storage area by 11,000 square feet. The project also removes 10 orphan piles, and it reduces boat miles traveled on the river, resulting in reduced water-quality impacts, which will extend from Portland to Astoria. The extent of beneficial effects defines the action area as shown on Sheet 7.

ENVIRONMENTAL SETTING

Existing conditions at the project site are discussed in detail as part of the habitat equivalency analysis in Appendix D.

TERRESTRIAL HABITAT CONDITIONS IN THE ACTION AREA

The project site is on the east bank of the Columbia River in the central portion of the Port of Kalama and adjacent to the marina. East of the project site are a port access road and internal railroad tracks, Interstate 5, the busiest railway line on the west coast, and the City of Kalama. About one mile downstream, to the north, is the mouth of the Kalama River.

The project area and surrounding properties are zoned for heavy industrial activities. Nearby industries include a lumber mill with log storage yards, a chemical manufacturer, and warehouses.

The terrestrial portion of the action area includes the 0.03-acre parcel that is currently not in use. It is proposed for use as a staging and stockpile area during construction and a parking and truck unloading area. This parcel is currently above the 100-year floodplain and is covered with compacted gravel.

The riverbank on the project site is at a 1:1 slope or steeper with riprap 2 to 3 feet in diameter. There are scattered California indigo trees growing along the bank between the riprap. This species is considered a non-native species that is common along the riverbanks in the lower Columbia River. There were a few large logs floating along the shoreline during the site visit on January 15, 2018.

AQUATIC HABITAT CONDITIONS IN ACTION AREA

The project area is located at RM 75.2, which is outside of the influence of salt water from the ocean, but it is influenced by tides. The proposed project is located in water deep enough that it does not have to be dredged, and the project is about 700 feet outside of the navigational channel. The substrate in this reach of the river is dominated by sand and silt. Most of the project area is in shallow-water habitat (less than 20 feet deep from OHW). There were no aquatic plants observed at the project site.

The proposed dock is at the entrance of the Port of Kalama marina. There is an existing log boom and log-storage area at the proposed barge dock location that is used by the adjacent lumber mill for on-water log storage. During the site visit, the log storage area appeared to be nearly full of logs, as shown on Sheet 10, and cormorants were perched on all three piling that are proposed for relocation and to have pile caps installed on them.

The most recent 303(d) list shows water-quality impairments within the Columbia River in the action area (Ecology 2018). At the project site and downstream (north) past Longview is an area listed as Category 5 (waters needing a total maximum daily load [TMDL]) for high water temperature and dissolved oxygen. Existing water quality in the project vicinity will have no effect on the project, and the project will have no effect on these water-quality parameters. The website showed no sediment-quality impairments in the vicinity.

SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

Endangered, threatened, proposed, and candidate species and critical habitat protected under the ESA were obtained from the following agencies and can be found in Appendix E:

- National Marine Fisheries Services (NMFS) website research for species lists on January 15, 2018 (NMFS 2018 a and b).
- U.S. Fish and Wildlife Service (USFWS) website research on the Information for Planning and Conservation (IPaC) website on November 17, 2017 (USFWS 2017).

WDFW and WDNR databases were not reviewed, because there are no in-air noise effects from the project due to its proximity to industries, railroad, and Interstate 5 traffic. Effects to terrestrial species will be confined to site boundaries. The site has been used for industrial purposes for decades, and no suitable habitat exists currently or after project completion for listed terrestrial species. Therefore, terrestrial species presence will not occur on the project site.

The following table shows federally endangered, threatened, proposed, and candidate species and critical habitat that may occur within the action area of the project. Life history information for species addressed in this report is included in Appendix F.

Table 3. Listed, Proposed, and Candidate Species and Critical Habitat Addressed in this Document.

Species, ESU, or DPS	Federal Status	Critical Habitat in Action Area?
NMFS Jurisdiction		
Chinook Salmon *(Onchorhynchus tshawytscha*)		
Lower Columbia River Chinook ESU	Threatened	Designated
Upper Willamette River Chinook ESU	Threatened	Designated
Upper Columbia River Spring-run Chinook ESU	Endangered	Designated
Snake River Spring-run Chinook ESU	Threatened	Designated
Snake River Fall-run Chinook ESU	Threatened	Designated
Chum Salmon (*Onchorhynchus keta*)		
Columbia River Chum Salmon ESU	Threatened	Designated
Coho Salmon (*Onchorhynchus kisutch*)		
Lower Columbia River Coho Salmon ESU	Threatened	Designated
Sockeye Salmon (*Onchorhynchus nerka*)		
Snake River Sockeye DPS	Endangered	Designated
Steelhead (*Onchorhynchus mykiss*)		
Lower Columbia River Steelhead DPS	Threatened	Designated
Upper Willamette River Steelhead DPS	Threatened	Designated
Middle Columbia River Steelhead DPS	Threatened	Designated
Upper Columbia River Steelhead DPS	Threatened	Designated
Snake River Basin Steelhead DPS	Endangered	Designated
North American Green Sturgeon Southern DPS *(Acipenser medirostris)*	Threatened	No
Eulachon (Columbia River Smelt) Southern DPS *(Thaleichthys pacificus)*	Threatened	Designated
USFWS Jurisdiction		
Bull Trout – Columbia River DPS *(Salvelinus confluentus)*	Threatened	Designated

DPS = Distinct Population Segment ESU = Evolutionarily Significant Unit

NMFS JURISDICTION

SALMON AND STEELHEAD

Each of the listed 13 ESUs/DPSs of salmon and steelhead occur within the Columbia River and the action area and could be present during project construction. The lower Columbia River in the action area reach is designated critical habitat for 13 ESUs/DPSs of salmon and steelhead as a rearing and migration corridor. Table F-2 in Appendix F of this BE shows the relative abundance of salmon and steelhead each month of the year (NMFS 2011). The following tables show primary constituent elements (PCEs) for salmon and steelhead ESUs/DPSs critical habitat present in the action area:

Table 4. PCEs of Designated Critical Habitats for ESA-Listed Salmon and Steelhead in the Action Area (except Snake River Spring/Summer Chinook, SR Fall Chinook, and SR Sockeye ESUs (NMFS 2011, Federal Register 2016).

Primary Constituent Elements		Species Life History Event
Site Type	**Site Attribute**	
Freshwater Rearing	Floodplain Connectivity	Fry/parr/smolt growth and development
	Forage	
	Natural Cover	
	Water Quality	
	Water Quantity	
Freshwater Migration	Free of artificial obstruction	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration
	Natural Cover	
	Water Quality	
	Water Quantity	

Table 5. Habitats and Essential Physical and Biological Features of Critical Habitats Designated for Snake River Spring/Summer Chinook, SR Fall Chinook, and SR Sockeye ESUs (NMFS 2011).

Habitat Component	SR Spring/Summer and SR Fall Chinook Salmon	SR Sockeye Salmon
Juvenile Rearing	Water Quality	Water Quality
	Water Quantity	Water Quantity
	Cover/Shelter	Water Temperature
	Food	Food
	Riparian Vegetation	Riparian Vegetation
	Space	Space
Juvenile and Adult Migration Corridors	Substrate	*(Same as Chinook)*
	Water Quality	
	Water Quantity	
	Water Temperature	
	Water Velocity	
	Cover/Shelter	
	Food *(juveniles only)*	
	Riparian Vegetation	
	Space	
	Safe Passage	

NORTH AMERICAN GREEN STURGEON

Subadult and adult green sturgeon use the Columbia River estuary in the summer and fall months for thermal refugia and for foraging (Federal Register 2008). Their presence in the Columbia River typically occurs from June through September, with the peak occurring in August, although they could be present throughout the year. Green sturgeon generally remain in the Columbia River estuary in saltwater habitat; however, they have been found upriver as far as Bonneville Dam. Critical habitat has been designated in the Columbia River to from the mouth to River Kilometer 74 (Federal Register 2009, River Mile 46), which is approximately 29 river miles downriver from the project site, so there is no critical habitat in the action area.

EULACHON (COLUMBIA RIVER SMELT)

The Southern DPS of Columbia River eulachon spawn in the mainstem Columbia River and some of its major tributaries in winter; juveniles rear in the estuary (Federal Register 2010a). A 'pilot run' adult spawning migrations have occurred as early as mid-November but typically occur in December. Larvae may be migrating down the river as late as mid-June. Peak occurrence is typically in February and March (see Appendix F). Critical habitat has been designated (Federal Register 2011) that includes the portion of the river within the action area. The following table shows primary constituent elements (PCEs) for the Southern DPS of Columbia River eulachon present in the action area.

Table 6. PCEs of Critical Habitat Proposed for the Southern DPS of Columbia River Eulachon in the Action Area.

Primary Constituent Elements		Species Life History Event
Site Type	**Site Attribute**	
Freshwater Spawning and Incubation	Flow	Adult spawning. Incubation.
	Water Quality	
	Water Temperature	
	Substrate	
Freshwater Migration	Migratory Corridor	Adult and larval mobility. Larval feeding.
	Flow	
	Water Quality	
	Water Temperature	
	Food	

USFWS JURISDICTION

BULL TROUT

Adult and subadult bull trout may use the Columbia River any time during the year for foraging, overwintering, or migrating between tributaries, but their presence is rare. The USACE 2001 *Biological Assessment for Columbia River Channel Improvements Project* states that the Columbia River is not used regularly by bull trout. The 2002 U.S. Fish and Wildlife Service's biological opinion for the USACE biological assessment states that no published records of bull trout occurrence in the Columbia River estuary have been located, and that it is likely that low numbers of bull trout have used the lower Columbia River as a migratory corridor between tributaries where they spawn and rear. There is no discussion in the documents cited in these documents if they are more likely to be present at a particular

time of the year. The Columbia River mainstem has been designated critical habitat for bull trout and is used for foraging, migration, and overwintering (Federal Register 2010b).

There is designated critical habitat in the Columbia River for the Columbia River DPS of bull trout (Federal Register 2010b). The following PCEs apply to critical habitat present in the Columbia River in the action area:

1. Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
2. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
3. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks, and substrates to provide a variety of depths, gradients, velocities, and structure.
4. Water temperatures ranging from 2 to 15°C (36 to 59°F) with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.
5. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.
6. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

SPECIES AND HABITATS NOT ADDRESSED IN THIS REPORT

USFWS information show that other federally listed species could be present in the action area, as summarized in the following table. These species are not likely to occur within the action area, because the only terrestrial habitat in the action area is beneath the pier and in the upland area of the project. This habitat is in a developed industrial area and has no suitable habitat for these species. In addition, there is no designated critical habitat, or proposed critical habitat for these species within the action area. Therefore, the project will have *no effect* on species and critical habitats in the following table.

Table 7. Listed Species Not Addressed in this BA.

Species, ESU, or DPS	Federal Status	Critical Habitat in Action Area?
NMFS Jurisdiction		
All listed, proposed, or candidate species potentially present are addressed in this report.		

Table 7. Listed Species Not Addressed in this BA (*continued*)**.**

Species, ESU, or DPS	Federal Status	Critical Habitat in Action Area?
USFWS Jurisdiction		
Columbian White-Tailed Deer *(Odocoileus virginianus leucurus)*	Endangered	No
Marbled Murrelet *(Brachyramphus marmoratus)*	Threatened	No
Northern Spotted Owl *(Strix occidentalis caurina)*	Threatened	No
Streaked Horned Lark *(Eremophila alpestris strigata)*	Threatened	No
Yellow-billed Cuckoo – Western DPS *(Coccyzus americanus)*	Threatened	No
North American Wolverine (*Gulo gulo luscus***)**	Threatened	No

EFFECTS OF THE ACTION

Effects of the action include direct and indirect effects on a species or critical habitat, along with effects from other activities that are interdependent, interrelated, and beneficial to the action. These effects were discussed above in the discussion entitled *Potential Effects of the Project on the Environment* in the *Action Area* section. These effects are considered in addition to the environmental baseline.

CONTAMINANT RELEASES

CONSTRUCTION

Concrete placement will occur above OHW and approximately 50 feet from the riverbank to construct the abutment and wall that will support the landward side of the pier. Avoidance and minimization measures will be implemented, so it is highly unlikely that uncured concrete will contact the water. For these reasons, concrete contact with the water will be insignificant and *may affect, but are not likely to adversely affect salmon, steelhead, green sturgeon, eulachon, bull trout, or their prey*.

VESSEL OPERATION

Potential contaminant releases to the river in the short term from the construction barge and workboats, and in the long term from docked vessels, could result in death or injury to aquatic organisms, primarily from petroleum hydrocarbons. Accidental spills during construction or from docked vessels could include fuel, lubricants, hydraulic fluid, among other compounds. These substances include polycyclic aromatic hydrocarbons (PAHs), which can cause lethal and sublethal effects to fish and other aquatic organisms (NMFS 2012). Avoidance and minimization measures will reduce the chances that spills will occur or will cause harm to aquatic habitat. For these reasons, contaminant releases from overwater operations will be insignificant and *may affect, but are not likely to adversely affect salmon, steelhead, green sturgeon, eulachon, bull trout, or their prey*.

This project significantly reduces the number of river miles traveled by allowing delivery boats to dock closer to their customers, reducing air emissions and the potential for

contaminant releases from vessels in the Columbia River. These releases will be reduced over the long term. Because this is a beneficial effect of the project, it *may affect, but is not likely to adversely affect salmon, steelhead, green sturgeon, eulachon, bull trout, or their prey*.

CONTAMINANT EFFECTS ON CRITICAL HABITAT

All critical habitats in the action area have a water-quality PCE and a food PCE, and contaminants can affect both. For reasons discussed above for listed species, the project *may affect, but is not likely to adversely affect critical habitat for salmon, steelhead, eulachon, or bull trout.*

UNDERWATER NOISE

Background information about underwater noise can be found in the previous discussion in the *Action Area* section. The Practical Spreading Loss model was used to estimate the spatial extent of noise levels.

VIBRATORY PILE DRIVING EFFECTS ON FISH

Vibratory pile-driving noise is not known to produce noise levels above injury thresholds for fish (WSDOT 2017); however, it will produce noise levels above behavioral thresholds. Noise levels are from Table 2 in this BA, and distances to fish behavioral thresholds set by NMFS are shown in the following table. Pile driving is estimated to take 7 days; however, four of the pier piles will be driven on land and two will likely be driven in the water. Sound can extend into the water from pile driving on land, but there are no data on noise levels created in the water.

Table 8. Distances that Vibratory Pile-Driving Noise Will Exceed Behavioral Disturbance Levels for Fish.

Hollow Steel Piles *(installation time)*	**Distance** (meters)	**Vibratory Pile Driving Noise**[1]	**Fish Behavior** (150 dB_{RMS} Threshold)
18-inch *(2 days in-water)*	10 meters	151 dB_{RMS}	8.6 meters 28 feet **620 square feet**
24-inch *(1 day)*	10 meters	184 dB_{RMS}	1,848 meters 6,061 feet = 1.1 miles **774 acres**

Behavioral distances were calculated using the Practical Spreading Loss Model.
1 = Noise levels from Table 2 in this BE using data for 20" piles because there was no data for 18" piles.

The calculated distance that the behavioral threshold will be exceeded is 6,061 feet from the pile if the 24-inch spud piles are vibrated into place, and is 28 feet from the pile when the 18-inch piles are vibrated into place. The areas cover approximately 774 acres for the 24-inch piles over one day, and 620 square feet for the two in-water, 18-inch piles over 2 days for a total of 3 days of in-water pile driving (see Sheet 6).

IMPACT-HAMMER PILE DRIVING EFFECTS ON FISH

Impact-hammer pile driving will occur over a period of 7 days for the pier piles. Only two pier piles are likely to be driven in the water, two piles are well above OHW, and the other

two are near OHW. These four pier piles are not likely to be driven in the water because the river levels only reach that level about once every two years.

The contractor will use a bubble curtain to reduce underwater noise impacts, resulting in an estimated 5 dB reduction in noise, as discussed in the *Action Area* section of this document. Noise levels and noise distances were estimated using the NMFS Underwater Noise Calculator sheets (see Appendix C). Assumptions for the number of pile strikes per day were provided by the project engineer. The seven pier piles will be driven by an impact hammer for approximately 1,000 blows each for up to one hour per pile. Noise levels of peak, cumulative SEL, and RMS are from sources stated in the *Action Area* section (Caltrans 2015). The table below summarizes distances noise is estimated to exceed injury and behavioral levels for fish.

Table 9. Distances that Attenuated Impact-Hammer Pile Driving Noise Will Exceed Injury or Behavioral Disturbance Levels for Fish using a Bubble Curtain.

Hollow Steel Piles	**Impact-Hammer Pile Driving w/ Bubble Curtain**	**Fish Injury** (206 dB_{Peak} Threshold)	**Fish Injury < 2 grams** (187 $dB_{cumuSEL}$ Threshold)	**Fish Injury > 2 grams** (187 $dB_{cumuSEL}$ Threshold)	**Fish Behavior** (150 dB_{RMS} Threshold)
18-inch @ 10 meters *Likely only 2 piles will be driven in the water, taking 2 hours, total*	**199 dB_{peak}** **156 dB_{RMS}** **173 dB_{SEL}** **203[2] $dB_{cumuSEL}$**	3.4 meters **11 feet** **98 square feet**	215 meters[1] **705 feet** [1]	117 meters[1] **382 feet** [1]	11.7 meters **38 feet** **1,148 square feet**

1 = SEL information is from the 24" piling information (CalTrans 2015). There are no data for 18" or 20" piling.

Fish Injury

Impact-hammer pile driving attenuated by a bubble curtain will occur for an estimated 60 minutes for each of the two pier piles that are likely to be driven in the water. Two piles are well above OHW and two are near OHW. These piles are not likely to be driven in the water because the river levels only reach that level about once every two years.

It is estimated that there will be 1,000 strikes per pile, lasting 60 minutes per pile, so 2 hours of impact-hammer pile driving in the water are anticipated. There are no SEL data for 18-inch piles, so the value for 24-inch piles was used. The injury distance for 18-inch piles is estimated to be less than for 24-inch piles, so sound levels discussed here are a conservative estimate.

Impact-hammer pile driving will create sound pressure levels high enough to injure fish within 11 feet of the pile for two hours at the peak injury threshold. Injury distances extend the farthest for cumulative SEL and are 382 feet and 705 feet from the pile, depending upon fish size.

Fish Behavioral Effects

Impact-hammer pile driving is estimated to occur for 2 days for the two pier piles to be driven in the water, and they will create sound pressure levels that will be above the fish behavioral threshold. Sound can extend into the water from pile driving on land, but there are no data on noise levels created in the water. Behavioral responses can include a startle response, feeding disruption, area avoidance, or they may not detect predators (WSDOT 2017). The farthest extent of behavioral disturbance is 2.6 miles. This encompasses an area of 1.1 square miles, as shown on Sheet 6. Therefore, this is the area predicted for fish behavioral changes during the two, 60-minute periods of impact-hammer pile driving with a bubble curtain for the two in-water pier piles.

NOISE EFFECTS ON SALMON AND STEELHEAD

According to information in the table in Appendix F, juveniles and adults from all 13 ESUs/DPSs could be present during pile driving.

Injury Levels

Impact-hammer pile driving will occur total of 60 minutes per day for 1,000 blows per day over 2 days for in-water pile driving. The predicted radius for fish injury at peak sound levels is 11 feet. The other 5 pier piles will be driven on land, and there is no data for underwater sound levels from pile driving on land.

At cumulative SEL sound levels, the fish injury radius is between 382 feet from the pile for fish greater than 2 grams and 705 feet from the pile for fish less than 2 grams. This is the distance for a 24-inch pile because data are not available for an 18-inch pile. The dB_{peak} and dB_{RMS} results are less than 24-inch pile results, so it is assumed that the SEL value would also be lower. Injury levels are likely to be exceeded up to 382 feet from impact-hammer pile driving intermittently for up to a total of 2 hours over a 2-day period, and listed fish from all 13 ESUs/DPSs could potentially occur within this radius. However, the short time period reduces the chances that fish will be injured, so pile driving *may affect, and is not likely to adversely affect all* 13 ESUs/DPSs.

Behavioral Levels

Vibratory pile driving intermittently over 8 days is estimated to cause behavioral changes for up to 38 feet for the seven 18-inch pier piles during 7 days and up to 1.1 mile for the 24-inch piles during one day. These effects are insignificant because this is a relatively small area within a large river and effects are short-term. This *may affect, and is not likely to adversely affect* all 13 ESUs/DPSs.

NOISE EFFECTS ON EULACHON

There are no known reports of injury from pile driving to fish that do not have swim bladders, such as eulachon (NMFS 2012). Studies of impacts to eggs and larvae do not occur in the literature. Pile driving over 8 days could cause behavioral changes within 1.1 miles of the pile. According to the table in Appendix F, eulachon are very unlikely to be present before December, so pile driving impacts would be discountable during that time. If pile driving occurs from December through February, eulachon could be migrating and spawning

in the river, so they could experience behavioral disturbances. Therefore, pile driving noise *may affect, but is not likely to adversely affect* eulachon.

NOISE EFFECTS ON NORTH AMERICAN GREEN STURGEON

Green sturgeon could be present in the action area during pile driving; however, most green sturgeon stay near the mouth of the Columbia River in the lower estuary, and their peak occurrence in the estuary is from June into mid-October. Few, if any, green sturgeon are expected in the action area during piling installation, but if present, they would be subadults or adults.

Injury Levels

No documentation could be found for green sturgeon responses to noise, but it is assumed they would experience the same effects as adult salmonids, because both salmonids and sturgeon have swim bladders that are vulnerable to sudden sound-pressure changes, such as impact-hammer pile driving. If adults are migrating or foraging during the 60 minute periods of impact-hammer pile driving for each of seven days, they could be injured by peak sound levels within 3 feet of the pile. The injury radius from cumulative SEL sound levels is not known for the proposed 18-inch piles, but for 24-inch piles, the radius is 362 feet from the pile. The dB_{peak} and dB_{RMS} results are less than 24-inch pile results, so it is assumed that the SEL value would also be lower. Green sturgeon are rare in freshwater areas of the river, and fish would be unlikely to occur this close to an in-water activity. Our professional judgement is that there will be no injuries to green sturgeon from impact-hammer pile driving.

Behavioral Levels

Vibratory pile driving 18-inch piling for 2 days in the water would create noise above the 150 dB_{RMS} fish behavioral level for 28 feet from the pile. Green sturgeon are rare in freshwater areas of the river, especially during the in-water work window, and any fish would be unlikely to be within 28 feet of this in-water activity. In our professional judgement, there will be no injuries to green sturgeon from impact-hammer pile driving.

If the three 24-inch log-boom piles are driven intermittently over one day, the radius for noise above the fish behavioral level would be 1.1 miles. They could experience behavioral changes from both types of pile driving. Green sturgeon are rare in this portion of the river, so they are unlikely to be present during pile driving; therefore, noise effects are discountable. Therefore, underwater noise *may affect, but is not likely to adversely affect* North American green sturgeon.

NOISE EFFECTS ON BULL TROUT

Bull trout are rare in the mainstem Columbia River; they may be present as adults and subadults, which weigh more than 2 grams. For the same reasons given above for green sturgeon, underwater noise *may affect, but is not likely to adversely affect* bull trout.

NOISE EFFECTS ON DESIGNATED CRITICAL HABITATS

Salmon and Steelhead Designated Critical Habitat

The safe-passage PCE is an essential feature of critical habitats for the Salmon River Sockeye, Spring-run Chinook, and Fall-run Chinook ESUs. For critical habitats of the

remaining ESUs/DPSs, the PCE that will be affected is "free of artificial obstruction" for migratory corridors. Noise can cause migratory obstruction by causing injury or changes in behavior that may delay migration or spawning. Injury levels to fish will be exceeded for impact-hammer pile driving and will create unsafe passage conditions; however, the effects beyond will only last for 7 days. Because noise above injury levels will occur within a very small area in relation to the river and over a short time period, the project *may affect*, and is *not likely to adversely affect* designated critical habitat for 13 ESUs/DPSs of salmon and steelhead.

Eulachon Critical Habitat
There is no PCE for spawning or incubation that includes impacts from noise, but the migratory corridor PCE requires safe and unobstructed passage. There are no known reports of injury from impact-hammer pile driving on fish that do not have swim bladders, such as eulachon (NMFS 2012); however, pile-driving noise could create intermittent obstructions to migration in a 1.1-mile radius from the pile by altering behavior. This is a small area when compared to the critical area within the Columbia River. Therefore, underwater noise *may affect, but is not likely to adversely affect* designated eulachon critical habitat.

Bull Trout Critical Habitat
PCE #1 states that "Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers." Impact-hammer noise acts as a physical barrier to migration by causing injury and changing behavior, and vibratory pile-driving noise acts as a physical barrier by changing behavior.

Injury levels to fish will be exceeded for impact-hammer pile driving and will create unsafe passage conditions; however, the cumulative effects will only last intermittently for 7 days within about 100 feet from the pile. Because noise above injury levels will occur within a very small area in relation to the river and over a short time period, underwater noise *may affect, but is not likely to adversely affect* designated critical habitat for bull trout.

SHADING

SHADING EFFECTS ON SALMON AND STEELHEAD
Smaller ocean-type juvenile salmon (Upper Willamette River [UWR] Chinook, Lower Columbia River [LCR] Chinook, Columbia River [CR] Chum, Snake River [SR] Fall Chinook) prefer shallow, slower-water habitats because of their small size and limited swimming abilities, so they are susceptible to predators in shallow-water habitat when overwater shading creates shadows that allow predators to hide in dark areas and ambush their prey swimming against a bright background. The larger stream-type juveniles from the remaining 9 ESUs/DPSs are less susceptible to predation and travel in deeper water than the ocean-type salmon (NMFS 2016).

Overwater structures in shallow water may disrupt the migration of smaller juveniles that use nearshore areas for migration; however, this project will cause little shading in water less than 20 feet deep. This site was selected by the Port, because it minimizes shallow-water

habitat impacts where the most vulnerable salmonids migrate, and it avoids maintenance dredging.

The design minimizes shading by keeping the pier and gangway that are near the shoreline to a small footprint. They are elevated 23 to 9 feet above MLLW and OHW, respectively, and they are fully grated, so shading will be minimized.

Vessels using this dock are interrelated to the permitted portion of the project. Up to five boats are expected to be docked at any one time. Their estimated dimensions are between 44 to 63 feet long and 13 to 15 feet wide for an estimated 3,000 square feet of on-water coverage. Moored boats will be in water that is at least 20 feet deep and away from the shoreline. Because the overwater structures are in deeper water with higher flow rates, the smaller, more vulnerable juveniles are less likely to migrate near the shoreline; therefore, there will not likely be significant predation on juvenile salmon from piscivorus fish from the barge dock or from moored vessels.

Benthic food production that typically takes place in shallow-water habitats will likely not be affected because on-water boats and the barge will be in water greater than 20 feet deep. No aquatic vegetation has been observed in the project area. Areas of deeper water that may be shaded by the floating dock and moored vessels is not near the middle of the river where older juvenile salmon and steelhead smolts are known to migrate, so shading effects from the project to those ESUs/DPSs will be insignificant.

The project will reduce the area of log storage adjacent to the project by 11,000 square feet. This reduces on-water shading and opportunities for birds and fish to prey on juvenile salmon. For the reasons discussed above, shading effects will be insignificant, so the project *may affect, but is not likely to adversely affect salmon and steelhead*.

SHADING EFFECTS ON NORTH AMERICAN GREEN STURGEON

Green sturgeon typically occur in water greater than 15 feet deep, and they are considered rare in freshwater (Federal Register 2008). They also occur in the Columbia River as adults and subadults, so are not susceptible to avian or fish predation. Shading will not affect feeding behavior, because they are typically bottom feeders that are accustomed to dark conditions, and their food sources will not be affected by the project. For this reason, shading effects from the project will have *no effect* on green sturgeon.

SHADING EFFECTS ON EULACHON

NMFS stated in a biological opinion (NMFS 2016) that they are unaware of studies related to adult eulachon behavior around overwater structures, but they anticipate adults on their spawning migration would reserve energy and seek out lower velocity waters. Larval eulachon passively emigrate, so while they may encounter the dock after it is installed, NMFS does not anticipate an increase in their predation, given that their location throughout the water column will be driven by riverine mixing forces at a much larger scale that would render the barge's effect negligible and indiscernible from background rates within or outside of the action area (NMFS 2016). Adult eulachon are unlikely to be eaten by piscivorus fish. Therefore, shading effects will have *no effect* on spawning eulachon, eggs, and larvae.

SHADING EFFECTS ON BULL TROUT

Bull trout could use the project area for overwintering, foraging, or migration. They are very rare in the Columbia River, but are known to be predators of juvenile salmon and other small fish. Therefore, bull trout may benefit by in-water and overwater structures on the project site or may have reduced foraging opportunities, shading *may affect, but is not likely to adversely affect bull trout.*

SHADING EFFECTS ON CRITICAL HABITAT

Salmon and steelhead, eulachon, and bull trout have critical habitats with PCEs that require a safe migratory corridor. The floating dock will create additional exposure to juvenile salmon and steelhead to their predators, but the effect is so small it will be insignificant. Eulachon and bull trout do not have predators that would use the shaded areas, so their safe-migratory corridor PCE will not be affected. All species have a PCE related to food; for reasons discussed above for each the species, the project's shading effects on the food web will be insignificant. Therefore, the project *may affect, but are not likely to adversely affect critical habitat for salmon, steelhead, eulachon, or bull trout.*

BENTHIC IMPACTS

There will be impacts to benthic and epibenthic organisms that are prey for listed fish species from 7 new piling totaling 14.7 square feet. Approximately 10 orphan piling near the shoreline in shallow-water habitat will be exposed, providing a small net gain of benthic habitat. For these reasons, impacts and benefits to benthic habitat *may affect, but is not likely to adversely affect salmon and steelhead, green sturgeon, eulachon, and bull trout.*

BENTHIC EFFECTS ON CRITICAL HABITAT

All critical habitats in the action area have a food/forage PCE, and impacts to the benthic habitat can affect that PCE. The project will result in a small net gain of benthic habitat. Therefore, the project *may affect, but is not likely to adversely affect critical habitat for salmon, steelhead, eulachon, or bull trout.*

EFFECTS FROM LIGHTING

Lights will be installed on the pier, gangway, and barge dock and directed only at areas to create safe working conditions. This area currently experiences artificial lighting from the nearby marina and Hendrickson Drive, so lighting effects in the water will be only slightly above current levels.

INTERRELATED AND BENEFICIAL EFFECTS

The interrelated action from this project includes shading effects from up to five docked service boats, primarily in water depths of less than 20 feet. Beneficial effects will result from this project by reducing 11,000 square feet of on-water log storage that creates in-water shading and bird perches, encouraging juvenile salmonid predation. Pile caps will be placed on new and relocated piling to avoid bird predation on listed fish. Currently, cormorants perch on the piles proposed for relocation, as seen during the January 2018 site visit.

Another beneficial effect is that the project reduces boat miles traveled on the river and reduces truck miles traveled to deliver the cargo to Kalama instead of to Portland and

Astoria. The project will reduce pollutants created by the extra boat miles and stormwater runoff from delivery trucks. Overall, the project will reduce the carbon footprint of this service operation, which will benefit all federally listed species and critical habitats addressed in this report.

EFFECT DETERMINATIONS

The project has been designed to avoid, minimize, and mitigate impacts to species and habitats within the project and action areas. This section summarizes the primary project impacts to each species; for a full discussion of potential impacts, see the section above entitled *Effects of the Action*.

NMFS JURISDICTION

SALMON AND STEELHEAD

The proposed project **may affect**, and is **not likely to adversely affect** salmon and steelhead from the 13 populations listed in Table 3. A **"may affect"** determination is warranted because:

- The action area supports migration habitat for juveniles and adults and rearing habitat for juveniles.
- The floating dock will cause increased shading, leading to increased fish predation.
- Vibratory pile driving could cause temporary behavioral effects.

A "**not likely to adversely affect"** determination is warranted because:

- Impact-minimization measures will be followed to avoid and reduce noise impacts.
- Underwater noise above the injury level from impact-hammer pile driving will be intermittent over 2 days within a few hundred feet of the pile.
- Reducing the log storage area by 11,000 square feet compensates for the on-water area of the T-barge and overwater structures.
- Reduced river and truck traffic reduces water-quality impacts from boats, and reduces the carbon footprint of the project.

DESIGNATED CRITICAL HABITAT FOR SALMON AND STEELHEAD

The proposed project **may affect**, and is **not likely to adversely affect** designated critical habitat for 13 ESUs/DPSs of salmon and steelhead. A **"may affect"** determination is warranted because:

- There is designated critical habitat in the action area for migration and rearing.
- The safe-passage PCE and "free of artificial obstruction" PCE will be affected by shading.
- Noise above injury levels will create unsafe passage conditions and artificial obstructions for these populations from pile-driving noise, as well as causing shading effects from the floating dock.

A "**not likely to adversely affect**" determination is warranted because:

- Impact-minimization measures will be followed to avoid and reduce noise impacts.
- Pile driving will have intermittent, short-term adverse effects to the migration PCEs; however, the noise will not continue round-the-clock and will last only 7 days.
- Reducing the log storage area by 11,000 square feet compensates for the on-water area of the T-barge and overwater structures.

NORTH AMERICAN GREEN STURGEON – SOUTHERN DPS

The project **may affect** but is **not likely to adversely affect** the Southern DPS of North American green sturgeon. A "**may affect**" determination is warranted because:

- The project will occur in an area that supports migration, oversummering, and foraging habitat for adults and subadults that are more likely to be present in the salt-water portion of the estuary between May and October. Individuals could potentially be in the action area during any time of the year.
- Impact-minimization measures will be followed to avoid and reduce noise impacts.
- Underwater noise from pile driving will create areas of potential behavioral effects for up to 7 days.

A "**not likely to adversely affect**" determination is warranted because:

- Few, if any, individuals will be present in the action area during the work window, so the effects are discountable.

COLUMBIA RIVER EULACHON

The proposed project **may affect,** but is **not likely to adversely affect** eulachon. A "**may affect**" determination is warranted because:

- The project will occur in an area that supports freshwater migration, spawning, and incubation habitat.
- Underwater noise from pile driving will create areas of potential behavioral effects for up to 7 days.

A "**not likely to adversely affect**" determination is warranted because:

- Impact-minimization measures will be followed to reduce noise impacts.
- There is no documented evidence of noise-caused injuries to eulachon, and they do not have a swim bladder that makes them as vulnerable to injury as other fish species.
- Reduced river and truck traffic reduces water-quality impacts from boats, and reduces the carbon footprint of the project.
- This project does not require dredging, it will have no effects on water temperature, and it will not cause increased impacts along the shoreline over current conditions. Therefore, the project complies with federal management recommendations listed in the eulachon recovery plan.

DESIGNATED CRITICAL HABITAT FOR COLUMBIA RIVER EULACHON

The proposed project **may affect,** but is **not likely to adversely affect** designated critical habitat for eulachon. A "**may affect**" determination is warranted because:

- The mainstem Columbia River in the action area is spawning, egg incubation, and migration habitat for eulachon.
- Underwater noise from pile driving will create areas of potential behavioral effects for up to 7 days.

A "**not likely to adversely affect**" determination is warranted because:

- Impact avoidance and minimization measures will be followed.
- Pile driving may have intermittent, short-term adverse effects to the migratory corridor PCE; however, the noise will not continue round-the-clock for only 7 days.

USFWS JURISDICTION

BULL TROUT

The project **may affect** but is **not likely to adversely affect** the Columbia River DPS of bull trout. A "**may affect**" determination is warranted because:

- The project will occur in an area that supports migration, foraging, and overwintering habitat for adults and subadults.
- Underwater noise from pile driving will create areas of potential behavioral effects for up to 7 days.

A "**not likely to adversely affect**" determination is warranted because:

- Impact-minimization measures will be followed to avoid and reduce noise impacts.
- Pile driving will have intermittent, short-term adverse effects to the migration PCEs. However, the noise will not continue round-the-clock and will last only 7 days.
- Few, if any, individuals will be present in the action area, so effects are discountable.

DESIGNATED CRITICAL HABITAT FOR BULL TROUT

The proposed project **may affect,** but is **not likely to adversely affect** designated critical habitat for the Columbia River DPS of bull trout. A "**may affect**" determination is warranted because:

- There is designated critical habitat in the action area for migration, overwintering, and foraging.
- The migratory-corridor PCE will affected by underwater noise from pile driving.

A "**not likely to adversely affect**" determination is warranted because:

- Impact-minimization measures will be followed to avoid and reduce noise impacts.
- Pile driving will have intermittent, short-term adverse effects to the migration PCEs. However, the noise will not continue round-the-clock and will last only 7 days.

SUMMARY OF EFFECT DETERMINATIONS

The project **may affect** and is **not likely to adversely affect** the following listed species and critical habitats:

- Salmon and Steelhead – 13 ESUs/DPSs
  - Lower Columbia River Chinook ESU
  - Upper Columbia River Spring-run Chinook ESU
  - Upper Willamette River Chinook ESU
  - Snake River Spring-run Chinook ESU
  - Snake River Fall-run Chinook ESU
  - Columbia River Chum Salmon ESU
  - Lower Columbia River Coho Salmon ESU
  - Snake River Sockeye DPS
  - Lower Columbia River Steelhead DPS
  - Middle Columbia River Steelhead DPS
  - Upper Columbia River Steelhead DPS
  - Upper Willamette River Steelhead DPS
  - Snake River Basin Steelhead DPS
- Designated Critical Habitat for Salmon and Steelhead – 13 ESUs/DPSs
- North American Green Sturgeon – Southern DPS
- Eulachon – Southern DPS
- Designated Critical Habitat for Eulachon – Southern DPS
- Bull Trout – Columbia River DPS
- Designated Critical Habitat for Bull Trout

The project **will not adversely affect** essential fish habitat (see Appendix G).

REFERENCES

California Department of Transportation (CalTrans). 2015. *Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish*. November.

Federal Register. 2016. *Designation of Critical Habitat for Columbia River Coho ESU*. 50 CFR Part 226 Volume 76 Number 203. National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA). October 20.

Federal Register. 2011. *Designation of Critical Habitat for Southern Distinct Population Segment of Eulachon*. 50 CFR Part 226 Volume 76 Number 203. National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA). October 20.

Federal Register. 2010a. *Threatened Status for Southern Distinct Population Segment of Eulachon*. 50 CFR Part 223 Volume 75 Number 52. National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA). March 18.

Federal Register. 2010b. *Revised Designation of Critical Habitat for Bull Trout in the Coterminous Untied States; Proposed Rule.* 50 CFR Part 17, Volume 75, Number 200. Department of the Interior. Fish and Wildlife Service. October 18.

Federal Register. 2009. *Final Rulemaking to Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American Green Sturgeon; Final Rule*. Volume 74, Number 195. Department of the Interior. Fish and Wildlife Service. October 9.

Federal Register. 2008. *Proposed Rulemaking to Designate Critical Habitat for the Threatened Southern Distinct Population Segment of North American Green Sturgeon; Proposed Rule*. Volume 73, Number 174 September 8.

Federal Register. 1999. *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for Bull Trout in the Coterminous United States; Final Rule*. Federal Register Volume 64 Number 210. Department of the Interior. Fish and Wildlife Service. Pages 58909-58933.

National Marine Fisheries Service (NMFS). 2018a. *Salmon and Steelhead Listings* dated July 2016. Internet site accessed January 15: http://www.westcoast.fisheries.noaa.gov/ publications/gis_maps/maps/salmon_steelhead/critical_habitat/wcr_salmonid_ch_esa_july2016.pdf.

National Marine Fisheries Service (NMFS). 2018b. *Eulachon, Rockfish, & other Marine Species*. Internet site January 15: http://www.westcoast.fisheries.noaa.gov/ protected_ species/species_list/other_esa_listed_species_wc.html.

National Marine Fisheries Service (NMFS). 2017. *Endangered Species Act Recovery Plan for the Southern Distinct Population Segment of Eulachon* (Thaleichthys pacificus). West Coast Region. Internet site: http://www.westcoast.fisheries.noaa.gov/ publications/ protected_species/other/eulachon/final_eulachon_recovery_plan_09-06-2017-accessible. pdf. September 6.

National Marine Fisheries Service (NMFS). 2016. *Endangered Species Act Section 7(a)(2) Biological and Conference Opinion and Magnuson Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Tidewater Barge Lines Spud Barge Placement (COE NO.: NWS-2012-1174), Sixth Field HUC 170800030307 – Columbia River Mainstem, Cowlitz County, Washington*. February 19.

National Marine Fisheries Service (NMFS). 2012. *Endangered Species Act Section 7 Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the City of Astoria 17th Street Dock Reconstruction, Columbia River (6th Field HUC 170800060500), Clatsop County, Oregon. Corps No.: NWP-2011-395*. NMFS No.: NWP-2011/02731. February 8.

National Marine Fisheries Service (NMFS). 2011. *Endangered Species Act Section 7 Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Georgia-Pacific Wauna Mill Transit Dock Repair and Piling Replacement, Columbia River (5th Field HUC 1708000307), Clatsop County, Oregon.* NMFS Tracking Number NWP-2011-578. September 7.

National Marine Fisheries Service (NMFS). 2007. *Green Sturgeon ESA Questions and Answers*. Online document http://swr.nmfs.noaa.gov/pdf/20060411_ESA_Questions.pdf. Accessed September 18, 2007.

Pacific Fisheries Management Council. 1999. *Amendment 14 to the Pacific Coast Salmon Plan: Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon*. Portland Oregon.

Pacific Fisheries Management Council. 1998a. *The Coastal Pelagic Species Fishery Management Plan*: *Amendment 8.*

Pacific Fisheries Management Council. 1998b. *Final Environmental Assessment/Regulatory Review for Amendment 11 to the Pacific Coast Groundfish Fishery Management Plan*.

Rodrick, E. and R. Milner, eds. 1991. *Management Recommendations for Washington's Priority Habitats and Species*. Washington Department of Wildlife, Wildlife Management, Fish Management, and Habitat Management Divisions, Olympia, Washington.

U.S. Army Corps of Engineers (USACE). 2001. *Biological Assessment – Columbia River Channel Improvements Project*. December 28.

U.S. Fish and Wildlife Service (USFWS). 2002. *Biological and Conference Opinions for the Columbia River Channel Improvements Project*. Oregon State Office, Portland, Oregon. May 20.

U.S. Fish and Wildlife Service (USFWS). 2017. *IPaC - Information, Planning, and Conservation System – Environmental Conservation Online System*. Internet site accessed November 17: http://ecos.fws.gov/ipac/.

Washington Department of Ecology (Ecology). 2018. *2012 Washington State Water Quality Assessment [303(d) List]*. Internet site accessed January 15: https://fortress.wa.gov/ecy/waterqualityatlas/map.aspx

Washington Department of Fish and Wildlife (WDFW). 2017a. *Habitats and Species Report in the Vicinity of T06R01W Section 7*. Olympia, Washington. March.

Washington Department of Fish and Wildlife (WDFW). 2017b. *SalmonScape*. Online map accessed November at http://apps.wdfw.wa.gov/salmonscape/.

Washington Department of Natural Resources (WDNR). 2018. *Natural Heritage Information System.* Washington Department of Natural Resources Natural Heritage Program. Olympia, Washington. Document dated February 6, 2017. Internet site accessed January 15. https://www.dnr.wa.gov/publications/amp_nh_trs.pdf?v7aymh.

Washington State Department of Transportation (WSDOT). 2017. *WSDOT Biological Assessment Preparation, Advanced Training Manual. Version 02-2017*. February.

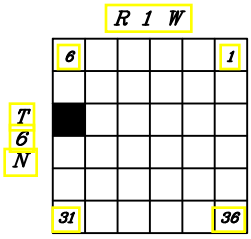
Personal Communications

Gayle Kreitman, 2013. ESA Reviewer for National Marine Fisheries Service. May 1.

FIGURES

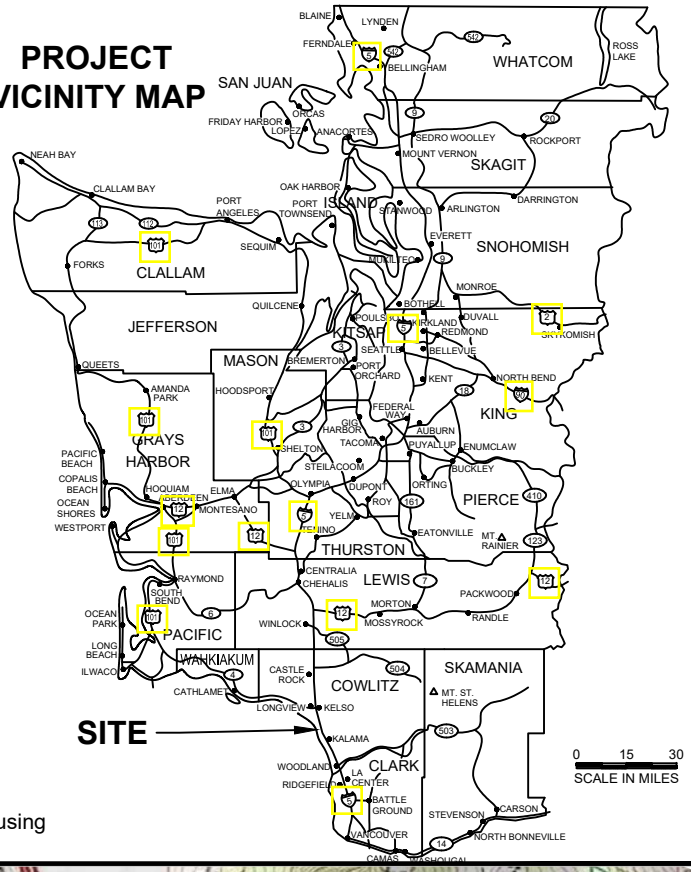
46.0097° Latitude
-122.8484° Longitude

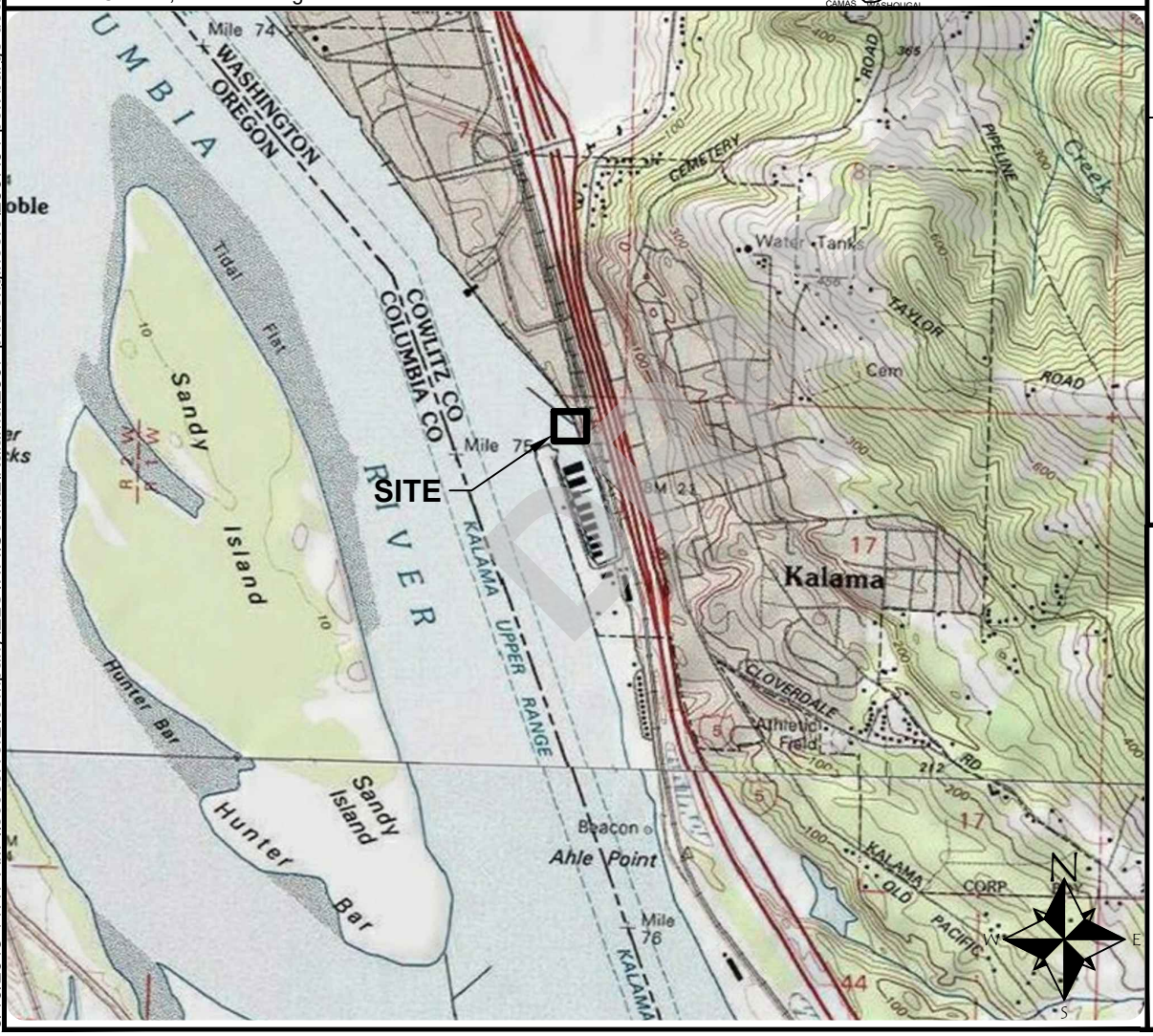
LOCATION MAP



NOTE:
USGS topographic quadrangle map reproduced using MAPTECH Inc., Terrain Navigator Pro software.

PROJECT VICINITY MAP





PROPOSED: New Dock
IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 1 **OF** 10
DATE: 3/19/18

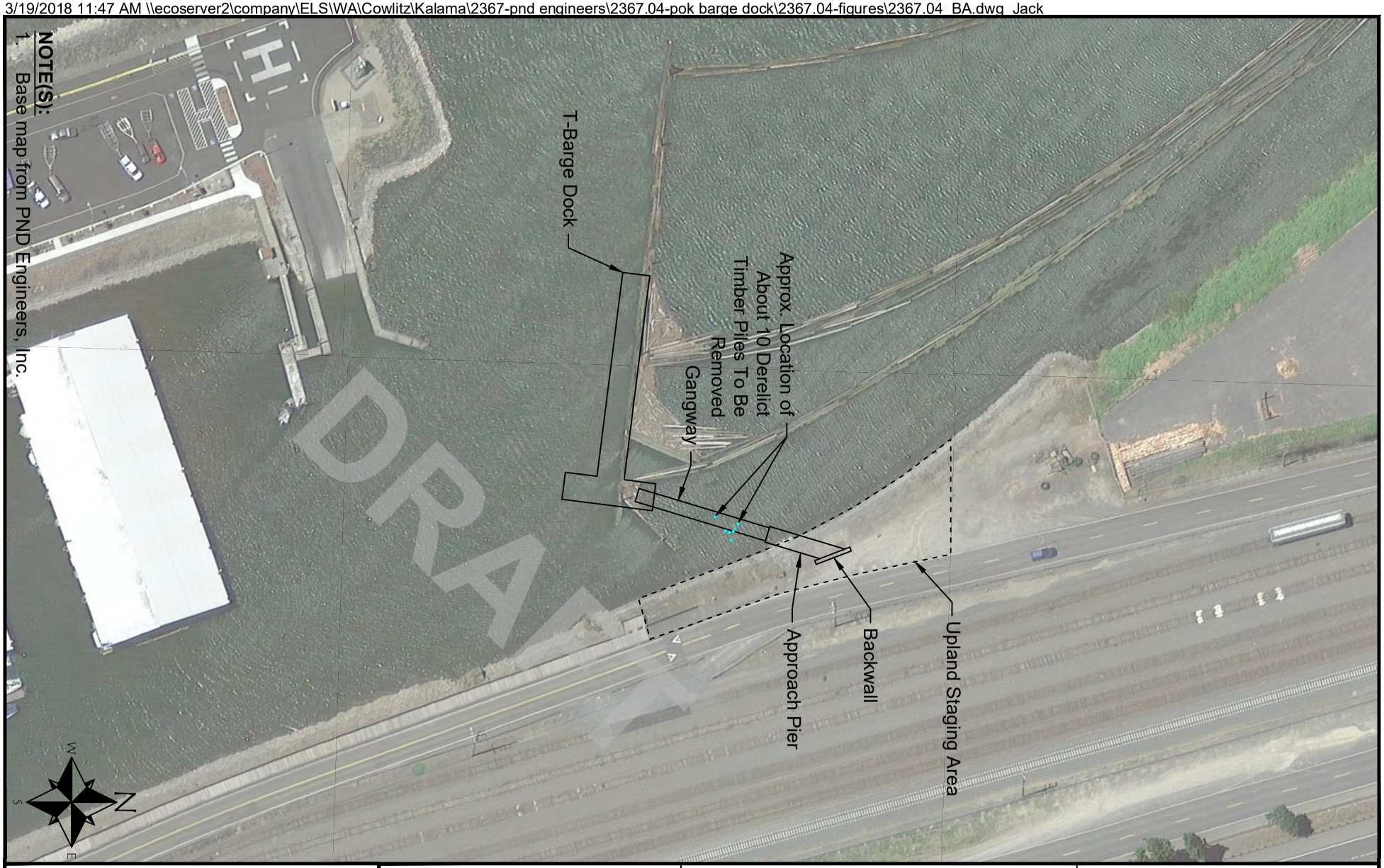
VICINITY MAP
APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:
See JARPA

SCALE IN FEET
0 2000 4000

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

Ecological Land Services



0 100 200
SCALE IN FEET

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

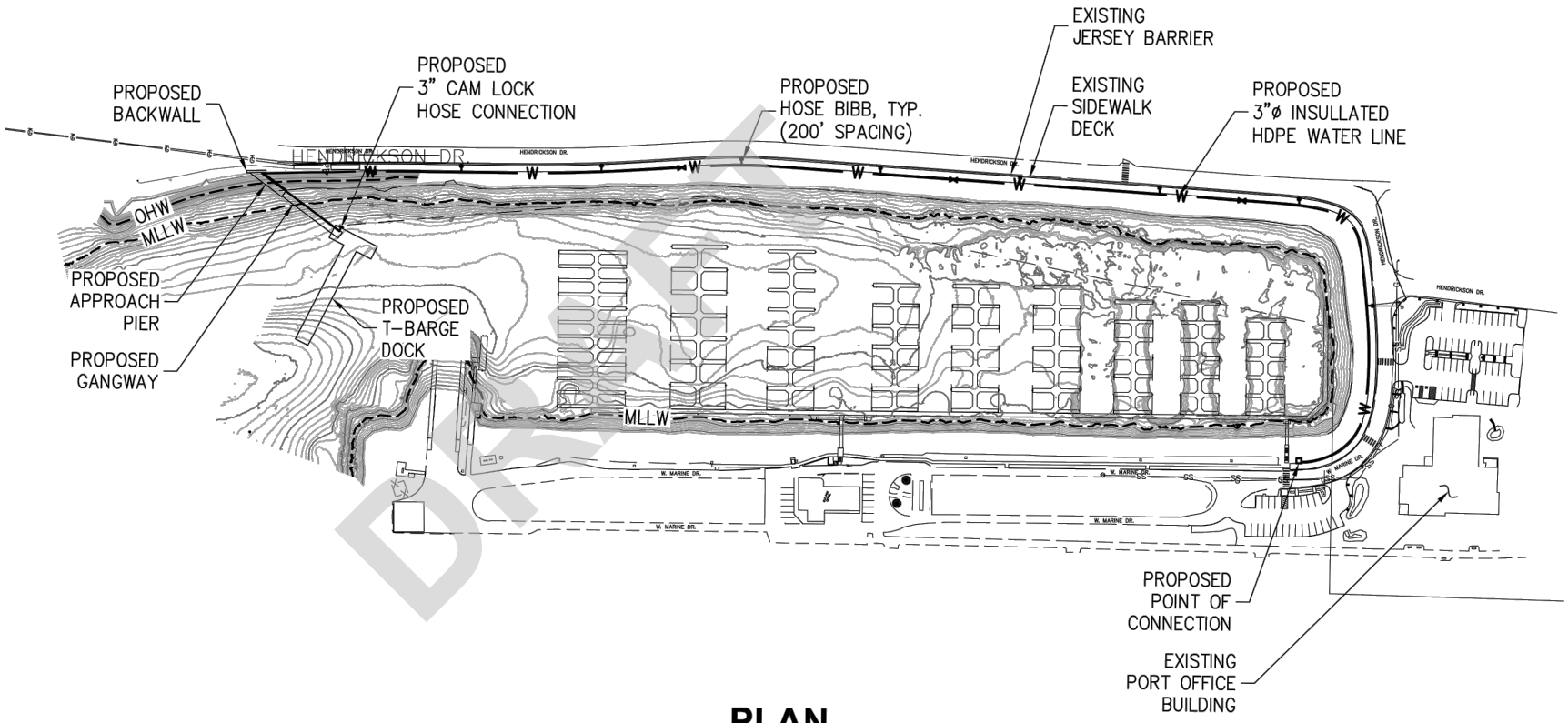
See JARPA

AERIAL PHOTOGRAPH

APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 2 **OF** 10
DATE: 3/19/18



PLAN

0 50 100 150 300 450 FT.

NOTE(S):

1. Base map from PND Engineers, Inc.

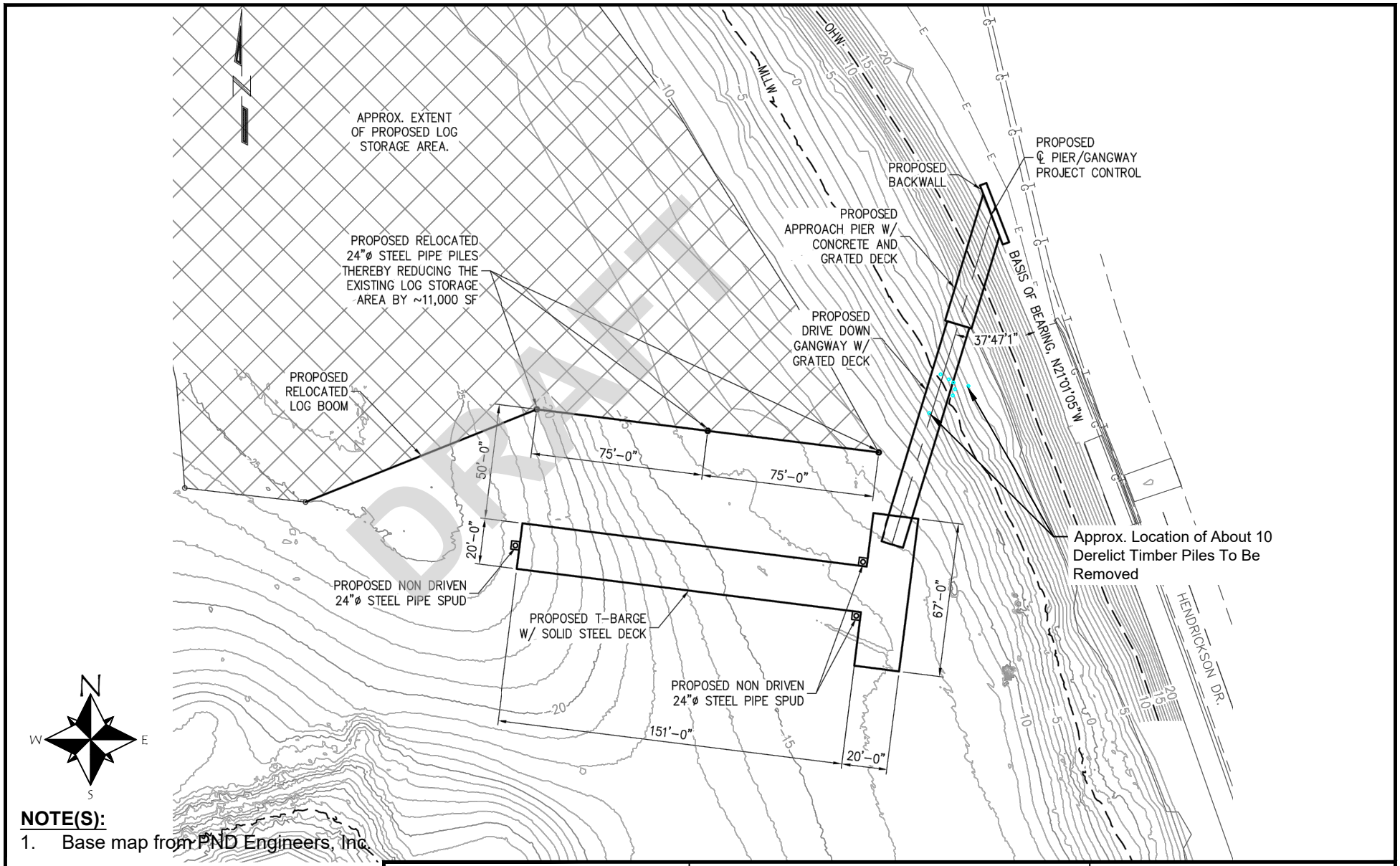
0 250 500

SCALE IN FEET

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE: Moor small vessels to serve shipping industry **DATUM:** NAD83 **ADJACENT PROPERTY OWNERS:** See JARPA	**OVERALL SITE PLAN** **APPLICANT:** Port of Kalama **PROJECT NAME:** Port of Kalama T-Barge Dock **REFERENCE #:** Not Yet Assigned **SITE LOCATION ADDRESS:** 1296 Third St. NW Kalama, WA	**PROPOSED:** New Dock **IN** Columbia River - RM 74.3 **NEAR:** Kalama **COUNTY:** Cowlitz **STATE:** WA **SHEET** 3 **OF** 10 **DATE:** 3/19/18

3/19/2018 11:47 AM \\ECOSERVER2\Company\ELS\WA\Cowlitz\Kalama\2367-pnd engineers\2367.04-pok barge dock\2367.04-figures\2367.04_BA.dwg Jack



NOTE(S):

1. Base map from PND Engineers, Inc.

0 60 120

SCALE IN FEET

Ecological Land Services

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

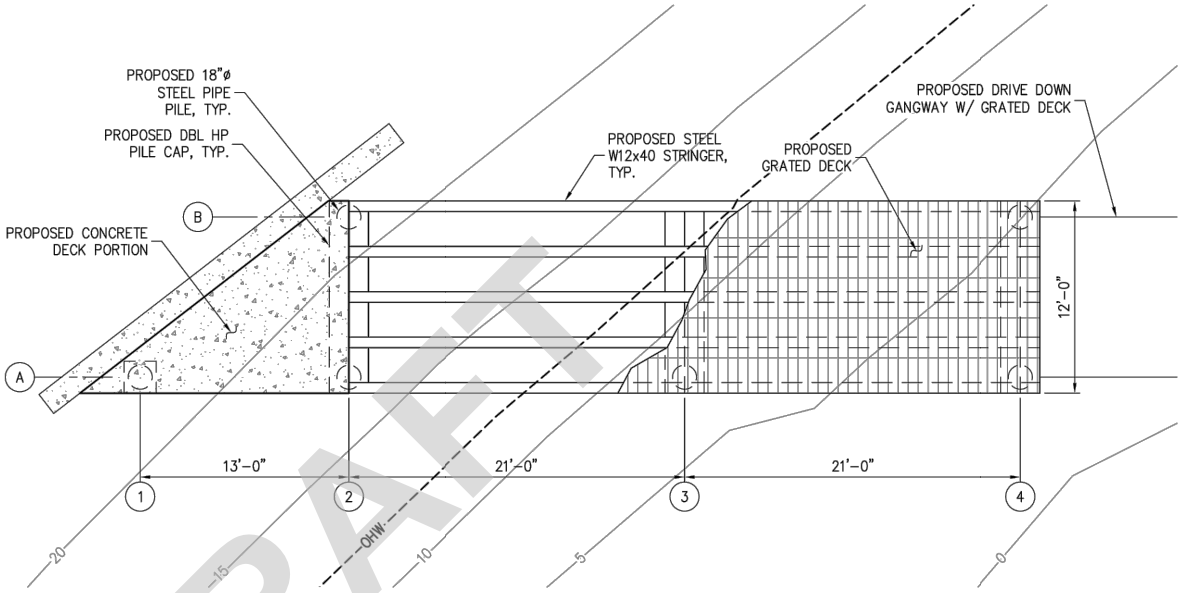
See JARPA

PROPOSED SITE PLAN

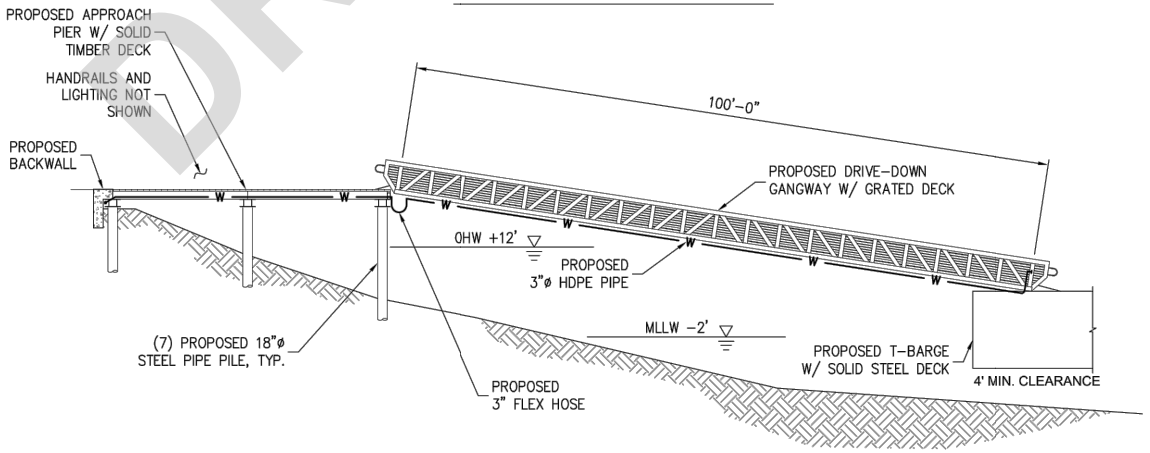
APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 4 **OF** 10
DATE: 3/19/18



APPROACH PIER PLAN



GANGWAY SECTION

NOTE(S):

1. Functional grating will be at least 25%.

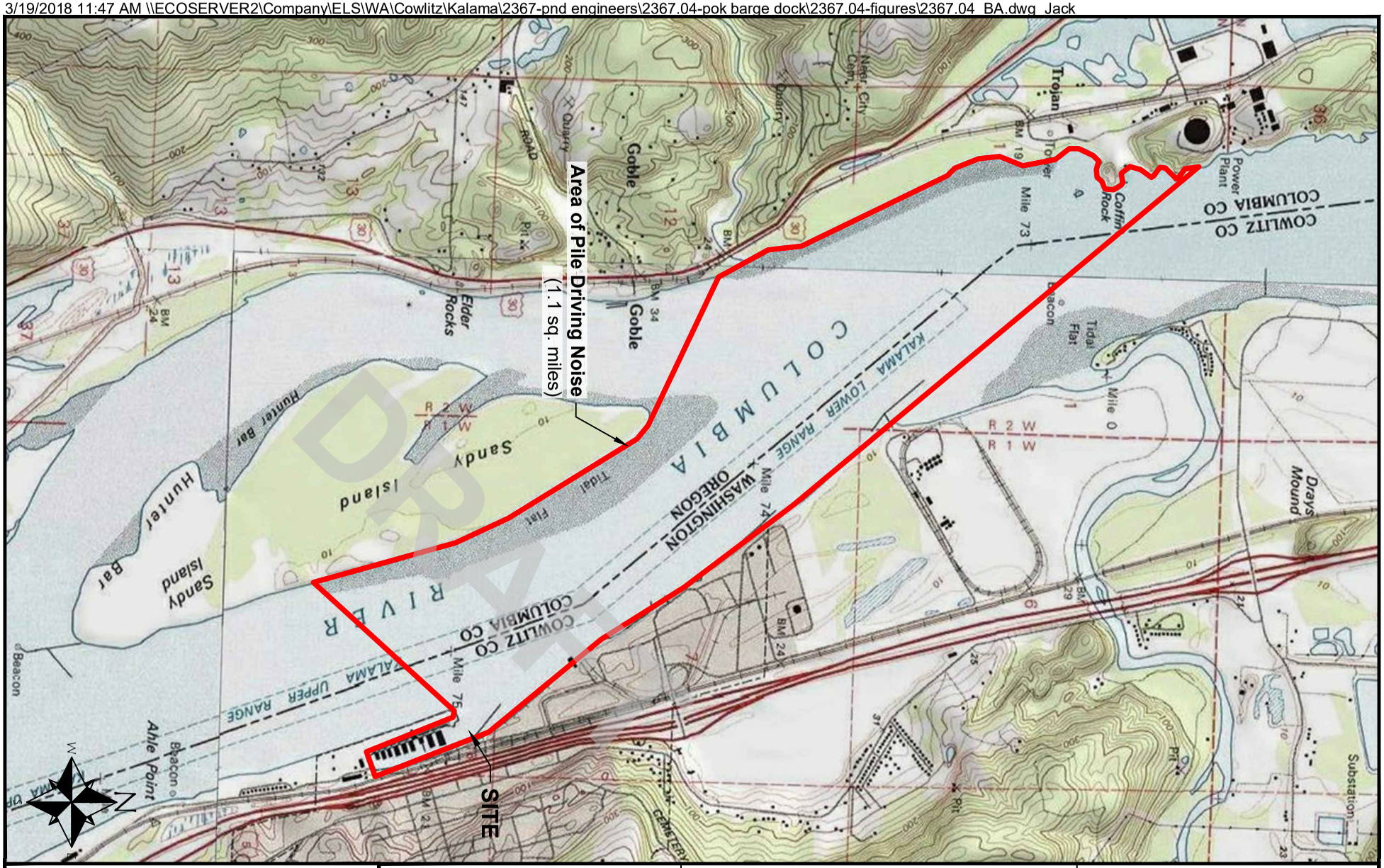
0 12 24

SCALE IN FEET

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE: Moor small vessels to serve shipping industry **DATUM:** NAD83 **ADJACENT PROPERTY OWNERS:** See JARPA	**APPROACH PIER PLAN & GANGWAY SECTION** **APPLICANT:** Port of Kalama **PROJECT NAME:** Port of Kalama T-Barge Dock **REFERENCE #:** Not Yet Assigned **SITE LOCATION ADDRESS:** 1296 Third St. NW Kalama, WA	**PROPOSED:** New Dock **IN** Columbia River - RM 74.3 **NEAR:** Kalama **COUNTY:** Cowlitz **STATE:** WA **SHEET** 5 **OF** 10 **DATE:** 3/19/18

3/19/2018 11:47 AM \\ECOSERVER2\Company\ELS\WA\Cowlitz\Kalama\2367-pnd engineers\2367.04-pok barge dock\2367.04-figures\2367.04 BA.dwg Jack



0 2000 4000
SCALE IN FEET

Ecological Land Services

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

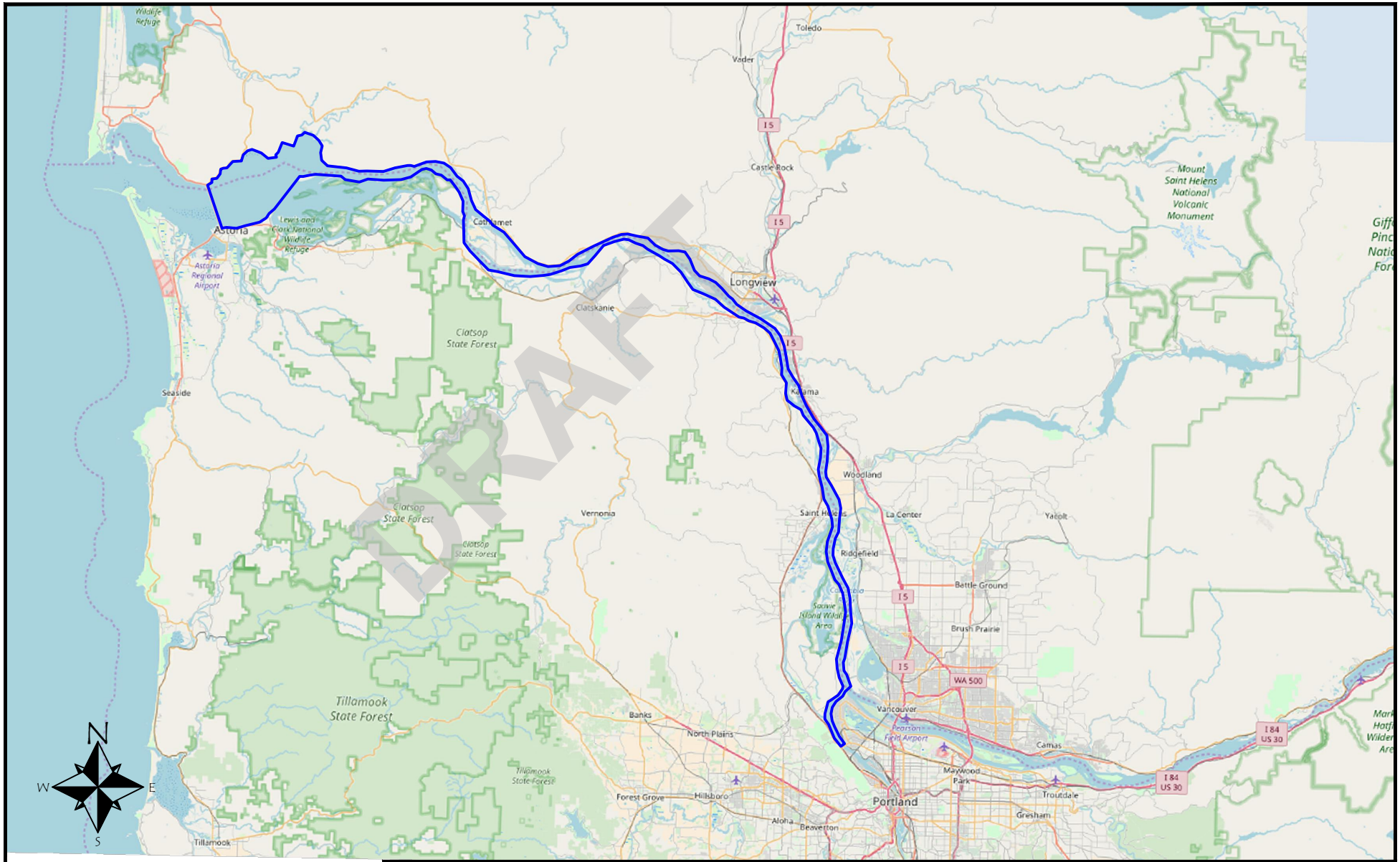
PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

See JARPA

EXTENT OF PILE-DRIVING EFFECTS ON FISH
APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 6 **OF** 10
DATE: 3/19/18



0 60000 120000

SCALE IN FEET

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

See JARPA

ACTION AREA MAP

APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 7 **OF** 10
DATE: 3/19/18

Looking from the north to the east at the proposed project site. The three circled piles will be relocated to the north and the bank protection will remain as shown.

NOT TO SCALE

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

See JARPA

PHOTOPLATE 2
APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 8 **OF** 10
DATE: 3/19/18

Looking at the existing log storage area and shoreline conditions. The proposed upland area is on the right side of the photograph. Pile caps will be installed on all new and relocated piling to prevent bird perching.

NOT TO SCALE

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

See JARPA

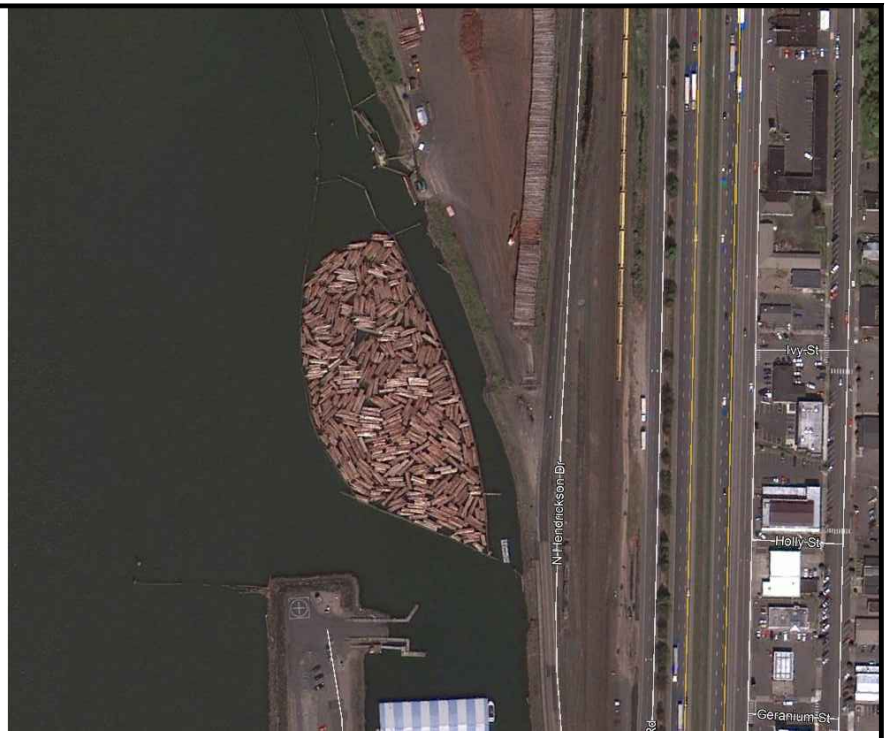
PHOTOPLATE 2

APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 9 **OF** 10
DATE: 3/19/18

Photograph of T-barge. Framework above the deck has been removed.



Photograph showing the extent of the log storage area.

NOT TO SCALE

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

See JARPA

PHOTOPLATE 3
APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 10 **OF** 10
DATE: 3/19/18

APPENDIX A

NMFS Spreadsheet of Piling and Overwater Areas

Port of Kalama Barge Dock - Project Summary

March 29, 2018

(NMFS Spreadsheet)

Action		Method	Pile Size	# Piles	Strikes/ pile	# piles/ day	total strikes/ day	est # days	
Removed	Perm	Vibratory	24	3	---	3	---	0.5	
Re-install Removed Piles	Perm	Vibratory	24	3			0	0.5	
Install	Perm	Vibratory/ Impact Proofing	18	7	1,000	1.0	1,000	7	Confined bubble curtain. **3 in-water**, 4 upland

8 Total Days

3 new in-water piling **6 (in-water installations)**

	ALL Piling							Total Area								
	Existing			New Piles			Net	Existing				Proposed				Net	
Component	**#**	**Dia "**	**SF**	**#**	**Dia "**	**SF**	**Area**	**#**	**L (ft)**	**W (ft)**	**Area**	**#**	**L (ft)**	**W (ft)**	**Area**	**Area**	**Grated?**
Log Storage								---	---	---	210,000	---	---	---	199,000	-11,000.0	NA
Existing Orphan Piles	10	12	7.85				-7.9										NA
Concrete Pier Landing												1	---	---	90.0	90.0	NA
Pier				7	18	12.36	12.4					1	49.5	12	594.0	594.0	Y
Gangway												1	88	11.3	994.4	994.4	Y
T-Barge				3	24	9.42	9.4					1	218	20	4,360.0	4,360.0	N
TOTALS				**10**		**21.8**	**13.9**				**210,000.0**				**205,038**	**-4,961.6**	

Calculated by engineer
100% grated
100% grated

Overwater/In-Water Summary

	IN-WATER Piling							On-water/Overwater Area								
	Existing						Net	Existing				Proposed				Net	
Component	**#**	**Dia "**	**SF**	**#**	**Dia "**	**SF**	**Area**	**#**	**L (ft)**	**W (ft)**	**Area**	**#**	**L (ft)**	**W (ft)**	**Area**	**Area**	**Grated?**
Log Storage						0		---	---	---	210,000	---	---	---	199,000	-11,000.0	NA
Existing Orphan Piles	10	12	7.85			0	-7.9										NA
Concrete Pier Landing												0				0.0	NA
Pier				3	18	5.30	5.3					1	25	12	300.0	300.0	Y
Gangway												1	88	11.3	994.4	994.4	Y
T-Barge				3	24	9.42	9.4					1	218	20	4,360.0	4,360.0	N
TOTALS				**6**		**14.7**	**6.9**				**210,000.0**				**204,654**	**-5,345.6**	

100% grated
100% grated

APPENDIX B

Bubble Curtain Details

Port of Kalama
T-Barge Dock – Bubble Curtain Details for Impact-Hammer Pile Driving

A bubble curtain will be used during impact-hammer pile driving to attenuate sound through the water column caused by driving operations. The bubble curtain will consist of a system of manifolds, hoses, and perforated pipe connected to an air compressor to provide compressed air into the system. The perforated pipe and manifolds will be appropriately dimensioned and supported as needed to provide bubbles around the circumference of the pile.

Typically, the bubble curtain consists of a circular ring of perforated pipe (approximately 2 to 3 inches in diameter, schedule 40) that is 1½ to 2 times the diameter of the pile being driven. The holes in the ring will be sized to allow a consistent bubble cover. Holes are roughly 1/8 to 1/4 inch in diameter, spaced every ½ to 1 inch along the perimeter of the ring. Ring spacers in will hold the bubble curtain in place, centered around the pile. The air compressor will be sized as necessary to provide sufficient air volume. A compressor with 185 cubic feet per minute typically provides sufficient air volume for a single ring.

APPENDIX C

NMFS Underwater Noise Calculator Forms

Model last updated January 26, 2009

Project Title	
Pile information (size, type, number, pile strikes, etc.)	18" inch, no attenuation - no data exist. Used 20-inch dia

Fill in green cells: estimated sound levels and distances at which they were measured, estimated number of pile strikes per day, and transmision loss constant.

	Acoustic Metric			
	Peak	SEL	RMS	Effective Quiet
Measured single strike level (dB)	**204**	**178**	**161**	**150**
Distance (m)	**10**	**10**	**10**	

Estimated number of strikes	**1000**

Cumulative SEL at measured distance
208

	Distance (m) to threshold			
	Onset of Physical Injury			Behavior
	Peak	Cumulative SEL dB**		RMS
	dB	Fish ≥ 2 g	Fish < 2 g	dB
Transmission loss constant (15 if unknown)	206	187	183	150
15	**7**	**251**	**464**	**54**

** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)

Notes (source for estimates, etc.)
(This model was last updated January 26, 2009)

Model last updated January 26, 2009

Project Title	
Pile information (size, type, number, pile strikes, etc.)	18" inch, 5 dB reduction - no data exist for 18". Used 20-i

Fill in green cells: estimated sound levels and distances at which they were measured, estimated number of pile strikes per day, and transmision loss constant.

	Acoustic Metric			
	Peak	SEL	RMS	Effective Quiet
Measured single strike level (dB)	**199**	**173**	**156**	**150**
Distance (m)	**10**	**10**	**10**	

Estimated number of strikes	**1000**

Cumulative SEL at measured distance
203

	Distance (m) to threshold			
	Onset of Physical Injury			Behavior
	Peak	Cumulative SEL dB**		RMS
	dB	Fish ≥ 2 g	Fish < 2 g	dB
Transmission loss constant (15 if unknown)	206	187	183	150
15	**3**	**117**	**215**	**25**

** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)

Notes (source for estimates, etc.)
(This model was last updated January 26, 2009)

APPENDIX D

Habitat Equivalency Analysis

PORT OF KALAMA – T-BARGE DOCK
Habitat Equivalency Analysis Summary

Ecological Land Services, Inc. (ELS) has quantified the proposed impacts and beneficial portions of the project using the Habitat Equivalency Analysis (HEA) to obtain the number of discounted service acre years (DSAYs) created by the project using spreadsheets provided by NMFS. Habitat values were assigned using examples from previous HEA analyses done for projects in the Willamette River and the Columbia River. HEA input values and results are attached to this narrative, and the attached figure shows the proposed structures and habitat areas described below. Specific habitat values used for this project are from HEA analyses in the Willamette River and in the Columbia River that have been previously accepted by NMFS.

Deep Water *- greater than 20 feet deep*
Deep water habitat at the site consists primarily of fine-grained sand and silts. The riverbed has a shallow slope of less than 5:1 and there are currently two 24-inch steel piles with a log boom attached as part of the southern boundary of a log storage area used by the mill north of the site.

Proposed changes to deep water habitat in this area include relocating one steel pile and the associated log boom to the north and reducing the log storage area in deep water by 3,311 square feet. This portion of the deep water habitat currently has a habitat value of 0.05 due to shading impacts from floating logs, as well as shading and benthic impacts from the pile. After the project is constructed, this area will have a habitat value of 0.1, resulting in +0.178 DSAYs.

Approximately 695 square feet of the T-barge will be in deep water habitat. This area currently has a habitat value of 0.1 and will have a habitat value of 0.05 after the project is constructed, resulting in -0.034 DSAYs. Deep water habitat will have a net gain of +0.144 DSAYs if this project is constructed.

Shallow Water *- between 20 feet deep and MLLW*
Shallow water habitat at the development site consists primarily of fine-grained sand and silts with shallow slopes of less than 5:1. There are currently two 24-inch steel piles with a log boom attached as part of the southern boundary of a log storage area used by the mill north of the site.

Proposed changes to shallow water habitat in this area include relocating the two steel piles the associated log boom to the north and reducing the log storage area in shallow water by 6,604 square feet. This portion of the shallow water habitat currently has a habitat value of 0.1 due to shading impacts from floating logs, as well as shading and benthic impacts from the piles. One orphan pile will be removed from this area; however, the habitat gain is less than 0.000 DSAYs. After the project is constructed, this area will have a habitat value of 1, resulting in +5.740 DSAYs.

Approximately 3,665 square feet of the T-barge will be in shallow water habitat. This area currently has a habitat value of 0.5 and will have a habitat value of 0.1 after the project is constructed, resulting in -0.034 DSAYs. Shallow water habitat will have a net gain of +4.324 DSAYs if this project is constructed.

Active Channel Margin *- between MLLW and OHM*

The Active Channel Margin (ACM) habitat that will change as a result of this project is the 614 square feet beneath the gangway and 566 square feet beneath the ramp. It consists of a steep, riprapped slope along the riverbank with little vegetation. This portion of the shallow water habitat currently has a habitat value of 0.01. After the project is constructed, this area will have a habitat value of 0.025 due to the proposed structures and shading, resulting in -0.085 DSAYs. Nine orphan piles (about 8 square feet of benthic habitat) will be removed from this area; however, the habitat gain is less than 0.000 DSAYs. ACM habitat will have a net loss of -0.085 DSAYs if this project is constructed.

Above OHW

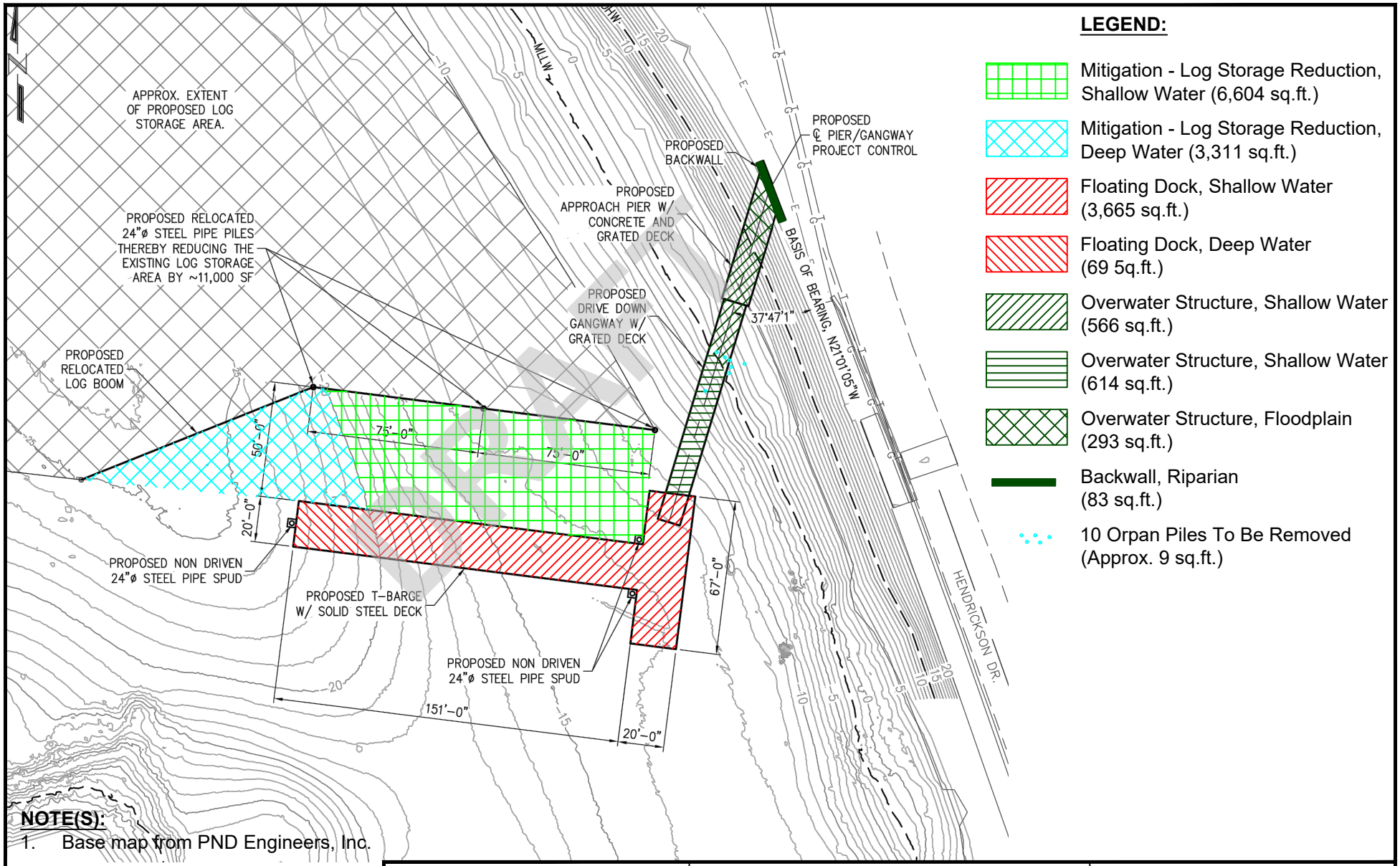
The portion of the project above OHW consists of a steep, riprapped slope along the riverbank with little vegetation, and the upland has an impervious surface of gravel with no vegetation in the riparian buffer. The pier and its backwall will be constructed in this area, covering a total of 376 square feet. Because this habitat is currently not functioning as floodplain or riparian habitat, minor shading from the pier and constructing a backwall will not degrade habitat function. Therefore, construction in this habitat type does not generate any DSAYs.

HEA SUMMARY

After the project is constructed, deep water habitat changes result in a net gain of +0.144 DSAYs, shallow water habitat will have a net gain of +4.324 DSAYs, ACM habitat will have a net loss of -0.085 DSAYs, and there will not be a significant habitat change above OHW that generates more than 0.000 DSAYs.

Overall, the project has a net impact of 0.13 acres and -1.535 DSAYs and a net benefit of 0.23 acres and +5.919 DSAYs for a net habitat gain of +4.384 DSAYs. Most of the habitat gains are in shallow water habitat from reducing the log storage area.

3/30/2018 4:30 PM S:\ELS\WA\Cowlitz\Kalama\2367-PND Engineers\2367.04-PoK Barge Dock\2367.04-Figures\2367.04_BA.dwg Jack



LEGEND:

- Mitigation - Log Storage Reduction, Shallow Water (6,604 sq.ft.)
- Mitigation - Log Storage Reduction, Deep Water (3,311 sq.ft.)
- Floating Dock, Shallow Water (3,665 sq.ft.)
- Floating Dock, Deep Water (69 5q.ft.)
- Overwater Structure, Shallow Water (566 sq.ft.)
- Overwater Structure, Shallow Water (614 sq.ft.)
- Overwater Structure, Floodplain (293 sq.ft.)
- Backwall, Riparian (83 sq.ft.)
- 10 Orpan Piles To Be Removed (Approx. 9 sq.ft.)

NOTE(S):

1. Base map from PND Engineers, Inc.

0 60 120

SCALE IN FEET

Ecological Land Services

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Moor small vessels to serve shipping industry
DATUM: NAD83
ADJACENT PROPERTY OWNERS:

See JARPA

HABITAT EQUIVALENCY ANALYSIS
APPLICANT: Port of Kalama
PROJECT NAME: Port of Kalama T-Barge Dock
REFERENCE #: Not Yet Assigned
SITE LOCATION ADDRESS:
1296 Third St. NW
Kalama, WA

PROPOSED: New Dock

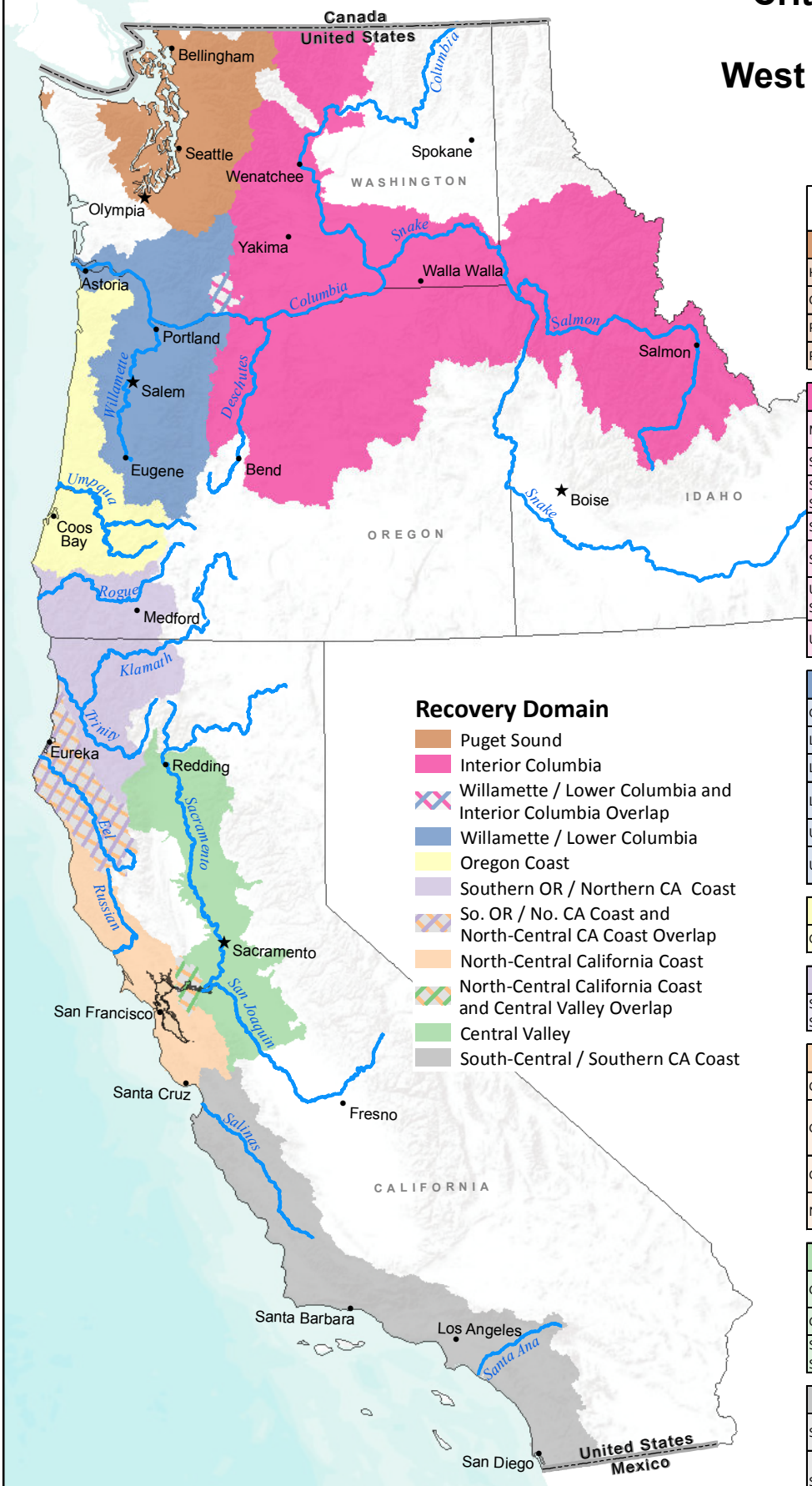
IN Columbia River - RM 74.3
NEAR: Kalama
COUNTY: Cowlitz **STATE:** WA
SHEET 1 **OF** 1
DATE: 3/30/18

APPENDIX E

Species Lists

National Marine Fisheries Service (NMFS) and
U.S. Fish and Wildlife Service (USFWS)

Status of ESA Listings & Critical Habitat Designations for West Coast Salmon & Steelhead



Updated July 2016

Evolutionarily Significant Unit / Distinct Population Segment	ESA Status	Date of ESA Listing	Date of CH Designation
Puget Sound Recovery Domain			
Hood Canal Summer-run Chum Salmon	T	3/25/1999	9/2/2005
Ozette Lake Sockeye Salmon	T	3/25/1999	9/2/2005
Puget Sound Chinook Salmon	T	3/24/1999	9/2/2005
Puget Sound Steelhead	T	5/11/2007	2/24/2016
Interior Columbia Recovery Domain			
Middle Columbia River Steelhead	T	3/25/1999 1/5/2006	9/2/2005
Snake River Fall-run Chinook Salmon	T	4/22/1992	12/28/1993
Snake River Spring / Summer-run Chinook Salmon	T	4/22/1992	10/25/1999
Snake River Sockeye Salmon	E	11/20/1991	12/28/1993
Snake River Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Upper Columbia River Spring-run Chinook Salmon	E	3/24/1999	9/2/2005
Upper Columbia River Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Willamette / Lower Columbia Recovery Domain			
Columbia River Chum Salmon	T	3/25/1999	9/2/2005
Lower Columbia River Chinook Salmon	T	3/24/1999	9/2/2005
Lower Columbia River Coho Salmon	T	6/28/2005	2/24/2016
Lower Columbia River Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Upper Willamette River Chinook Salmon	T	3/24/1999	9/2/2005
Upper Willamette River Steelhead	T	3/25/1999 1/5/2006	9/2/2005
Oregon Coast Recovery Domain			
Oregon Coast Coho Salmon	T	2/11/2008	2/11/2008
Southern Oregon / Northern California Coast Recovery Domain			
Southern OR / Northern CA Coasts Coho Salmon	T	5/6/1997	5/5/1999
North-Central California Coast Recovery Domain			
California Coastal Chinook Salmon	T	9/16/1999	9/2/2005
Central California Coast Coho Salmon	E	10/31/1996 (T) 6/28/2005 (E) 4/2/2012 (RE)	5/5/1999
Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Northern California Steelhead	T	6/7/2000 1/5/2006	9/2/2005
Central Valley Recovery Domain			
California Central Valley Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Central Valley Spring-run Chinook Salmon	T	9/16/1999	9/2/2005
Sacramento River Winter-run Chinook Salmon	E	11/5/1990 (T) 1/4/1994 (E)	6/16/1993
South-Central / Southern California Coast Recovery Domain			
South-Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Southern California Steelhead	E	8/18/1997 5/1/2002 (RE) 1/5/2006	9/2/2005

ESA = Endangered Species Act, CH = Critical Habitat, RE = Range Extension
E = Endangered, T = Threatened,

http://www.westcoast.fisheries.noaa.gov/protected_species/species_list/other_esa_listed_species_wc.html

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
Phone: (360) 753-9440 Fax: (360) 753-9405
http://www.fws.gov/wafwo/

In Reply Refer To: November 17, 2017
Consultation Code: 01EWFW00-2018-SLI-0254
Event Code: 01EWFW00-2018-E-00473
Project Name: Port of Kalama - T-Barge Dock

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated and proposed critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. The species list is currently compiled at the county level. Additional information is available from the Washington Department of Fish and Wildlife, Priority Habitats and Species website: http://wdfw.wa.gov/mapping/phs/ or at our office website: http://www.fws.gov/wafwo/species_new.html. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether or not the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). You may visit our website at http://www.fws.gov/pacific/eagle/for information on disturbance or take of the species and information on how to get a permit and what current guidelines and regulations are. Some projects affecting these species may require development of an eagle conservation plan: (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Also be aware that all marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas. The importation of marine mammals and marine mammal products into the U.S. is also prohibited. More information can be found on the MMPA website: http://www.nmfs.noaa.gov/pr/laws/mmpa/.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Related website:
National Marine Fisheries Service:
http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

Project Summary

Consultation Code: 01EWFW00-2018-SLI-0254

Event Code: 01EWFW00-2018-E-00473

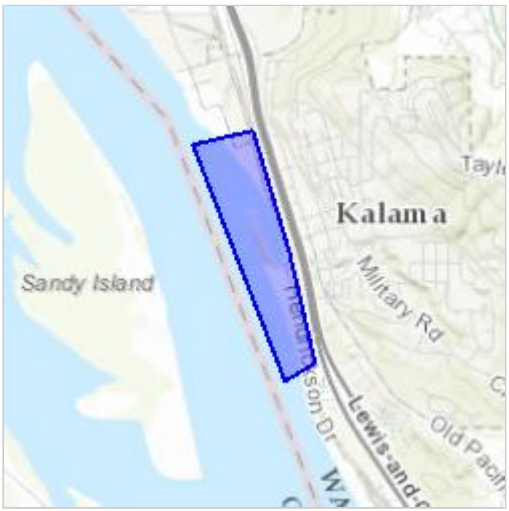
Project Name: Port of Kalama - T-Barge Dock

Project Type: ** OTHER **

Project Description: Install new float, ramp, and pier near the Port of Kalama Marina to serve shipping industry.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/46.00647071057818N122.84819734720482W



Counties: Cowlitz, WA

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Columbian White-tailed Deer *Odocoileus virginianus leucurus* Population: Columbia River DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/154	Threatened
North American Wolverine *Gulo gulo luscus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Birds

NAME	STATUS
Marbled Murrelet *Brachyramphus marmoratus* Population: U.S.A. (CA, OR, WA) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Streaked Horned Lark *Eremophila alpestris strigata* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout *Salvelinus confluentus*	Threatened

Population: U.S.A., conterminous, lower 48 states
There is **final** critical habitat for this species. Your location is outside the critical habitat.

Species profile: https://ecos.fws.gov/ecp/species/8212

Flowering Plants

NAME	STATUS
Golden Paintbrush *Castilleja levisecta*	Threatened

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/7706

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX F

Biology of Listed Species

SPECIES AND HABITAT INFORMATION

LISTED SPECIES UNDER NMFS JURISDICTION

Salmon and Steelhead ESUs (*Oncorhynchus* species)

Status

There are 13 salmon and steelhead ESUs listed as threatened or endangered in the Columbia River watershed. Critical habitat has been designated in the mainstem for all Chinook, chum, sockeye, and steelhead ESUs, because each fish run must migrate through the Columbia River mainstem. Critical habitat for coho is currently under review.

Life-History Types and Habitat Requirements

All life-history information in this section is from the USACE *Biological Assessment for Columbia River Channel Improvements Project* (channel deepening), December 28, 2001.

Individual fish from each population may be present within the action area as juveniles or adults, because they move through the action area as juveniles on their way to the ocean and again as adults during their return migration to spawn in their ESU or DPS. However, the amount of time spent in the lower Columbia River during different life stages and at different seasons varies greatly among populations. Because of differences in each of these salmonid types, different portions of the habitat are used, so changes to habitat may affect them differently.

Water depth, water velocity, and substrate type are basic physical characteristics determining habitat suitability for young and adult salmon. Water temperature, salinity, and turbidity are secondary physical factors that influence habitat suitability.

As adults, returning salmonids have much less restrictive habitat requirements than juveniles and tend to migrate in deeper water. This biological evaluation focuses on juvenile life stages, because they are more vulnerable to environmental disturbances. Habitat requirements for salmon and steelhead can be divided into two life-history strategies. The ocean-type rears in freshwater for only a few weeks to a few months before migrating to sea during their first year of life. Stream-type salmonids spend at least a year rearing in fresh water prior to their downstream migration. The table below shows life-history types and juvenile life stages of each listed ESU or DPS within the action area.

Table F-1. Life-History Types and Juvenile Life Stages of Listed ESUs and DPSs in the Action Area.

Common Name	Scientific Name	Life-History Type	Juvenile Life Stage in Action Area
Chinook	*Oncorhynchus tshawytscha*		
Lower Columbia River ESU		*Ocean*	*Subyearling*
Upper Columbia River Spring Run ESU		Stream	Yearling +
Snake River Spring/Summer Run ESU		Stream	Yearling +
Snake River Fall Run ESU		*Ocean*	*Subyearling*
Upper Willamette River ESU		*Ocean*	*Subyearling*
Chum	*Oncorhynchus keta*		
Columbia River ESU		*Ocean*	*Subyearling*
Coho	*Oncorhynchus kisutch*		
Lower Columbia River ESU		Stream	Yearling +
Sockeye	*Oncorhynchus nerka*		
Snake River ESU		Stream	Yearling +
Steelhead	*Oncorhynchus mykiss*		
Lower Columbia River DPS		Stream	Yearling +
Middle Columbia River DPS		Stream	Yearling +
Upper Columbia River DPS		Stream	Yearling +
Snake River Basin DPS		Stream	Yearling +
Upper Willamette River DPS		Stream	Yearling +

Ocean Type

Ocean-type salmon migrate downstream to the estuary as subyearlings, generally leaving the spawning area where they hatched within days to months following their emergence from the gravel. Ocean-type salmon ESUs in the Columbia River include some Chinook ESUs (Lower Columbia River, Snake River fall, and Upper Willamette River) and the Columbia River chum ESU.

The first outbound migrants of the lower Columbia River fall Chinook and chum may arrive in the lower Columbia River as early as late February. The majority of these fish are present from March through June. Outbound Snake River fall Chinook begin their migration much farther upstream and arrive in the lower Columbia River approximately one month later.

There is considerable variability in the freshwater-rearing period of ocean-type juveniles. Subyearlings from the mid-Columbia and Snake Rivers tend to be substantially larger than the Lower Columbia ESU by the time they reach the lower Columbia River. Larger subyearlings from the Snake River can likely use a greater range of depth and current conditions than the subyearlings of the lower Columbia River ESUs.

Once ocean-type subyearlings arrive in the lower Columbia River, they may remain for weeks to months. Because these fish arrive small in size, they undergo extended lower river and estuary rearing before they reach the transitional size necessary to migrate to the ocean. This larger size is necessary to deal with the physical conditions and predators they face in the ocean environment, as

well as to be successful in obtaining prey in that environment. Ocean-type yearlings require weeks to months in the lower Columbia River to reach this larger size.

Subyearlings are commonly found within a few meters of the shoreline at water depths of less than 1 meter. Although they migrate between areas over deeper water, they generally remain close to the water surface and near the shoreline during rearing, favoring water no more than 2 meters deep and areas where currents do not exceed 0.3 meters per second. They seek lower-energy areas where waves and currents do not require them to expend considerable energy to remain in position while they consume invertebrates that live on or near the substrate.

Stream Type

Stream-type salmon rear in freshwater, usually remaining in the stream where they hatched for a year or more before beginning their downstream migration to the ocean. Steelhead trout may rear in freshwater for several years before migrating to the ocean. Sockeye rear in lakes rather than in streams. Stream-type ESUs and DPSs include some Chinook salmon ESUs (upper Columbia spring run and Snake River spring/summer runs), sockeye, coho, and steelhead. Stream-type populations migrate to the ocean in their second year of life or later as relatively large smolts (generally 100 to 300 mm) and travel quickly through riverine reaches of the river within days to weeks.

Smolts undergo a physiological alteration in the spring that prepares them for migration and saltwater adaptation. Although fish of various populations may migrate at somewhat different times, smolts tend to migrate from early April through September. Migration timing varies with species and with distance between the ocean and the stream where they hatched.

The larger size of the yearling smolts allows them to occupy a wider range of habitats. Smolts are commonly found farther from shore with a deeper distribution than ocean-type migrants. They are not shoreline oriented, but they are typically found within the top 20 feet of the water column. Yearling smolts are also found in a wider range of current speeds and tend to avoid low-velocity areas except during brief periods when they hold position against river currents. These fish either remain in major channels where substantial current occurs or are actively swimming at a high rate. They also move between channels. Yearling salmon are not associated with specific substrate types, because they tend to be water-column oriented rather than shoreline oriented.

Adult Salmon and Steelhead

Adult salmon and steelhead returning to the Columbia River migrate through the river mouth throughout the year. The majority migrate in or near the action area from early spring through autumn, with the exception that winter steelhead peak migration is from April to June (NMFS 2011).

Table F-2. ESA-listed Fish Species in the Lower Columbia River by Life Stage

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Eulachon (Southern DPS)													
	Adult migr. & holding												
	Adult spawning												
	Egg incubation												
	Larvae emigration												
Green Sturgeon (Southern DPS)													
Juvenile Rearing (& Oversummering)													
Chinook Salmon													
Lower Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Upper Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Upper Willamette River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Snake River Spring/ Summer	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Snake River Fall	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Chum Salmon													
Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Coho Salmon													
Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Sockeye Salmon													
Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Steelhead													
Lower Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Middle Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Upper Columbia River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Upper Willamette River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												
Snake River	Adult migr. & holding												
	Juvenile rearing												
	Juvenile emigration												

= Present = Relatively Abundant = Peak Occurrence

Source: NMFS 2011.

North American Green Sturgeon *(Acipenser medirostris)*

Status

The Southern DPS of North American green sturgeon is federally listed as threatened (the Northern DPS is a species of concern). Critical habitat has been designated in the lower Columbia River below river kilometer 74 (RM 46, Federal Register 2009).

Life History

Sturgeon are large, primitive, bottom-dwelling fish with a skeleton consisting mostly of cartilage. Like all sturgeon, green sturgeon are anadromous and they are the most marine-oriented of the sturgeon species. They range from Mexico to the Bearing Sea and are commonly observed in bays and estuaries along the west coast of North America, with particularly large concentrations entering the Columbia River estuary, Willapa Bay, and Grays Harbor during late summer, peaking in August. Reasons for these concentrations are unclear, but to not appear to be related to spawning or feeding. Studies show green sturgeon caught in the Columbia River gillnet fishery have empty stomachs, while white sturgeon stomachs contain digested material. Green sturgeon in the Columbia River are typically immature; however, at least one ripe fish has been caught in the lower Columbia River (Federal Register 2008).

Little is known about green sturgeon feeding. Adults in the Sacramento River are reported to feed on benthic invertebrates, including shrimp, mollusks, amphipods, and even small fish. Green sturgeon spawn every 2 to 5 years. They spend most of their lives in nearshore marine or estuarine waters then migrate to freshwater beginning in late February. Spawning occurs from March to July. Confirmed spawning locations of the Southern DPS are in the Sacramento and Feather Rivers up to 200 miles from the ocean. Eggs are likely broadcast over large cobbles and settle into the cracks. Stream temperatures above 68° F are lethal to embryos in laboratory experiments. Juveniles spend 1 to 4 years in freshwater and little is known about their prey, but they are known to feed on shrimp and amphipods. Life spans range from 15 to 40 years old, with maximum ages likely to 60 or 70 years. They can reach 350 pounds (Federal Register 2008).

During the late summer and early fall, non-spawning adults and subadults aggregate in estuaries along the Pacific coast, presumably for thermal refugia and to forage. They historically occurred in the Columbia River from the mouth to the Cascade Rapids, but rarely travel beyond the influence of the saltwater intrusion layer that can extend 30 miles upstream during early fall. Green sturgeon have been known to occur upriver from the salt-water intrusion layer as far as Bonneville Dam (Federal Register 2008).

Habitat

The principal threat to the Southern DPS is the reduction in spawning habitat due to the construction of stream barriers along the Sacramento and Feather Rivers. Other threats are sufficient flow rates, increase water temperatures, water diversion, non-native species, poaching, pesticide and heavy-metal contamination, and local fishing (NMFS 2007).

Eulachon (*Thaleichthys pacificus*) – Southern DPS

Status

The Southern DPS of eulachon (also called Columbia River smelt, candlefish, or hooligan) were proposed for listing as a threatened species under the ESA on March 13, 2009 (Federal Register 2009). The Southern DPS is defined as south of, but not including, the Nass River, near Prince Rupert in Canada.

Life History

Eulachon are endemic to the northeastern Pacific Ocean, ranging from northern California to the southwest and south-central Alaska and to the southeastern Bering Sea. South of the United States/Canada border, most eulachon production occurs within the Columbia River just upstream from the estuary (River Mile [RM] 25) to immediately downstream of Bonneville Dam at RM 146 and in some tributaries. Adults average from 180 to 200 millimeters (5.1 inches) and 40 to 58 grams at age 2, to 220-225 millimeters (5.7 inches) and 80 to 90 grams at age 5. Periodic spawning also occurs in the Grays, Skamokawa, Elochoman, Kalama, Lewis, and Sandy rivers (Columbia River tributaries). Other river basins below the Canadian border with documented spawning runs include the Klamath River in northern California and infrequently in some, but not all, coastal rivers.

Eulachon typically spend 3 to 5 years in saltwater before returning to spawn in freshwater from December through March in the Columbia River watershed and are influenced by water temperatures and the occurrence of high tides. Spawning grounds are typically in the lower reaches of larger rivers fed by snowmelt, and spawning usually occurs at night. Males typically outnumber females 2:1 or more. In the Columbia River and tributaries, spawning occurs over sand, coarse gravel, or detrital substrates. Eggs are fertilized in the water column, sink, and adhere to the river bottom. Most adults die after spawning.

Eulachon eggs hatch in 20 to 40 days, depending on water temperature. Shortly after hatching, larvae are carried downstream and disperse by estuarine and ocean currents. Juvenile eulachon are thought to imprint on the chemical signature of their natal river basin, although returning eulachon stray from their spawning sites more than salmon.

After leaving estuarine rearing areas, juvenile eulachon move from shallow nearshore areas to deeper areas over the continental shelf where larvae and young juveniles become widely distributed in coastal waters. There is currently little information about their movements in nearshore areas and the open ocean.

Eulachon feed on zooplankton, primarily crustaceans. Larvae and post-larvae eat phytoplankton, copepods and their eggs, mysids, barnacle larvae, worm larvae, and eulachon larvae. Adults and juveniles commonly forage at moderate depths (15 to 182 meters) in inshore waters.

Eulachon are very high in lipids. Due to their availability during spawning runs, they are an important part of the Pacific coastal food web and therefore have numerous avian and marine-mammal predators. During spawning runs, bears and wolves feed on eulachon. Fish predators include white sturgeon, spiny dogfish, sablefish, salmon sharks, arrowtooth flounder, salmon, Dolly Varden, Pacific halibut, and Pacific cod. Eulachon seem to provide a significant food source for white sturgeon in the Columbia and Fraser rivers.

WDFW does not list management recommendations for this species. The federal recovery plan for this species has not yet been written, so there are no federal management recommendations. The final recovery plan (NMFS 2017c) lists many management recommendations. The following priority actions that have habitat components are listed in the plan as follows:

- Continue to work with the U.S. Army Corps of Engineers to develop and implement actions to reduce impacts from dredging, e.g., entrainment, on eulachon.
- Continue to work with the states of California, Oregon, and Washington to implement programs that improve water quality for temperature.
- Continue to work with Federal agencies and the states of California, Oregon, and Washington to implement programs, e.g., revetment breaching and removal, to reduce the impacts of shoreline construction on eulachon and their habitats.

LISTED SPECIES UNDER USFWS JURISDICTION

Bull Trout (*Salvelinus confluentus*)

Status

The USFWS lists the Columbia River Distinct Population Segment (DPS) of bull trout as federally threatened. The nearest critical habitat has been designated in the lower Lewis River (Federal Register 2010).

Habitat Requirements

Bull trout are members of the char subgroup of the salmon family, which also includes Dolly Varden, lake trout, and Arctic char. Bull trout and Dolly Varden look similar, and were once considered to be the same species. Bull trout are native throughout the Pacific Northwest and historically ranged from 41° to 60° north latitude (Rodrick and Milner 1991). They now exist primarily in upper tributary streams and several lake and reservoir systems (Federal Register 1999) and may exist in isolated populations above stream barriers.

Bull trout reach sexual maturity between 4 and 7 years of age and are known to live as long as 12 years. They spawn in the fall after temperatures drop below 8°C (48° F), in streams with cold, unpolluted water, clean gravel and cobble substrate, and gentle stream slopes. Some bull trout fry migrate from their natal streams to lakes and reservoirs. Because lakes and reservoirs provide poor spawning habitat for the species, migratory bull trout may swim long distances to spawn (Federal Register 1999).

Bull trout are adversely affected by high stream temperatures, lack of degraded spawning and rearing habitat, and lack of preferred food (Rodrick and Milner 1991). Small bull trout eat terrestrial and aquatic insects although they also consume insects, amphibians, crayfish, and other available food, but shift to preying on other fish as they mature. Large bull trout are primarily fish predators, eating whitefish, sculpins, and other salmonids (USACE 2001). They are more sensitive to increased water temperatures, poor water quality, and degraded stream habitat than many other salmonids. In addition, brook trout have been introduced as sport fish throughout much of the bull trout's range and the two species often hybridize, producing sterile offspring. Dams and irrigation canals also are hazards to bull trout because they can trap fish, alter water temperatures, and block migration routes (Federal Register 1999).

APPENDIX G

Essential Fish Habitat Assessment

ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act includes a mandate that NMFS must identify Essential Fish Habitat (EFH) for federally managed marine fish and federal agencies must consult with the NMFS on all activities, or proposed activities, authorized, funded, or undertaken by the agency that may adversely affect EFH. The Pacific Fisheries Management Council (PFMC) has designated EFH for the federally-managed Pacific Salmon Fishery, and the federally-managed groundfish and coastal pelagic fisheries (PFMC 1999, PFMC 1998a, PFMC 1998b).

A description of project activities is described in the section entitled *Project Description*. The action area contains EFH habitat for Chinook and coho salmon, but is not influenced by salt-water instruction, so groundfish EFH and coastal pelagic EFH do not occur in the action area.

Project Effects

This is a summary of the primary project effects to each species; for a full discussion of potential impacts, see the section entitled *Effects of the Action*, which take into consideration avoidance and minimization measures listed in the section entitled *Impact Avoidance and Minimization Measures*. Primary project impacts to Pacific Salmon EFH include the following considerations:

- The action area supports migration habitat for juveniles and adults and rearing habitat for juveniles.
- Impact-minimization measures will be followed to avoid and reduce noise impacts.
- Underwater noise above the injury level from impact-hammer pile driving will be intermittent over 2 days within a few hundred feet of the pile.
- Reducing the log storage area by 11,000 square feet is larger than the on-water area of the T-barge and overwater structures.
- Reduced river and truck traffic reduces water-quality impacts from boats, and reduces the carbon footprint of the project.

Conclusions

Because the pile-driving noise will only exceed injury levels within a relatively small radius in a large river for two hours over two days, and there will be a net benefit to shallow and deep water habitats from overall reduced on-water shading, the project **will not adversely affect** essential fish habitat.