Biological Evaluation
for
Port of Kalama
Marina Renovation
Kalama, Washington

ESA and MSA Consultation

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

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INTRODUCTION

CONSULTATION HISTORY

This is a new project that has not undergone previous Endangered Species Act (ESA) or Essential Fish Habitat (EFH) consultation.

DESCRIPTION OF PROPOSED ACTION

PROPONENT, FEDERAL NEXUS, AND LOCATION

The Port of Kalama proposes to renovate the existing marina on the east bank of the Columbia River at approximately river mile (RM) 75.2. A federal nexus is created by applying to the U.S. Army Corps of Engineers' (USACE or Corps) Portland District for a Section 10 permit for installing and removing piling and floating structures in waters of the United States.

The project is located at 110 West Marine Drive in Kalama, Washington, Cowlitz County and is in Section 7 of Township 6N 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.

PURPOSE AND NEED

The proposed project is necessary to address matters of maintenance, improving habitat functions, public facility use, and overall aesthetics. The marina was constructed in the 1970s and requires normal repair, maintenance, and improvements. This project will replace the marginal float, transient moorage float, boat ramp float, fuel dock, and access floats. Repairs will be made to the existing floating moorage houses, and a new visitors' dock along the east edge of the marina basin will be constructed.

A condition assessment was performed in June of 2015 by PND Engineers, Inc. that identified potential safety concerns, non-compliance with current ADA standards, worn or rotted members, and it outlined an overall maintenance plan.

Maintenance: The existing floating docks (with the exception of the mooring houses) have exceeded their typical useful design life, with extensive portions of timber walers showing severe decay and deterioration. Surface cracks and spalling on the concrete deck surfaces are exhibiting signs of corrosion on the reinforcing steel within the float units. The covered mooring houses have held up longer, due to the protection afforded the roof structures, and can be maintained with current efforts. However, the uncovered portions are significantly deteriorated, requiring replacement.

The electrical service provided to the floats is no longer code-compliant, posing a safety hazard as well as providing inadequate service for the current users. The water system and other utilities are a consistent maintenance issue, and a fire line will be added to the main marginal floats.

Habitat Function: Replacing the solid concrete floats with grated deck surfaces will improve aquatic habitat by reducing shaded areas that may be used by predatory fish to ambush juvenile salmon. Replacing the concrete deck and fuel float access gangway with a new grated gangway will also reduce shading. Nine of the existing anchor piles are creosote treated timber piles, which will be removed and replaced with new steel pipe piles.

The new visitors' float and gangway will have grated deck surfaces, which will improve aquatic habitat by reducing shaded areas.

Use and Aesthetics: The proposed improvements are necessary to make the marina and upland areas more user-friendly and inviting by providing additional visitors' moorage space for short-term users, improved access to the floats, ADA compliance, and a more pleasant atmosphere.

PROJECT SETTING

The proposed project is located within the Port Management Area, which extends along the east bank of the Columbia River from RM 72 to RM 77 and is located west of Interstate 5. The project is at RM 75.2. The Washington Department of Natural Resources (WDNR) owns the aquatic land in the marina, and the Port has a maintenance agreement with WDNR.

The project site is on the Columbia River in the central portion of the Port of Kalama. East of the project site are a port access road, railroad tracks, Interstate 5, and the City of Kalama. The port office, the city sewer treatment facility, and a park are south of the site and a log yard and mill are to the north. A parking area for boat trailers and the former port office are between the marina and the river. The banks of the marina are about a 1:1 slope with small riprap and little vegetation.

The marina banks are at about a 1:1 slope and are riprapped; there is only very sparse weedy herbaceous vegetation. The marina substrate primarily consists of fine sediments and is maintained at approximately -10 feet Columbia River Datum (CRD). 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 project area is located outside of the influence of salt water from the ocean, but it is influenced by tides.

CURRENT MARINA USE

The facility is open to the public. Uplands include sidewalks, parking, boat ramp access, gangways and marina access. Overwater facilities include covered and open floating boat moorage, boat launch ramp and floats, fuel dispensing and sewer pump-out facilities. Utility services provided on the floats include electrical, lighting, potable water, etc.

The marina is used for year round vessel moorage for permanent tenants as well as short term visitors' moorage. The boat ramp, courtesy floats and associated parking and upland amenities are used heavily for launching trailered vessels. The fuel float provides fueling service for vessels. A sewer pump-out facility is located within the harbor for vessel operator's use.

CURRENT MARINA STRUCTURES

The site contains covered (roofed) and open marina floats for long-term and short-term (visitor) vessel moorage. The floats are constructed of modular concrete float units held together with timber walers and steel thru-rods. The floats move vertically with the river water level and are anchored horizontally by an assortment of creosote timber and steel pipe piles that are attached using external pile hoops on the edge of the floats.

The existing marginal and transient floats are 6 feet wide and form a continuous, solid, floating, concrete sidewalk. The marginal float runs along the west edge of the marina basin, providing access to all of the marina moorage floats. Two solid deck gangways provide access from the upland to the marginal float, which is currently solid. The proposed decking for the marginal float will include grating to increase light penetration into the water. All utility services to the marina vessel slips are carried within and/or attached to the marginal float. Security gates control access to the long-term/permanent moorage slips within the marina. The existing transient float is open for visiting vessels and also has solid decking. No utilities are currently provided on the transient float.

An existing gangway at the south end of the marina provides access to the transient float and, through security-gated access, the rest of the marina floats. This gangway is only approximately 30 feet long and access to the top of the gangway is via a set of concrete stairs. Neither of these conditions meets ADA access requirements. The existing gangway is a steel thru-truss with solid decking.

The existing boat ramp float and fuel access floats are constructed of modular concrete float units held together with steel-pipe hinge connections. These floats ground out along the boat launching ramp surface at lower water levels and lift off the ramp at high water. They are attached to the upland by a concrete abutment located at the top of the boat ramp. Steel pipe piles anchor the floats horizontally and allow the floats to move vertically through all river water levels.

An existing gangway provides access from an upland fixed pier, down to the fuel dock access floats. This gangway is a steel thru-truss with solid concrete deck.

The existing fuel dock is constructed of modular concrete float units held together with timber walers and steel thru-rods. The float is anchored with external pile hoops and steel pipe piles to allow movement through all water levels. The fuel float has a diesel and unleaded fuel dispenser mounted to the float with fuel supply lines beneath the solid deck gangway. Electrical service provides power to the fuel float.

The condition of the facility is typical for structures of this age in the Columbia River. A condition assessment was performed in June 2015 by PND Engineers, which included repair recommendations for the floating marina houses and utilities.

PROPOSED PROJECT

The marina was constructed in the 1970s and requires normal repair and maintenance. The Port's marina renovation project consists of elements that are confined largely to repair and

maintenance of the Port's marine structures, proposed new construction, and expanding existing structures. This project will replace the marginal float, transient moorage float, boat ramp float, fuel dock, and access floats; repairs will be made to the existing floating moorage houses; and a new visitors' dock along the east edge of the marina basin will be constructed. Work associated with each of these features is described in detail below.

Replace the marginal float, transient moorage float, boat ramp float, fuel dock, and access floats. Details are as follows:

- Replace existing modular concrete floats with new aluminum frame floats with grated deck surface. These include the marginal floats, transient moorage floats, boat ramp floats and fuel dock access floats.
- Replace fuel dock float with a new monolithic concrete float unit.
- Install upgraded utilities along the marginal float and provide improved electrical, lighting, potable water, and fire suppression systems to the marginal and transient floats.
- Upgrade electrical service to 30 ampere and 50 ampere power pedestals and dock lighting.
- Install new potable water service and pedestals with freeze protection.
- Install new fire suppression system consisting of dry fire line with upland fire department connections and standpipes along the floats for fire department use.
- Reinstall sewer pump-out equipment on widened section of marginal float.
- Re-establish fuel dispenser and service lines to new fuel float.
- Re-use existing steel-pipe anchor piles.
- Remove creosote timber piles and replace with new steel piles. Some of the steel pipe piles will be reused in-place, while others will need to be extracted and reinstalled at new locations.
- Replace existing steel gangway on the marginal float located at the south end of marina with a new ADA compliant, aluminum thru-truss gangway with grated deck and new upland concrete abutment.
- Replace concrete abutments for boat ramp float and fuel dock access float in-kind.
- Replace existing fuel dock access gangway with new aluminum thru-truss gangway with grated deck.

Repair the existing floating moorage houses. Details are as follows:

- Repair existing float structures, including replacing damaged or deteriorated walers and thru-rods, repair or replace pile hoops, repair damaged concrete surfaces, and other miscellaneous repairs.
- Repair timber roof structure framing as needed.
- Upgrade electrical service to 30 ampere and 50 ampere power pedestals and dock lighting.
- Install new potable water service and pedestals with freeze protection.
- Install new fire suppression system consisting of dry fire line with upland fire department connections and standpipes along the floats for fire department use.

Add a new visitors' dock along the east edge of the marina basin. Details are as follows:

- Install new aluminum-frame floats with grated deck surface for a continuous length of side-tie moorage for short-term visitors' vessels.
- Install new steel pipe piles to anchor the floats horizontally, while allowing vertical movement of the floats through all water levels.
- Install new ADA-compliant aluminum thru-truss gangway with fully grated deck and new upland concrete abutment.
- Install new 30 and 50 ampere electrical service power pedestals and dock lighting.
- Install new potable water service and pedestals with freeze protection.
- Install new fire suppression system consisting of dry fire line with upland fire department connections and standpipes along the floats for fire department use.

The following table summarizes existing structures to be removed and replaced.

Table 1. Existing Structures to be Removed or Replaced

	Area below or over OHW (sf)	**Deck Surface Type**	**Piles below OHW** (timber creosoted)
Marginal and Transient Floats	7,400	Solid	8 timber, 6 steel
Gangway	100	Solid	---
Boat Ramp Float	960	Solid	4 steel
Fuel Access Floats	1,090	Solid	6 steel
Fuel Dock Gangway	150	Solid	---
Fuel Dock Float	400	Solid	1 timber, 3 steel
Total	**10,100**		**9 timber, 19 steel**

*Overwater area only – does not include areas overlapping with landing float.

The following table summarizes the proposed structures.

Table 2. Proposed Structures.

	Area Below OHW[1] (sf)	Solid Deck Surfaces (sf)	Grated Deck Surfaces[2] (sf)	Total Piles to be Driven below OHW[3]
Aluminum Floats (marginal floats, transient moorage floats, boat ramp floats, fuel-dock access floats, and visitors' dock floats)	13,900	0	13,900	31
Concrete Floats (fuel dock)	500	500	0	3
Aluminum Gangways	1,050*	0	1,050*	0
Concrete Abutments	0	180	0	2
Totals	**15,450**	**680**	**14,950**	**36**

All new piles will be 12.75 inches in diameter.
1 = Overwater area only – does not include areas overlapping with landing float or land.
2 = 50 percent of the deck will be grated. Grating allows at least 50% light penetration.

Construction Sequencing

Work is proposed to begin in late 2017. Repairing the existing slips and constructing the visitors' dock will begin as funding becomes available; it is anticipated to be completed by 2018. Pile driving will be performed using the vibratory method. Underwater noise from vibratory pile driving has not been proven to cause injury to aquatic organisms, and the noise will be mostly contained within the marina. Therefore, all proposed work could take place any time of the year after permits are received.

Pile Driving and Removal

Nine creosote-treated timber piles that are below OHW will be replaced with nine hollow steel piles, and five steel piles will be re-used. A total of 36 piles will be installed below OHW for this project. There will be a net increase of 26 piles proposed for this project (23.1 square feet of additional benthic area coverage).

A barge-mounted crane will be used to remove and install steel piles with a vibratory hammer. The barge-mounted crane will also be used to install the prefabricated floats and gangways. A storage barge and small tender boat will likely be used to support the crane barge during construction.

The total time estimated to remove and install piles for dock replacement is four weeks, and the visitors' dock will take one week. It will take approximately 30 minutes to install each pile.

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, material storage, and disposal areas, as well as the presence of work vessels used in construction and delivery. Materials will be stored onsite either on the work barge or in adjacent upland parking area.

Interrelated Activities
Interrelated activities are a part of the larger action and depend on the larger action for their justification, although they could be done as a separate project. For this project, structures removed or installed above the OHW (abutments and gangways) and roof repairs to covered structures, utility upgrades, and additional lighting and moored boats at the new visitors' dock are interrelated activities.

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. Several design features are proposed in order to avoid and minimize adverse impacts to the aquatic environment as listed below:

1. Gangways will be constructed of grated material to allow for light penetration into the water.
2. New floats will feature partially grated ADA-compliant grated decking to allow for light penetration to the water.
3. New floats will be located at elevations sufficient to eliminate float and vessel grounding after dredging is completed.
4. The new fuel dock will have a monolithic concrete deck surface, and pumps will be equipped with spill-detection monitors with an automatic cut-off switch to help protect the water from inadvertent fuel spills.

In addition to the measures described above, in order to further avoid and minimize adverse impacts to the aquatic environment, typical construction BMPs for working over, in, and near water will be applied, including the following measures:

<u>Construction Avoidance and Minimization Measures:</u>

1. New floats will be primarily be manufactured offsite, delivered, splashed, floated, and assembled final in place.
2. All manmade construction debris will be collected and not allowed to enter waters of the state/US.
3. Methods for containing debris during overwater demolition work may include use of tarps or shrouds. Other methods may be identified by the City, Engineer, or contractor.
4. Land-based equipment will not be operated on the substrate below the waterline.
5. Project construction will be completed in compliance with Washington State Water Quality Standards WAC 173-201A.
6. Contractor will use vegetable-oil based hydraulic fluid for equipment working over or in the water.

7. Contractor will check equipment for leaks and other problems that could result in discharge of petroleum-based products, hydraulic fluid, or other material to the waterway.
8. Contractors conducting in-water and overwater work, including demolition, will be familiar with BMP implementation and permit conditions typical of working in the aquatic environment.
9. The contractor will have a spill containment kit, including oil-absorbent materials, onsite to be used in the event of a spill or if any oil product is observed in the water.
10. Piles will be removed using vibratory extraction to greatest extent possible. Piles which cannot be extracted will be cut below the mudline.
11. Piles will be removed slowly so as to minimize sediment disturbance and turbidity in the water column.
12. Where possible, extraction equipment will be kept out of the water to avoid "pinching" the pile below the waterline to minimize creosote release during extraction.
13. New pile will be installed using a vibratory hammer only. Proofing with an impact hammer will not be necessary.

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.

POTENTIAL EFFECTS OF THE PROJECT ON THE ENVIRONMENT

NOISE ASSESSMENT

Background information involving noise-impact assessments is explained fully in the *WSDOT Biological Assessment Preparation, Advanced Training Manual, Version 02-2015* (WSDOT 2015).

In-Air Noise

Background noise data are not available for the project site. This project occurs adjacent to the busiest railway and interstate highway on the west coast and a navigational channel in the river with relatively heavy shipping traffic. This area of the river is also a busy recreational boating and fishing area. Therefore, construction noise and long-term operational noise are estimated to be within the range of background noise for this area.

Underwater Noise

Regulatory agencies have not cited any studies to indicate that vibratory pile driving causes fish mortality; therefore, pile driving can be performed outside of an in-water work window during any time of the year. There are no underwater noise data for this site for background noise or pile-driving noise, 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) and the WSDOT BA manual mentioned above. The Practical Spreading Loss model was used to calculate the distance that pile driving noise will attenuate to

estimated background levels. Background levels are estimated at 140 dB_{RMS} in rivers that have wave action at the surface, which is common in the Columbia River.

Vibratory Pile Driving
Vibratory pile driving will be used to drive all piles. The Caltrans guidance document does not provide an underwater noise estimate for vibratory pile driving 12.75-inch hollow steel piles; however, it 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). There is no estimate for impact-hammer driving 12.75-inch hollow steel piles, but the document states noise from driving 12-inch hollow steel piles is 183 dB_{RMS} at 10 meters (CalTrans 2015) and driving 14-inch hollow steel piles is 182 dB_{RMS} (at 22 meters, WSDOT 2015).

As a conservative estimate, 10 dB was subtracted from the noise value stated for driving 12-inch hollow steel piles with an impact hammer, resulting in a predicted 173 dB_{RMS} at 10 meters. No noise attenuation will be used for vibratory pile driving. Using the Practical Spreading Loss model, the farthest distance that vibratory pile driving noise will attenuate to fish behavioral-change levels is 10 meters * $10^{((173-150)/15)}$ = 341 meters = 1,120 feet. The area affected is estimated to be 31.2 acres.

DIRECT EFFECTS
Direct effects are those effects that take place at or near the time of construction. The following direct effects to the environment may occur:

Terrestrial
- None. There is no native terrestrial habitat in or near the marina that will be disturbed as part of this project. In-air noise is estimated to be at or below background noise.

Aquatic
- Intermittent, underwater noise and turbidity from removing 10 piles is estimated to remain within the marina for about 8 hours.
- Intermittent, underwater noise above the fish behavioral level due to vibratory pile driving 36 piles is estimated to extend as far as 1,120 feet from each pile (31.2 acres) for a period lasting about 5 weeks.

INDIRECT EFFECTS
Indirect effects are defined as those negative effects that are caused by the project, but occur after project completion. The following table compares the overwater areas below OHW before and after project completion.

Table 3. Overwater Coverage Comparison (below OHW)

	Existing (sf)		**Proposed** (sf)		**Net Difference** (sf)	
	Solid	Grated	Solid	Grated	Solid	Grated
Replacement Floats	8,525	0	500	10,400	-8,025	+ 10,400
Replacement Gangways	210	0	0	415*	-210	+415
Visitors' Dock Floats	0	0	0	3,680	0	+3,680
Visitors' Dock Gangway	0	0	0	230*	0	+230
Subtotal	*8,735*	*0*	*500*	*14,725*	***-8,235***	*+14,725*
Totals	8,735 sf		15,225 sf		**+6,490 sf**	

*Overwater area only – does not include area overlapping with landing float or land.

The project results in 6,450 square feet of new on-water and overwater structures, and most surfaces will be either fully or partially grated. The overall project offers significant ecological improvements. It increases light penetration by reducing solid floats and gangways, and will have a total of 8,235 square feet of grated surface where solid surfaces previously existed (existing 8,735 square feet minus the proposed 500 square feet of the fuel dock). Most of the new overwater coverage results from the new visitors' float and gangway, which are necessary to accommodate heavy short-term/transient moorage needs. Nine creosote-treated timber piles will be replaced with nine new steel-pipe piles. The project improves recreational access along the shoreline of the state with ADA access and the additional visitors' float.

Terrestrial

- None. There is no native terrestrial habitat in or near the marina that will be disturbed as part of this project.

Aquatic

- Shading effects from an additional 3,680 square feet of grated floats within the marina (the fully grated gangway is over the water, so the shading is not anticipated to be significant).
- Benthic, epibenthic, and water-column impacts from an additional 26 piling below OHW totaling 23.1 square feet.

EFFECTS FROM INTERDEPENDENT ACTIONS

Interdependent actions would not occur if the project was not constructed. Most materials will be brought in by boat, and any staging will occur in the marina or nearby areas that are already developed. No traffic detours will be necessary during construction. Therefore, there will be no effects from interdependent actions.

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 do not require permits when not related to a larger

project (work above OHW, boat operation, etc.). The following interrelated actions will occur with this project:

- Shading effects in the marina from additional moored vessels temporarily using the visitors' floats.
- Additional overwater lighting from additional light poles and docked vessels. Currently, there is lighting in the marina and from the surrounding roadway.

BENEFICIAL EFFECTS

Beneficial effects from the project will result from the following project elements:

- Removing nine creosote-treated piles from the marina.
- Replacing 8,025 square feet of solid float decks with grated decks.
- Replacing 210 square feet of overwater solid-deck gangways with fully grated gangways.
- The new fuel dock will have a monolithic concrete deck surface, and pumps will be equipped with spill detection monitors to help protect the water from inadvertent fuel spills.

These beneficial effects will compensate for the additional 6,490 square feet of proposed floats and gangways, as well as an additional 26 piling (23.1 square feet). Comparing these additional areas (6,490 sf + 23.1 sf = 6,513.1) to the area of replaced solid floats, gangways, and creosote piling (8,025 + 210 + 9 = 8,244 sf), the ratio is 1.2 to 1. Based on this analysis and preliminary feedback from National Marine Fisheries Services (NMFS), Washington Department of Fish and Wildlife (WDFW), and the City of Kalama, this project is self-mitigating.

ACTION AREA BOUNDARIES

The action area is defined as all areas to be affected directly and indirectly by the project. The farthest-reaching effect that defines the action area is underwater noise from vibratory-hammer pile driving above fish behavioral levels. It is estimated to extend as far as approximately 1,120 feet from the project site, as shown on Sheet 1. Approximately half of the area is inside the marina.

SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

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

- NMFS website research for species lists on April 11, 2016 (NMFS 2016).
- U.S. Fish and Wildlife Service (USFWS) website research for species and habitats on the *IPaC - Information, Planning, and Conservation System*, April 11, 2016 (USFWS 2016).
- WDFW *SalmonScape* website research on April 11, 2016 (WDFW 2016).

A WDFW Priority Habitats and Species (PHS) Report and Washington Department of Natural Resources (WDNR) Website research was not conducted, because there will be no terrestrial impacts.

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 E.

Table 4. 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 and their designated critical habitat (NMFS 2016a) occur within the action area. During the construction, impacted areas include the marina and a portion of the river outside the marina. Off-channel habitat is relatively rare in the lower Columbia River; however, the marina has been constructed and is not a natural habitat, but it could be used by fish. Adults and juveniles of all the populations could be within the action area during vibratory pile driving (Appendix C); however, adults are not expected in the marina or action area. Juveniles could use it as off-channel refugia during downstream migration or could they could use it for rearing, and ocean-type juveniles are

more likely to be in the action area than stream-type juveniles. It should be noted that the marina has associated human disturbances, such as underwater noise and visual disturbance that could deter fish from using the marina.

The following tables show primary constituent elements (PCEs) for salmon and steelhead ESUs/DPSs present in the action area.

Table 5. 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).

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 6. 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 eulachon spawn in the mainstem Columbia River and some of its major tributaries in winter. Larvae could float down the river in the action area from December through June, and juveniles rear in the salt-water portion of the lower river (NMFS 2016). 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 7. 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 this report for the time of year they are more likely to be present. The

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

There is designated critical habitat in the Columbia River for the Columbia River DPS of bull trout (Federal Register 2010). 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 action area does not include terrestrial or in-air habitat, and the only terrestrial habitat near the marina has been developed. Additionally, there is no suitable habitat for these species near the marina, and 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 these species and critical habitats.

Table 8. 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.		
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

ENVIRONMENTAL SETTING

TERRESTRIAL HABITAT CONDITIONS IN THE ACTION AREA

As described above in the *Action Area* section of this report, the action area does not contain terrestrial or in-air habitat; it only consists of aquatic habitat. The project site is on the Columbia River in the central portion of the Port of Kalama. East of the project site are a port access road, railroad tracks, Interstate 5, and the City of Kalama. The port office and a park are south of the site, and a log yard and mill are to the north. A parking area for boat trailers and the former port office are between the marina and the river. The banks of the marina vary from as steep as 2:1 (above elevation +5 feet) to as shallow as 5:1 from elevation +5 feet to bottom of basin. The banks consist of small riprap and little vegetation.

AQUATIC HABITAT CONDITIONS IN ACTION AREA

The marina banks slope at about a 1:1 slope and are riprapped; there is only sparse weedy herbaceous vegetation. The marina substrate primarily consists of fine sediments and is maintained at approximately -10 feet CRD. 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 is 19.7 feet CRD. The project area is located outside of the influence of saltwater from the ocean, but it is influenced by tides. The average tidal fluctuation is about 5 feet (USGS 1990).

SEDIMENT QUALITY

Polychlorinated biphenyls (PCBs) were detected in two core samples (CR-MA-4A collected at elevation -6.5 to -12.5 feet CRD in 2007 and PM1-2013C elevation -5 to -9 feet CRD in 2013) from the southern portion of the Port of Kalama Marina, in open navigation areas and not at pile locations where the marina renovation will occur. The concentration of PCBs detected in sample CR-MA-4A is 290 parts per billion (ppb) and in sample PM1-2013C is 30 ppb.

The Port plans to dredge the marina during the October through December 2016 in-water work window to the authorized dredge depth of -10 + 2 feet CRD. The Portland Sediment Evaluation Team (PSET) has determined that dredged material from the marina is not suitable for in-water placement because of the 2007 Sediment Evaluation Framework (SEF) screening level one (SL1) exceedance and because the 2013 data indicates that PCBs are "resident in the south part of the marina". BergerABAM has had several communications with the PSET group (5/31/2016, 6/2/2016, and 7/11/2016) regarding the need to place a sand cover over the post-dredge surface. During a phone call with the PSET (James Holm, USACE; Laura Inouye, Ecology; Margaret Chang, USACE; Tom Haussman, NMFS; and Peter Anderson, Oregon Department of Environmental Quality) on July 13, 2016, Laura Inouye indicated she believes that the PCB impacted sediment will be removed during dredging. The following table summarizes sample concentrations and sediment level criteria.

Table 9. Summary of PCB Concentrations Relative to SEF Criteria

Sample ID	**Sample Elevation** (feet CRD)	**Collection Year**	**Total PCBs** (ppb)	**SEF SL1** (ppb)	**SEF SL2** (ppb)
CR-MA-4A	-6.5 to -12.5	2007	290	110	2,500
PM1-2013C	-5 to -9	2013	30	110	2,500

The post-dredging sediment sampling and analysis will determine the need for the sand cover following dredging for PCBs. PSET stated during the July 13, 2016 phone conference that the sand cover will be needed if the PCBs are present in the post-dredge sample at a concentration greater than the SL1 criteria (110 ppb). If a sand cover is placed, it will cap any remaining contaminants so they will not be suspended during marina construction or operation of the marina. Therefore, there will be no exposure to PCBs.

The SEF SL1 is 110 ppb and the screening level two (SL2) is 2,500 ppb. SL1 corresponds to a concentration below which adverse effects to benthic communities are not expected; SL2 corresponds to a concentration above which more than minor adverse effects may be observed in benthic organisms. Chemical concentrations at or below the SL2 but greater than the SL1 correspond to sediment quality that may have resulted in minor effects to the benthic community.

WATER QUALITY

The 2012 303(d) list shows three water-quality impairments within the Columbia River near the action area (WDOE 2016). Just downstream of the action area in the Columbia River, there is an area listed as Category 5 (waters needing a total maximum daily load [TMDL]) for high water temperature. This area is also shown as a Category 4A (has an existing TMDL) for total dissolved gas and dioxin. Existing water quality will have no effect on the project, and the project will have no effect on these water-quality parameters. The website reported no sediment-quality impairments in the vicinity.

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

VESSEL OPERATION

There are potential contaminant releases to the river in the short term from the construction barge and workboats and in the long term from moored vessels at the new visitors' floats. This could result in death or injury to aquatic organisms, primarily from petroleum hydrocarbon fluids. Accidental spills during construction or from moored 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 that could cause harm to aquatic habitat. For these reasons, and because the lower Columbia River is a large waterbody, 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 has beneficial effects to water quality in the long term by reducing the potential for inadvertent contaminant releases to the Columbia River from the fuel dock. Fuel pumps will have spill detection with an automatic cut-off switch to prevent accidental spills. Because this is a beneficial effect of the project, it *may affect, and is not likely to adversely affect salmon, steelhead, green sturgeon, eulachon, bull trout, or their prey*.

SEDIMENT QUALITY

This project will remove nine creosote-treated piling, so the source of creosote leaching into sediments will be removed. Some sediments contaminated by creosote and any PCBs contamination could be brought to the surface during piling removal, but the amount of sediments released into the water when removing only nine piles will be small and are expected to remain in the marina. Therefore, a low contaminant concentration in a minor amount of sediment will not likely elevate concentrations in the water, and a small layer of sediments settling on the surface of the existing sediment will not likely cause increased

levels of sediment concentrations. Therefore, this project will not likely cause an increase in contaminants in sediments or water quality. For this reason, contaminant releases from sediments that may be released by piling removal will be insignificant and *may affect, and is not likely to adversely affect salmon, steelhead, green sturgeon, eulachon, bull trout, or their prey*.

For the reasons stated above, effects from sediments that may be released by piling removal will be insignificant and *may affect, and is not likely to adversely affect salmon, steelhead, and bull trout designated critical habitat.*

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 increased noise levels.

VIBRATORY PILE DRIVING EFFECTS ON FISH

Vibratory pile-driving noise levels were compared with injury and behavioral thresholds for fish. Vibratory pile-driving noise is not known to produce noise levels above injury thresholds for fish (WSDOT 2015); however, it will produce noise levels above behavioral thresholds. Noise levels are from Table 1 in this BA, and distances to fish behavioral thresholds set by NMFS are shown in the following table. Pile driving is conservatively estimated to take 17 days to replace existing structures and 8 days to construct the visitors' dock. Using the Practical Spreading Loss model, the farthest distance that vibratory pile driving noise will attenuate to estimated background levels is 10 meters * $10^{((173-150)/15)}$ = 341 meters = 1,120 feet. These results are summarized in the following table.

Table 10. 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)
12.75-inches in diameter *(25 days)*	10 meters	173 dB_{RMS}	342 meters **1,120 feet** (31.2 acres)

Behavioral distances were calculated using the Practical Spreading Loss Model.
1 = Noise levels from Table 1 in this BA.

The behavioral threshold is estimated within 1,120 feet from pile driving. This includes the marina and a portion of the Columbia River for a total area of approximately 31.20 acres (see Sheet 1); about half the area is in the marina. The portion outside the marina is an insignificant area for a large river. Eulachon do not have swim bladders, so they may be less susceptible to underwater noise disturbances than salmonids and green sturgeon that have swim bladders. Therefore, pile driving noise *may affect, and is not likely to adversely affect* all 13 ESUs/DPSs of salmon and steelhead, North American green sturgeon, eulachon, and bull trout.

NOISE EFFECTS ON CRITICAL HABITATS

Salmon and Steelhead 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 changes in behavior that may delay migration or spawning. Because noise over injury levels will occur within a very small area in relation to the river, the project *may affect*, and is *not likely to adversely affect* designated critical habitat for 12 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. Pile-driving noise could create an obstruction by altering behavior in a 1,120-foot radius from the pile, which is a small area when compared to the size of 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." Underwater noise acts as a physical barrier by changing behavior. Therefore, 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. This makes them susceptible to predators 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 typically travel quickly through this area in deeper water than the ocean-type salmon, although there is no barrier to their presence in the marina.

This project will result in a net gain of 6,490 square feet of on-water and overwater coverage. New vessels that may be moored at the visitors' float are an interrelated activity that will create additional, temporary shading. The design minimizes shading to the extent possible by incorporating grated decking into the new visitors' dock floats, fully grating the gangways, and replacing 8,025 square feet of floats that currently have solid decking with grated decks.

Benthic food production that typically takes place in shallow-water habitats within the marina could be affected by overwater shading, but grating will reduce the effects. Because the increase in shaded areas and piling areas are relatively small, and food production in the Columbia River is not a limiting factor to salmonid survival (USACE 2001). Therefore

shading effects to salmonid prey will be insignificant, so the additional shading *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 because this is a small increase in shading within a large river. Because shading effects from the project will not affect green sturgeon survival or behavior, and because green sturgeon are rare in freshwater areas and are unlikely to be present in the marina, the project will have *no effect* on green sturgeon.

SHADING EFFECTS ON EULACHON

Adult eulachon are unlikely to spawn or enter into the marina during their upstream migration and would not likely become prey to ambush predators. Eggs adhere to sand particles to anchor them, and when hatched, larval eulachon passively emigrate, so the river flow will likely carry them past the marina. If eggs or larvae enter the marina, they could become prey for predators in shaded areas; however the number of larvae entering the marina would likely be small, and shading effects would therefore be discountable. Therefore, shading effects *may affect, but are not likely to adversely affect eulachon.*

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, because bull trout may benefit from the using the cover of in-water and overwater structures on the project site, 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. Additional floats could create shading that causes additional exposure of ocean-type juvenile salmon, and perhaps eulachon eggs and larvae to predators, but the effect is so small it will be insignificant.

All species' critical habitats 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 an additional 26 piling totaling 23.1 square feet. This is a small area compared to the size of the Columbia River, so it will reduce the amount of prey by a very small amount. Food is not a limiting factor for salmonids in the Columbia River. For these reasons, an

insignificant loss of 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. This is a small area compared to the size of the Columbia River, so it will reduce the amount of prey by a very small and insignificant amount. Therefore, the project *may affect, but is not likely to adversely affect critical habitat for salmon, steelhead, eulachon, or bull trout.*

EFFECT DETERMINATIONS

The project has been designed to avoid, minimize, and mitigate impacts to species and habitats within the action area. 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 4. A **"may affect"** determination is warranted because:

- The action area supports migration habitat for juveniles and adults and rearing habitat for juveniles.
- New floats and boats temporarily moored at the proposed visitors' dock could cause increased shading, leading to increased predation on juveniles.
- Vibratory pile driving noise will cause temporary behavioral effects.

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

- Avoidance and minimization measures will be implemented.
- Underwater noise from pile driving will be intermittent and is below the injury level.
- The project replaces 8,025 square feet of solid floats with grated floats and fully grated gangways. This is a replacement ratio of 1.2 to 1.
- Nine creosote-treated piles will be replaced with hollow steel piles.
- The proposed fuel dock will have a fuel-leak detection system.

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.
- Pile-driving noise above levels that can cause behavioral changes could affect the unsafe passage conditions PCE or artificial obstructions PCE.
- The safe-passage PCE and "free of artificial obstruction" PCE can be affected by shading.

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

- Pile driving will have intermittent, short-term effects that will not cause physical harm and will be above the behavioral threshold for only 25 days.
- Predation increases from an additional 6,490 square feet of floats and gangways, as well as 26 piling will be insignificant in a river the size of the lower Columbia River.
- The leak-detection system in the fuel dock will likely improve the water-quality PCE.

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.
- Underwater noise from pile driving will create areas of potential behavioral effects for up to 25 days.

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

- Few, if any, individuals will be present in the action area, 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 be intermittent over 25 days and will create potential behavioral effects during the time piles are driven.

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

- Temporary noise from vibratory pile driving will not reach injury levels and behavioral effects are expected to be insignificant.

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 freshwater migration habitat for eulachon.
- Underwater noise from pile driving will create areas of potential behavioral effects to the migratory corridor PCE for up to 25 days.

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

- Pile driving may have intermittent, short-term adverse effects to the migratory corridor PCE requiring unobstructed passage; however, the noise will only be temporary for up to 25 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.
- The project may benefit bull trout by providing additional shaded cover in the marina that could improve their foraging efforts.

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

- Pile driving will have intermittent, short-term adverse effects to the migration PCEs; however, the noise will last only up to 25 days.
- Bull trout are rare in the action area, so effects will be 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.
- Underwater noise from pile driving will create areas of potential behavioral effects to the migratory corridor PCE for up to 25 days.

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

- Pile driving will have intermittent, short-term adverse effects to the migration PCEs; however, the noise will only last up to 25 days.

SUMMARY OF EFFECT DETERMINATIONS

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

- Salmon and Steelhead – 13 ESUs/DPSs and their
  - 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 13 ESUs/DPSs of Salmon and Steelhead
- 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 – Columbia River DPS

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

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FIGURES

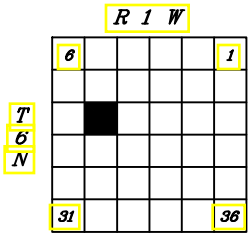
46.0077° Latitude
-122.8479° Longitude

LOCATION MAP

WATER LEVEL INFORMATION	
MHHW	+4.0'
OHW	+3.5'
MHW	+3.5'
MLW	+0.3'
MLLW	+0.0'

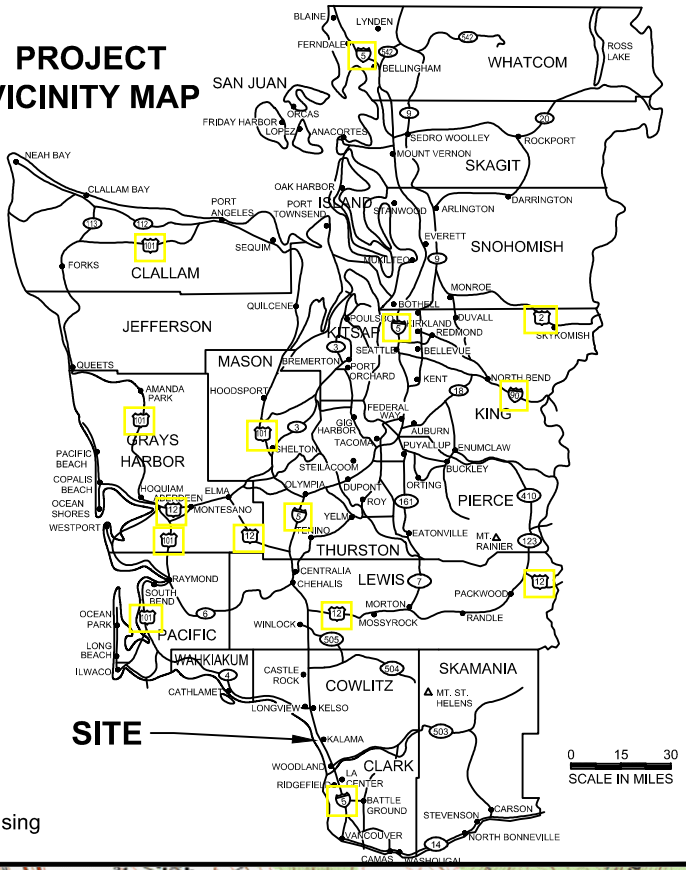
LAT: 46° 00' 26.90"N

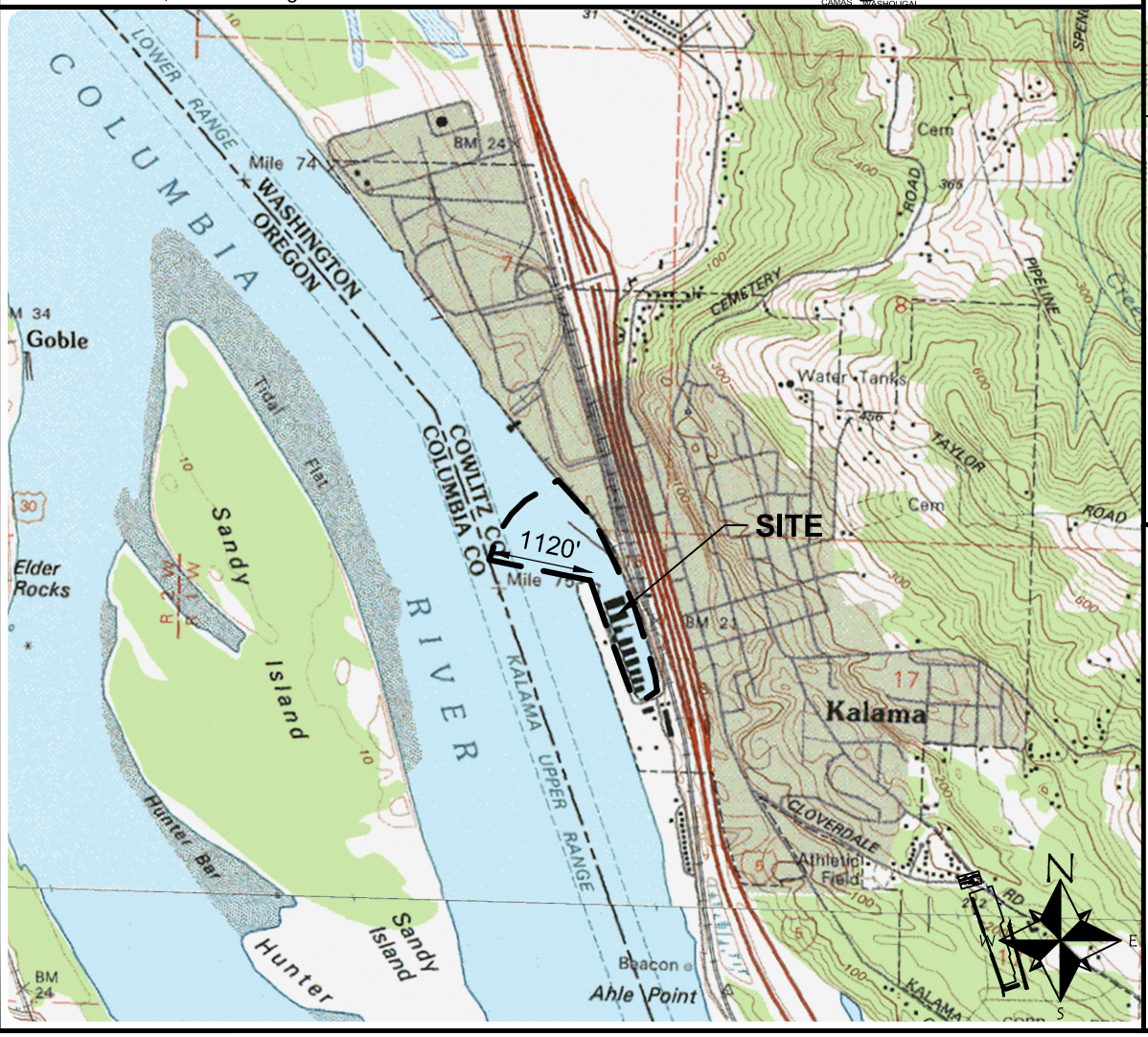
LONG: 122° 50' 52.58"W



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

PROJECT VICINITY MAP





PROPOSED: Overwater Area Increase
IN Comlumbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 1 **OF** 17
DATE: 8/23/16

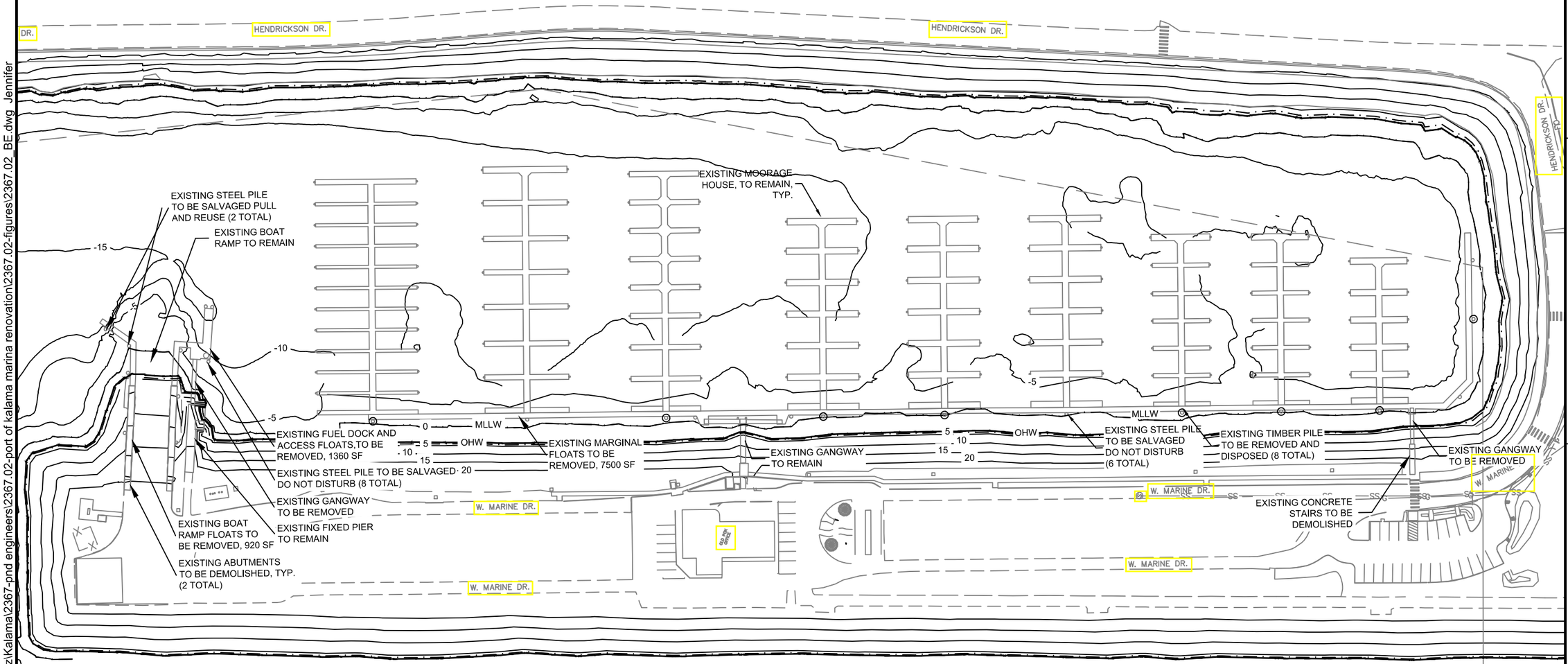
Vicinity Map & Action Area
APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS:
110 West Marine Drive
Kalama, WA 98625

PURPOSE:
Marina Restoration

DATUM: NGVD29
ADJACENT PROPERTY OWNERS:

SCALE IN FEET
0 2000 4000

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



LEGEND

◎	TIMBER PILE
○	STEEL PILE

NOTE(S):

1. Base map from PND Engineers, Inc.

Existing Conditions & Demolition Plan

APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS: 110 West Marine Drive Kalama, WA 98625

PURPOSE: Marina Restoration

DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

PROPOSED: Overwater Area Increase

IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 2 **OF** 17
DATE: 8/23/16

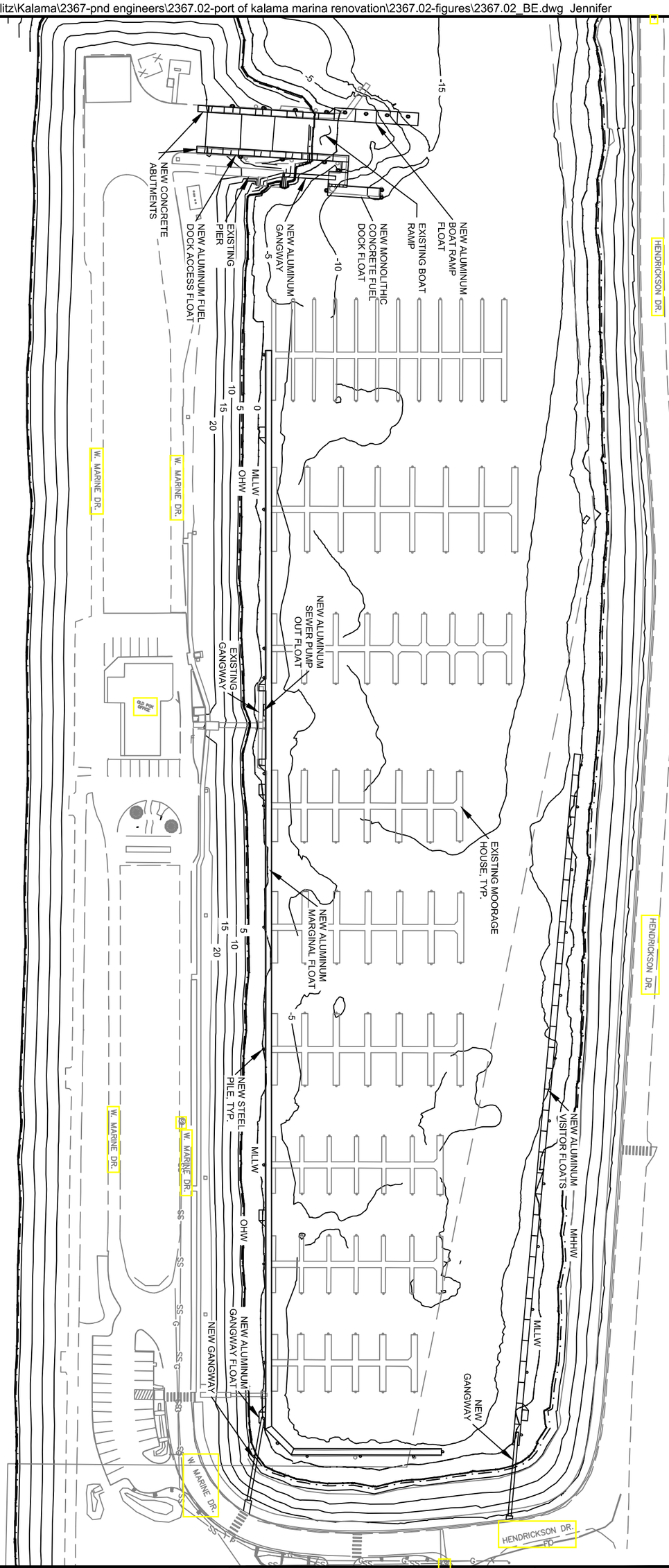
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

SCALE IN FEET
0
100
200

Ecological Land Services

NOTE(S):

1. Base map from PND Engineers, Inc.



N
W
E
S

0 100 200

SCALE IN FEET

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

PURPOSE: Marina Restoration

DATUM: NAVD 29-47

ADJACENT PROPERTY OWNERS:

Overall Site Plan

APPLICANT: PND Engineers

PROJECT NAME: Port of Kalama Marina Renovation

REFERENCE #:

SITE LOCATION ADDRESS: 110 West Marine Drive, Kalama, WA 98625

PROPOSED: Overwater Area Increase

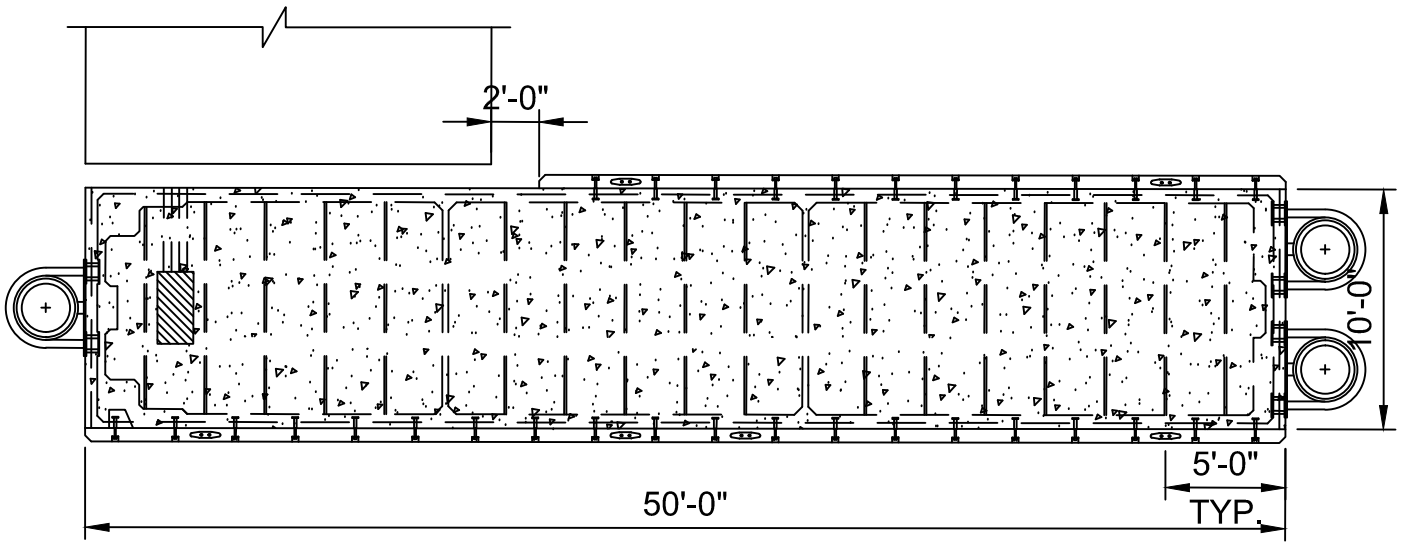
IN Comlumbia River

NEAR:

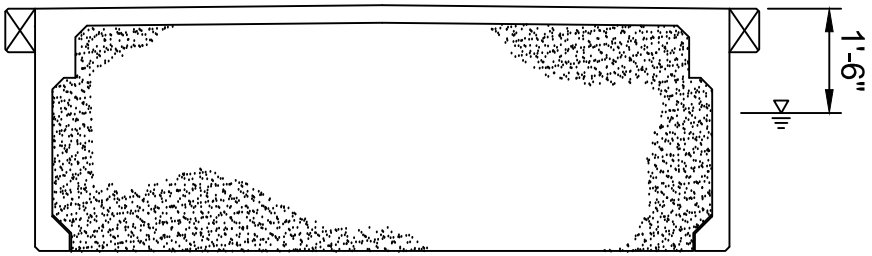
COUNTY: Cowlitz **STATE:** WA

SHEET 3 **OF** 17

DATE: 8/23/16



FLOAT PLAN



FLOAT SECTION

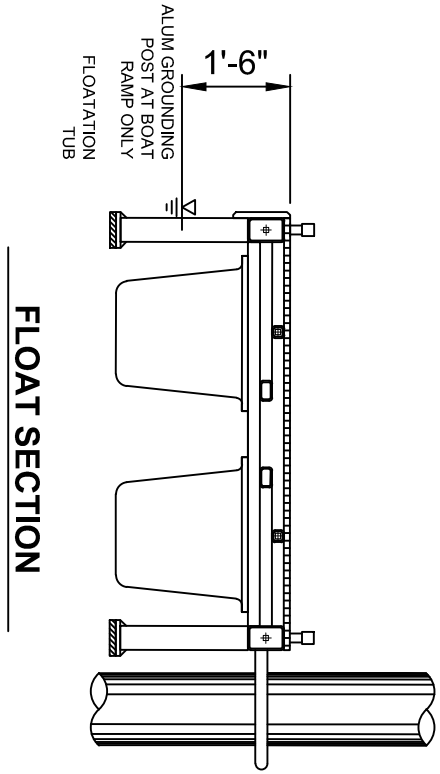
NOT TO SCALE

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

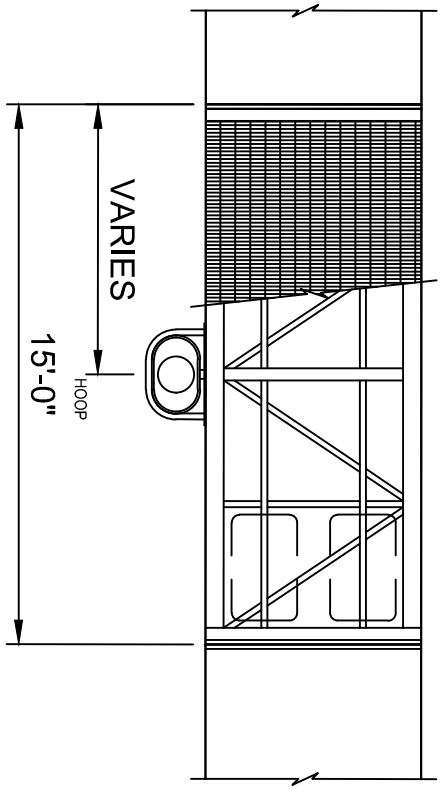
PURPOSE: Marina Restoration	Proposed Monolithic Concrete Float Detail	**PROPOSED:** Overwater Area Increase
	APPLICANT: PND Engineers	
	PROJECT NAME: Port of Kalama Marina Renovation	**IN** Comlumbia River
DATUM: N/A	**REFERENCE #:**	**NEAR:**
ADJACENT PROPERTY OWNERS:	**SITE LOCATION ADDRESS:** 110 West Marine Drive Kalama, WA 98625	**COUNTY:** Cowlitz **STATE:** WA
		SHEET 4 **OF** 17
		DATE: 8/23/16

NOTE(S):

1. Base map from PND Engineers, Inc.

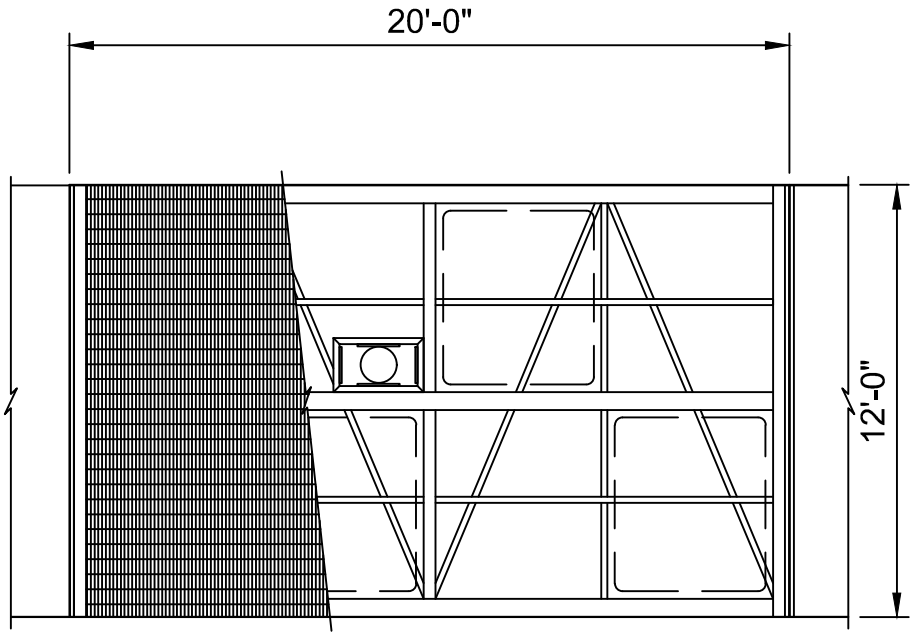


FLOAT SECTION

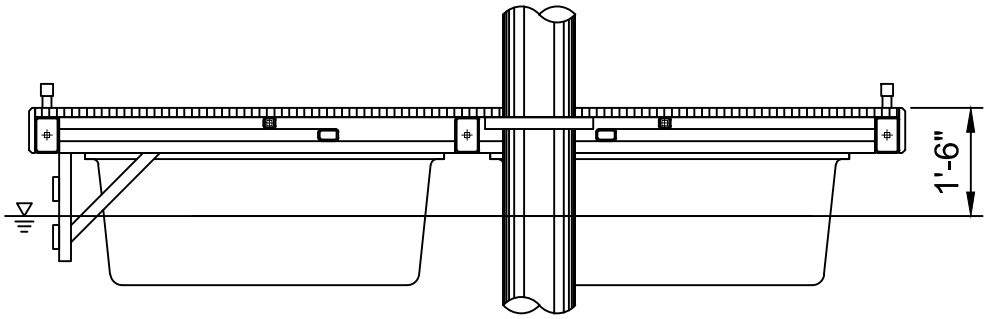


FLOAT PLAN

NOT TO SCALE Ecological Land Services 1157 3rd Ave., Suite 220A Longview, WA 98632 Phone: (360) 578-1371	**PURPOSE:** Marina Restoration **DATUM:** N/A **ADJACENT PROPERTY OWNERS:**	Aluminum Float With External Pile Hoop **APPLICANT:** PND Engineers **PROJECT NAME:** Port of Kalama Marina Renovation **REFERENCE #:** **SITE LOCATION ADDRESS:** 110 West Marine Drive Kalama, WA 98625	**PROPOSED:** Overwater Area Increase **IN** Comlumbia River **NEAR:** **COUNTY:** Cowlitz **STATE:** WA **SHEET** 5 **OF** 17 **DATE:** 8/23/16



FLOAT PLAN



FLOAT SECTION

NOTE(S):

1. Base map from PND Engineers, Inc.

NOT TO SCALE	**PURPOSE:** Marina Restoration **DATUM:** N/A **ADJACENT PROPERTY OWNERS:**	Aluminum Float With Internal Pile Hoop **APPLICANT:** PND Engineers **PROJECT NAME:** Port of Kalama Marina Renovation **REFERENCE #:** **SITE LOCATION ADDRESS:** 110 West Marine Drive Kalama, WA 98625	**PROPOSED:** Overwater Area Increase **IN** Comlumbia River **NEAR:** **COUNTY:** Cowlitz **STATE:** WA **SHEET** 6 **OF** 17 **DATE:** 8/23/16

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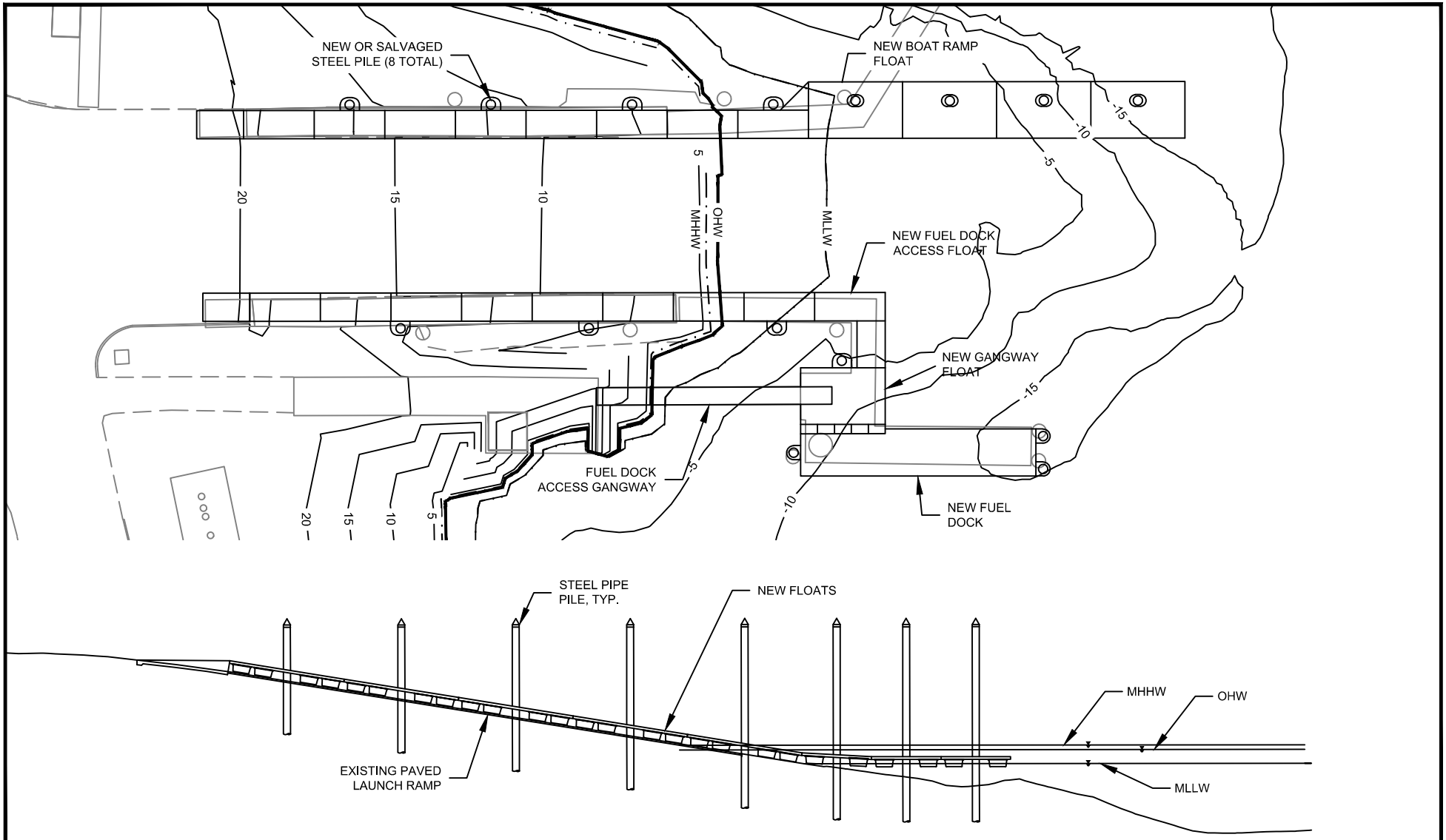
Phone: (360) 578-1371



NOT TO SCALE

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

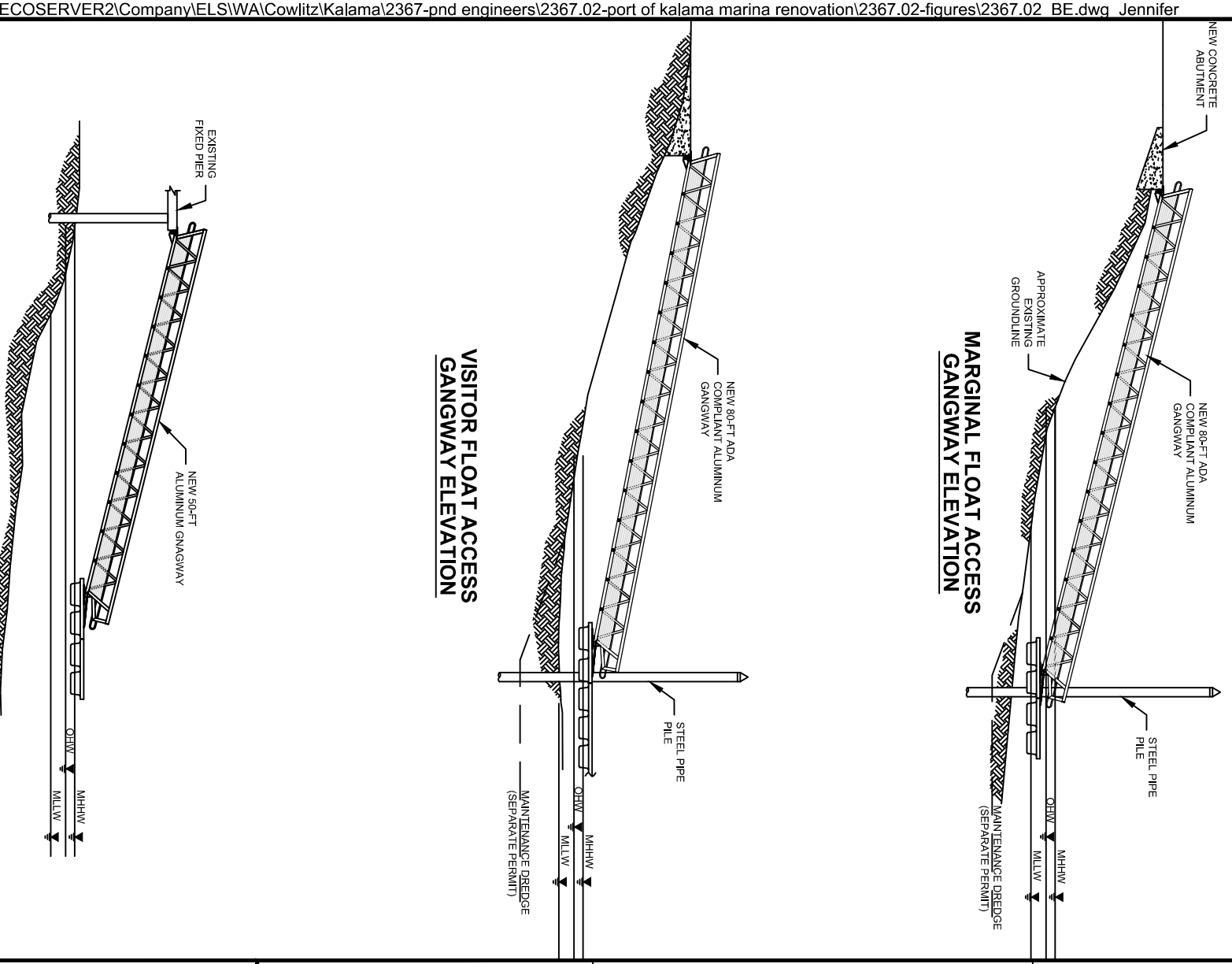
PURPOSE:
Marina Restoration

DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

Boat Ramp Float Plan & Elevation
APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS:
110 West Marine Drive
Kalama, WA 98625

PROPOSED: Overwater Area Increase

IN Comlumbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 7 **OF** 17
DATE: 8/23/16



NOTE(S):

1. Base map from PND Engineers, Inc.

NOT TO SCALE

Ecological Land Services
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Longview, WA 98632
Phone: (360) 578-1371

PURPOSE:
Marina Restoration

DATUM: N/A
ADJACENT PROPERTY OWNERS:

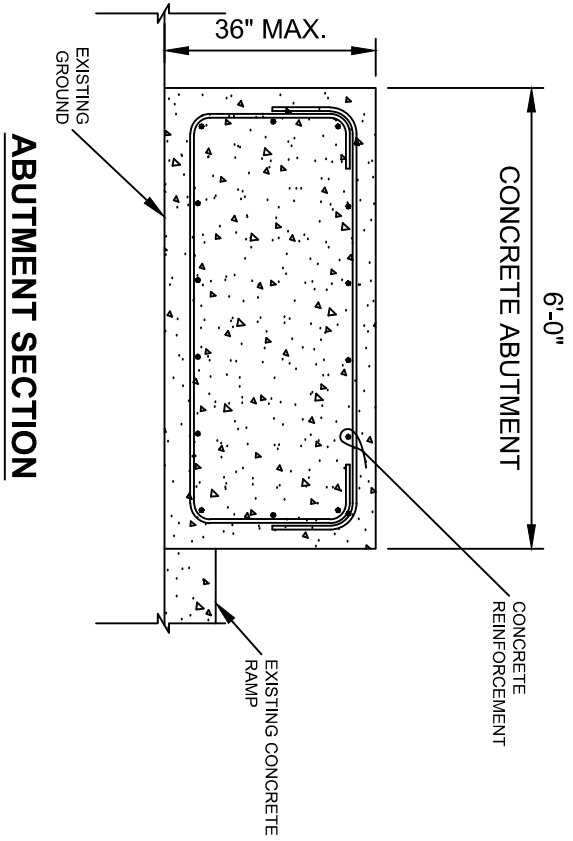
Proposed Gangway Elevations
APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS:
110 West Marine Drive
Kalama, WA 98625

PROPOSED: Overwater Area Increase

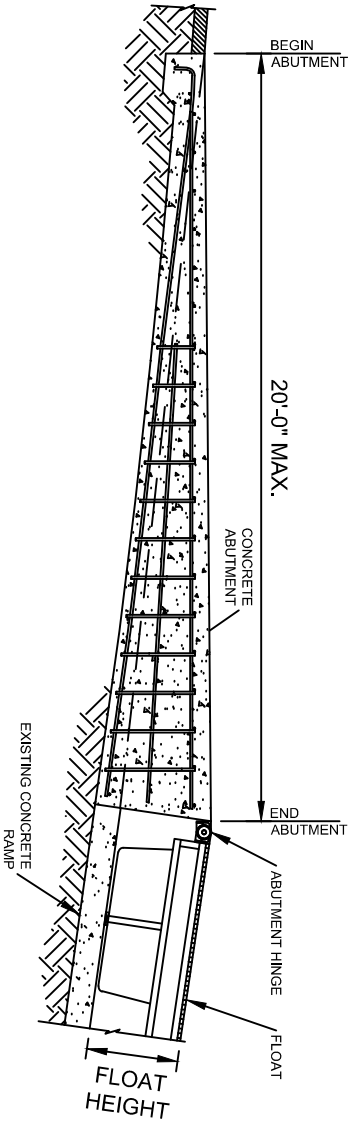
IN Comlumbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 8 **OF** 17
DATE: 8/23/16

NOTE(S):

1. Base map from PND Engineers, Inc.

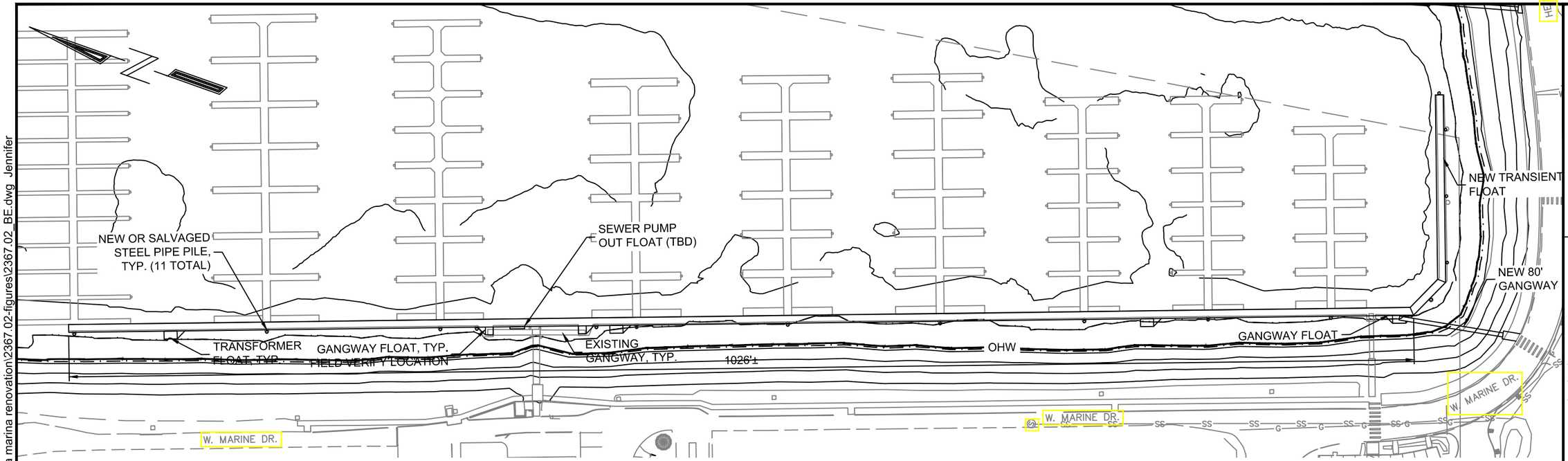


ABUTMENT SECTION



ABUTMENT PROFILE

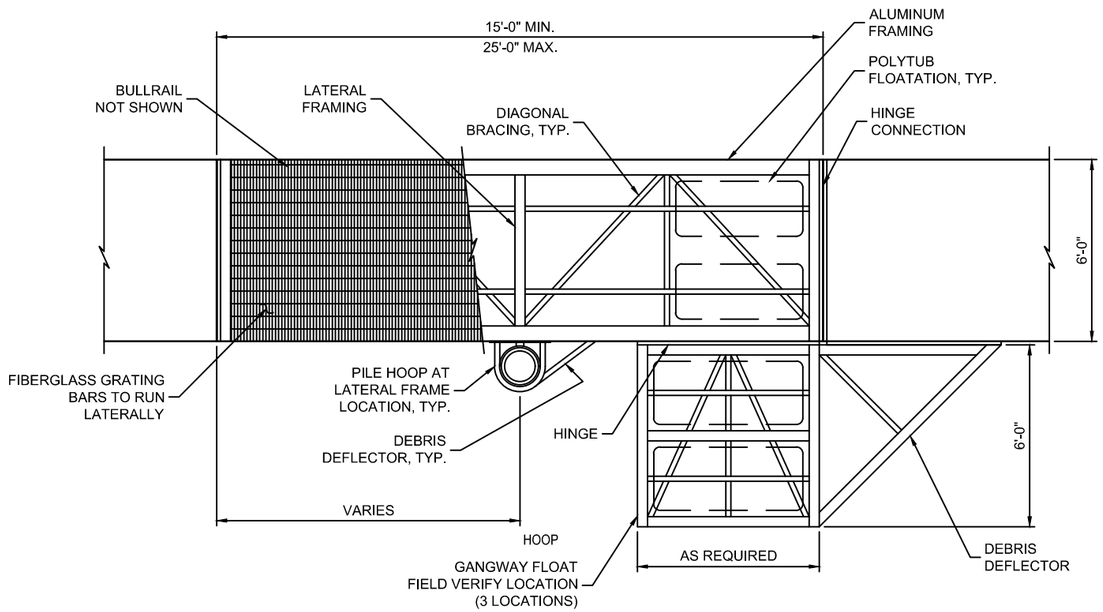
Ecological Land Services 1157 3rd Ave., Suite 220A Longview, WA 98632 Phone: (360) 578-1371 NOT TO SCALE	**PURPOSE:** Marina Restoration **DATUM:** N/A **ADJACENT PROPERTY OWNERS:**	Typical Float Abutment Profile & Section **APPLICANT:** PND Engineers **PROJECT NAME:** Port of Kalama Marina Renovation **REFERENCE #:** **SITE LOCATION ADDRESS:** 110 West Marine Drive Kalama, WA 98625	**PROPOSED:** Overwater Area Increase **IN** Comlumbia River **NEAR:** **COUNTY:** Cowlitz **STATE:** WA **SHEET** 9 **OF** 17 **DATE:** 8/23/16



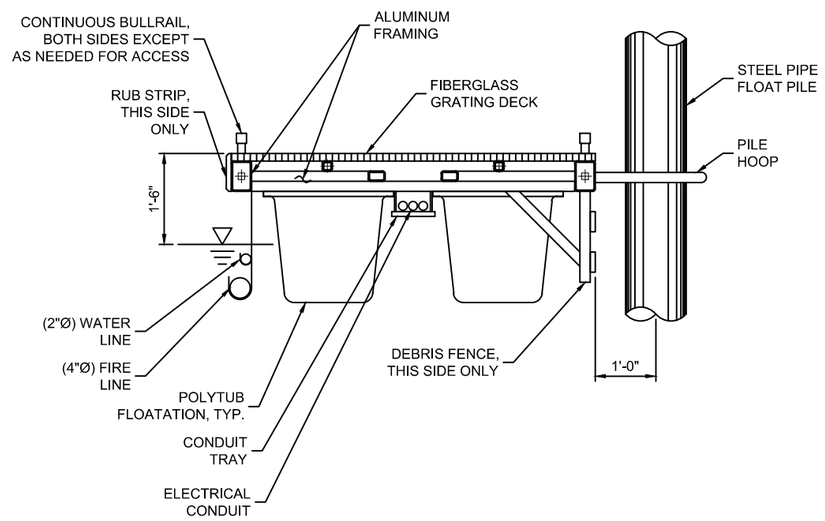
PLAN - 1"=80'

NOTE(S):

1. Base Plan from PND Engineers, INC.



FLOAT PLAN - 1"=60'



FLOAT SECTION - 1"=30'

PROPOSED: Overwater Area Increase

IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 10 **OF** 17
DATE: 8/23/16

Marginal Float

APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS:
110 West Marine Drive
Kalama, WA 98625

PURPOSE:
Marina Restoration

DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

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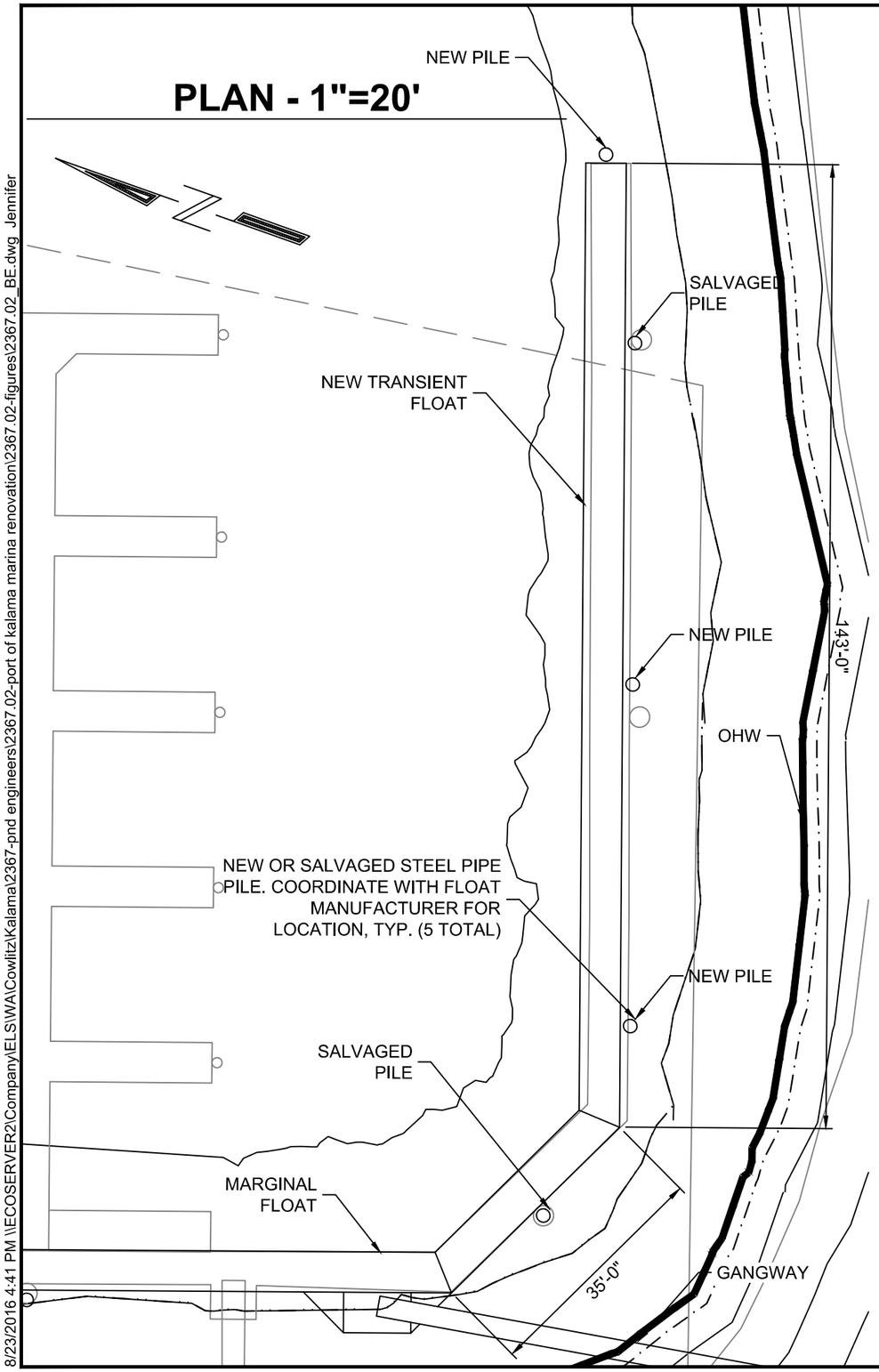
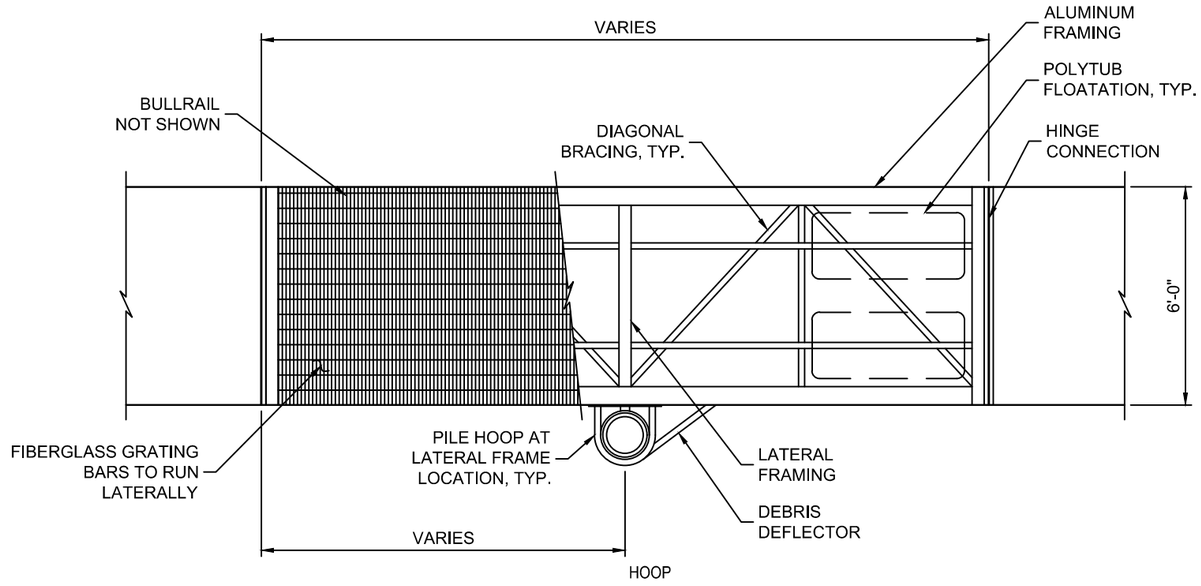
Longview, WA 98632
Phone: (360) 578-1371

Ecological Land Services

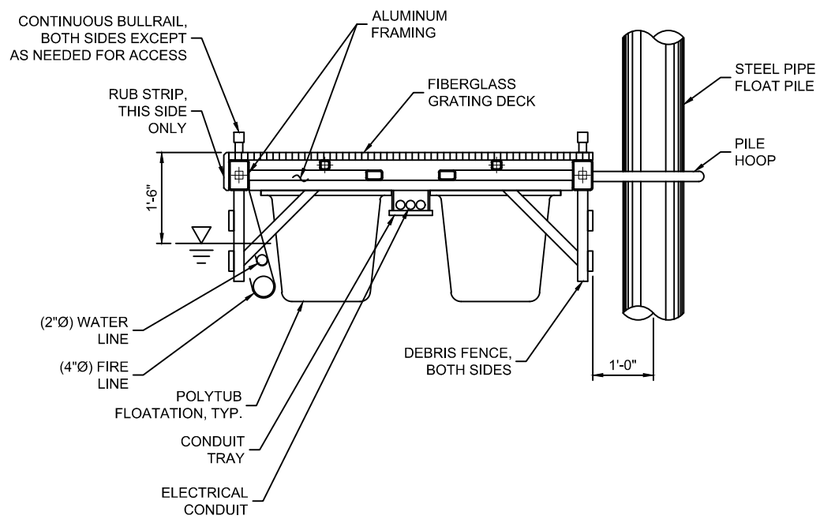




FLOAT PLAN - 1"=50'

NOTE(S):

1. Base Plan from PND Engineers, INC.



FLOAT SECTION - 1"=30'

PROPOSED: Overwater Area Increase

IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 11 **OF** 17
DATE: 8/23/16

Transient Moorage

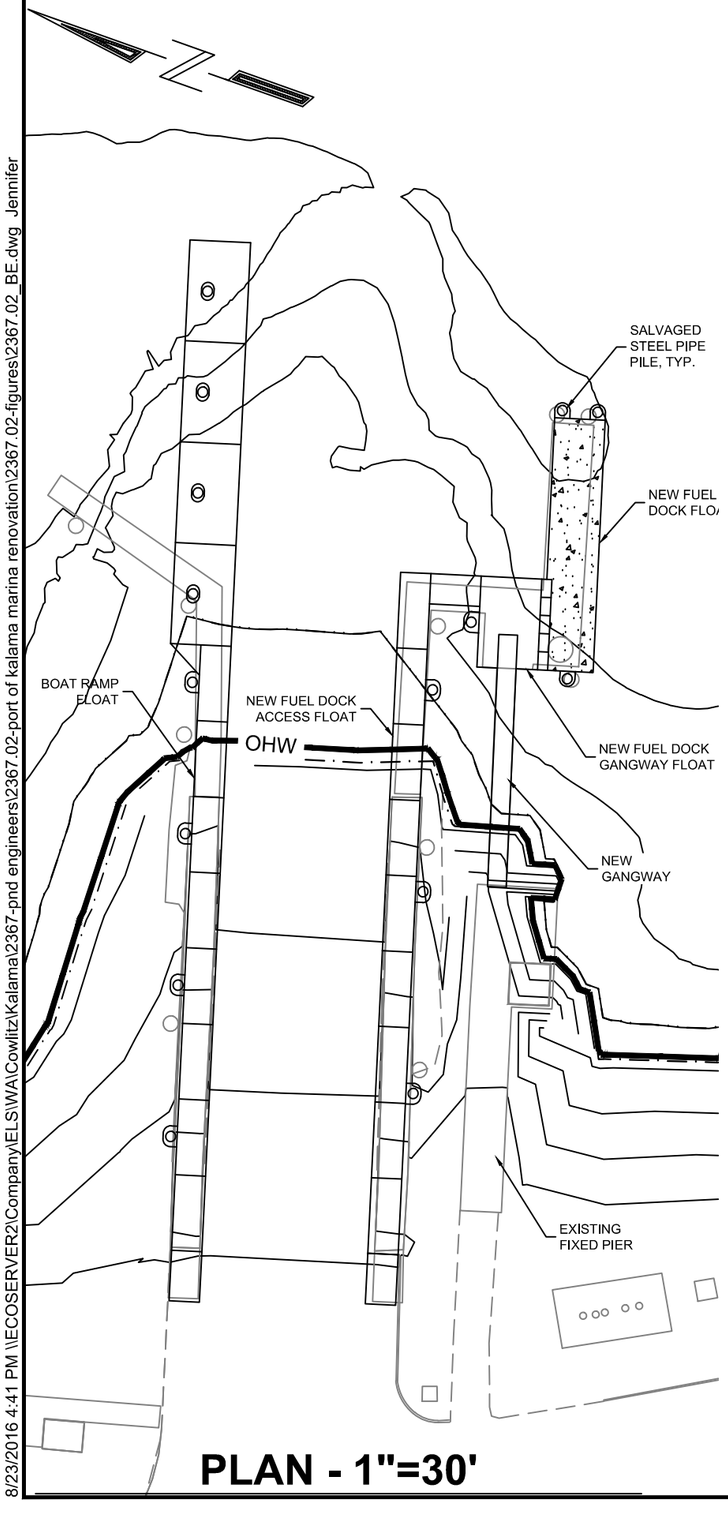
APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS: 110 West Marine Drive Kalama, WA 98625

PURPOSE: Marina Restoration

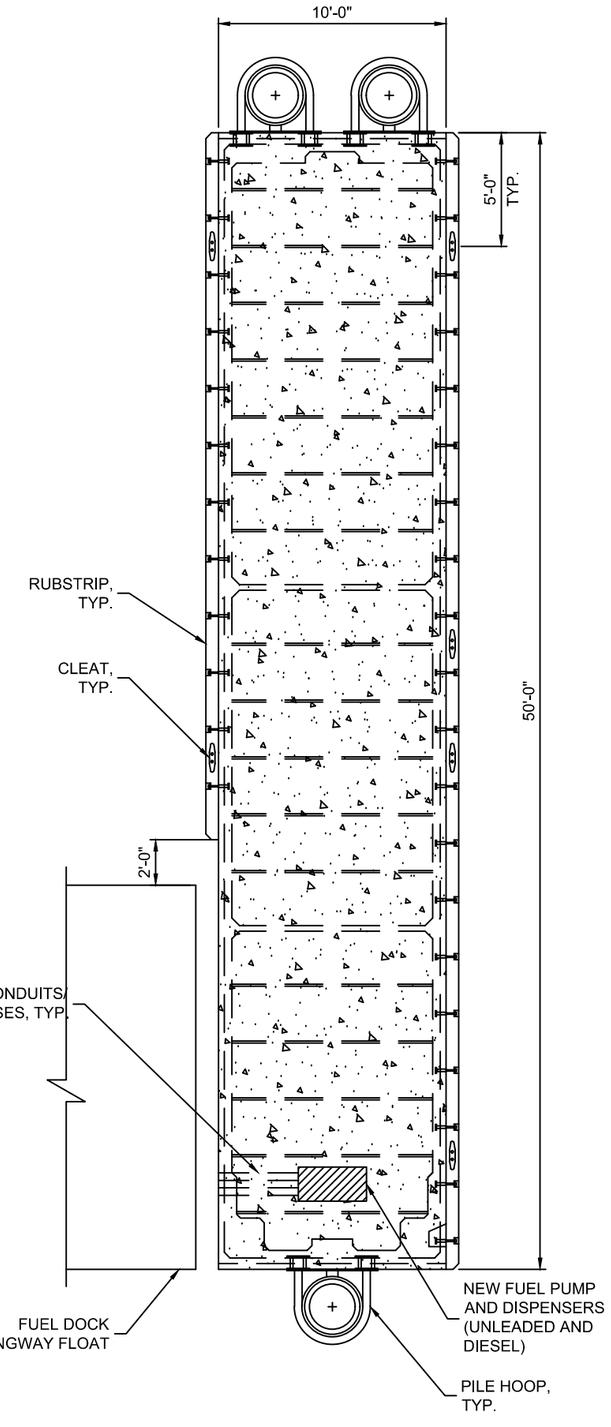
DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

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

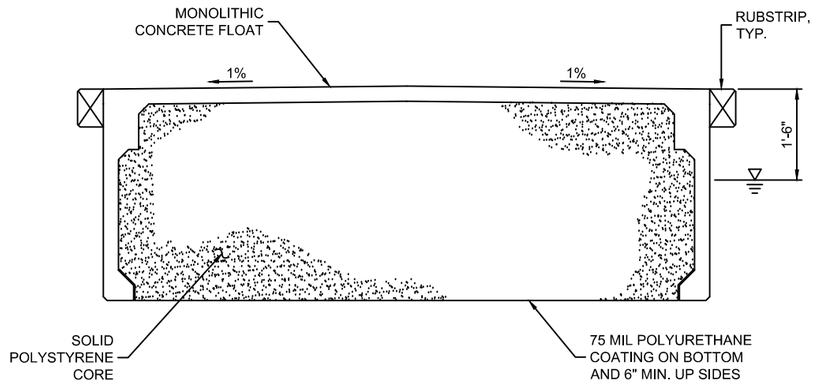
Ecological Land Services



PLAN - 1"=30'



FLOAT PLAN - 1"=80'



FLOAT SECTION - 1"=30'

NOTE(S):

1. Base Plan from PND Engineers, INC.

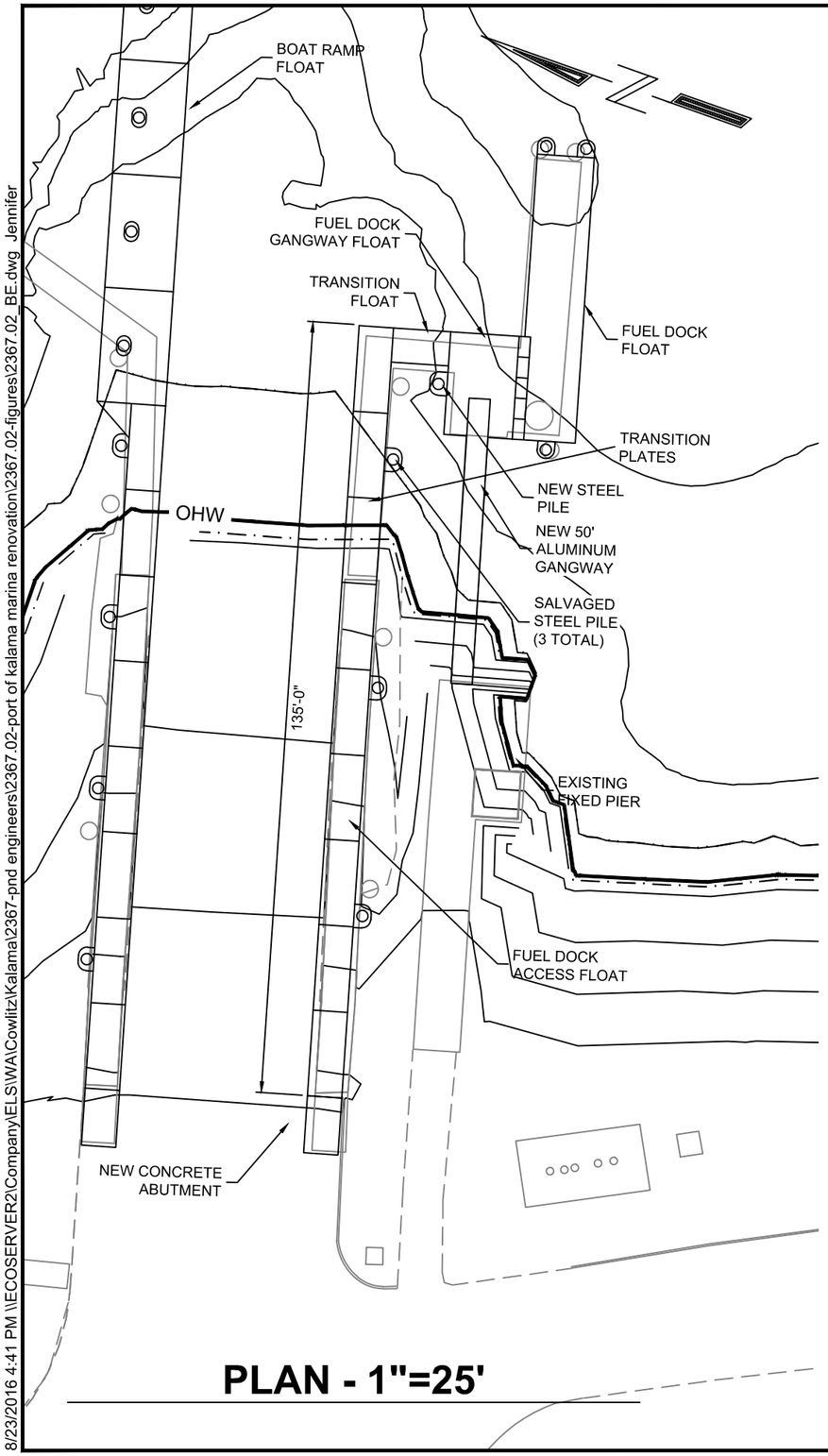
PROPOSED: Overwater Area Increase
IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 12 **OF** 17
DATE: 8/23/16

Fuel Dock Float
APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS: 110 West Marine Drive, Kalama, WA 98625

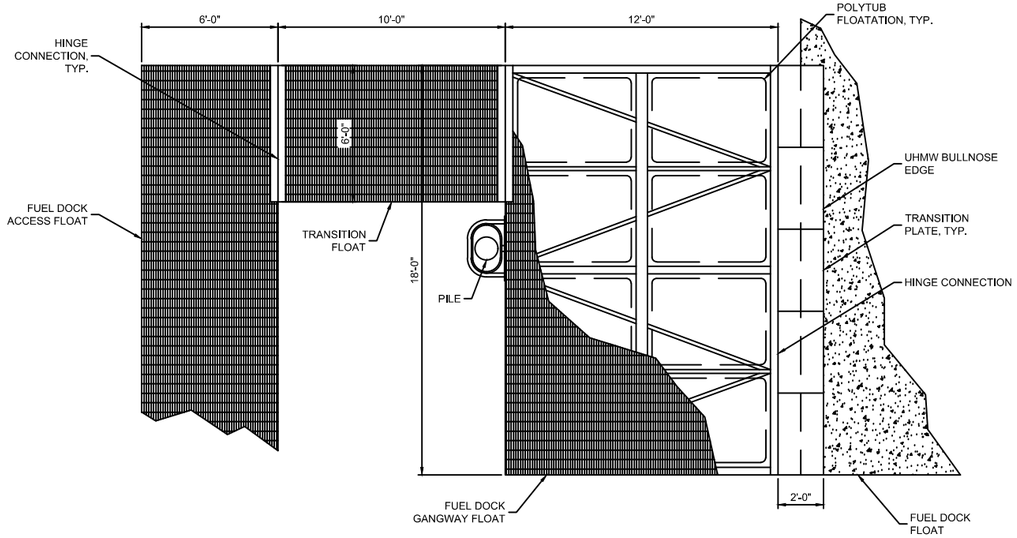
PURPOSE: Marina Restoration
DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

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

Ecological Land Services



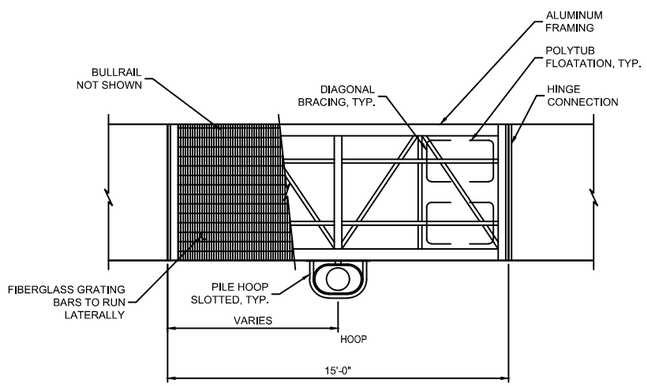
PLAN - 1"=25'



PLAN - 1"=80'

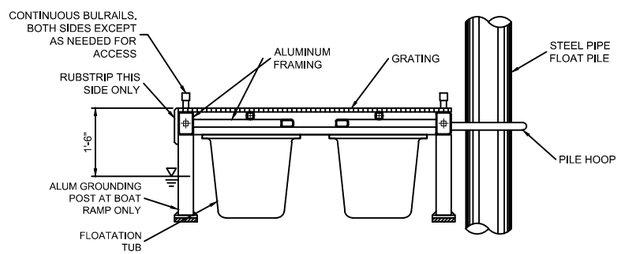
NOTE(S):

1. Base Plan from PND Engineers, INC.



FUEL DOCK ACCESS FLOAT PLAN - 1"=80'

TRANSITION FLOAT SIMILAR



FUEL DOCK ACCESS FLOAT SECTION - 1"=40'

TRANSITION FLOAT SIMILAR

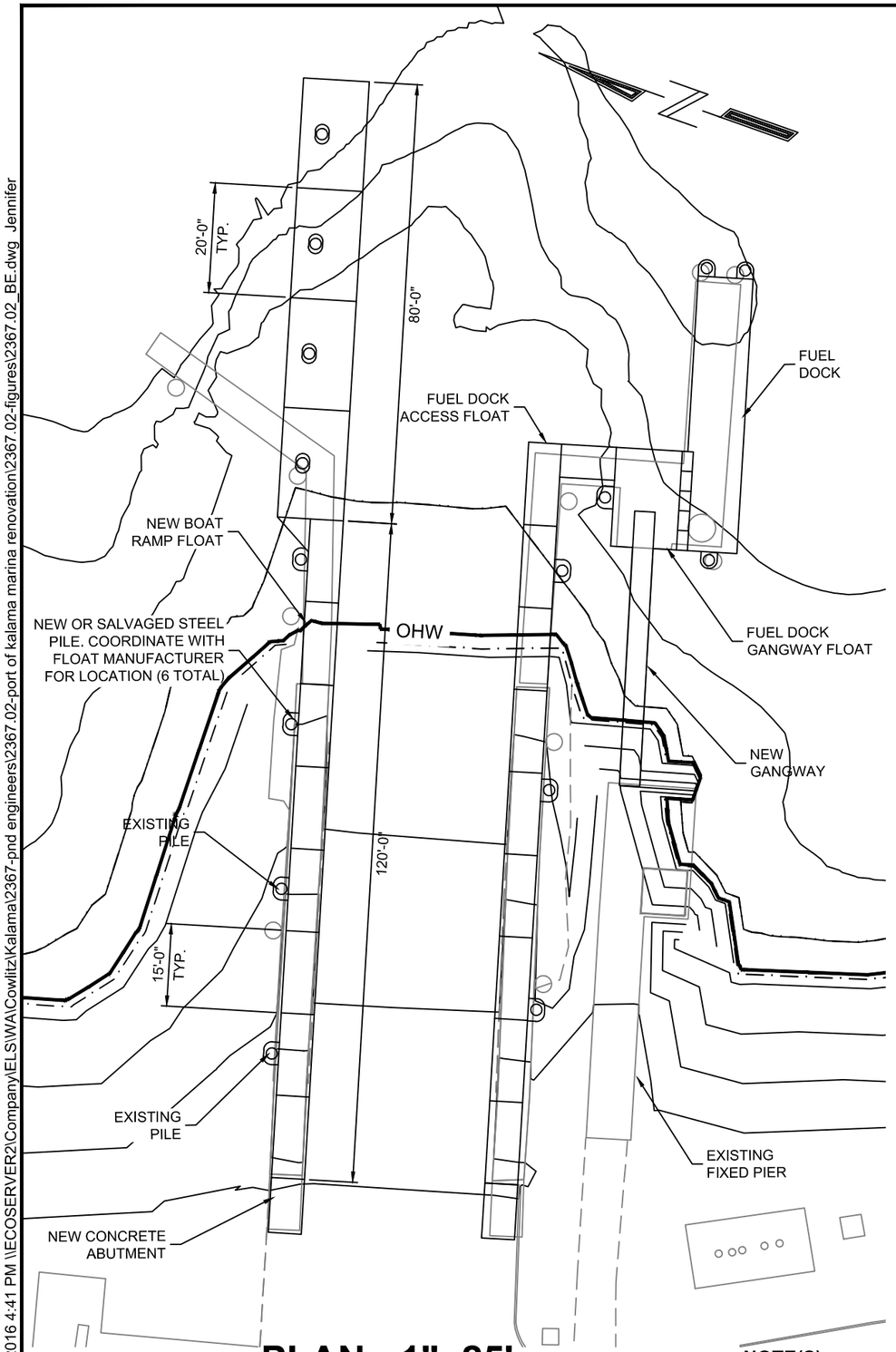
PROPOSED: Overwater Area Increase
IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 13 **OF** 17
DATE: 8/23/16

Fuel Dock Access Float and Gangway Float
APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS: 110 West Marine Drive Kalama, WA 98625

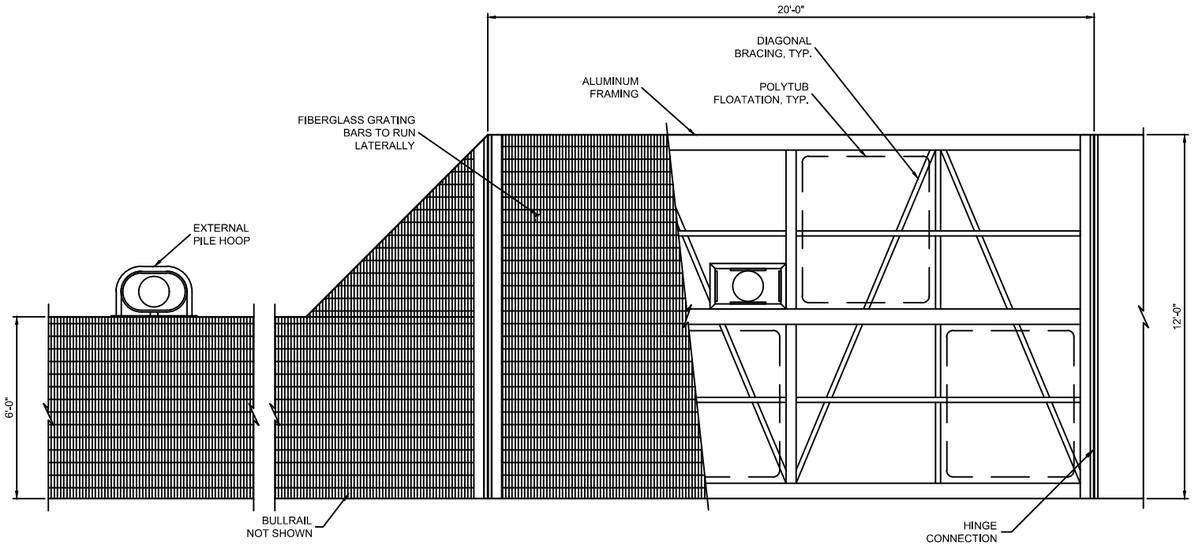
PURPOSE: Marina Restoration
DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

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

Ecological Land Services

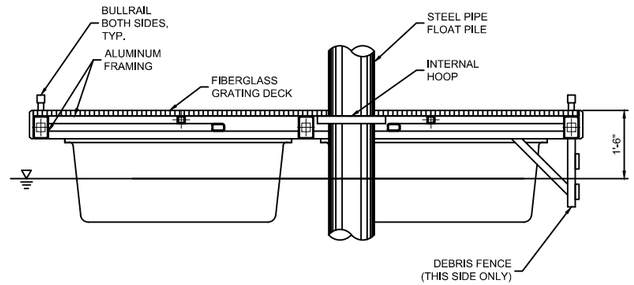


PLAN - 1"=25'

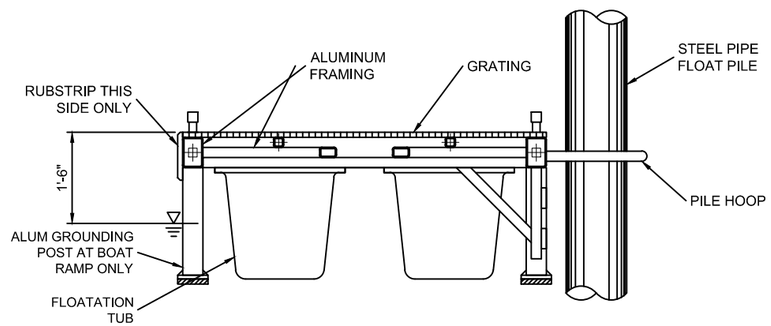


FLOAT PLAN - 1"=60'

END FLOAT SHOWN



6 FOOT WIDE FLOAT SECTION - 1"=40'



12 FOOT WIDE FLOAT SECTION - 1"=30'

NOTE(S):

1. Base Plan from PND Engineers, INC.

PROPOSED: Overwater Area Increase

IN Comlumbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 14 **OF** 17
DATE: 8/23/16

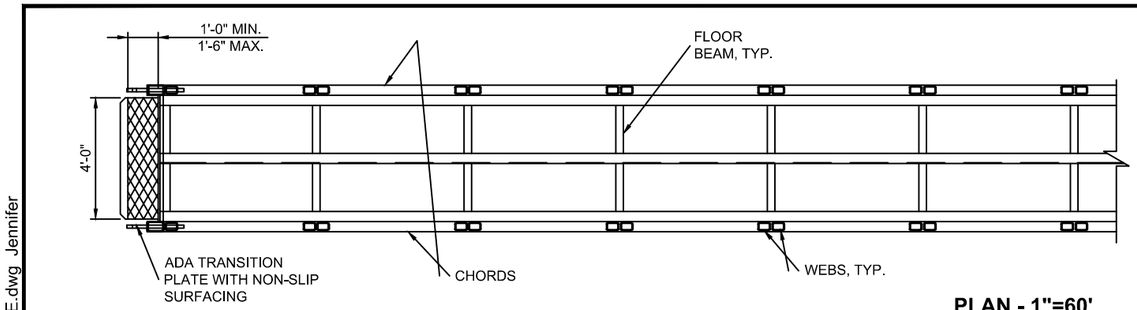
Boat Ramp Float

APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS: 110 West Marine Drive Kalama, WA 98625

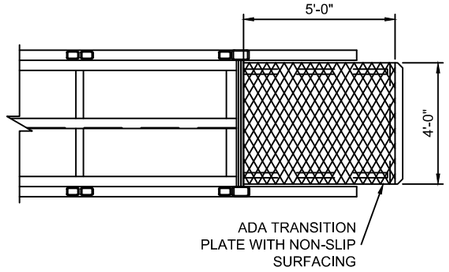
PURPOSE: Marina Restoration
DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

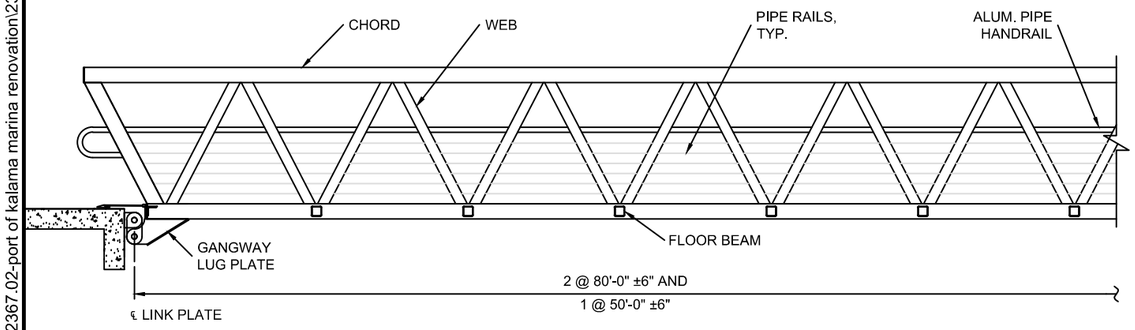
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371

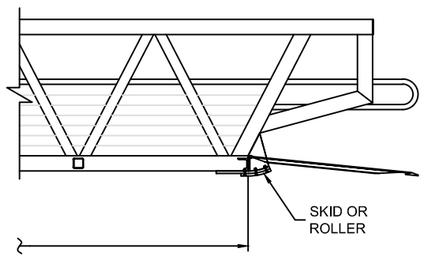
Ecological Land Services



PLAN - 1"=60'
(AT FLOOR FRAMING)

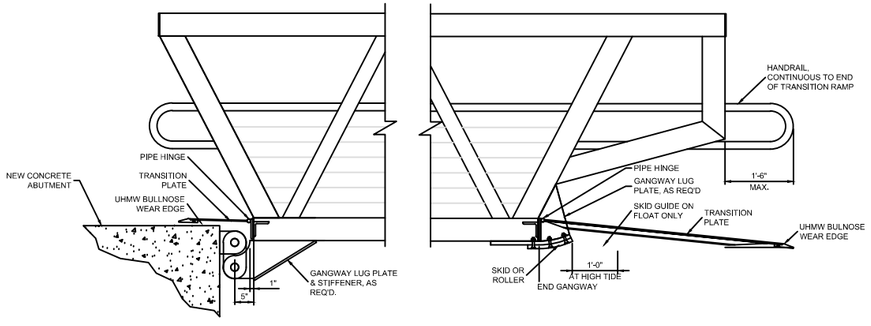






ELEVATION
ALUMINUM GANGWAY - 1"=60'

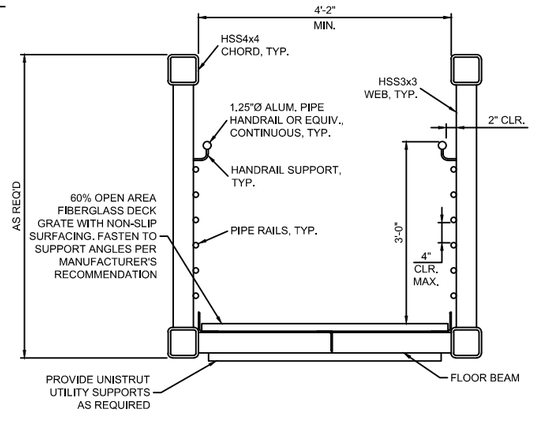
BOARDWALK END



BOARDWALK END - 1"=40'

FLOAT END - 1"=40'

FLOAT END



TYPICAL SECTION - 1"=30'

NOTE:
Base Plan from PND Engineers, INC.
WELD ALL JOINTS WITH MINIMUM 5/16" FILLET
WELD ALL AROUND OR EQUIVALENT BEVEL WELD.

GANGWAY PERFORMANCE CRITERIA
Gangway is design build by vendor to meet performance criteria requirements. Submit shop drawings and calculations for approval.

SUPPLIED DETAILS
Details shown are for reference only. Gangway manufacturer may submit different details for attaching gangway at hanger end, bearing end (skid shoe or roller), transition plates, etc. Submit alternative details with calculations for approval.

APPLICABLE CODES
All local codes plus the Applicable Codes and Standards.

DESIGN CRITERIA
Dead Loads - 80' Gangway (8,000 lb max. self weight)
50' Gangway (5,000 lb max. self weight)
Live Load - Uniform 100 psf
Wind Load - 85 mph

MATERIALS AND CONSTRUCTION

All material and construction shall conform to the following:

STRUCTURAL STEEL
ASTM A36 galvanized

ALUMINUM
Aluminum for gangway shall conform to 6061-T6 unless otherwise noted. Aluminum pipe for rails shall be 6063-T6. Modification to the gangway as detailed shall conform to the latest revisions of the Aluminum Design Manual and all applicable standards as set forth by the Aluminum Association. Edges shall be cut true, smooth and free of burrs. Flame cutting is not permitted. Holes for bolts shall be drilled or punched. Corner edges shall be ground smooth. Weld spatter and flash marks shall be removed and ground smooth. Mill stamps and markings shall be removed from all exposed surfaces. No finish is required on aluminum surfaces.

ALUMINUM WELDING
Per AWS D1.2. All welders shall be qualified per AWS for the type of welding anticipated.

BOLTS
All bolts shall be ASTM A325, hot-dip galvanized unless otherwise noted. Washers shall be used under both head and nut of all bolts.

GALVANIZING
All steel and hardware shall be hot-dipped galvanized per ASTM A123 or A153 after fabrication unless otherwise noted.

DISSIMILAR ISOLATION
Isolation washers & bushings shall be used between dissimilar metals.

DECK
Deck grating shall be light transmitting fiberglass deck grating. Attach to floor supports using Manufacturer supplied hold-downs and connectors per Manufacturer's recommendations.

NON-SLIP SURFACING
All walking surfaces shall have a non-slip surface meeting ADA requirements. Submit sample for approval.

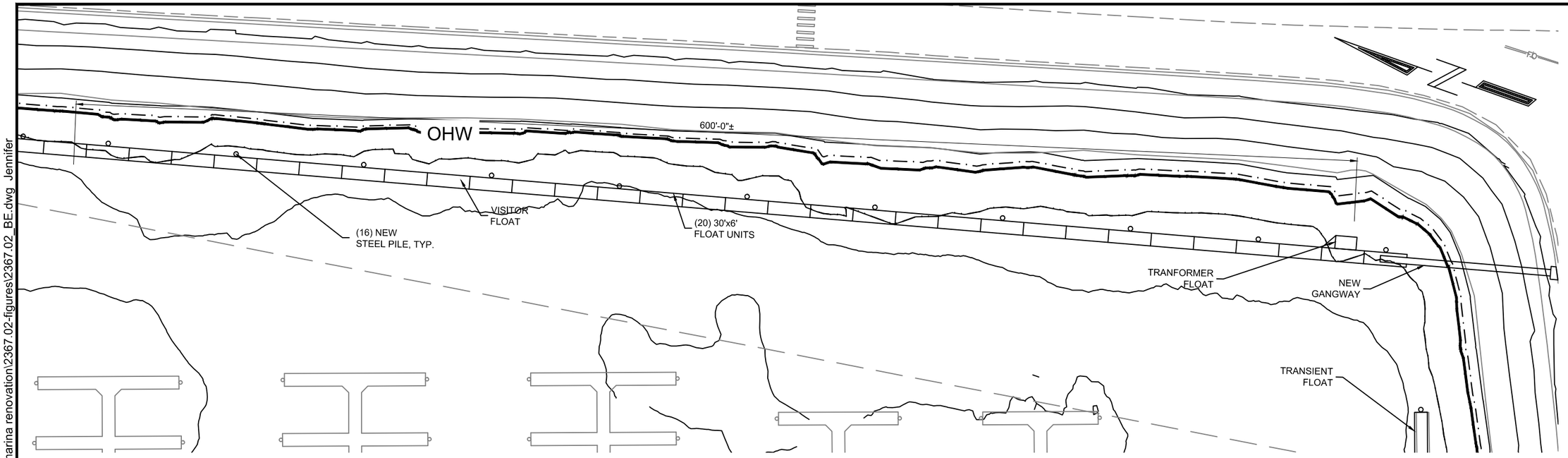
PROPOSED: Overwater Area Increase
IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 15 **OF** 17
DATE: 8/23/16

New Aluminum Gangways
APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS:
110 West Marine Drive
Kalama, WA 98625

PURPOSE: Marina Restoration
DATUM: N/A
ADJACENT PROPERTY OWNERS:

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

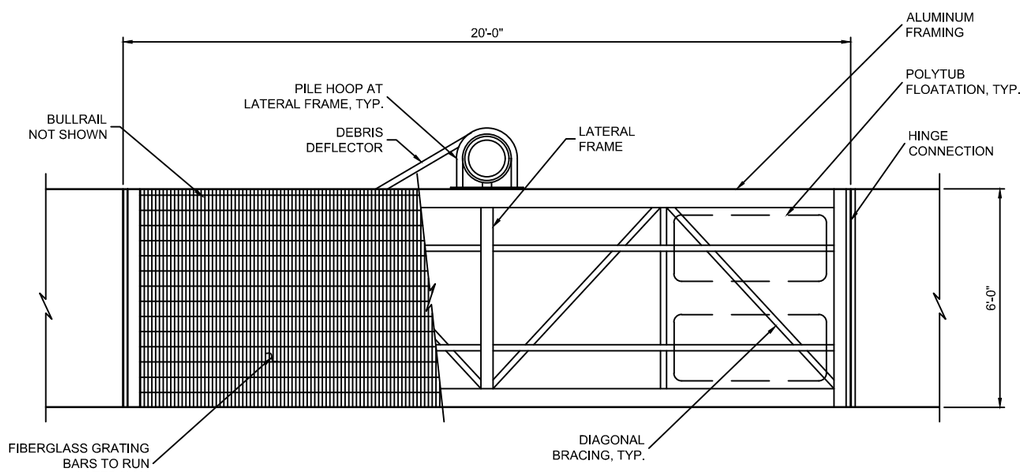
Ecological Land Services



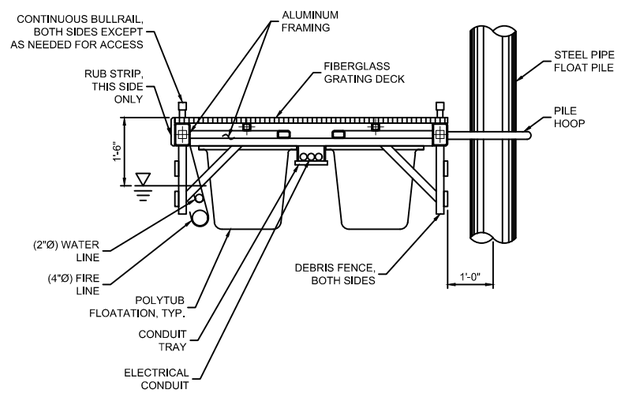
PLAN - 1"=50'

NOTE(S):

1. Base Plan from PND Engineers, INC.



FLOAT PLAN - 1"=50'



FLOAT SECTION - 1"=40'

PROPOSED: Overwater Area Increase

IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 16 **OF** 17
DATE: 8/23/16

Visitor Float

APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS: 110 West Marine Drive Kalama, WA 98625

PURPOSE: Marina Restoration

DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

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

Ecological Land Services

PILE SCHEDULE

LOCATION	PILE ID	DIA (IN)	T (IN)	TOP EL	TIP EL
MARGINAL FLOATS	MF 1	12.75	0.50	+30'	TBD
	MF 2	12.75	0.50	+30'	TBD
	MF 3	12.75	0.50	+30'	TBD
	MF 4	12.75	0.50	+30'	TBD
	MF 5	12.75	0.50	+30'	TBD
	MF 6	12.75	0.50	+30'	TBD
	MF 7	12.75	0.50	+30'	TBD
	MF 8	12.75	0.50	+30'	TBD
	MF 9	12.75	0.50	+30'	TBD
	MF 10	12.75	0.50	+30'	TBD
	MF 11	12.75	0.50	+30'	TBD
TRANSIENT FLOATS	TF 1	12.75	0.50	+30'	TBD
	TF 2	12.75	0.50	+30'	TBD
	TF 3	12.75	0.50	+30'	TBD
	TF 4	12.75	0.50	+30'	TBD
	TF 5	12.75	0.50	+30'	TBD
BOAT RAMP FLOATS	BR 1	12.75	0.50	+30'	TBD
	BR 2	12.75	0.50	+30'	TBD
	BR 3	12.75	0.50	+30'	TBD
	BR 4	12.75	0.50	+30'	TBD
	BR 5	12.75	0.50	+30'	TBD
	BR 6	12.75	0.50	+30'	TBD
	BR 7	12.75	0.50	+30'	TBD
	BR 8	12.75	0.50	+30'	TBD
FUEL DOCK FLOAT	FD 1	12.75	0.50	+30'	TBD
	FD 2	12.75	0.50	+30'	TBD
	FD 3	12.75	0.50	+30'	TBD
ACCESS FLOAT	FDA 1	12.75	0.50	+30'	TBD
	FDA 2	12.75	0.50	+30'	TBD
	FDA 3	12.75	0.50	+30'	TBD
	FDA 4	12.75	0.50	+30'	TBD
VISITOR FLOATS	VF 1	12.75	0.50	+30'	TBD
	VF 2	12.75	0.50	+30'	TBD
	VF 3	12.75	0.50	+30'	TBD
	VF 4	12.75	0.50	+30'	TBD
	VF 5	12.75	0.50	+30'	TBD
	VF 6	12.75	0.50	+30'	TBD
	VF 7	12.75	0.50	+30'	TBD
	VF 8	12.75	0.50	+30'	TBD
	VF 9	12.75	0.50	+30'	TBD
	VF 10	12.75	0.50	+30'	TBD
	VF 11	12.75	0.50	+30'	TBD
	VF 12	12.75	0.50	+30'	TBD

TO BE DEVELOPED

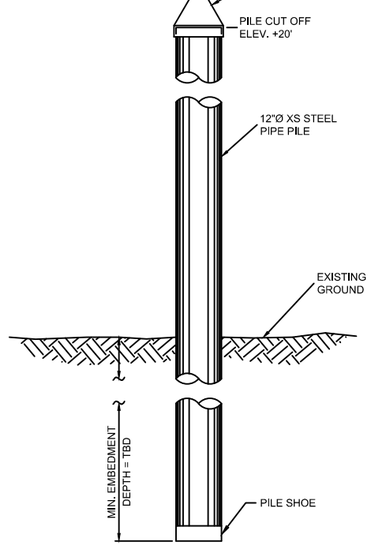
SECTION

TO BE DEVELOPED

PILE SPLICE

TO BE DEVELOPED

PROFILE



PILE SECTION - 1"=60'

NOTE(S):

1. Base Plan from PND Engineers, INC.

Pile Schedule and Details

APPLICANT: PND Engineers
PROJECT NAME: Port of Kalama Marina Renovation
REFERENCE #:
SITE LOCATION ADDRESS: 110 West Marine Drive Kalama, WA 98625

PURPOSE: Marina Restoration

DATUM: NAVD 29-47
ADJACENT PROPERTY OWNERS:

PROPOSED: Overwater Area Increase
IN Columbia River
NEAR:
COUNTY: Cowlitz **STATE:** WA
SHEET 17 **OF** 17
DATE: 8/23/16

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

Ecological Land Services

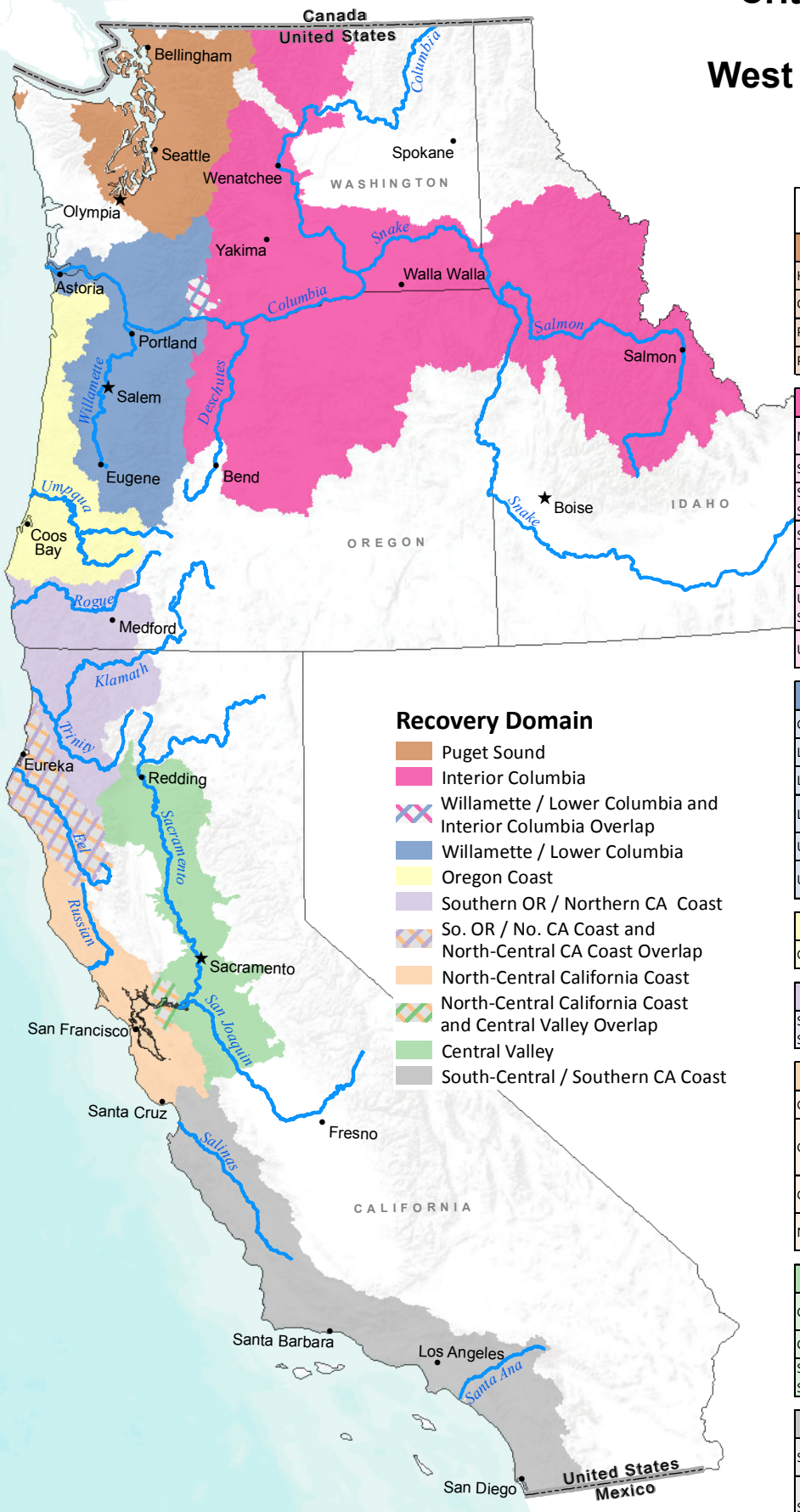
APPENDIX A

Official Species Lists:

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

NOAA FISHERIES

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,

Critical Habitat Rules Cited

- 2/24/2016 (81 FR 9252) Final Critical Habitat Designation for Puget Sound Steelhead and Lower Columbia River Coho Salmon
- 2/11/2008 (73 FR 7816) Final Critical Habitat Designation for Oregon Coast Coho Salmon
- 9/2/2005 (70 FR 52630) Final Critical Habitat Designation for 12 ESU's of Salmon and Steelhead in WA, OR, and ID
- 9/2/2005 (70 FR 52488) Final Critical Habitat Designation for 7 ESU's of Salmon and Steelhead in CA
- 10/25/1999 (64 FR 57399) Revised Critical Habitat Designation for Snake River Spring/Summer-run Chinook Salmon
- 5/5/1999 (64 FR 24049) Final Critical Habitat Designation for Central CA Coast and Southern OR/Northern CA Coast Coho Salmon
- 12/28/1993 (58 FR 68543) Final Critical Habitat Designation for Snake River Chinook and Sockeye Salmon
- 6/16/1993 (58 FR 33212) Final Critical Habitat Designation for Sacramento River Winter-run Chinook Salmon

ESA Listing Rules Cited

- 4/2/2012 (77 FR 19552) Final Range Extension for Endangered Central California Coast Coho Salmon
- 2/11/2008 (73 FR 7816) Final ESA Listing for Oregon Coast Coho Salmon
- 5/11/2007 (72 FR 26722) Final ESA Listing for Puget Sound Steelhead
- 1/5/2006 (71 FR 5248) Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead
- 6/28/2005 (70 FR 37160) Final ESA Listing for 16 ESU's of West Coast Salmon
- 5/1/2002 (67 FR 21586) Range Extension for Endangered Steelhead in Southern California
- 6/7/2000 (65 FR 36074) Final ESA Listing for Northern California Steelhead
- 9/16/1999 (64 FR 50394) Final ESA Listing for Two Chinook Salmon ESUs in California
- 3/25/1999 (64 FR 14508) Final ESA Listing for Hood River Canal Summer-run and Columbia River Chum Salmon
- 3/25/1999 (64 FR 14517) Final ESA Listing for Middle Columbia River and Upper Willamette River Steelhead
- 3/25/1999 (64 FR 14528) Final ESA Listing for Ozette Lake Sockeye Salmon
- 3/24/1999 (64 FR 14308) Final ESA Listing for 4 ESU's of Chinook Salmon
- 3/19/1998 (63 FR 13347) Final ESA Listing for Lower Columbia River and Central Valley Steelhead
- 8/18/1997 (62 FR 43937) Final ESA Listing for 5 ESU's of Steelhead
- 5/6/1997 (62 FR 24588) Final ESA Listing for Southern Oregon / Northern California Coast Coho Salmon
- 10/31/1996 (61 FR 56138) Final ESA Listing for Central California Coast Coho Salmon
- 1/4/1994 (59 FR 222) Final ESA Listing for Sacramento River Winter-run Chinook Salmon
- 4/22/1992 (57 FR 14653) Final ESA Listing for Snake River Spring/summer-run and Snake River Fall Chinook Salmon
- 11/20/1991 (56 FR 58619) Final ESA Listing for Snake River Sockeye Salmon
- 11/5/1990 (55 FR 46515) Final ESA Listing for Sacramento River Winter-run Chinook Salmon

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- Learn more about the Pacific Coastal Salmon Recovery Fund
- Log into my IFQ account
- Find a biological opinion
- Report a stranded or entangled marine mammal
- Report a violation
- Find grant opportunities

West Coast Region Home » Listed Species

Other ESA-Listed Species

Under the jurisdiction of NOAA Fisheries that may occur off the West Coast Region:

- **Black Abalone** (*Haliotis cracherodii*), throughout its range, endangered
- **White Abalone** (*Haliotis sorenseni*), throughout its range (California and Mexico),endangered
- Puget Sound distinct population segment, or DPS, of **bocaccio** *(Sebastes paucispinis)*, endangered
- Puget Sound distinct population segment, or DPS, of **yelloweye rockfish** *(Sebastes ruberrimus)*, threatened
- Southern distinct population segment, or DPS, of **eulachon (Columbia River smelt)** *(Thaleichthys pacificus)*, threatened
- Southern distinct population segment, or DPS, of **North American green sturgeon** *(Acipenser medirostris)*, threatened

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West Coast Region Home » Marine Mammals

ESA-Listed Marine Mammals

NOAA Fisheries has listed 22 species of marine mammals under the Endangered Species Act, where 8 of those species are from the West Coast. We manage 7 different species of cetaceans (listed below) and Guadalupe fur seals. NOAA Fisheries' **Alaska Region** manages Steller sea lions. The Alaska Fisheries Science Center's **Marine Mammal Laboratory does research on Steller sea lions**.

Blue Whales

Fin Whales

Guadalupe Fur Seals

Humpback Whales

Northern Pacific Right Whales

Sei Whales

Southern Resident Killer Whales

Sperm Whales

Steller Sea Lions * change in status, *delisted* as of December 2013

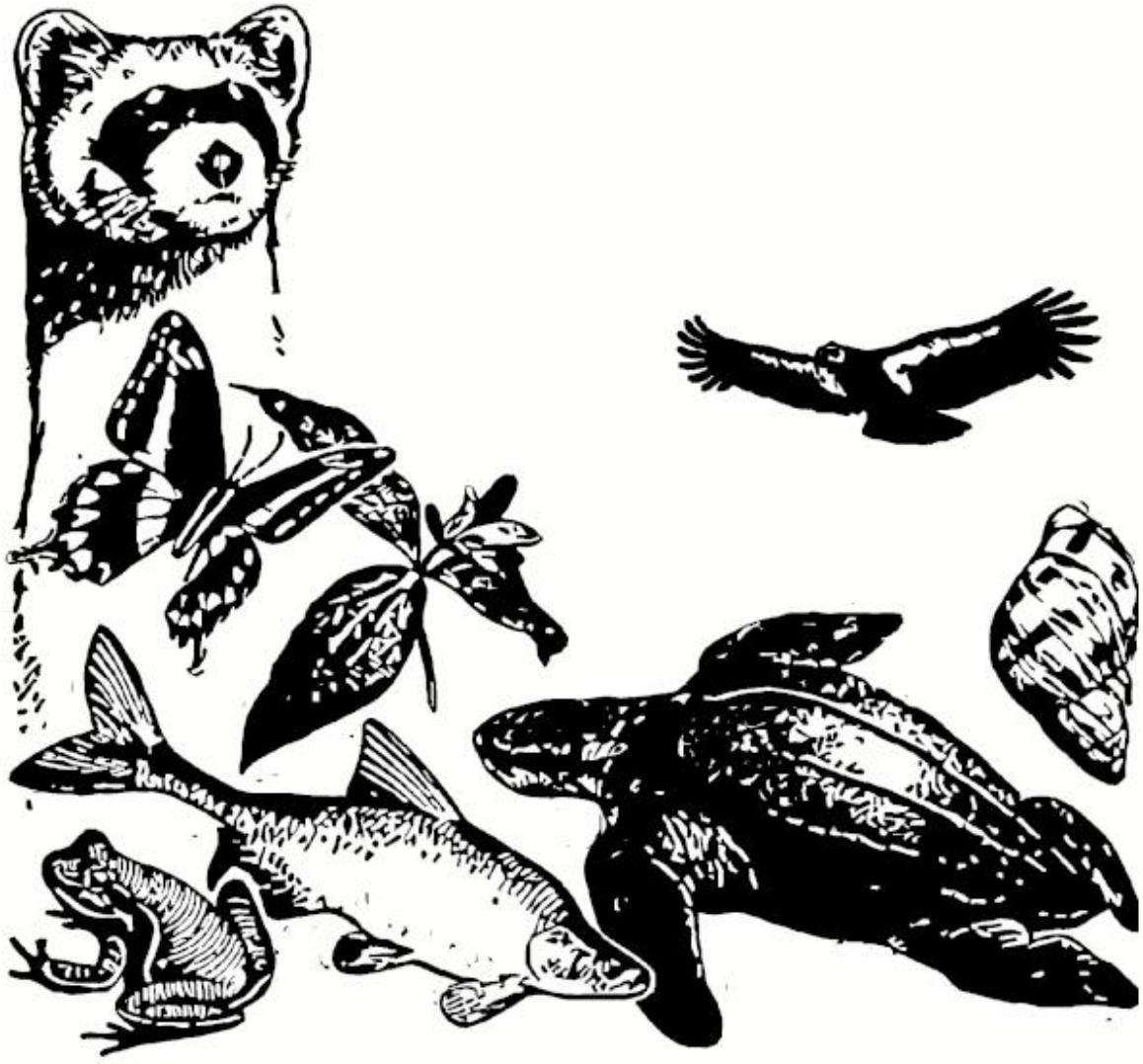
U.S. Fish & Wildlife Service

Port of Kalama - Marina Renovation

IPaC Trust Resources Report

Generated April 11, 2016 02:46 PM MDT, IPaC v3.0.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

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U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

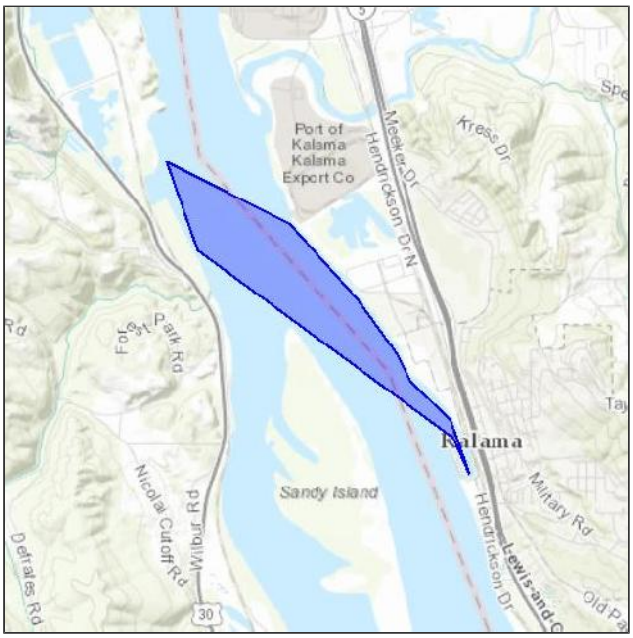
Port of Kalama - Marina Renovation

LOCATION

Oregon and Washington

IPAC LINK

https://ecos.fws.gov/ipac/project/YJCWJ-EYQFB-AHNDG-57ZHM-6HUB6M



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

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

Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
(503) 231-6179

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Marbled Murrelet Brachyramphus marmoratus

Threatened

MANAGED BY
Washington Fish And Wildlife Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B08C

Northern Spotted Owl Strix occidentalis caurina

Threatened

MANAGED BY
Oregon Fish And Wildlife Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B08B

Streaked Horned Lark Eremophila alpestris strigata

Threatened

MANAGED BY
Oregon Fish And Wildlife Office
Washington Fish And Wildlife Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0B3

Yellow-billed Cuckoo Coccyzus americanus

Threatened

MANAGED BY
Oregon Fish And Wildlife Office
Washington Fish And Wildlife Office

CRITICAL HABITAT
There is **proposed** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06R

Fishes

Bull Trout Salvelinus confluentus

Threatened

MANAGED BY
Oregon Fish And Wildlife Office
Washington Fish And Wildlife Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E065

Mammals

Columbian White-tailed Deer Odocoileus virginianus leucurus — Endangered

MANAGED BY
Oregon Fish And Wildlife Office
Washington Fish And Wildlife Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A002

Critical Habitats

This location overlaps all or part of the critical habitat for the following species:

Bull Trout Salvelinus confluentus
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E065#crithab

Chinook Salmon Oncorhynchus (=Salmo) tshawytscha
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E06D#crithab

Chinook Salmon Oncorhynchus (=Salmo) tshawytscha
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E06D#crithab

Chinook Salmon Oncorhynchus (=Salmo) tshawytscha
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E06D#crithab

Chum Salmon Oncorhynchus keta
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E09Q#crithab

Steelhead Oncorhynchus (=Salmo) mykiss
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D#crithab

Steelhead Oncorhynchus (=Salmo) mykiss
Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D#crithab

Steelhead Oncorhynchus (=Salmo) mykiss
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Steelhead Oncorhynchus (=Salmo) mykiss

Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D#crithab

Steelhead Oncorhynchus (=Salmo) mykiss

Final designated critical habitat
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E08D#crithab

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Caspian Tern Hydroprogne caspia — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Purple Finch Carpodacus purpureus — Bird of conservation concern
Year-round

Rufous Hummingbird selasphorus rufus — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0E1

Short-eared Owl Asio flammeus — Bird of conservation concern
Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Vesper Sparrow Pooecetes gramineus ssp. affinis — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F9

Western Grebe aechmophorus occidentalis — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EA

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Riverine

R1UBV	62000.0 acres
R1USR	13.6 acres

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

APPENDIX B

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 B-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).

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.

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 C

Listed Species in the Lower Columbia River by Life Stage

Table C-1. 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.

APPENDIX D

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 intrusion, 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.
- New visitors' dock floats and boats temporarily moored could cause increased shading, leading to increased predation on juveniles.
- Vibratory pile driving noise will cause temporary behavioral effects within 1,120 feet of the marina for 25 days.

Conclusions

The project **will not adversely affect** essential fish habitat for the following reasons:

- Underwater noise from pile driving will be intermittent, below the injury level and will occur only periodically for 25 days.
- Comparing the total increase in overwater area and piling (6,513.1 sf) to the area of replaced solid floats, gangways, and creosote piling (8,025 + 210 + 9 = 8,244 sf), the ratio is 1.2 to 1. Based on this analysis and preliminary feedback from National Marine Fisheries Services (NMFS), Washington Department of Fish and Wildlife (WDFW), and the City of Kalama, this project is self-mitigating.
- The fuel system, including the tanks, fuel lines, and fuel dispensers will have leak-detection capabilities.