

Biological Assessment

MORROW PACIFIC PROJECT



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April 2012

**BIOLOGICAL ASSESSMENT
FOR
THE MORROW PACIFIC PROJECT**

**MORROW AND COLUMBIA COUNTIES, OREGON,
AND THE COLUMBIA RIVER NAVIGATION CHANNEL,
PORT OF MORROW TO THE COLUMBIA BAR**

APRIL 2012

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LIST OF ACRONYMS

BA	Biological Assessment
BMP	Best Management Practice
dB	Decibel
CALTRANS	California Department of Transportation
CFR	Code of Federal Regulations
CR	Columbia River
DEQ	Oregon Department of Environmental Quality
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
ESU	Evolutionarily Significant Unit
FHWA	Federal Highway Administration
FHWG	Fisheries Hydroacoustic Working Group
FPC	Fish Passage Center
FR	Federal Register
HAPC	Habitat Areas of Particular Concern
HDPE	High-Density Polyethylene
LCFRB	Lower Columbia Fish Recovery Board
LCR	Lower Columbia River
m	Meter
MCR	Middle Columbia River
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NPCC	Northwest Power and Conservation Council
ODFW	Oregon Department of Fish and Wildlife
OGV	Ocean-Going Vessel
OHWE	Ordinary High Water Elevation
ORBIC	Oregon Biodiversity Information Center
OWRD	Oregon Water Resources Department
PCE	Primary Constituent Element
PFMC	Pacific Fisheries Management Council
RM	River Mile
RMS	Root Mean Square Pressure
SAR	Stock Assessment Report
SEL	Sound Exposure Level
SF	Square Feet
SR	Snake River
SRB	Snake River Basin
SWPP	Stormwater Pollution Prevention Plan
UCR	Upper Columbia River
USACE	U.S. Army Corps of Engineers

USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWR	Upper Willamette River
W.M.	Willamette Meridian
WSDOT	Washington State Department of Transportation

EXECUTIVE SUMMARY

Coyote Island Terminal, LLC, a division of Ambre Energy North America, has contracted with Anderson Perry & Associates, Inc., to prepare a Biological Assessment (BA) and Section 10 Permit application for the Morrow Pacific project. The project is funded by Ambre Energy North America. A permit from the U.S. Army Corps of Engineers (USACE) will be required for in-water work, which constitutes the federal nexus. Endangered Species Act (ESA) consultation will be initiated by the USACE.

The purpose of this project is to develop an environmentally responsible coal transfer facility in the Pacific Northwest for export of low-sulfur Montana coal to United States trade allies in Asia. The project was designed to minimize train traffic through urban areas, reduce the exposure of coal to the environment, and use existing infrastructure while minimizing impacts to the environment. The project involves transporting coal on existing rail lines to a new coal handling facility near Boardman, Oregon (Morrow County), transloading the coal by a telescoping chute to enclosed barges and transporting it down the Columbia River to an existing dock near Clatskanie, Oregon (Columbia County), and then transferring the coal through enclosed conveyors from barges to ocean-going vessels (OGV) for export.

Construction will only occur at the Port of Morrow site near Boardman, and will take approximately 10 to 12 months. Construction at this site includes installation of mooring and breasting dolphins, installation of a walkway and enclosed conveyor, construction of the upland coal storage facility, and planting/site restoration. The recommended in-water work window for the portion of this project in Morrow County is December 1 to March 31, when salmonid abundance in the area is at seasonal minimums, and all work below the ordinary high water elevation (OHWE) will take place during this period. Work outside of the OHWE may occur year-round as weather permits. Site restoration will include seeding disturbed upland areas and planting woody species on the disturbed riverbank areas.

Other activities that will take place as part of the proposed project include barge traffic downstream in the existing Columbia River navigation channel to Port Westward, near Clatskanie, and transloading the coal from the barges to OGV. The coal will then be shipped out the Columbia River via established shipping lanes. No in-water or terrestrial construction activities are planned for the Port Westward site, as there is an existing dock at the site.

The proposed project will result in unavoidable impacts to protected species and critical habitat as project activities take place. Impacts are expected to be primarily behavioral and not likely to result in mortality. Based on this conclusion and the implementation of conservation measures during project construction, and assuming compliance with all other permit conditions, it is anticipated that the proposed project will have effects on listed species, designated critical habitat, and Essential Fish Habitat (EFH), as shown in Table ES-1.

Table ES-1. Listed Species Affected by the Morrow Pacific Project

Species	ESU ¹ /DPS ²	ESA Determination	Critical Habitat Determination	EFH Determination
Steelhead (<i>Oncorhynchus mykiss</i>)	Upper Columbia River DPS	LTAA ³	LTAM ⁴	-- ⁵
	Middle Columbia River DPS	LTAA	LTAM	
	Lower Columbia River DPS	LTAA	LTAM	
	Upper Willamette River DPS	LTAA	LTAM	
	Snake River Basin DPS	LTAA	LTAM	
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	Upper Columbia River spring-run ESU	LTAA	LTAM	LTAA
	Lower Columbia River ESU	LTAA	LTAM	
	Snake River fall-run ESU	LTAA	LTAM	
	Snake River spring/summer-run ESU	LTAA	LTAM	
	Upper Willamette River ESU	LTAA	LTAM	
Chum salmon (<i>Oncorhynchus keta</i>)	Columbia River ESU	LTAA	LTAM	--
Coho salmon (<i>Oncorhynchus kisutch</i>)	Lower Columbia River ESU	LTAA	--	LTAA
Sockeye salmon (<i>Oncorhynchus nerka</i>)	Snake River ESU	LTAA	LTAM	--
Bull trout (<i>Salvelinus confluentus</i>)	Columbia River DPS	LTAA	LTAM	--
Green sturgeon (<i>Acipenser medirostris</i>)	Southern DPS	LTAA	LTAM	--
Eulachon (<i>Thaleichthys pacificus</i>)	Southern DPS	LTAA	LTAM	--
Steller sea lion (<i>Eumetopias jubatus</i>)	Eastern DPS	NLTAA ⁶	NAM ⁷	--
Killer whale (<i>Orcinus orca</i>)	Southern Resident DPS	NLTAA	NAM	--
Humpback whale (<i>Megaptera novaeangliae</i>)	--	NLTAA	--	--
Fin whale (<i>Balaenoptera physalus</i>)	--	NLTAA	--	--
Sei whale (<i>Balaenoptera borealis</i>)	--	NLTAA	--	--
Sperm whale (<i>Physeter catodon</i>)	--	NLTAA	--	--
Blue whale (<i>Balaenoptera musculus</i>)	--	NLTAA	--	--
Leatherback turtle (<i>Dermochelys coriacea</i>)	--	NLTAA	NAM	--
Green turtle (<i>Chelonia mydas</i>)	--	NLTAA	NAM	--
Loggerhead turtle (<i>Caretta caretta</i>)	North Pacific Ocean DPS	NLTAA	--	--
Olive ridley turtle (<i>Lepidochelys olivacea</i>)	--	NLTAA	--	--
Coastal Pelagic species	--	--	--	No Effect
Pacific Coast Groundfish	--	--	--	NLTAA

¹Evolutionarily Significant Unit, ²Distinct Population Segment, ³May Affect, Likely to Adversely Affect, ⁴May Affect, Likely to Adversely Modify,

⁵Not Applicable, ⁶May Affect, Not Likely to Adversely Affect, ⁷No Adverse Modification

1.0 INTRODUCTION

1.1 Background

Coyote Island Terminal, a division of Ambre Energy North America, proposes to transport low-sulfur coal from Montana to U.S. trade allies in Asia. Three modes of transport are involved: rail, barges, and OGVs. First, coal treated with surfactants will be transported from coal mines along an existing rail line from Montana to the Port of Morrow where the coal will be offloaded in an indoor stilling shed, temporarily stored in enclosed storage barns, and then loaded through telescoping chutes onto enclosed barges to be transported down the Columbia River to Port Westward, where it will be transferred by enclosed conveyors to OGVs that will carry the coal across the Pacific Ocean to Asian markets. New facilities associated with the project consist of a coal transfer facility at the Port of Morrow and covered barges. All other components of the project involve use of existing facilities, including rail lines, rail cars, the Port Westward dock, and OGVs.

On May 16, 2011, the Port of Morrow Commission approved the development of the Port of Morrow coal transfer facility, and in a public meeting on January 26, 2012, the Port of St. Helens Commission approved the lease option for the transloading facility at Port Westward, near Clatskanie, Columbia County, Oregon.

The coal transfer facility at the Port of Morrow near Boardman, Morrow County, Oregon, will consist of five new components: enclosed storage buildings, enclosed coal conveyor system, loading dock with enclosed telescoping loader, dock walkway, and dolphins for moorage. Outside of the storage buildings, the remaining components are associated with in-water construction. The loading dock facility at the Port of Morrow was designed to allow the moorage of a four-barge tow.

Once the coal is loaded onto enclosed barges at the Port of Morrow, the barges will transport the coal down the Columbia River in the existing navigation channel, through the John Day, The Dalles, and Bonneville Dams, to a transloading facility at Port Westward. Panamax-sized OGVs will moor at the existing dock, and the river barges will moor alongside, such that a floating transloader can transfer the coal from the barges to the OGVs. No terrestrial or in-water construction is anticipated at the Port Westward site. The OGVs will transfer the coal through the remainder of the Columbia River to the Pacific Ocean and, subsequently, Asian markets.

This BA has been prepared in association with the USACE Joint Permit Application filed for the project to obtain a Section 10 Permit under the Rivers and Harbors Act of 1899. The USACE has jurisdiction over the proposed construction at the Port of Morrow and associated transportation within the Columbia River.

1.2 Project Information

Project Name:	Morrow Pacific Project
Location:	Columbia River at Port of Morrow River Mile (RM) 271 HUC-6: 170701 T4N, R25E, Section 2, Willamette Meridian (W.M.), Morrow County, Oregon Columbia River at Port Westward RM 53 HUC-6: 170800 T8N, R4W, Section 37, W.M., Columbia County, Oregon Columbia River between the Port of Morrow (RM 271) and the Columbia Bar (RM -5)
Project Applicant:	Coyote Island Terminal, LLC Ambre Energy North America 170 S. Main Street, Suite 700 Salt Lake City, Utah 84101 Contact – John Thomas, Secretary (801) 539-3788
Preparer:	Anderson Perry & Associates, Inc. 1901 N. Fir Street La Grande, Oregon 97850 Contact – Sue Brady, Biologist (541) 963-8309

1.3 Action Area

The ESA requires that potential effects to listed and proposed endangered and threatened species be evaluated in relation to the complex extent of area influenced by the proposed action, referred to as the action area (50 CFR Part 402.02). The action area encompasses the location(s) where measurable direct and indirect effects resulting from the proposed action are foreseeable and are reasonably certain to occur (USFWS, 1998; NMFS, 1996).

The action area includes all areas that could be potentially affected by the proposed action and is not limited to the actual construction and operation areas as defined in Section 3 of this BA.

For this BA, the action area is defined as three primary components:

1. **Port of Morrow.** This action area component consists of the enclosed storage buildings, enclosed coal conveyor system, loading dock with enclosed loader, dock walkway, dolphins for moorage, and all associated adjacent areas that could be impacted by Coyote Island's activities at the Port of Morrow. The Port of Morrow facility is at RM 271.
2. **Columbia River between the Port of Morrow and Port Westward.** This action area component consists of the Columbia River (below the OHWE) from the Port of Morrow to Port Westward. This project component involves use of established shipping lanes in the Columbia River by barges.
3. **Port Westward and Columbia River/Pacific Ocean.** This action area component consists of the Columbia River from Port Westward (RM 53) to its terminus with the Pacific Ocean, out to and including the Columbia Bar located approximately five miles offshore. This project component consists of transferring coal from barges to OGVs at Port Westward and use of established shipping lanes in the Columbia River to the Columbia Bar by OGVs.

Overall, the action area includes a total of 276 miles of Columbia River channel below the OHWE, plus approximately 35 acres of upland area at the new Port of Morrow facility at Boardman.

1.4 Project Purpose and Need

The purpose of the proposed project is to develop and successfully operate an environmentally responsible coal transfer facility in the Pacific Northwest for export of low-sulfur Montana coal to U.S. trade allies in Asia. The project has been designed to minimize train traffic through major urban areas, reduce the exposure of coal to the atmosphere, and use existing infrastructure while minimizing impacts to the environment.

A coal transfer/transloading facility at the Port of Morrow, with an in-stream transloading facility at an existing dock at Port Westward, will begin to provide a secure route for high-value coal to supply the substantial and growing need of trade allies in Asia, establish an environmentally responsible coal export facility, and operate a socially responsible industry in Oregon. The upstream location of the facility at the Port of Morrow reduces the distance traveled and number of urban areas crossed by trains from Montana carrying coal treated with dust suppressant. At the two transfer and transloading facilities (Port of Morrow and Port Westward), coal is nearly fully enclosed as it moves from train to storage facility to covered barge to OGV, minimizing exposure of coal or coal dust to humans or the environment. At the Port of Morrow through to Port Westward, the Morrow Pacific project creates local, family-wage jobs in Oregon, supports mining-related jobs nationally, and provides low-sulfur coal to Asian countries to generate electricity.

2.0 EVALUATION METHODS

Factors considered in evaluating project impacts include federally listed species' dependence on specific habitat components that would be removed or modified, the abundance and distribution of habitat, habitat components in the project vicinity, distribution and population levels of the species, the possibility of direct impact to the species, the degree of impact to habitat, and the potential to mitigate adverse effects.

The National Marine Fisheries Service (NMFS) Matrix of Pathways and Indicators described in *Making Endangered Species Act Determination of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS, 1996) was used to assess the current condition of various steelhead and salmon habitat parameters. The U.S. Fish and Wildlife Service (USFWS) matrix described in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS, 1998) was used to assess the current condition of bull trout habitat parameters.

Further information on resources in the action area was obtained through the use of online databases, site visits, watershed planning documents, and ongoing personal communication with agency personnel. Port of Morrow and Port Westward site data were collected during site surveys conducted in January 2012. Other data were collected from previous studies conducted in the Port of Morrow site vicinity, as well as aquatic surveys conducted within the Columbia River. The Washington State Department of Transportation (WSDOT) Construction Noise Impact Analysis methods (WSDOT, 2011) were used to evaluate the hydroacoustic impacts of construction at the Port of Morrow.

Anderson Perry staff met with Gary Miller (USFWS) and Spencer Hovekamp (NMFS) on November 29, 2011, to discuss preliminary project consultation needs, and on February 24, 2012, with Ben Meyer (NMFS) to discuss more detailed requirements for preparation of this BA. In addition, Oregon Department of Fish and Wildlife (ODFW) personnel were consulted on January 23, 2012 (Bill Duke, ODFW Pendleton office) and January 31, 2012 (John North, ODFW Clackamas office) to discuss listed fish species potentially present in the action area and the timing of their presence at the Port of Morrow and Port Westward sites.

3.0 PROJECT DESCRIPTION

Descriptions of all elements involved in the proposed action are included in this section. Please see Figures 1 through 10 in Appendix A for location and vicinity maps, aerial photographs, tax lot maps, conceptual design renderings, estimated hydroacoustic impact, and planting plan. Photographs of existing site conditions are presented in Appendix B. Construction details for the Port of Morrow site are shown on the plan sheets in Appendix C.

3.1 Port of Morrow

Development at the Port of Morrow will include construction of coal storage buildings, enclosed coal conveyor system, loading dock with telescoping loader, dock walkway, and dolphins. These facilities will be located on approximately 35 acres of uplands as well as the adjacent Columbia River shoreline and substrate below the OHWE (see Figure 1B, Appendix A).

3.1.1 Coal Storage Building and Staging

For the coal storage buildings, approximately 24 acres of existing vegetation will be removed, the site will be graded, and three new storage buildings will be placed at the site, along with a train unloading barn (stilling shed) and enclosed conveyor structure (see Figure 6, Appendix A). The storage buildings will be directly adjacent to the rail line. The new conveyor system will be adjacent to the southwest corners of the three buildings and will cross the rail line to the dock.

One temporary staging area (approximately 0.5 acre) is planned between the railroad tracks and the shoreline (see Figure 2A, Appendix A). Disturbed areas will be reseeded with native grassland species.

3.1.2 Coal Conveyor System

The elevated conveyor will be approximately 30 feet wide and 270 feet long, located above water, and supported by up to three reinforced concrete capped support bents (see Figure 4, Appendix A). The conveyor will be elevated from 50 to 90 feet above the water surface. The landward support bent portion will be entirely above the OHWE and will consist of 32 16-inch diameter round steel piles that will be installed with vibratory and impact hammers to a depth of 35 feet. The support bents may be installed using a land-based crane located 150 feet upland from the OHWE. The support bents will be constructed near the top of the existing bank above the OHWE to provide a transition between the shore and the fixed dock.

Two concrete capped support bents will be installed in the water. These support bents consist of ten 24-inch diameter round steel piles installed to a minimum depth of 35 feet. The total area of physical impact at the water surface is 62.8 SF. Prior to installation of each bent, four 16-inch diameter temporary template piles will be

installed with a vibratory hammer to support the installation of the permanent piles. Once the permanent piles have been installed, the template piles will be removed. Refer to Section 3.1.7, Pile Driving, for a description of the pile driving, associated noise levels, and mitigation planned for the project to minimize underwater noise impacts.

The completed conveyor will be enclosed and have a telescoping chute to eliminate potential fugitive dust. The enclosed conveyor will create a non-grated, solid metal surface above the water of 8,100 square feet (SF). In addition, the two concrete pile caps will create an above-water surface area of 960 SF. The elevation of the top of the conveyor will be set to allow a clearance of at least 50 feet between the conveyor and the water surface at the OHWE. This elevation was chosen for operability, as well as to limit shadow casting under the conveyor. The total above-water surface area of the elevated conveyor and pile caps is 9,060 SF, and the total area of impact at the water surface is 71 SF.

3.1.3 Loading Dock

The elevated fixed dock will be approximately 6 feet wide and 275.5 feet long, supported by up to four bents (see Figures 4 and 5, Appendix A). Each support bent will consist of two 16-inch diameter round steel piles that will be installed with a vibratory hammer mounted on a barge and supported by two supply barges. Piles will be installed to a depth of approximately 35 feet. Prior to installation of each bent, two 16-inch diameter temporary template piles will be installed with a vibratory hammer to support the installation of the permanent piles. Once the permanent piles have been installed, the template piles will be removed. Six permanent piles will be installed below the OHWE and two will be installed above the OHWE for the elevated fixed dock.

The elevation of the top of the fixed dock will be set to allow a clearance of at least 9 feet between the dock and the water surface at the OHWE to allow more light penetration under the dock. In addition, the surface of the dock will be grated. The total above-water surface area of the elevated fixed dock is 990 SF, and the total area of physical impact at the water surface is 8.4 SF.

3.1.4 Dock Walkway

The elevated fixed walkway will be approximately 4 feet wide and 1,160 feet long, supported by 30 support bents (see Figure 4, Appendix A). Each support bent will consist of two 14-inch diameter round steel piles that will be installed with a vibratory hammer mounted on a barge supported by two supply barges. Piles will be installed to a depth of approximately 25 feet. Prior to installation of each bent, two 16-inch diameter temporary template piles will be installed with a vibratory hammer to support the installation of the permanent piles. Once the permanent piles have been installed, the template piles will be removed. All piles will be installed below the OHWE.

The surface of the walkway will consist of grated expanded metal decking. The elevation of the top of the walkway will be set to allow a clearance of at least 9 feet between the walkway and the water surface at the OHWE to allow more light penetration under the walkway. The total above-water surface area of the walkway is 4,232 SF, and the total area of impact at the water surface is 66 SF.

3.1.5 Dolphins

In addition to the dock, conveyor, and walkway structures, two mooring dolphins and seven breasting dolphins will be constructed (see Figure 6, Appendix A).

Mooring Dolphins. One mooring dolphin will be installed at the upstream and downstream ends of the structure, for a total of two dolphins. Each dolphin will consist of six 16-inch diameter battered steel piles. Prior to installation of the permanent piles, four temporary template piles will be installed with a vibratory hammer to support the installation of the permanent piles. Once the permanent piles have been installed, the template piles will be removed. A metal bracing will be installed two feet above the pool height at the time of construction. Avian anti-perching devices will be installed atop the piles.

Breasting Dolphins. Seven breasting dolphins will be installed between the two mooring dolphins, adjacent to the walkway. The breasting dolphins will be 160 feet apart at the OHWE. Six dolphins will consist of six battered steel piles (16-inch diameter) and one dolphin will consist of five battered steel piles (16-inch diameter). In addition, three high-density polyethylene (HDPE) fender piles (18-inch diameter) will be installed on the dolphin face using only a vibratory hammer. Prior to installation of the permanent piles, four temporary template piles will be installed with a vibratory hammer to support the installation of the permanent piles. Once the permanent piles have been installed, the template piles will be removed. A metal bracing will be installed 2 feet above the pool height at the time of construction. Avian anti-perching devices will be installed atop the piles.

3.1.6 Construction

3.1.6.1 Upland Facilities

Construction of upland facilities will occur from 2012 through 2014. These facilities will consist of the negative pressure enclosed storage buildings, a train unloading barn, and the conveyor structure components that are on land. Existing vegetation will be removed, the property graded, and structures erected at the site beginning in fall 2012. Hay bales and a silt fence will be placed along the construction site perimeter. One storage building, the train unloading barn, and the conveyor structure will be constructed within 10 to 12 months. The remaining two storage buildings will be constructed within three years of initial site construction. Prior to commencing construction, an Erosion and Sediment

Control Plan (ESCP) will be prepared and approved by the Oregon Department of Environmental Quality (DEQ). A sediment fence, bioswales, and other erosion control methods for on-site stormwater containment will be installed along the shoreline side of the property to avoid runoff and soil loss onto the shoreline and into the Columbia River. No materials disposal will be needed. The contractor will limit disturbance of riverbank and upland sites to that area required for buildings and staging. Thus, removal of vegetation will be kept to the minimum required for construction activities. No woody vegetation will be removed. Once construction is complete, the remaining disturbed areas will be restored to original slopes and planted and seeded with native grass and woody species.

Upland construction of the coal unloading, storage, and transfer facility will be conducted prior to, during, and after the mooring facility construction and will occur outside the in-water work window. The Port of Morrow facility will use the best available technologies, such as wet scrubbers and enclosed conveyors, to reduce dust and spillage and improve environmental and occupational safety.

3.1.6.2 In-water Facilities

Construction of in-water facilities is planned for the ODFW recommended in-water work window for the project area, which is December 1 through March 31. The loading dock facility will incorporate the following major components of work and new in-water structures:

1. Construction staging.
2. Construction of an elevated, fixed dock and conveyor system supported by four two-pile dock support bents, as well as three concrete capped conveyor support bents. The dock deck will be expanded metal.
3. Construction of an elevated, fixed operation personnel access (walkway) supported by 12 bents, each consisting of two 14-inch diameter round steel piles with expanded metal deck. This structure will provide a safe walkway for workers mooring and loading barges.
4. Construction of nine dolphins installed adjacent to the walkway to assist in vessel mooring activities.
5. Restoration.

The riverward edge of the loading dock facility will extend approximately 190 feet from the OHWE of 268 feet, at a water depth of approximately 28 feet.

Staging and primary construction of the Port of Morrow dock facility will occur from three barges: one barge for the crane and pile driving equipment and two barges for materials delivery and staging. The crane barge will have two spuds that will be used throughout the project; the materials barges will be tied to the crane barge and will not require the use of spuds. Spuds are heavy steel piles used to moor the barge. The piles will be located in a well at the bottom of the

crane barge and will function as anchors for the three barges. Crews will access the barges daily on a 16-foot aluminum crew boat launched from the Port of Morrow recreational dock approximately two miles downstream.

No in-water work area isolation or fish salvage is planned, as NMFS has determined that it is not necessary for this project (NMFS, 2012f).

3.1.7 Pile Driving

3.1.7.1 Piling Installation

Oregon Water Resources Department (OWRD) well logs indicated that the substrate in the Port of Morrow area of the Columbia River is composed of coarse-grained alluvium, mainly sand with some gravel (OWRD, 2012). According to the pile driving logs obtained from the 2006 construction of the Tidewater Ethanol Dock, located immediately upstream of the proposed project, bedrock is located at approximately 35 feet below the mud line. Due to the dense substrate in the work area, it is anticipated that an impact hammer and a vibratory hammer will be needed for installation of elevated conveyor support bents and all the main dolphin piles. A vibratory hammer will be used to the extent feasible. All pile driving activities will take place from barges, and equipment will not be required to enter the water. Barge-mounted pile driving equipment includes:

Vibratory Hammer. The vibratory hammer is a common tool used to install steel piles in appropriate sediment. Methods for its use begin by placing a choker around the pile and lifting it into a vertical position with a crane. Then the pile is lowered into position and set in place at the mud line. The pile is held steady while the vibratory hammer installs the pile to the required tip elevation. A total of 194 permanent and 118 temporary piles will be driven by the vibratory hammer.

Impact Hammer. For load-bearing structures to meet design criteria and ensure proper functioning, piles must often be proofed by striking them with an impact hammer. An impact hammer is a large steel device that works with a hydraulic or diesel piston with a guide that holds the hammer in alignment with the pile while the piston moves up and down, striking the top of the pile and driving it into the substrate from the downward force of the hammer on the top of the pile. While the impact hammer is used, an observer will record the distance the pile is embedded with each impact hammer blow. A bubble curtain will be employed during impact hammer installation or proofing of steel piles to reduce the peak (instantaneous) decibel (dB) levels, cumulative sound exposure levels (SEL), and root mean square (RMS) pressure. In addition, acoustic monitoring will be conducted according to the NMFS monitoring protocol. A total of 105 piles will require the use of an impact hammer.

A summary of the number of pilings, size, and driving method is presented in Table 3-1.

Table 3-1. Summary of Pilings Needed for the Port of Morrow Construction

Structure		Number, Size, and Installation Method for Piles									Total Number of Piles
		Permanent Below OHWE			Permanent Above OHWE			Temporary Below OHWE			
Elevated Fixed Dock (3 bents)		6	16"	V ¹	2	16"	V	6	16"	V	14
Elevated Conveyor (3 bents total)	1 Above OHWE	N/A			32	16"	V/I	N/A			32
	2 Below OHWE	20	24"	V/I ²	N/A			16	16"	V	36
Elevated Fixed Walkway (30 bents)		60	14"	V	N/A			60	16"	V	120
Mooring Dolphins (2)		12	16"	V/I	N/A			8	16"	V	20
Breasting Dolphins (7)		41	16"	V/I	N/A			28	16"	V	69
		21	18"	V				N/A			21
Total Number of Piles		160			34			118			312
No. of Piles Requiring Impact Hammer		73			32			0			105

¹V – Only vibratory hammer used

²V/I – Vibratory and impact hammers used

For vibratory driving, typically three to four permanent piles per day are driven. Thus, approximately 55 days of pile driving using the vibratory hammer will be required to install 194 permanent piles.

Prior to using the impact hammer, either a confined or unconfined bubble curtain (as specified by NMFS) will be installed around the piles to reduce peak dB levels. Based on pile driving logs from adjacent facilities, it is estimated that each pile would require up to 150 strikes. The elevated conveyor support bents will require a total of up to 1,500 strikes per day, representing less than five hours of impact driving. The mooring and breasting dolphins will require a total of up to 900 strikes per day, representing less than five hours of impact driving. A summary of the number of strikes and estimated time is shown in Table 3-2.

Table 3-2. Impact Hammer Use at the Port of Morrow

Structure		No. Piles	Strikes Per Pile	Total Strikes	Total Time (assuming 2 sec/strike)	Number of Days
Elevated Conveyor Bents	1 Above OHWE	32	150	4,800 (maximum 1,500 per day)	2.7 hours	3.2
	2 Below OHWE	20	150	3,000 (maximum 1,500 per day)	1.7 hours	2
Mooring Dolphins (2)		12	150	1,800 (maximum 900 per day)	1 hour	2
Breasting Dolphins (7)		41	150	6,150 (maximum 900 per day)	3.4 hours	6.8
Total		105 Piles		15,750 Strikes	8.8 Hours	14 Days

In summary, a total of 312 piles will be used for the proposed project, 194 of which will be permanent. Use of the vibratory hammer for 312 temporary and permanent piles will occur over 55 days. Of the permanent piles, 105 will require impact driving (73 below the OHWE). Assuming the maximum number of strikes per day, approximately 9 hours over 14 days (not necessarily consecutive) will be required for all impact hammer driving activities during the course of project construction.

3.1.7.2 Distance to Underwater Sound Thresholds

Noise and sound analyses are generally conducted using metric units. Thus, this section of the BA also includes metric distances for noise, consistent with industry practices. NMFS has used sound threshold levels for fish since 2005, and these criteria were revised in 2008 (FHWG, 2008). Table 3-3 provides the current thresholds for underwater noise levels by functional group for fish. These thresholds represent levels of sound that produce either a behavioral disturbance (e.g., disruption of migration or foraging) or injury (e.g., internal tissue damage, hearing loss, or death) to fish within the threshold radius (Hastings and Popper, 2005).

Table 3-3. Fish Injury and Disturbance Thresholds for Underwater Construction Activity

Functional Group	Underwater Noise Thresholds		
	Vibratory Pile Driving Disturbance Threshold	Impact Pile Driving Disturbance Threshold	Injury Threshold
Fish \geq 2 grams	Behavior Effects Threshold 150 dB RMS		187 dB cumulative SEL
Fish < 2 grams			183 dB cumulative SEL
Fish All Sizes			206 dB peak

The proposed construction at the Port of Morrow will involve piling installation using vibratory and impact hammers, which produce sound levels above the thresholds for fish disturbance and injury. The WSDOT guidance and calculator for estimating the distances to the noise thresholds for various piling sizes were used to evaluate the distance to each threshold for each of the piling sizes that will be used in the project (WSDOT, 2011). These findings are presented in Table 3-4. Installation techniques that were considered include un-attenuated impact driving, attenuated impact driving (includes use of a bubble curtain), and vibratory driving. Attenuation for pile driving is defined as decreasing the sound level, and for this project consists of use of a bubble curtain to confine the noise within the bubble curtain. Attenuation would only be used for impact driving. A graphical representation of the noise level distances at the Port of Morrow site is shown in Figure 7, Appendix A, using the threshold distances for the 24-inch pilings, as they represent the greatest hydroacoustic impact.

The elevated conveyor piles installed above the OHWE using an impact driver may have some hydroacoustic effects; however, this will be less than the in-water impact driving effects. Therefore, the pilings installed above the OHWE were not addressed in the hydroacoustic effects analysis below, as the in-water driving provides a more conservative estimate of hydroacoustic effects.

Table 3-4. Underwater Distance to Noise Thresholds for Pilings Installed at the Port of Morrow

Pile Size and Action		Distance (m) to Threshold			
		Fish Injury			Fish Disturbance
		Peak (206 dB)	SEL (187 dB)	SEL (183 dB)	RMS (150 dB)
14-inch Pilings	Vibratory Driving Received Level ¹				162 dB RMS @ 22m
	No Attenuation	N/A	N/A	N/A	139
16-inch Pilings	Impact Driving Received Level ²	200 dB peak @ 9m	170 dB SEL @ 22m	170 SEL @ 22m	187 dB RMS @ 9m
	Impact Pile Driving No Attenuation	4	5	10	2,636
	Impact Pile Driving with -10 dB for Attenuation	1	1	2	568
	Vibratory Driving Received Level ¹				167 dB RMS @ 9m
	No Attenuation	N/A	N/A	N/A	122
18-inch Pilings	Vibratory Driving Received Level ¹				167 dB RMS @ 10m
	No Attenuation	N/A	N/A	N/A	122
24-inch Pilings	Impact Driving Received Level ²	212 dB peak @ 10m	181 dB SEL @ 10m	181 dB SEL @ 10m	189 dB RMS @ 10m
	Impact Pile Driving No Attenuation	25	522	964	3,981
	Impact Pile Driving with -10 dB for Attenuation	5	112	208	858
	Vibratory Driving Received Level ¹				169 dB RMS @ 10m
	No Attenuation	N/A	N/A	N/A	185

¹Vibratory driving assumes 20 dB lower than RMS levels for impact driving.

²All received level values taken or estimated from WSDOT BA guidance, Table 7-9 (WSDOT, 2011).

In summary, a vibratory hammer will be used to install 312 temporary and permanent piles (see Table 3-1), which will result in fish disturbance out to a maximum of 185 meters (607 feet) from the area of vibratory pile driving (see Table 3-4) and will occur up to a maximum of 55 days. Vibratory pile driving will result in fish disturbance but not result in fish injury (see Table 3-4). No bubble curtain would be used for vibratory pile driving.

An impact hammer will also be used on 105 of the 312 piles, of which 73 will be below the OHWE (20 24-inch piles and 53 16-inch piles) (see Table 3-1). Use of the impact hammer would occur over 14 days and include use of a bubble curtain to lessen sound effects to aquatic organisms, including fish. Use of a bubble curtain would reduce noise impacts by up to four to five times relative to the noise impacts that would have occurred if a bubble curtain were not used (see Table 3-4).

Use of the impact hammer with a bubble curtain for the 20 24-inch piles would result in maximum noise impacts of:

- fish injury to all sizes at peak (instantaneous) sound levels up to 5 meters (16 feet) from the driving activity,
- cumulative injury to fish ≥ 2 grams in size up to 112 meters (367 feet) from pile driving activity,
- cumulative injury to fish < 2 grams in size up to 208 meters (682 feet) from pile driving activity, and
- disturbance to all fish regardless of size up to 858 meters (2,815 feet) from pile driving activity (see Tables 3-3 and 3-4).

Use of an impact hammer with a bubble curtain for the 53 16-inch piles would result in fish injury at a distance of up to 2 meters (7 feet) from the pile driving activity regardless of fish size and fish disturbance at a distance of up to 568 meters (1,863 feet) from the pile driving activity (see Tables 3-3 and 3-4).

3.1.8 Equipment

Limited land-based equipment will be used for construction of the dock facility. A land-based crane may be needed for placement of the conveyor system. If used, the crane would be located 150 feet beyond the OHWE in an upland location. In addition, a loader and backhoe may be used in the upland staging area.

As discussed in Section 3.1.7.1, Piling Installation, in-water work will take place from three floating barges. One barge will be mounted with a crane and pile driving equipment, while the others will be used for supplies and will be tied to the first barge. A tug will be on site and used to move barges around the work area. The tug and barges will be equipped with hazardous materials cleanup kits and floating booms and will follow a spill-prevention plan.

3.1.9 Restoration

The contractor will limit disturbance of the riverbank and upland sites. Removal of vegetation will be kept to the minimum required for construction activities. No woody vegetation will be removed. Once construction is complete, the disturbed shoreline areas will be restored to original slopes and planted and seeded with native grass and woody species. Additional mitigation for near-shore habitat loss will be accomplished through the removal of existing derelict piles from the Columbia River at a future location to be developed in cooperation with NMFS. The number of derelict piles and their location are yet to be determined.

3.1.10 Site Operation

Coal will be offloaded from the rail cars and stored in enclosed, negative-pressure storage buildings and transferred into enclosed barges via enclosed conveyors (see Figures 4, 5, and 6, Appendix A). The barges will be maneuvered at the mooring facility using a tug, which will then transport the four-barge tow down river. No permanent tug will be assigned to the Port of Morrow facility. Fueling for the tugs will take place at an existing dock at Vancouver, Washington, and the tugs will be docked there when not in use.

3.2 Columbia River Between the Port of Morrow and Port Westward

When the project is operating at full capacity, approximately one to two four-barge tows per day will be required to transport coal from the Port of Morrow to Port Westward. Each barge will have a capacity of 2,727 metric tons (3,500 short tons). The draft of each barge when fully loaded or ballasted will be 13.6 feet, and the draft when empty will be 2.5 feet. The average speed of the four-barge tow will be approximately 6 to 9 knots upstream and 7 to 10 knots downstream. The barges will be required to pass through three lock systems (John Day Dam, The Dalles Dam, Bonneville Dam), and will take approximately 38 hours to travel from the Port of Morrow to Port Westward using established shipping lanes.

The barges will be enclosed, as will the loading conveyer system at the Port of Morrow and the floating transloader at Port Westward, to avoid environmental contamination and loss of coal and coal dust during transport and loading.

The barges will receive coal at the Port of Morrow facility and travel down the Columbia River to Port Westward. One of the barges in the four-barge tow will be ballast-capable. After the coal is unloaded at Port Westward, the empty barges will travel upstream to the Tidewater dock at Vancouver, Washington, where the empty ballast-capable barge will be ballasted, to protect the empty barges from drift when traveling upstream. The four-barge tow with three empty barges and one ballasted barge will travel upstream to the Port of Morrow, where the ballast water will be released into the Columbia River. Coal will then be loaded in all four barges.

A summary of the anticipated increase in barge and vessel (four-barge tow) traffic, considering the project at full capacity (8.0 million metric tons per year), is presented in Table 3-5, below. Current and historic high traffic levels were obtained from the USACE Navigation Center traffic counts at the Bonneville Dam from 1993 through 2010 (USACE, 2011a). Note that the additional traffic levels presented below represent barge and tow round-trips (i.e., each barge is counted twice, for the upriver and downriver trips).

**Table 3-5. Summary of Barge and Tow Traffic per Year
at Bonneville Dam for Project Full Capacity**

Additional Traffic from the Project (Per Year)		Total Traffic	Bonneville Dam		Effect Relative to:	
			Current Level (2010)	Historic High (1995)	Current Levels (2010)	Historic High Levels (1995)
Total Barges	5,029	10,382	5,353	8,037	94% increase	29% increase
Total Tows	1,258	3,972	2,714	4,040	46% increase	98% of historic high

The total number of barges and the number of vessels (barge tows) on the Columbia River will increase above current levels as a result of the proposed project. When compared to historic high levels, there is a 29 percent increase in the total number of individual barges, although the total number of vessels (barge tows) will remain lower than the historic high level.

3.3 Port Westward and Columbia River/Pacific Ocean

The proposed action at Port Westward involves the use of an existing commercial loading dock facility (see Figure 1C, Appendix A) near Clatskanie to facilitate operations of the Morrow Pacific project. Coal will be transloaded from the enclosed barges onto OGVs, and then shipped out of the Columbia River using established shipping lanes.

The existing dock at Port Westward was built in the early 1940s as part of a military facility, and has most recently been used as a commercial loading dock for ethanol and diesel. The OGV will moor to the dock, and the barge tow will pull up alongside (see Figure 9, Appendix A). Transloading will be accomplished through the use of a floating transloader (see Figure 10, Appendix A) with an enclosed transfer system. No terrestrial or aquatic construction is proposed at this time, as the dock and access roads that serve it are adequate for the proposed use.

When the project is operating at full capacity, approximately two to three OGVs per week will leave Port Westward, for a total of approximately 133 ships per year. Each vessel will have a capacity of 60,000 metric tons. These vessels will be approximately 700 to 900 feet long and 105 feet wide, with a draft when fully loaded of approximately 41 feet (draft of 18 feet before loading). The average speed of the OGV will be approximately 10 to 12 knots when traveling both upstream and downstream. Fueling for the OGVs will likely be accomplished using a bunker barge based out of Portland, Oregon. The vessels may be fueled at the Port

Westward dock, but this will more likely take place while the OGVs are at anchor farther downstream.

One tug will be assigned permanently to Port Westward to maneuver the barges. This tug will return to a dock at Vancouver, Washington, for fueling and when not in use at Port Westward. Barges will be staged along the upstream 600 feet of dock when they are not being unloaded. Some off-site barge staging may occur at existing tie-offs located in the Vancouver harbor area, on the north side of Hayden Island and at Mathews Point. These tie-offs consist of barges that are spudded to the river bottom in 15 to 20 feet of water.

A summary of the anticipated increase in OGV traffic, considering the project at full capacity (8.0 million metric tons), is presented in Table 3-6, below. Current and historic high traffic levels were obtained from the Merchants Exchange of Portland traffic counts for vessel arrivals to the lower Columbia River from 1992 through 2011 (Merchants Exchange, 2011).

Table 3-6. Summary of OGV Traffic per Year in the Lower Columbia River for Project Full Capacity

Additional Traffic from the Project (Per Year)		Total Traffic	Arrivals to the Columbia River		Effect Relative to:	
			Current Level (2010)	Historic High (1995)	Current Levels (2010)	Historic High Levels (1995)
OGV	133	1,690	1,557	2,413	9% increase	70% of historic high

The total number of OGVs in the lower Columbia River will show a slight increase above current levels as a result of the proposed project; however, OGV traffic will remain lower than the historic high level.

4.0 NATURAL HISTORY AND SPECIES OCCURRENCE

Species lists for this project were obtained from the USFWS and NMFS on January 7, 2012, for species present in Morrow and Columbia Counties. These species could be affected from development at the Port of Morrow, operation of barges between the Port of Morrow and Port Westward, and operation of OGVs downstream of Port Westward. A database search of the Oregon Biodiversity Information Center (ORBIC) identified 20 records of rare species within a two-mile radius of the Columbia and Morrow County project areas (ORBIC, 2012). For the presence of threatened and endangered species at the mouth of the Columbia River and the nearshore marine portion of the action area, the list of species developed for the project titled "Major Rehabilitation of the Jetty System at the Mouth of the Columbia River" was used, as presented in the 2011 NMFS Biological Opinion for that project (NMFS, 2011b). In addition, NMFS requested evaluation of several sea turtle species for this BA (NMFS, 2012c). Appendix D contains the information used to identify the federally listed species to be evaluated for this BA.

The federally listed species that may occur in the action area are provided in Table 4-1 along with their federal and state status and presence of critical habitat. The presence and use of the area by the listed species are described in the following sections.

Table 4-1. ESA Listed and Proposed Species in the Action Area

Species	ESU/DPS	Federal Status	State Status (OR) ¹	Critical Habitat in Action Area
Steelhead (<i>Oncorhynchus mykiss</i>)	Upper Columbia River DPS	T	--	Y
	Middle Columbia River DPS	T	SC	Y
	Lower Columbia River DPS	T	SC	Y
	Upper Willamette River DPS	T	SV	Y
	Snake River Basin DPS	T	SV	Y
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	Upper Columbia River spring-run ESU	E	--	Y
	Lower Columbia River ESU	T	SC	Y
	Snake River fall-run ESU	T	LT	Y
	Snake River spring/summer-run ESU	T	LT	Y
	Upper Willamette River ESU	T	SC	Y
Chum salmon (<i>Oncorhynchus keta</i>)	Columbia River ESU	T	SC	Y
Coho salmon (<i>Oncorhynchus kisutch</i>)	Lower Columbia River ESU	T	LE	--
Sockeye salmon (<i>Oncorhynchus nerka</i>)	Snake River ESU	E	--	Y
Bull trout (<i>Salvelinus confluentus</i>)	Columbia River DPS	T	SC	Y
Green sturgeon (<i>Acipenser medirostris</i>)	Southern DPS	T	--	Y
Eulachon (<i>Thaleichthys pacificus</i>)	Southern DPS	T	--	Y

Species	ESU/DPS	Federal Status	State Status (OR) ¹	Critical Habitat in Action Area
Steller sea lion (<i>Eumetopias jubatus</i>)	Eastern DPS	T	--	N
Killer whale (<i>Orcinus orca</i>)	Southern Resident DPS	E	--	N
Humpback whale (<i>Megaptera novaeangliae</i>)	--	E	LE	--
Blue whale (<i>Balaenoptera musculus</i>)	--	E	LE	--
Fin whale (<i>Balaenoptera physalus</i>)	--	E	LE	--
Sei whale (<i>Balaenoptera borealis</i>)	--	E	LE	--
Sperm whale (<i>Physeter catodon</i>)	--	E	LE	--
Leatherback turtle (<i>Dermochelys coriacea</i>)	--	E	LE	Y
Green turtle (<i>Chelonia mydas</i>)	--	T	LE	N
Loggerhead turtle (<i>Caretta caretta</i>)	North Pacific Ocean DPS	E	LT	--
Olive ridley turtle (<i>Lepidochelys olivacea</i>)	--	T	LT	--

¹ SC = Sensitive Critical, SV = Sensitive Vulnerable, LT = Listed Threatened, LE = Listed Endangered,
 -- = Not Applicable

Summaries of when listed fish species may be present at the Port of Morrow and Port Westward sites are presented in Tables 4-2 and 4-3. These tables were prepared based on conversations with ODFW biologists (ODFW 2012a, 2012b) and review of adult and smolt passage data from McNary Dam (representative of timing at Port of Morrow) and Bonneville Dam (representative of timing at Port Westward) from the Fish Passage Center web site (FPC, 2012b and 2012c). Outside of these two sites, fish use of the Columbia River represents a continuum based on run timing, as upstream or downstream movement occurs during migration. Adult fish would be found at upstream reaches later than downstream reaches, as they migrate upstream, and the opposite would be true for juvenile fish migrating downstream. In addition, juveniles may be found in the lower reaches of the river (downstream of Port Westward) for a significant portion of the year, as estuarine areas represent important rearing habitat while juveniles make the physiological transition from fresh water to salt water.

Table 4-2. Timing of Fish Presence in the Columbia River at Port of Morrow (RM 271)

Species	ESU/DPS		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ODFW In-water Work Window														
Steelhead	Upper Columbia River	Adult	migration											
		Juvenile	migration and limited rearing											
	Middle Columbia River	Adult	migration											
		Juvenile	migration and limited rearing											
	Snake River Basin	Adult	migration											
		Juvenile	migration and limited rearing											
Chinook	Upper Columbia River spring-run	Adult				migration								
		Juvenile	migration and limited rearing											
	Snake River fall-run	Adult								migration				
		Juvenile	migration and limited rearing											
	Snake River spring/summer-run	Adult				migration								
		Juvenile	migration and limited rearing											
Sockeye	Snake River	Adult						migration						
		Juvenile	migration and limited rearing											
Bull Trout	Columbia River	Adult	overwintering and foraging			upstream movement						overwintering and foraging		
		Juvenile	migration and limited rearing											

Table 4-3. Timing of Fish Presence in the Columbia River at Port Westward (RM 53)

Species	ESU/DPS		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
Steelhead	Upper Columbia River	Adult						migration							
		Juvenile	rearing/migration												
	Middle Columbia River	Adult						migration							
		Juvenile	rearing/migration												
	Lower Columbia River	Adult	migration					migration							migration
		Juvenile	rearing/migration												
	Upper Willamette River	Adult	migration											migration	
		Juvenile	rearing/migration												
	Snake River Basin	Adult						migration							
Juvenile		rearing/migration													
Chinook	Upper Columbia River spring-run	Adult			migration										
		Juvenile	rearing/migration												
	Lower Columbia River	Adult			migration							migration			
		Juvenile	rearing/migration												
	Snake River fall-run	Adult								migration					
		Juvenile	rearing/migration												
	Snake River spring/summer-run	Adult			migration										
		Juvenile	rearing/migration												
Upper Willamette River	Adult			migration											
	Juvenile	rearing/migration													
Chum	Columbia River	Adult											migration		
		Juvenile	rearing/migration												
Coho	Lower Columbia River	Adult							migration						
		Juvenile	rearing/migration												
Sockeye	Snake River	Adult						migration							
		Juvenile	rearing/migration												
Bull Trout	Columbia River	Adult/subadult	unlikely to be present												
		Juvenile	not present												
Green Sturgeon	Southern	Adult/subadult							foraging						
		Juvenile	not present												
Eulachon	Southern	Adult	migration/spawning											m/s	
		Juvenile	rearing/migration												

4.1 Steelhead

Five steelhead DPSs will be affected by the proposed project. A DPS is a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or distinct population segments of vertebrate species.

According to StreamNet (2012), the action area is used as a migration corridor for adults, and juveniles may use it for migration and rearing. Please see Tables 4-2 and 4-3 for a summary of when the five steelhead DPSs may be present at the Port of Morrow and Port Westward. The entire length of the action area is located within critical habitat for Upper Columbia River, Middle Columbia River, and Snake River Basin ESUs, whereas critical habitat for Lower Columbia River and Upper Willamette River ESUs is located well downstream of the construction area at the Port of Morrow.

For the Port of Morrow site, steelhead adults and juveniles from three DPSs (Upper Columbia River, Middle Columbia River, and Snake River Basin) may occur at the site during the construction in-water work window (see Table 4-2). For the remainder of the Columbia River, adults and juveniles from all five DPSs occur during different seasons of the year (see Table 4-3).

Adult steelhead pass McNary Dam in the greatest numbers from mid-June through mid-November although small numbers are recorded passing the site through the remainder of the year. Adult steelhead passage at Bonneville Dam occurs primarily from early June through October (FPC, 2012b). Juvenile steelhead pass McNary and Bonneville Dams primarily during April through June but small numbers are recorded throughout the year as some fish rear over the winter in Columbia River reservoirs prior to completing their smolt migrations (FPC, 2012c).

Information describing steelhead status and use of the Columbia River was obtained from listings in the Federal Register, 5-year reviews, and critical habitat descriptions, and is summarized below.

4.1.1. General Background Pertinent to the Columbia River

Anadromous steelhead populations in the Columbia River can be broadly divided into two life history forms: summer-run (which migrate upstream as adults from mid-May through mid-October) and winter-run (which migrate upstream as adults from mid-November to early April). Summer-run (stream-maturing) steelhead enter fresh water sooner than winter-run steelhead and require several months to mature prior to spawning. Juvenile summer and winter steelhead migrate downstream as smolts primarily from mid-March through July and subadults typically spend one to three years in the ocean before maturing and migrating back to their natal streams to spawn (63 FR 11798).

4.1.2. Affected Distinct Population Segments

A discussion of the ESA listing status and designated critical habitat status follows for each DPS, as well as its use of the action area.

4.1.2.1. Upper Columbia River DPS

Current Status. Upper Columbia River (UCR) steelhead were listed as endangered on August 18, 1997 (62 FR 43937). This status was upgraded to threatened on January 5, 2006 (71 FR 834), reinstated to endangered status per U.S. District Court decision in June 2007, and re-upgraded to threatened per U.S. District Court order in June 2009 (74 FR 42605). The five-year review on August 15, 2011 (76 FR 50448) concluded that this species should remain listed as threatened. Critical habitat was designated on September 2, 2005 (70 FR 52630). This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the United States-Canada border, as well as six artificial propagation programs. This DPS exhibits a summer-run life history strategy.

Presence in Action Area. According to StreamNet (2012), the action area is used for steelhead migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that UCR steelhead are present in the Columbia River through the entire action area. Adults use the action area as a migration corridor, and juveniles use it for migration and rearing. The action area is not likely to be used for spawning (ODFW 2012a, 2012b). For the Port of Morrow site, UCR adult and juvenile steelhead may be present all year (see Table 4-2). For the Port Westward site, UCR adult steelhead are present from mid-May through mid-October (see Table 4-3) and juveniles may be present all year. The entire length of the action area is located within designated critical habitat for UCR steelhead (70 FR 52630).

4.1.2.2. Middle Columbia River DPS

Current Status. Middle Columbia River (MCR) steelhead were listed as threatened on March 25, 1999 (64 FR 14517). This status was reaffirmed on January 5, 2006 (71 FR 834) and upheld in the five-year review on August 15, 2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington, as well as seven artificial propagation programs. Steelhead from the Snake River Basin are excluded from this DPS. This DPS exhibits a summer-run life history strategy.

Presence in Action Area. According to StreamNet (2012), the action area is used for steelhead migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that MCR steelhead are present in the Columbia River through the entire action area. Adults use the action area as a migration corridor, and juveniles may use it for migration and rearing. The action area is not likely to be used for spawning (ODFW 2012a, 2012b). For the Port of Morrow site, MCR adult and juvenile steelhead may be present all year (see Table 4-2). For the Port Westward site, MCR steelhead adults are present from mid-May through mid-October and juveniles may be present all year (see Table 4-3). The entire length of the action area is located within designated critical habitat for MCR steelhead (70 FR 52630).

4.1.2.3. Lower Columbia River DPS

Current Status. Lower Columbia River (LCR) steelhead were listed as threatened on March 19, 1998 (63 FR 13347). This status was reaffirmed on January 5, 2006 (71 FR 834) and upheld in the five-year review on August 15, 2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive), as well as ten artificial propagation programs. Steelhead populations in the Upper Willamette River Basin above Willamette Falls, Oregon, and from the Little and Big White Salmon Rivers, Washington, are excluded from this DPS. This DPS exhibits both summer-run and winter-run life history strategies.

Presence in Action Area. According to StreamNet (2012), the action area is used for steelhead migration. A conversation with John North, ODFW biologist, confirmed that LCR steelhead are only present in the portion of the action area downstream of the confluence with the Hood River (RM 169). Adults use the action area as a migration corridor, and juveniles may use it for migration and rearing. The action area is not likely to be used for spawning (ODFW, 2012b). LCR steelhead are not present at the Port of Morrow site. For the Port Westward site, LCR adult steelhead may be present all year except from April through mid-May and mid-October through mid-November and juveniles may be present all year (see Table 4-3). The portion of the action area downstream of the Hood River (RM 169) is located within designated critical habitat for LCR steelhead (70 FR 52630).

4.1.2.4. Upper Willamette River DPS

Current Status. Upper Willamette River (UWR) steelhead were listed as threatened on March 25, 1999 (64 FR 14517). This status was reaffirmed on January 5, 2006 (71 FR 834) and upheld in the five-year review on August 15,

2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River (inclusive). This DPS exhibits a winter-run life history strategy.

Presence in Action Area. According to StreamNet (2012), the action area is used for steelhead migration. A conversation with John North, ODFW biologist, confirmed that UWR steelhead are only present in the portion of the action area downstream of the confluence with the Willamette River (RM 101). Adults use the action area as a migration corridor, and juveniles may use it for migration and rearing. The action area is not likely to be used for spawning (ODFW, 2012b). UWR steelhead are not present at the Port of Morrow site. For the Port Westward site, UWR adult steelhead may be present from mid-November through July and juveniles may be present all year (see Table 4-3). The portion of the action area downstream of the confluence with the Willamette River (RM 101) is located within designated critical habitat for UWR steelhead (70 FR 52630).

4.1.2.5. Snake River Basin DPS

Current Status. Snake River Basin (SRB) steelhead were listed as threatened on August 18, 1997 (62 FR 43937). This status was reaffirmed on January 5, 2006 (71 FR 834) and upheld in the five-year review on August 15, 2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This DPS includes all naturally spawned anadromous steelhead populations below natural and manmade impassable barriers in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho, as well as six artificial propagation programs. This DPS exhibits a summer-run life history strategy.

Presence in Action Area. According to StreamNet (2012), the action area is used for steelhead migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that SRB steelhead are present in the Columbia River through the entire action area. Adults use the action area as a migration corridor, and juveniles may use it for migration and rearing. The action area is not likely to be used for spawning (ODFW 2012a, 2012b). For the Port of Morrow site, SRB adult and juvenile steelhead may be present all year (see Table 4-2). For the Port Westward site, SRB adult steelhead may be present from mid-May through mid-October and juveniles may be present all year (see Table 4-3). The entire length of the action area is located within designated critical habitat for SRB steelhead (70 FR 52630).

4.1.3. Critical Habitat

Critical habitat for all five of the affected steelhead DPSs is described in terms of the following six primary constituent elements (PCEs) (70 FR 52630). Section 5.0, Baseline Conditions, provides more detailed information on existing habitat conditions and elements that support these PCEs within the action area.

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

4.2. Chinook Salmon

Five Chinook salmon ESUs will be affected by the proposed project. An evolutionarily significant unit is a Pacific salmon population or group of populations that is substantially reproductively isolated from other conspecific populations and that represents an important component of the evolutionary legacy of the species. The ESA provides for listing species, subspecies, or distinct population segments of vertebrate species.

According to StreamNet (2012), the action area is used as a migration corridor for adults, and juveniles may use it for migration and rearing. In addition, LCR Chinook salmon spawn in the action area near the Bonneville Dam (ODFW, 2012b). Please see Tables 4-2 and 4-3 for a summary of when the five Chinook salmon ESUs may be present at the Port of Morrow and Port Westward. The entire length of the action area is located within critical habitat for UCR spring-run, Snake River (SR) fall-run, and SR spring/summer-run ESUs, whereas critical habitat for LCR and UWR ESUs is located well downstream of the construction site at the Port of Morrow.

For the Port of Morrow site, Chinook salmon juveniles from three ESUs (UCR spring-run, SR fall-run, and SR spring/summer-run) and adults from two ESUs (UCR spring-run and SR spring/summer-run) may occur at the site during the in-water work window (see Table 4-2). Adult Chinook salmon, migrating upstream, begin passing McNary Dam in March with the largest numbers passing from mid-April through October (FPC, 2012b). USACE (2011b) uses the following dates as a general guide for separating Chinook runs as they pass McNary Dam: spring-run, April 1 through June 8 (although some begin arriving in March in some years); summer-run, June 9 through August 8; and fall-run, August 9 through October 31. Most juvenile Chinook, migrating downstream as smolts, pass McNary Dam from early April through early October although some are present throughout the year. The majority of yearling smolts, mostly spring- and summer-run, pass McNary Dam from April through June while sub-yearlings, mostly fall-run, pass from early May through early October (FPC, 2012c).

For Port Westward and the remainder of the Columbia River, adults and/or juveniles from all five ESUs may be present at some time during the year (see Table 4-3). Adult Chinook begin migrating past Bonneville Dam in March with the largest numbers passing from April through October (FPC, 2012b). USACE (2011b) uses the following general guide for separating runs of Chinook passing Bonneville Dam: spring-run, March 15 through May 31; summer-run, June 1 through July 31; and, fall-run, August 1 through November 15. Most Chinook juveniles migrate downstream as smolts past Bonneville Dam from March through August although some juveniles are present throughout the year. Yearling smolts generally pass Bonneville Dam from mid-March through June while sub-yearlings generally pass from April through August (FPC, 2012c).

Chinook salmon are regulated under a federal fishery management plan, and the provisions of the Magnuson-Stevens Act protecting EFH apply to all ESUs of this species (see Section 8.0 of this BA).

Information describing Chinook salmon status and use of the Columbia River was obtained from status listings in the Federal Register, 5-year reviews, and critical habitat descriptions, and is summarized below. The life history and habitat requirements of Chinook salmon are described in detail in *Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California* (Myers et al., 1998), which was used to describe habitat requirements and use of the action area.

4.2.1. General Background Pertinent to the Columbia River

Chinook salmon populations in the Columbia River can be broadly divided into three life history forms: spring-run (which migrate from late February through mid-June), spring/summer-run (which migrate from late February through late October), and fall-run (which migrate from mid-August through late November). Juveniles and subadults typically spend one to three years in the ocean before migrating back to their natal streams to spawn (Myers et al., 1998). Chinook salmon spawning (Lower Columbia River ESU) in the action area takes place only near Ives Island, downstream of the Bonneville Dam (ODFW, 2012b; StreamNet, 2012).

Chinook salmon migrate upstream from the ocean to spawn in freshwater streams and rivers. Eggs spawned in the fall remain in the redds and hatch the following spring. Fry, fingerlings, and smolts may have different emergence, movement, and migration patterns depending on seasonal temperatures and prey resource availability. Fingerlings may migrate downstream and distribute into other rearing areas upon emergence, or they may remain in their natal reach to rear and forage until the following spring. Outmigration of yearling spring/summer-run smolts typically occurs in the spring of the year following emergence, while most fall-run Chinook migrate during their first year. Chinook salmon require clean spawning gravel, cool water in summer and fall, and holding pools for pre-spawning adults. Rearing and foraging juveniles require slower moving, off-channel areas for resting and in-stream woody debris and streambank vegetation for cover (Myers et al., 1998).

4.2.2. Affected Evolutionarily Significant Units

A discussion of the ESA listing status and designated critical habitat status follows for each ESU, as well as its use of the action area.

4.2.2.1. Upper Columbia River Spring-run ESU

Current Status. UCR spring-run Chinook salmon were listed as endangered on March 24, 1999 (64 FR 14308). This status was reaffirmed on June 28, 2005 (70 FR 37160) and upheld in the five-year review on August 15, 2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This ESU includes all naturally spawned populations of spring Chinook salmon in all river reaches accessible to spring Chinook salmon in Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington, as well as six artificial propagation programs.

Presence in Action Area. According to StreamNet (2012), the action area is used for Chinook salmon migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that UCR spring-run Chinook salmon are present in the Columbia River through the entire action area. Adults use the action area as a migration corridor, and juveniles may use it for migration and rearing. The

action area is not likely to be used for spawning (ODFW 2012a, 2012b). For the Port of Morrow site, UCR adult Chinook salmon may be present from March through June while juveniles may be present all year (see Table 4-2). For the Port Westward site, UCR adult Chinook salmon may be present from mid-February through mid-June while juveniles may be present all year (see Table 4-3). The entire length of the action area is located within designated critical habitat for UCR spring-run Chinook salmon (70 FR 52630).

4.2.2.2. Lower Columbia River ESU

Current Status. LCR Chinook salmon were listed as threatened on March 24, 1999 (64 FR 14308). This status was reaffirmed on June 28, 2005 (70 FR 37160) and upheld in the five-year review on August 15, 2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This ESU includes all naturally spawned populations of Chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River, as well as seventeen artificial propagation programs. This ESU exhibits spring-run, fall tule, and late-fall bright life history strategies.

Presence in Action Area. According to StreamNet (2012), the action area is used for Chinook salmon migration, with an area immediately downstream of Bonneville Dam used for fall Chinook spawning. A conversation with John North, ODFW biologist, confirmed that LCR Chinook salmon are present in the portion of the action area downstream of the confluence with the Hood River (RM 169). Adults use the action area as a migration corridor, and juveniles may use it for migration and rearing. Spawning is present in the action area only near Bonneville Dam (ODFW, 2012b; FPC, 2012a). LCR Chinook salmon are not present at the Port of Morrow site. For the Port Westward site, LCR adult Chinook salmon may be present from mid-February through mid-November while juveniles may be present all year (see Table 4-3). The portion of the action area downstream of the confluence with the Hood River (RM 169) is located within the final designated critical habitat for LCR Chinook salmon (70 FR 52630).

4.2.2.3. Snake River Fall-run ESU

Current Status. SR fall-run Chinook salmon were listed as threatened on April 22, 1992 (57 FR 14653), with a correction on June 3, 1992 (57 FR 23458). This status was reaffirmed on June 28, 2005 (70 FR 37160) and upheld in the five-year review on August 15, 2011 (76 FR 50448). Critical habitat was designated on December 28, 1993 (58 FR 68543). This ESU includes all naturally spawned populations of fall-run Chinook salmon in the mainstem Snake River below Hells Canyon Dam, and in the Tucannon River, Grande Ronde River, Imnaha River,

Salmon River, and Clearwater River, as well as four artificial propagation programs.

Status in Action Area. According to StreamNet (2012), the action area is used for Chinook salmon migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that SR fall-run Chinook salmon are present in the entire action area. Adults and juveniles use the action area as a migration corridor, and juveniles may use it for rearing, especially the estuary. The action area is not likely to be used for spawning (ODFW 2012a, 2012b). For the Port of Morrow site, SR fall-run adult Chinook salmon may be present from August through October and juveniles may be present all year (see Table 4-2). For the Port Westward site, SR fall-run adult Chinook salmon may be present from mid-July through mid-October and juveniles may be present all year (see Table 4-3). The entire length of the action area is located within designated critical habitat for SR fall-run Chinook salmon (58 FR 68543).

4.2.2.4. Snake River Spring/summer-run ESU

Current Status. SR spring/summer-run Chinook salmon were listed as threatened on April 22, 1992 (57 FR 14653) and corrected on June 3, 1992 (57 FR 23458). This status was reaffirmed on June 28, 2005 (70 FR 37160) and upheld in the five-year review on August 15, 2011 (76 FR 50448). A final designation of critical habitat was published on December 28, 1993 (58 FR 68543) and revised on October 25, 1999 (64 FR 57399). This ESU includes all natural populations of spring/summer-run Chinook salmon in the mainstem Snake River and the Tucannon River, Grande Ronde River, Imnaha River, and Salmon River subbasins, as well as fifteen artificial propagation programs.

Presence in Action Area. According to StreamNet (2012), the action area is used for Chinook salmon migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that SR spring/summer-run Chinook salmon are present in the entire action area. Adults and juveniles use the action area as a migration corridor, and some juveniles may use it for rearing, especially the estuary. The action area is not likely to be used for spawning (ODFW 2012a, 2012b). For the Port of Morrow site, SR spring/summer-run adult Chinook salmon may be present from March through early August and juveniles may be present all year (see Table 4-2). For the Port Westward site, SR spring/summer-run adult Chinook salmon may be present from mid-February through July and juveniles may be present all year (see Table 4-3). The entire length of the action area is located within designated critical habitat for SR spring/summer-run Chinook salmon (58 FR 68543).

4.2.2.5. Upper Willamette River ESU

Current Status. UWR Chinook salmon were listed as threatened on March 24, 1999 (64 FR 14308). This status was reaffirmed on June 28, 2005 (70 FR 37160) and upheld in the five-year review on August 15, 2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This ESU includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon, as well as seven artificial propagation programs.

Presence in Action Area. According to StreamNet (2012), the action area is used for Chinook salmon migration. A conversation with John North, ODFW biologist, confirmed that UWR Chinook salmon are present in the portion of the action area downstream of the confluence with the Willamette River (RM 101). Adults use the action area as a migration corridor, and juveniles use it for migration and estuary rearing. The action area is not likely to be used for spawning (ODFW, 2012b). UWR Chinook salmon are not present at the Port of Morrow site. For the Port Westward site, UWR adult Chinook salmon may be present from mid-February through May and juveniles may be present all year (see Table 4-3). The portion of the action area downstream of the confluence with the Willamette River (RM 101) is located within the final designated critical habitat for UWR Chinook salmon (70 FR 52630).

4.2.3. Critical Habitat

Two separate Federal Register critical habitat designations apply to the various affected ESUs of Chinook salmon. Section 5.0, Baseline Conditions, provides more detailed information on existing habitat conditions and elements that support these PCEs within the action area.

4.2.3.1. Upper Columbia River Spring-run ESU Lower Columbia River ESU Upper Willamette River ESU

The September 2005 Federal Register (70 FR 52630) identifies six PCEs of critical habitat for these three ESUs. These are the same as for steelhead, listed in Section 4.1.3, Critical Habitat, above.

4.2.3.2. Snake River Spring/summer-run ESU Snake River Fall-run ESU

The December 1993 Federal Register (58 FR 68543) identifies four components of critical habitat for these two ESUs:

1. *Spawning and Juvenile Rearing Areas. This component is further broken out into specific habitat components, and includes (a) spawning gravel, (b) water quality, (c) water quantity, (d) water temperature, (e) cover/shelter, (f) food, (g) riparian vegetation, and (h) space.*
2. *Juvenile Migration Corridors. This component is further broken out into specific habitat components and include (a) substrate, (b) water quality, (c) water quantity, (d) water temperature, (e) water velocity, (f) cover/shelter, (g) food, (h) riparian vegetation, (i) space, and (j) safe passage conditions.*
3. *Areas for Growth and Development to Adulthood.*
4. *Adult Migration Corridors.*

4.3. Chum Salmon – Columbia River ESU

4.3.1. Current Status

Columbia River (CR) chum salmon were listed as threatened on March 25, 1999 (64 FR 14508). This status was reaffirmed on June 28, 2005 (70 FR 37160) and upheld in the five-year status review on August 15, 2011 (76 FR 50448). Critical habitat was designated on September 2, 2005 (70 FR 52630). This ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, as well as three artificial propagation programs.

4.3.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of chum salmon are described in detail in the proposed rule to designate chum salmon as a threatened species (63 FR 11774), which is included herein by reference. A summary follows to assist in the discussion of effects related to the proposed action.

Like most other salmonids this species is semelparous and requires stable gravel beds in cold freshwater rivers for spawning, but chum salmon spend more of their life history in marine waters than other Pacific salmonids. Chum salmon usually spawn in the lower reaches of coastal river systems, typically within 60 to 100 miles of the ocean, and juveniles migrate to the ocean almost immediately after emerging from the redds. Unlike other salmonids in the same genus, which spend months or years rearing in fresh water, this ocean-type migratory pattern means that juvenile chum salmon depend less on freshwater conditions than on favorable estuarine and marine conditions for growth and development (63 FR 11774).

4.3.3. Presence in Action Area

According to StreamNet (2012), the action area downstream of Bonneville Dam is used for chum salmon migration, with an area immediately downstream of the dam used for spawning. A conversation with John North, ODFW biologist, confirmed that chum salmon are not present at the Port of Morrow site and are present only downstream of Bonneville Dam. Adults use this portion of the action area as a migration corridor, and juveniles use it for rearing and migration (ODFW, 2012b). Spawning occurs within the action area downstream of the Bonneville Dam, primarily at the Ives Island complex (RM 143), the region around the mouth of Multnomah Creek (RM 136), and at the I-205 bridge (RM 113) (StreamNet, 2012; FPC, 2012a). For the Port Westward site, adult chum salmon may be present from mid-October through December and juveniles may be present from February through May (see Table 4-3). The portion of the action area downstream of the confluence with the Hood River (RM 169) is located within the designated critical habitat for CR chum salmon (70 FR 52630).

4.3.4. Critical Habitat

The September 2005 Federal Register (70 FR 52630) identifies six PCEs of critical habitat for CR chum salmon. These are the same as for steelhead, listed in Section 4.1.3, Critical Habitat, above. Section 5.0, Baseline Conditions, provides more detailed information on existing habitat conditions and elements that support these PCEs within the action area.

4.4. Coho Salmon – Lower Columbia River ESU

4.4.1. Current Status

LCR coho salmon were identified as a separate ESU and listed as threatened on June 28, 2005 (70 FR 37160). The LCR ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries from the mouth of the Columbia River up to and including the Big White Salmon and Hood Rivers, the Willamette River to Willamette Falls, Oregon, as well as 25 artificial propagation programs.

Critical habitat for LCR coho salmon has not been designated. However, coho salmon are regulated under a federal fishery management plan and the provisions of the Magnuson-Stevens Act protecting EFH apply to all ESUs of this species (see Section 8.0 of this BA).

4.4.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of coho salmon are described in detail in the proposed rule to designate coho salmon as a threatened species (63 FR 11774), which is included herein by reference. A summary follows to assist in the discussion of effects related to the proposed action.

Coho salmon migrate upstream to freshwater spawning habitats with stable gravel substrates. Like other salmon species, coho salmon require clean, cool waters for egg, larval, and juvenile growth and development. Smolts typically spend one to two years in fresh water, migrating downstream in the spring. Preferred summer and winter freshwater habitats consist of quiet areas with low velocity, such as backwater pools, beaver ponds, dam pools, and side channels, with winter habitats generally having greater water depth and more large woody debris (63 FR 11774).

4.4.3. Presence in Action Area

According to StreamNet (2012), the action area is used for LCR coho salmon migration, with an area immediately downstream of the Bonneville Dam used for limited spawning. A conversation with John North, ODFW biologist, confirmed that LCR coho salmon are present downstream of the confluence with the Hood River (RM 169). Adults use this portion of the action area as a migration corridor, with some spawning activity near Ives Island, downstream of the Bonneville Dam, and juveniles use this portion of the action area for rearing and migration (ODFW, 2012b; FPC, 2012a). For the Port Westward site, adult coho salmon may be present from mid-July through December, while juveniles may be present all year (see Table 4-3).

4.4.4. Critical Habitat

Critical habitat for LCR coho salmon has not been designated.

4.5. Sockeye Salmon – Snake River ESU

4.5.1. Current Status

SNAKE RIVER sockeye salmon were listed as endangered on November 20, 1991 (56 FR 58619). This status was reaffirmed on June 28, 2005 (70 FR 37160) and upheld in the five-year status review on August 15, 2011 (76 FR 50448). Critical habitat was designated on December 28, 1993 (58 FR 68543). The Snake River ESU includes all anadromous and residual sockeye salmon from the Snake River Basin, Idaho, as well as artificially propagated sockeye salmon from the Redfish Lake captive propagation program.

4.5.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of the various life history strategies of sockeye salmon are described in detail in *Status Review of Sockeye Salmon from Washington and Oregon* (Gustafson et al., 1997), which is included herein by reference. A summary follows to assist in the discussion of effects related to the proposed action.

Sockeye salmon are more frequently associated with lakes than other species of salmon and may be divided into three life-history forms: anadromous, residual, and kokanee.

Residual sockeye salmon and kokanee remain in fresh water for their entire life cycle; the term residual sockeye is used to identify resident, non-migratory offspring of anadromous sockeye salmon parents, and the term kokanee is used to identify entire populations that no longer migrate to the ocean. Residual and kokanee forms of sockeye salmon do not occur in the action area. Anadromous sockeye salmon rear for one to three years in their natal freshwater lake, migrate downstream and spend an additional one to four years at sea while growing to maturity, then migrate back to their natal freshwater habitat to spawn (Gustafson et al., 1997).

4.5.3. Presence in Action Area

According to StreamNet (2012), the action area is used for sockeye salmon migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that SR sockeye salmon may be present in the entire action area. Adults and juveniles use the action area as a migration corridor, and juveniles may be present at the Port of Morrow site during the in-water work window. The action area is not likely to be used for spawning (ODFW 2012a, 2012b). Sockeye salmon adults use the Port of Morrow area from mid-May through Mid-November, and juveniles may be present throughout the year (see Table 4-2). Sockeye salmon adults may occur at the Port Westward site from mid-May through August, and juveniles may be present throughout the year (see Table 4-3). The entire length of the action area is located within designated critical habitat for SR sockeye salmon (58 FR 68543).

4.5.4. Critical Habitat

The December 1993 Federal Register (58 FR 68543) identifies four PCEs of critical habitat for this species. These are the same as listed in Section 4.2.3.2, Critical Habitat, for SR spring/summer-run and SR fall-run Chinook salmon.

4.6. Bull Trout – Columbia River DPS

4.6.1. Current Status

Columbia River Basin bull trout were listed as threatened on June 10, 1998 (63 FR 31647). Critical habitat for Columbia River Basin bull trout was designated on September 26, 2005 (70 FR 56211) and revised on October 18, 2010, with an effective date of November 17, 2010 (75 FR 63898). This DPS encompasses the mainstem Columbia River and its tributaries, excluding the Jarbidge River in Nevada and east of the Continental Divide in Montana.

4.6.2. General Background Pertinent to the Columbia River

The life history of bull trout is described in detail in the final rule to list the Columbia River DPS as a threatened species (63 FR 31647). A summary follows to assist in the discussion of effects related to the proposed action.

Bull trout have more specific habitat requirements than most other salmonids and are found primarily in cold streams, although individual fish are found in larger, warmer river systems throughout the Columbia River Basin. Water temperature above 15°C (59°F) is believed to limit bull trout distribution. Resident and juvenile migratory bull trout prey on zooplankton, terrestrial and aquatic insects, and small fish, while adult migratory bull trout prey on various fish species. All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools. Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover.

Migratory corridors link seasonal habitats for all bull trout life histories. Migrations facilitate gene flow among local populations when individuals from different local populations interbreed, or stray to non-natal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants (63 FR 31647).

4.6.3. Presence in Action Area

According to StreamNet (2012), the portion of the action area upstream of Bonneville Dam is used for bull trout migration. Conversations with Bill Duke and John North, ODFW biologists, confirmed that a few bull trout may be present in the upstream portions of the action area (ODFW, 2012a), but are very rare in the area below Bonneville Dam (ODFW, 2012b). Adults use the upstream portions of the action area as overwintering and foraging habitat, and juveniles may use it for rearing when water temperatures are low enough. The action area is not likely to be used for spawning (ODFW 2012a, 2012b). Bull trout may be present at the Port of Morrow when water temperatures are low enough, primarily from October through June (see Table 4-2), but are unlikely to be present at Port Westward (see Table 4-3). The entire length of the action area is located within designated critical habitat for bull trout (75 FR 63898).

4.6.4. Critical Habitat

Bull trout critical habitat is described in terms of the following nine PCEs (75 FR 63898). Section 5.0, Baseline Conditions, provides more detailed information on existing habitat conditions and elements that support these PCEs within the action area.

1. *Water quality – springs, seeps, groundwater sources, and subsurface connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.*
2. *Migration corridors – 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.*

3. *Food availability – an abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.*
4. *In-stream habitat – complex river, stream, lake, reservoir, and marine shoreline aquatic environments; and processes with features such as large wood, side channels, pools, undercut banks and diverse substrates, to provide a variety of depths, gradients, velocities, and structure.*
5. *Water temperature – 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.*
6. *Substrate characteristics – substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.*
7. *Stream flow – 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.*
8. *Water quantity – sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.*
9. *Non-native species – few or no non-native fish; predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.*

4.7. Green Sturgeon – Southern DPS

4.7.1. Current Status

The southern DPS of green sturgeon was listed as threatened on April 7, 2006 (71 FR 17757). Critical habitat was designated on October 9, 2009 (74 FR 52300). This DPS includes all spawning populations of green sturgeon south of the Eel River (exclusive), principally including the Sacramento River green sturgeon spawning population.

4.7.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of green sturgeon are described in detail in the proposed critical habitat rule (73 FR 52084), which is included herein by reference. A summary follows to assist in the discussion of effects related to the proposed action.

Green sturgeon are large, slow-growing anadromous fish that spend most of their life cycle in the nearshore oceanic and estuarine environments of the Pacific coast of North America. This species is iteroparous, making repeated migrations into freshwater rivers to spawn. Spawning has been confirmed in only three rivers: the Rogue River in Oregon, the Klamath River in California (northern DPS), and the Sacramento River in California (southern DPS). Adult and subadult green sturgeon are found in certain estuaries in California, Oregon, and Washington during the summer and coastal marine waters in central California, Vancouver Island, and southeast Alaska during the winter. This species spends most of its time near the bottom of the water column in waters as deep as 350 feet and are benthic feeders, consuming shrimp, mollusks, crustaceans, and small fish.

The Columbia River estuary supports large summer aggregations of green sturgeon, with individuals from all known spawning populations, including the southern DPS (73 FR 52084).

4.7.3. Presence in Action Area

A conversation with John North, ODFW biologist, confirmed that adult and subadult southern DPS green sturgeon may be present in the lower portion of the Columbia River and are seen infrequently as far upstream as the Bonneville Dam (ODFW, 2012b). Green sturgeon use this portion of the action area as a migration corridor and summer foraging area from mid-June through mid-September. The Columbia River is not used for spawning, and juvenile green sturgeon are not present in the action area (ODFW, 2012b). The portions of the action area in the Columbia River estuary downstream of Wallace Island (RM 46), as well as the coastal marine area between the mouth of the Columbia River and the Columbia Bar are located within designated critical habitat for southern DPS green sturgeon (74 FR 52300).

4.7.4. Critical Habitat

Southern DPS green sturgeon critical habitat is described in terms of PCEs for the following three areas used by different life stages of the species (74 FR 52300). Section 5.0, Baseline Conditions, provides more detailed information on existing habitat conditions and elements that support these PCEs within the action area.

1. *Freshwater riverine systems. Components of this system include: (i) food resources providing abundant prey for larval, juvenile, subadult, and adult life stages; (ii) substrate type or size suitable for egg deposition and development,*

larval development, and subadults and adults; (iii) water flow regime necessary for normal behavior, growth, and survival of all life stages; (iv) water quality necessary for normal behavior, growth, and viability of all life stages; (v) migratory corridor necessary for the safe and timely passage of southern DPS fish within riverine and estuarine habitats; (vi) depth of holding pools (>5m) with adequate flow and water quality to maintain the physiological needs of holding adult and subadult fish; and (vii) sediment quality (i.e., chemical characteristics) necessary for normal behavior, growth, and viability of all life stages.

2. *Estuarine areas. Components of this system include: (i) food resources providing abundant prey for juvenile, subadult, and adult life stages; (ii) water flow regime within the Sacramento River bays and estuaries that is adequate to allow adults to successfully orient to the incoming flow and migrate upstream to spawning grounds; (iii) water quality necessary for normal behavior, growth, and viability of all life stages; (iv) migratory corridor necessary for the safe and timely passage of southern DPS fish within riverine and between estuarine and riverine or marine habitats; (v) depth diversity necessary for shelter, foraging, and migration of juvenile, subadult, and adult life stages; and (vi) sediment quality (i.e., chemical characteristics) necessary for normal behavior, growth, and viability of all life stages.*
3. *Nearshore marine waters. Components of this system include: (i) migratory corridors necessary for the safe and timely passage of southern DPS fish within marine and between estuarine and marine habitats; (ii) water quality in nearshore areas with adequate dissolved oxygen and acceptably low levels of contaminants that may disrupt the normal behavior, growth, and viability of adult and subadult green sturgeon; and (iii) food resources providing abundant prey items for subadults and adults, which may include benthic invertebrates and fishes.*

4.8. Eulachon – Southern DPS

4.8.1. Current Status

Southern DPS eulachon were listed as threatened on March 18, 2010 (75 FR 13012). Critical habitat was designated on October 20, 2011 (76 FR 65324). This DPS includes all populations spawning from the Skeena River in British Columbia (inclusive) south to the Mad River in northern California (inclusive).

4.8.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of eulachon are described in detail in the critical habitat listing (76 FR 65324), which is included herein by reference. A summary follows to assist in the discussion of effects related to the proposed action.

Eulachon are small anadromous fish, spending most of their life cycle in the ocean and migrating into the lower reaches of large rivers to spawn. This species is semelparous. Eggs are typically deposited onto sand or gravel and incubate for 20 to 40 days before hatching. The larvae are carried downstream into estuarine areas, where they may remain for several weeks. Larval and young juvenile eulachon are dispersed into nearshore marine environments by estuarine, tidal, and ocean currents. Once entering the ocean, eulachon tend to disperse to deeper areas over the continental shelf, and are mainly found near the bottom of the water column in waters between 60 and 300 feet deep, though occasionally to 600 feet deep. Larvae and juveniles eat phytoplankton, small crustaceans, and worm larvae, while oceanic adults eat zooplankton, mainly crustaceans. Spawning adults do not feed. Eulachon remain in the ocean for two to five years before returning to their natal streams to spawn.

The Columbia River Basin contains the highest production of eulachon south of Canada, primarily in the mainstem Columbia River and the Cowlitz River. Eulachon in the Columbia River system typically spawn in January, February, and March, when water temperatures are between 4°C and 10°C (39°F and 50°F). Spawning has been reported in the Columbia River between RM 35 and RM 73 (76 FR 65324).

4.8.3. Presence in Action Area

A conversation with John North, ODFW biologist, confirmed that southern DPS eulachon may be present in the lower portion of the Columbia River as far upstream as the Bonneville Dam. Adult eulachon use this portion of the action area as a migration corridor and spawning area from December through March, and juveniles use this area for rearing and migration from February through April (ODFW, 2012b). The portion of the action area from the Bonneville Dam (RM 146) to the mouth of the Columbia River is located within designated critical habitat for southern DPS eulachon (76 FR 65324).

4.8.4. Critical Habitat

Southern DPS eulachon critical habitat is described in terms of the following three essential features (76 FR 65324). Section 5.0, Baseline Conditions, provides more detailed information on existing habitat conditions and elements that support these PCEs within the action area.

1. *Freshwater spawning and incubation sites. Components of this feature include: (a) flow regimes (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) that support spawning and survival of all life stages; (b) water quality suitable for spawning and viability of all eulachon life stages; (c) water temperatures suitable, within natural ranges, in eulachon spawning reaches; and (d) substrate suitable for eulachon egg deposition and development.*

2. *Freshwater and estuarine migration corridors. Components of this feature include: (a) migratory corridors to provide safe and unobstructed pathways for adults to access freshwater spawning habitats, for larval stages to access estuarine rearing habitats, and for juveniles and adults to access oceanic habitats; (b) flow regimes (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) that support spawning migration of adults and outmigration of larval eulachon from spawning sites; (c) water quality suitable for survival and migration of spawning adults and larval eulachon; (d) water temperature suitable for survival and migration; and (e) food resources to support larval eulachon survival.*
3. *Nearshore and offshore marine foraging habitat. Components of this feature include: (a) food resources that support foraging leading to adequate growth and reproductive development for adults and juveniles in the marine environment; and (b) water quality suitable for adequate growth and reproductive development.*

4.9. Steller Sea Lion – Eastern DPS

4.9.1. Current Status

Steller sea lions were originally listed as threatened on November 26, 1990 (55 FR 49204). When the eastern and western DPSs were designated on June 5, 1997 (62 FR 30772), the western Steller sea lion DPS was reclassified as endangered, while the eastern Steller sea lion DPS remained listed as threatened. Critical habitat for eastern DPS Steller sea lions was designated on August 27, 1993 (58 FR 45269). This DPS includes all Steller sea lion populations east of 144 degrees West longitude (a line near Cape Suckling, Alaska).

4.9.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of Steller sea lions are described in detail in the *Recovery Plan for the Steller Sea Lion* (NMFS, 2008b), which is included herein by reference. A summary follows to assist in the discussion of effects related to the proposed action.

This species is relatively long-lived, with males living up to 20 years and females up to 30 years. Haulout sites are used for resting and refuge during the non-breeding season by all ages and sexes, and by non-breeding adults and subadults year-round. Steller sea lions are generalist predators and eat mainly fish and cephalopods. Some prey species, such as salmon, herring, cod, eulachon, and capelin, are preferentially targeted by sea lions when they become seasonally abundant. Steller sea lions may travel long distances during the year, between feeding areas and breeding rookeries (NMFS, 2008b).

4.9.3. Presence in Action Area

Eastern DPS Steller sea lions are known to use the action area. Four known haulout areas are located in the Columbia River: 1) the tip of the South Jetty of the Columbia River, RM 0; 2) the East Mooring Basin in Astoria, RM 15; 3) Phoca Rock, downstream of Bonneville Dam, RM 132; and 4) Bonneville Dam tailrace, RM 146. Of the four sites, the highest numbers are seen at the South Jetty (NMFS, 2012a). Areas near Bonneville Dam have been increasingly used in recent years by eastern DPS Steller sea lions in the spring, attracted by the high numbers of fish entering the upstream fish ladders during migration (Stansell et al., 2010).

4.9.4. Critical Habitat

Critical habitat for eastern DPS Steller sea lions consists of (a) Alaska rookeries, haulouts, and associated areas; (b) California and Oregon rookeries and associated areas; and (c) three special aquatic foraging areas in Alaska (58 FR 45269). None of these areas occur in the action area. The closest areas of designated critical habitat are the Oregon rookery areas, located at Rogue Reef (Pyramid Rock) and Orford Reef (Long Brown Rock and Seal Rock). These areas are approximately 240 miles south of the Columbia River and will not be affected by the proposed project.

4.10. Killer Whale – Southern Resident DPS

4.10.1. Current Status

Southern resident DPS killer whales were listed as endangered on November 18, 2005 (70 FR 69903), and this status was upheld in the five-year review in January 2011 (NMFS, 2011a). This DPS includes whales from J, K, and L pods, wherever they occur in the wild. Critical habitat for southern resident DPS killer whales was designated on November 29, 2006 (71 FR 69054).

4.10.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of killer whales are described in detail in the *Recovery Plan for Southern Resident Killer Whales* (NMFS, 2008a), which is included herein by reference. A summary follows to assist in the discussion of effects related to the proposed action.

Killer whales are the largest members of the dolphin family of toothed whales and are found in all oceans, although most commonly in coastal waters and higher latitudes. The killer whales in the northeastern Pacific region can be classified in three ecotypes based on ecological, behavioral, morphological, and genetic characteristics: offshore form, transient form, and resident form (which includes the southern resident DPS). Only the southern resident DPS is federally listed and described in this BA. Resident killer whales are fish eaters and live in stable, close-knit matrilineal pods of 10 to 60

individuals. The three pods that compose the southern resident DPS reside for most of the year (late spring, summer, and fall) in the inland waterways of Washington state and British Columbia, including the Strait of Georgia, Strait of Juan de Fuca, and Puget Sound, and to a lesser extent in coastal waters off California, Oregon, Washington, and British Columbia. Little is known about the winter range of southern resident killer whales (NMFS, 2008a).

Killer whales have the most varied diet of all cetaceans and often use a coordinated hunting strategy, working as a team to capture and share prey. Salmon comprises a large percentage of the diet of southern resident DPS killer whales, especially Chinook salmon (NMFS, 2008a; Hanson et al., 2005).

4.10.3. Presence in Action Area

The only portion of the action area that southern resident DPS killer whales are likely to use is the nearshore marine habitat between the mouth of the Columbia River and the Columbia Bar, although they may occasionally enter the lower reaches of the Columbia River in pursuit of salmon. Killer whale distribution is correlated with salmon runs, particularly Chinook salmon, and killer whales have been recorded in the vicinity of the Columbia River in March and October (NMFS, 2008a).

4.10.4. Critical Habitat

All designated areas of critical habitat for southern resident DPS killer whales are located in the Puget Sound and Strait of Juan de Fuca regions of Washington State (71 FR 69054), approximately 150 miles north of the Columbia River, and will not be affected by the proposed project.

4.11. Other Whales – Humpback, Fin, Sei, Sperm, and Blue

4.11.1. Current Status

These five whale species were listed as endangered on June 2, 1970 (35 FR 8491), and no critical habitat has been designated.

4.11.2. General Background Pertinent to the Columbia River

The life histories and habitat requirements of these whale species are described in detail in the NMFS Office of Protected Resources species Internet web pages (NMFS, 2012d). A brief summary follows to assist in the discussion of effects related to the proposed action.

Humpback, fin, sei, and blue whales are baleen whales that feed by filtering small organisms such as krill, small fish, and squid out of the water column. The sperm whale is a toothed whale and feeds primarily on large squid. These species are all large, long-

lived whales that typically inhabit open ocean areas. These species may use nearshore marine areas for foraging and as migration corridors between summer feeding areas in northern latitudes and winter breeding areas farther south. None of the five species uses the action area for breeding. Threats to the species include ship strikes, entanglement in drift nets or other fishing gear, and increasing levels of anthropogenic sound in the ocean (NMFS, 2012d).

4.11.3. Presence in Action Area

The only portion of the action area that these species may occupy is the area between the mouth of the Columbia River and the Columbia Bar. In general, these whales typically use open ocean habitat and are widely distributed; it is therefore unlikely that these species may be found in the action area. Based on the most recent stock assessment reports (NMFS, 2012b), humpback whales are the most likely to be found close to shore, followed by fin whales and blue whales, although near-shore sightings are generally more likely to occur farther south than the action area, in California. A humpback whale was seen inside the Columbia Bar on May 12, 2011, when it collided with a sailboat approximately 2.3 miles southwest of the tip of the South Jetty (Schroeder, 2011). Sei and sperm whales are usually found farther offshore, and it is unlikely that they would be seen inside the Columbia Bar (NMFS, 2012b).

4.11.4. Critical Habitat

Critical habitat for these five whale species has not been designated.

4.12. Leatherback Turtle

4.12.1. Current Status

Leatherback turtles were listed as threatened on June 2, 1970 (35 FR 8491). Critical habitat was designated on January 26, 2012 (77 FR 4170).

4.12.2. General Background Pertinent to the Columbia River

The life history and habitat requirements of this species are described in detail in the NMFS Office of Protected Resources species Internet web page (NMFS, 2012e). A brief summary follows to assist in the discussion of effects related to the proposed action.

Leatherback turtles are the largest living reptile and can reach a length of 6.5 feet and a weight of up to 2,000 pounds. Leatherback turtles prey on jellyfish and salps, migrating to temperate waters to take advantage of higher prey densities during the summer. This species is highly migratory and usually pelagic, although it does use coastal habitats for foraging. Leatherback turtles nest in the tropics and use the action area only for migrating and feeding. Threats to this species include entanglement in nets and other

fishing gear, loss of nesting habitat, marine trash (especially plastic debris that can be mistaken for jellyfish prey), and environmental contamination (NMFS, 2012e).

4.12.3. Presence in Action Area

Suitable migrating and foraging habitat for leatherback turtles occurs in the action area only in the nearshore marine waters between the mouth of the Columbia River and the Columbia Bar. This area is located in Area 2 of the final critical habitat designation, which extends from Cape Flattery, Washington, to Cape Blanco, Oregon. High seasonal densities of a primary prey species (brown sea nettle) occur in this area, and it is known to be the principal leatherback foraging area in Washington and Oregon, particularly the important habitat associated with the Columbia River plume (77 FR 4170). Distribution of leatherback turtles is correlated with jellyfish density, and while it is possible that leatherback turtles may be found within the action area, satellite tracking data indicates that they are most likely to forage in continental shelf and slope waters between the 200 meter (656 feet) and 2,000 meter (6,562 feet) depth contours (Benson et al., 2011), which is beyond the seaward extent of the action area.

4.12.4. Critical Habitat

Leatherback critical habitat is described in terms of one PCE. This consists of the occurrence of prey species, primarily jellyfish of the order *Semaeostomeae*, of sufficient condition, distribution, diversity, abundance, and density necessary to support individual as well as population growth, reproduction, and development of leatherbacks (77 FR 4170). The portion of the action area between the mouth of the Columbia River and the Columbia Bar is within the designated critical habitat.

4.13. Other Sea Turtles – Green, Loggerhead, and Olive Ridley

4.13.1. Current Status

Green, loggerhead, and olive ridley turtles were listed as threatened on July 28, 1978 (43 FR 32800). Loggerhead turtles were later split into nine DPSs, and the North Pacific Ocean DPS was listed as endangered on September 22, 2011 (76 FR 58868). Of these three species, critical habitat has been designated only for green turtles, on September 2, 1998 (63 FR 46693).

4.13.2. General Background Pertinent to the Columbia River

The life histories and habitat requirements of these turtle species are described in detail in the NMFS Office of Protected Resources species Internet web pages (NMFS, 2012e). A brief summary follows to assist in the discussion of effects related to the proposed action.

These three species range in size from large to relatively small. The green turtle can weigh up to 350 pounds, while the olive ridley turtle weighs up to 100 pounds. Green turtles are exclusively herbivorous, grazing on seagrasses and algae. Loggerhead turtles prey on whelks and conch, and olive ridley turtles have a more varied diet, consuming algae, tunicates, crustaceans, fish, and mollusks. These species are all highly migratory and are usually pelagic, although they do use coastal habitats for foraging and nesting. Threats to these turtle species include entanglement in nets and other fishing gear, loss of nesting habitat, disease, marine trash, environmental contamination, and human harvest of eggs and adults (NMFS, 2012e).

4.13.3. Presence in Action Area

Suitable habitat for green, loggerhead, and olive ridley turtles occurs in the action area only in the nearshore marine waters between the mouth of the Columbia River and the Columbia Bar. The action area is used only for migrating and feeding. Green and loggerhead turtles are known to use coastal waters for foraging, while olive ridley turtles mainly use coastal waters as migration corridors between pelagic foraging areas and tropical nesting beaches farther south. None of these turtles nest in the action area (NMFS, 2012e).

4.13.4. Critical Habitat

Of these three species, critical habitat has been designated only for the green turtle. This critical habitat is entirely located in the waters around Culebra Island, Puerto Rico (63 FR 46693), and will not be affected by the proposed project.

5.0 BASELINE CONDITIONS

5.1 Port of Morrow

5.1.1 Upland Facilities

The upland vegetation at the Port of Morrow project site where the upland facilities and staging will be located consists of a mix of native and introduced species dominated by rabbitbrush (*Chrysothamnus nauseosus*), Russian thistle (*Salsola iberica*), and annual grasses, primarily cheatgrass (*Bromus tectorum*) (see Photographs 6 and 8, Appendix B). Russian thistle and cheatgrass are non-indigenous invasive species. There are no wetlands or unique plant communities in the vicinity of the upland facilities.

5.1.2 In-water Facilities

For the Port of Morrow, little riparian vegetation exists along the shoreline where in-water facilities are planned. Some individual willow (*Salix* sp.) plants as well as false indigo (*Amorpha fruticosa*), an invasive woody species, were noted near the OHWE during a site visit in December 2011 (see Photographs 1 and 2, Appendix B). Other species present along the shoreline include bitterbrush (*Purshia* sp.), sagebrush (*Artemesia* sp.), and yarrow (*Achillea millefolium*). There are no trees within the impact area, although scattered introduced trees are near the site of in-water facilities. Much of the river shoreline is a mixture of sand, large gravels, and small cobbles, which extend into the water to the extent visible from the shoreline. Small pieces of driftwood were observed on the shore above the water level, but no large or small wood was evident in the water where in-water facilities will be located. There are no wetlands or other important aquatic plant communities along the water line, and the substrate below the proposed dock consists of sand, gravels, cobbles, and other depositional materials not suitable for spawning and marginally suitable for benthic prey production.

5.2 Columbia River Between the Port of Morrow and Port Westward

The Columbia River is the largest river in the Pacific Northwest, draining an area of approximately 258,000 square miles and located in portions of seven states and British Columbia. Beginning at Columbia Lake, British Columbia, the river travels 1,200 miles through 14 dams before reaching the Pacific Ocean on the border between Washington and Oregon (USGS, 1990). The action area for the proposed project is located in the mid to lower reaches of the river, from RM 271 at Boardman, Oregon, to the Columbia Bar, which is approximately five miles beyond the mouth of the river.

The proposed project extends from the Columbia Basin Province (Port of Morrow site) downstream through the Columbia Gorge, the Coast Range Province (Port Westward site), and the Columbia River Estuary to the Pacific Ocean. Climate in these areas ranges from hot and arid in the interior Columbia Basin region to a milder maritime climate in the Coast Range and

coastal areas (Franklin and Dyrness, 1988). The Columbia River is highly regulated for hydropower, transportation, and flood control, and much of the action area is a series of reservoirs created by the John Day Dam (RM 215), The Dalles Dam (RM 192), and the Bonneville Dam (RM 146). The lower, estuarine reaches of the river are tidally influenced up to the Bonneville Dam, with the upper limit of salt intrusion at approximately RM 30, depending on river discharge levels (Chawla et al., 2008).

Table 5-1 documents the environmental baseline and effects of the proposed action on relevant indicators for salmon and steelhead for the portion of the Columbia River that would be affected by the Morrow Pacific project. The completion of this checklist was based on use of the Matrix of Pathways and Indicators developed for Pacific salmon by NMFS (NMFS, 1996). Table 5-2 documents the environmental baseline and effects of the proposed action on relevant indicators for bull trout. Table 5-2 was based on use of the USFWS matrix described in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS, 1998).

The functionality of each indicator was evaluated in terms of the criteria established by NMFS and USFWS and was rated as follows: properly functioning, at risk, or not properly functioning. The potential effect of the proposed project construction and transfer of coal within the Columbia River on the functionality of each indicator was then determined. This determination consisted of evaluating whether the project has the potential to restore, maintain, or degrade the functionality of each indicator. Information used to create the tables was obtained from consultation with NMFS, USFWS, ODFW, and various online resources. Further explanation of the effects of the action on the baseline conditions is found in Section 6, Analysis of Effect.

Table 5-1. Matrix of Pathways and Indicators for Pacific Salmon and Steelhead. A checklist for documenting the environmental baseline and effects of the proposed action(s) on relevant environmental indicators.

<u>Pathways:</u> Indicators	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION		
	Properly Functioning	At Risk	Not Properly Functioning	Improve	Maintain	Degrade
<u>Water Quality:</u>						
Temperature			X		X	
Sediment			X		X(-)	
Chemical Contamination/ Nutrients			X		X(-)	
<u>Habitat Access:</u>						
Physical Barriers		X			X	
<u>Habitat Elements:</u>						
Large Woody Debris		X			X	
Pool Frequency		X			X	
Pool Quality		X			X	
Off-channel Habitat		X			X	
Refugia		X			X	
<u>Channel Conditions and Dynamics:</u>						
Width/Depth Ratio		X			X	
Streambank Condition		X			X	
Floodplain Connectivity			X		X	
<u>Flow/Hydrology:</u>						
Peak/Base Flows			X		X	
Drainage Network Increase		X			X	
<u>Watershed Conditions:</u>						
Road Density and Location		X			X	
Disturbance History		X			X	
Riparian Reserves		X			X	

X (+,-) demonstrates temporary, localized impacts, but no significant impacts at the watershed scale.

Table 5-2. Matrix of Pathways and Indicators for Columbia River Bull Trout. A checklist for documenting the environmental baseline and effects of the proposed action(s) on relevant environmental indicators.

Pathways: Indicators	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION		
	Functioning Appropriately	Functioning At Risk	Functioning at Unacceptable Risk	Improve	Maintain	Degrade
<u>Subpopulation Character:</u>						
Subpopulation Size			X		X	
Growth and Survival			X		X	
Life History Diversity/Isolation			X		X	
Persistence and Genetic Integrity Subpopulation			X		X	
<u>Water Quality:</u>						
Temperature			X		X	
Sediment			X		X (-)	
Chemical Contamination/ Nutrients			X		X(-)	
<u>Habitat Access:</u>						
Physical Barriers		X			X	
<u>Habitat Elements:</u>						
Fine Sediment		X			X (-)	
Pool Frequency		X			X	
Large Woody Material		X			X	
Riparian Habitat		X			X	
<u>Channel Conditions and Dynamics:</u>						
Streambank Condition		X			X	
Floodplain Connectivity			X		X	
<u>Flow/Hydrology:</u>						
Change in Peak/Base Flows			X		X	
Drainage Network Increase		X			X	
<u>Integration of Species and Habitat Conditions</u>		X			X	

X (+,-) demonstrates temporary, localized impacts, but no significant impacts at the watershed scale.

Water Quality. The Columbia River is listed as a water quality limited stream for the following parameters by the DEQ Integrated Report (DEQ, 2012).

Table 5-3. Pollutants Present in the Columbia River in the Action Area

Parameter	River Mile	Parameter	River Mile
<u>Category 5, 303(d) list, TMDL needed:</u>		<u>Category 3B, Potential Concern:</u>	
arsenic	0-142	aldrin	0-142
arsenic(tri)	35.2-98	alkalinity	0 to 34.5
DDT metabolite (DDE)	0-142	alpha-BNC	0-142
fecal coliform	0-35.2	benzo(a)anthracene	0-142
PCB	0-188.6	benzo(g,h,i)perylene	0-142
pH	121.8-319.3	BHC	0-142
PAH	98-142	cadmium	0-142
temperature	0-306.1	chromium(hex)	0-142
		chrysene	0-142
<u>Category 4A, TMDL approved:</u>		copper	0-142
dioxin (2,3,7,8-TCDD)	0-303.9	cyanide	35.2-142
total dissolved gas	0-287.1	DDD	0-142
		DDT	0-142
		dieldrin	0-142
		dioxins/furans	0-142
		endrin	0-142
		iron	0-142
		lead	0-142
		manganese	75.5-137.1
		mercury	0-142
		nickel	0-142
		pH	35.2-98
		phenol	0-142
		phosphate phosphorus	0-319.3
		PAH	0-98
		pyrene	0-142
		radionuclides	0-142
		silver	0-142
		tributyltin	0-142
		zinc	0-142

Much of the Columbia River is water quality limited, particularly in areas where historic industrial and agricultural practices have contaminated the river through direct discharge or indirectly through surface runoff or via tributaries. Many of these pollutants are contained within river sediments (TechLaw, 2011) and could be released to the water column if these sediments are disturbed (Asplund, 2000; Eggleton and Thomas, 2004). As a result, the water quality pathway and associated indicators are considered **not properly functioning**.

Habitat Access. There are 14 hydroelectric dams on the mainstem Columbia River; however, most have fish passage facilities. There are three dams within the action area: John Day, The Dalles, and Bonneville. All provide upstream and downstream passage, through

upstream ladders for adults, downstream juvenile passage facilities, or spill. Migrating salmon may be injured or killed while passing these dams, although upstream and downstream fish passage facilities at all three locations and turbine upgrades at the Bonneville Dam have been installed to minimize the risk to fish. Recent juvenile salmonid downstream survival rates through the Bonneville Dam, The Dalles Dam, and the John Day Dam were approximately 96 percent, 96 percent, and 91 percent, respectively (Johnson et al., 2011; Ploskey et al., 2011; Weiland et al., 2011). Predation by piscivorous birds and fish on juvenile salmonids is elevated in the areas around the dams, as migrating fish are concentrated in passage facilities before they are able to disperse to the safer deep water areas of the river channel (USACE, 2005). Predation on adults by sea lions can also be a factor in the area downstream of Bonneville Dam (Stansell et al., 2010). Exclusionary devices and other deterrents are used to help reduce the impact of predation on salmon. While passage is possible, the dams do interrupt salmonid migration, so this habitat indicator is considered **at risk**.

Habitat Elements. Habitat elements include substrate, large woody material, pool frequency and quality, off-channel habitat, and refugia. These habitat elements can be limiting in the lower Columbia River, especially in the areas within and upstream of the Columbia Gorge where forests are naturally lacking and where the dams have created large reservoirs (NPCC, 2004a). In the lower reaches, where the surrounding land is more forested, these habitat elements are more available but still do not fully meet the desired standard and may be degraded by industrial activities, urbanization, agricultural and forestry activities, and shipping channel maintenance (NPCC, 2004a; NPCC, 2004b; LCFRB, 2004).

Aquatic vegetation, side channels, and slower water refuges are present among the islands, sloughs, and marshes located in the estuary, and this complex habitat generally supports adequate prey species for adult and juvenile fish. Diking and filling riparian wetlands and floodplains to improve agricultural land and provide flood control has further reduced access to rearing areas adjacent to the river in the lower mainstem and estuary, input of large woody debris to the river system, and food base available to migrating and rearing salmonids (LCFRB, 2004). These habitat elements are identified as **at risk**.

Channel Conditions and Dynamics. Due to the creation of large reservoirs by hydroelectric dams along much of the length of the river, the width/depth ratio is considered **at risk**. Streambank condition and floodplain connectivity is considered **at risk** due to agricultural and forestry practices, urban development, and roads. These activities can lead to reduced and altered riparian vegetation communities, increased erosion, increased bank armoring (riprap), and reduced linkage of channel and off-channel areas (NPCC, 2004a; NPCC, 2004b; LCFRB, 2004).

Flow/Hydrology. The Columbia River drains a very large area and is fed by rains and snowmelt from the surrounding mountains. Historically, peak flows would occur in the spring and low base flows would occur in the late summer and early fall. Currently, Columbia River flows are impacted dramatically by the operation of the hydroelectric dams, which are managed for hydropower production, recreation, navigation, irrigation, anadromous fish passage, and flood control (NPCC, 2004a; NPCC, 2004b; LCFRB, 2004). Water quantity below

the Bonneville Dam is affected by dam operation, which affects river levels and may dewater LCR Chinook, chum, and coho salmon redds that are high in the floodplain (FPC, 2012; NPCC, 2004a; NPCC, 2004b). Hydrology in the basin as a whole has been altered because of dam operations, roads, urban development, agricultural practices, and forest management practices along the Columbia River and on its tributaries (NPCC, 2004a; NPCC, 2004b; LCFRB, 2004). Peak/base flow in the Columbia River is considered **not properly functioning** due to hydroelectric dam operations. No new roads will be constructed as a result of this project, and drainage network increases are considered **functioning properly**.

Watershed Conditions. Much of the Columbia River Basin has roads in close proximity to waterways. Disturbance history in the Columbia watershed is high and riparian reserves along much of the mainstem Columbia River are degraded (NPCC, 2004a; NPCC, 2004b; LCFRB, 2004). As a result, indicators of watershed conditions are considered **at risk**.

Subpopulation Character (Bull Trout). There are numerous physical barriers to fish movement in the Columbia River watershed, including 14 major hydroelectric dams on the mainstem Columbia. In addition, the formation of large reservoirs by the dams and lack of streamside shade in much of the central portion of the river can create thermal barriers that may limit bull trout movement. Highly modified in-channel and riparian habitat in the Columbia River Basin further limits bull trout use of these areas and may lead to population isolation (USFWS, 2008; NPCC, 2004a; NPCC 2004b). As a result, indicators of subpopulation character are considered **functioning at unacceptable risk** for bull trout.

Integration of Species and Habitat Conditions (Bull Trout). Moderate to severe habitat alteration and reduced subpopulation connectivity are present in the Columbia River watershed (USFWS, 2008). As a result, the integration of species and habitat condition indicators are considered **at risk** for bull trout.

5.3 Port Westward and Western Columbia River/Pacific Ocean

Refer to Section 5.2, Columbia River Between the Port of Morrow and Port Westward, for a description of baseline conditions within the Columbia River. The Port Westward site is a developed commercial dock historically used for transfer of ethanol and diesel to OGVs. The dock is adjacent to an ethanol plant that is no longer in service, as well as the Bradbury Slough (see Figure 1C, Appendix A). Wetlands and hardwood trees are scattered throughout upland areas adjacent to the dock (see Figure 9, Appendix A). The site is relatively flat along the shoreline. Minimal on-site data were collected for this area because there will be no changes to existing conditions as a result of this project. The Port Westward dock is located at a water depth of approximately 60 feet and is composed of timber with an asphalt roadway surface.

The only marine habitat in the action area is the nearshore area between the mouth of the Columbia River and the Columbia Bar. There are no major obstructions to migration in this area, and minimal cover, such as large wood and aquatic vegetation, is present. Nearshore water quality is heavily influenced by the water quality of the Columbia River, which has elevated levels of several contaminants (see Section 5.2, Columbia River Between Port of

Morrow and Port Westward). The Columbia River jetties, which extend out approximately 0.5 mile (North Jetty) and 2.5 miles (South Jetty) from the mouth of the river, provide underwater structure for aquatic organisms, haulout areas for seals and sea lions, and perching/roosting areas for birds.

6.0 ANALYSIS OF EFFECT

This section addresses possible impacts to listed species from the proposed action, which includes Port of Morrow site construction (installation of the dolphins, construction of the walkway, dock, conveyor, and coal unloading/storage facility, and planting and restoration activities), downstream transportation of coal by barges, transloading of coal from the barges to OGVs at Port Westward, and travel of the OGVs out of the Columbia River.

This section is organized into five primary areas:

1. Changes to baseline conditions following the salmon and bull trout matrices of pathways and indicators and focusing on physical changes.
2. Noise impacts that are expected to occur to all listed fish species that would occur at the Port of Morrow during pile driving.
3. Ship strike impacts to marine mammals and turtles.
4. Habitat impacts expected to occur as a result of project construction and operations.
5. Species-specific and critical habitat impacts based on each species' use of the Port of Morrow and Columbia River.

In addition, each area is also subdivided into the three components of the action area and includes direct and indirect construction and operational impacts.

6.1 Effects on NMFS and USFWS Matrix Indicators

Analyses within this section follow the matrix of pathways and indicators for Columbia River salmon, steelhead, and bull trout. Refer to Tables 5-1 and 5-2.

6.1.1 Port of Morrow

Water Quality. Earth-disturbing activities, including piling installation below the OHWE and upland construction activities, may cause an increased delivery of sediment to the Columbia River and increased turbidity in the water column. Sediment introduced into waterways can degrade fish habitat and reduce primary productivity, leading to a decreased food base for listed species that use the area (NPCC, 2004a, 2004b). Physical effects of increased turbidity on fish can include damage to gill tissue and physiological stress (Bash et al., 2001). Behavioral effects of increased turbidity on salmonids include disruption of migration and feeding behavior, reduced ability of fish to locate prey, and avoidance of areas of increased turbidity (Bash et al., 2001; Salo et al., 1980).

Because erosion control measures, such as silt fences, will be used during construction, very little sediment is expected to be released from the upland portion of the project site. As temporary and permanent pilings are installed and the temporary pilings are removed, sediment disturbance will occur at the site and downstream of the site. These

impacts will be localized in the vicinity of the dock site and temporary over the four-month in-water construction period. In addition, operation of tugboats and barges at the site may result in localized sediment disturbances, although placement of the mooring facility in a water depth of approximately 28 feet will minimize this potential. As the proposed construction area represents a relatively small area on the bank of the river, fish are likely to avoid areas with higher turbidity (Salo et al., 1980), and will therefore be minimally impacted.

Construction in and near water bodies increases the risk that toxic or harmful substances such as fuel, lubricants, hydraulic fluids, or coolants may enter the water. These chemicals can be acutely toxic to fish at high levels of exposure and can cause acute and chronic effects to fish species, aquatic invertebrates, and aquatic and riparian vegetation (Neff, 1985). In-channel work will include pile driving; however, the work will be conducted from barges to avoid placement of pile driving equipment directly into the river channel. The operation of equipment adjacent to the Columbia River also has the potential to release toxic or harmful substances and kill or injure listed fish or disrupt normal behavior. In addition to avoiding placement of equipment directly into the water, conservation measures include use of non-toxic lubricants for pile driving equipment, which should minimize the opportunity for contaminants to come into contact with the water and affect ESA-listed fish.

Loading the barges at the Port of Morrow will increase the risk of coal entering the river. However, the coal handling devices will be enclosed and, therefore, minimize the risk of coal spills. Additionally, studies have shown that Powder River Basin coal, a low-sulfur sub-bituminous coal, is less likely to release toxic contaminants than other coals, and poses minimal risk to the environment in the event that an accidental release should occur (Golder Associates, Inc., 2012).

Although impacts to water quality, including turbidity and chemical contaminants, may occur as a result of the proposed construction and project operation, these will not have a significant impact on the river as a whole. Currently, the water quality pathways and indicators are considered "not properly functioning" for the project area (see Tables 5-1, 5-2, and 5-3 in Section 5.0, Baseline Conditions).

Habitat Access. Upstream and downstream adult and juvenile fish passage within the Columbia River will be maintained during the in-water construction period, although fish will likely avoid the immediate construction site. The area of avoidance for turbidity and noise effects from in-water work will occur in a relatively small area on the bank and nearshore area of the Columbia River. Following construction, approximately 249 square feet of riverbed will be occupied by the pilings and unavailable to aquatic organisms. This impact will be mitigated by the removal of existing derelict piles from the Columbia River at a future location to be developed in cooperation with NMFS. These derelict piles contain creosote, which is toxic to aquatic organisms (Stratus, 2006). The number of derelict piles and their location are yet to be determined. The piles used

for the Port of Morrow will be steel piles that pose no potential for toxic contaminant releases.

Habitat Elements. The Port of Morrow site does not contain any large woody debris, pools, off-channel habitat, or refugia. These habitat elements will not be affected by the proposed construction. Installation of the pilings will increase in-water structures at the site.

Channel Conditions and Dynamics. Channel conditions at the Port of Morrow, including its width/depth ratio, streambed condition, and floodplain connectivity will remain unchanged by the proposed construction and project operation.

Flow Hydrology. Flow hydrology will remain unchanged at the Port of Morrow site during construction and project operation.

Watershed Conditions. There are no new roads planned for the Port of Morrow site. The site is currently disturbed from previous commercial and agricultural uses. The upland site will result in an approximately 23-acre increase in impervious surfaces for the storage buildings and loss of an equal amount of existing disturbed vegetation. Use of silt fences during site construction will minimize disturbance to adjacent vegetated areas. No wetlands will be impacted. Following construction, graded areas with open soil will be re-vegetated with native vegetation.

Subpopulation Character (Bull Trout). The proposed construction and project operation will not impact the size of bull trout subpopulations or permanently affect their ability to migrate through the Port of Morrow portion of the action area. Temporary, localized disturbance from noise and turbidity may cause bull trout to avoid the work area during construction.

Integration of Species and Habitat Conditions (Bull Trout). Temporary increases in waterborne sediment will occur during construction. The sediment impact is expected to occur on a daily basis when piles are being installed, and sediment is expected to dissipate after pile driving is complete. Sediment disturbance from construction will occur only within the in-water work window. During construction activities, no fill material, including concrete, will be allowed to enter the water column, and channel disturbance will be kept to a minimum. Bull trout are present in low numbers in the action area (ODFW, 2012a, 2012b) and are unlikely to be significantly impacted.

6.1.2 Columbia River Between the Port of Morrow and Port Westward

Water Quality. Increased barge traffic between the Port of Morrow and Port Westward presents an increased risk to water quality, as the potential for fuel spills and other environmental contamination, such as accidental coal release, will increase. The barges will be enclosed to minimize the potential for coal or coal dust to spill into the river during transit between the Port of Morrow and Port Westward. To minimize the

potential for water quality impacts from contaminant leaks, barge operators will be required to follow established safe operation protocols and maintain onboard spill containment kits. Tidewater has an Integrated Contingency Plan in place that addresses Best Management Practices (BMPs) for their tugs and barge tows while in transit on the Columbia River.

6.1.3 Port Westward and Columbia River/Pacific Ocean

Water Quality. Increased OGV traffic downstream of Port Westward may present an increased risk to water quality through the potential for fuel spills and other environmental contamination, such as accidental coal release. However, OGV operators will be required to follow established safe operation protocols, including spill prevention and containment.

Propeller wash from tugboats and OGVs will disturb the sediments at the Port Westward dock and may cause trapped contaminants to be released into the water column. Monitoring performed in May 2010 for the U.S. Environmental Protection Agency (USEPA) at the Port Westward site revealed elevated levels of semi-volatile organic compounds and inorganic compounds in the sediments near the dock and in Bradbury Slough (TechLaw, 2011), which accumulated over many years from the area's previous uses as a military facility and then commercial transfer facility.

Transloading from the barges to the OGVs at Port Westward will increase the risk of coal entering the river. However, the coal handling devices will be enclosed, therefore minimizing the risk of coal spills. Additionally, studies have shown that Powder River Basin coal, a low-sulfur sub-bituminous coal, is less likely to release toxic contaminants than other coals and poses minimal risk to the environment in the event that an accidental release should occur (Golder Associates, Inc., 2012).

Channel Conditions and Dynamics. Channel conditions at Port Westward, including width/depth ratio, streambed condition, and floodplain connectivity, will remain unchanged by the project operation. Existing channel maintenance and dredging operations in the Columbia River will continue at current levels.

Flow/Hydrology. Basin hydrology (peak/base flow) and the drainage network will not be affected by operations at Port Westward or downstream. Flow in the Columbia River will not be altered by the proposed project.

Watershed Condition. Road density and location and disturbance history will not be affected by operations at Port Westward.

Subpopulation Character (Bull Trout). The proposed project will not impact the size of bull trout subpopulations or affect their ability to migrate through the action area.

Integration of Species and Habitat Conditions (Bull Trout). Temporary periodic increases in waterborne sediment may occur during project operations at Port Westward; however, these impacts will be of short duration and conditions will quickly return to previous conditions. Bull trout are unlikely to be present in the vicinity of Port Westward (ODFW, 2012b) and are unlikely to be significantly impacted.

6.2 Noise Effects

Underwater sound can produce a range of effects on fish. These thresholds represent levels of sound that produce either a behavioral disturbance or injury to fish within the threshold radius. Behavioral effects caused by vibratory and impact pile driving can include disruption of migration or foraging activities as fish disperse into surrounding areas to avoid the disturbance area. Fish injuries caused by intense sound pressures near the source of impact pile driving can include swim bladder and other internal tissue damage, hearing loss, or death (Hastings and Popper, 2005).

During in-water construction activities at the Port of Morrow, fish will be subject to disturbance and/or injury as a result of vibratory and impact pile driving, as described in Section 3.1.7.2, Distance to Underwater Sound Thresholds. Depending on the size of the pile, vibratory driving will produce a disturbance effect at a distance of up to 185 meters (607 feet) from the pile, while attenuated impact driving may produce a disturbance effect at a distance of up to 858 meters (2,815 feet) from the pile. Fish injury effects may occur from attenuated impact driving, at a distance of up to 208 meters (682 feet) from the pile. Fish will be subject to noise impacts from vibratory driving activities for a total of approximately 55 days, and from impact driving activities for a total of approximately 8.8 hours, spread over 14 days (not necessarily consecutive). These impacts will be minimized by using vibratory pile driving whenever possible and using a bubble curtain to attenuate underwater sounds when using an impact hammer. Use of a vibratory hammer prior to use of an impact hammer should elicit an avoidance response in fish using the area and reduce the potential of physical injury when impact driving is used.

6.3 Ship Strike Effects

Marine mammals and sea turtles could be impacted by OGV traffic in the nearshore marine portion of the action area between the mouth of the Columbia River and the Columbia Bar through disturbance or direct mortality in the event of a collision.

Collisions between ships and whales have occurred historically, and have been summarized for areas on the east coast of the United States and elsewhere in the world (Laist et al., 2001; Jensen and Silber, 2003), as well as within Washington State (Douglas et al., 2008). Laist et al. (2001) reported a higher incidence of increased injury and mortality when the ship speed increased, and the whale species most likely to collide with ships included fin whales, right whales, humpback whales, sperm whales, and gray whales. This study reported that most vessel strikes between whales and large vessels (80 m [262 feet] or larger) occurred when vessels were travelling at 14 knots or more, and noted that larger cetaceans and those that

spend more time at the surface are at increased risk of collision. Douglas et al. (2008) reported that of 19 stranding records of presumed ship and whale collisions in Washington State, most were of fin whales and grey whales. The six records that occurred within 50 miles of the mouth of the Columbia River included four grey whales, one fin whale, and one sperm whale (Douglas et al., 2008).

Similar studies have been conducted on the incidence of ship strikes on marine turtles near ports and in shipping lanes (Hazel and Gyuris, 2006; Hazel et al., 2007). These studies showed that the risk of a ship strike increased as ship speed increased, and that vessel strikes can be a significant cause of mortality for sea turtles.

The proposed project will increase OGV and barge traffic, which could lead to increased risk of injury or mortality of marine mammals or sea turtles at the mouth of the Columbia River, and increased risk of injury and mortality of Steller sea lions downstream of Bonneville Dam. However, both barge and OGV traffic will travel at speeds of 10 to 12 knots, which is less than the 14 knots or more reported when most vessel strikes occur. In addition, OGV traffic will increase by 9 percent over current levels as a result of this project, but will remain below historic high levels (see Table 3-6). Therefore, increased OGV traffic should not present a significantly increased risk to whales, sea turtles, and Steller sea lions.

6.4 Habitat Effects

Port of Morrow Site. Permanent piling installation as well as temporary piling installation and removal at the Port of Morrow construction site will result in a temporary increase in turbidity, which may cause fish to avoid the area of the sediment plume, interrupting normal migration, rearing, or foraging behavior. The temporary loss of this amount of habitat will have a minimal effect on this species in the context of the entire amount of habitat available in the Columbia River.

The proposed project will have a permanent effect on conditions in the Columbia River channel at the locations of the dolphins, which will occupy approximately 249 square feet of riverbed. This impact will be mitigated by the removal of existing derelict piles from the Columbia River at a future location to be developed in cooperation with NMFS. The number of derelict piles and their location are yet to be determined.

Predation by piscivorous birds could increase as the new pilings may provide perches. This effect will be minimized by installing anti-perching devices on top of the new pilings.

In addition, there will be shading effects from the dolphins, walkway, conveyor, and barge staging at the Port of Morrow site. Nearshore shading can lead to increased predation by fish species that use light/shadow transitions to lie in wait for potential prey and avoid detection (USACE, 2010). This effect will be minimized by constructing the walkway and conveyor structures at a sufficient height (+9 feet) above the mean pool elevation to reduce shading, using expanded metal grating for the walkway deck, and managing the staging of

vessels to minimize the length of time that the vessels are stationary and shading the nearshore area.

Dolphins and support structures for the dock and conveyor may also create microhabitats with cover and reduced velocity. These microhabitats may also result in increased predation as some predator species use these microhabitats to enhance their ability to capture prey (Beamesderfer and Rieman, 1988).

Tug operation at the Port of Morrow may disturb sediments through propeller wash, leading to temporary increases in turbidity at the dock and a short distance downstream.

Barge Traffic Between the Port of Morrow and Port Westward. An impact to habitat from the increased barge traffic on the Columbia River will be the increased potential for toxic materials to enter the river. However, barge operators will follow established safety and operational protocols to minimize the risk of accidental spills or other release of contaminants.

Port Westward Site and Downstream. Tug and OGV operation at Port Westward may disturb sediments through propeller wash, leading to temporary increases in turbidity at the dock and a short distance downstream.

In addition, there will be shading effects from barge and ship staging at Port Westward. Nearshore shading can lead to increased predation by fish species that use light/shadow transitions to lie in wait for potential prey and avoid detection (USACE, 2010). This effect will be minimized by managing the staging of vessels to minimize the length of time that the vessels are stationary and shading the nearshore area.

6.5 Effects to Specific Species

6.5.1 Direct Harm

6.5.1.1 Salmonids

Port of Morrow Site. Based on Table 4-2 and conversations with Bill Duke, ODFW biologist, it is possible that multiple species of salmonids could be present at the Port of Morrow site during the recommended in-water work window of December 1 through March 31 (ODFW, 2012a). Species and life stages that may be present during the in-water work window include adult and juvenile steelhead (UCR, MCR, SR); adult Chinook salmon (UCR spring-run, SR spring/summer-run); juvenile Chinook salmon (UCR spring-run, SR spring/summer-run, SR fall-run); juvenile SR sockeye salmon; and adult and juvenile CR bull trout (see Table 4-2). All in-water work will be completed during the ODFW preferred in-water work window of December 1 through March 31. These dates represent times of minimal abundance of salmonids in the area. In addition, direct effects to listed species are expected to be primarily behavioral disturbance and the potential for mortality will be low.

Activities below the OHWE associated with in-water work primarily consist of temporary and permanent piling installation. To avoid direct harm to fish from construction equipment, all work will take place from barges and construction equipment will not enter the water. Direct harm could result from increased turbidity and contact (or near-contact) with materials during piling installation and from the hydroacoustic effects of pile driving (see Section 6.2, Noise Effects).

Direct impacts may also occur to salmonids during operation of the facilities at the Port of Morrow. Studies have found that entrainment through towboat propellers has the potential to injure or kill fish and other aquatic organisms, through pressure changes, shear stress, and turbulence (Killgore et al., 2005; Killgore et al., 2001; Cada 1990). In addition, disturbance of migrating and foraging behavior may occur from tug and barge traffic and the sediment disturbance resulting from propeller wash at the dock.

Barge Traffic Between Port of Morrow and Port Westward. All 14 listed salmonid species addressed in this BA could be impacted through direct contact with tug propellers during tug transit between the Port of Morrow and Port Westward, as mentioned above. As a result of this project, barge vessel traffic will increase by approximately 46 percent above current traffic levels, which represents 98 percent of historic high levels, leading to a corresponding increase in the potential for impact to ESA-listed species (see Table 3-5).

Port Westward Site and Downstream. All 14 listed salmonids addressed in this BA may be impacted by OGV traffic downstream of Port Westward. As mentioned above, there is the potential for harm to occur to these species through direct contact with propellers of the vessels and disturbance of migrating and foraging behavior from tug and barge traffic and sediment disturbance from propeller wash at the dock.

In addition, large vessels with drafts of approximately 30 feet or greater have been shown to cause wake stranding of fish that tend to congregate in shallow nearshore riverine waters (Ackerman, 2002; Pearson and Skalski, 2011). Wake stranding occurs when the large waves caused by vessel wakes carry fish up a beach and strand them. Beaches with flatter slopes are particularly susceptible to this, as the wave travels a greater distance up the beach, reducing the ability of the fish to return to the river before the water is no longer sufficiently deep for them to maneuver. Multiple factors interact at low slope beaches and contribute to the likelihood of stranding occurring at any given beach, including ship kinetic energy (which takes into account ship size, draft, and speed), tidal height, fish presence, and unique beach characteristics (Pearson and Skalski, 2011). Studies have shown that juvenile Chinook salmon are the most common species affected by wake stranding, including at County Line Park, approximately one mile downstream of Port Westward on the north side of the Columbia River (Ackerman, 2002; Pearson and Skalski, 2011). Pearson and Skalski (2011) found

that for County Line Park, 15.4 percent of deep-draft vessel passages past the site resulted in wake stranding, with an average of 7.3 fish stranded per stranding event, of which 82 percent were Chinook salmon.

The OGVs leaving Port Westward could impact listed species by causing wake stranding and through direct contact with fish. It is expected that when the project is operating at full capacity, three OGVs will make the round trip from the Columbia Bar to Port Westward each week.

6.5.1.2 Green Sturgeon

Port of Morrow Site. This species is not present at the Port of Morrow and will not be affected by the construction there.

Barge Traffic Between the Port of Morrow and Port Westward. This species may be present downstream of the Bonneville Dam, but as this species is a benthic dweller, preferring deeper areas of the river, it is unlikely that green sturgeon will be found close enough to the surface to be directly impacted by tug propellers.

Port Westward Site and Downstream. It is unlikely that green sturgeon will be directly impacted by barge and tug traffic. Green sturgeon may be directly affected by deep-draft vessels in the shipping channels, and the level of OGV traffic in the lower Columbia River will increase by 9 percent over current levels but will not exceed historic high levels (see Table 3-6). The impact to green sturgeon will be minimal from these vessel operations.

Channel maintenance activities in the lower Columbia River that may affect green sturgeon, including channel dredging, will continue at current levels.

6.5.1.3 Eulachon

Port of Morrow Site. This species is not present at the Port of Morrow and will not be affected by the construction there.

Barge Traffic Between the Port of Morrow and Port Westward and Port Westward Site and Downstream. Eulachon may be directly impacted by barge and tug traffic downstream of the Bonneville Dam, and OGV traffic downstream of Port Westward. As mentioned above, increased vessel traffic may increase the potential for harm to occur through direct contact with tug or OGV propellers. Barge vessel traffic will increase by approximately 46 percent above current traffic levels, which represents 98 percent of historic high levels (see Table 3-5), and the level of OGV traffic in the lower Columbia River will increase by 9 percent, which represents 70 percent of the historic high levels (see Table

3-6), leading to a corresponding increase in the potential for impact to this species.

In addition, tug and OGV operation at Port Westward may disturb the sediments at the dock, periodically increasing turbidity in the immediate area. This may have a negative effect on adult eulachon movement through the area, spawning behavior, egg incubation, and juvenile foraging.

Channel maintenance activities in the lower Columbia River that may affect eulachon, including channel dredging, will continue at current levels.

6.5.1.4 Steller Sea Lion

Port of Morrow Site. This species is not present at the Port of Morrow and will not be affected by the construction there.

Barge Traffic Between the Port of Morrow and Port Westward and Port Westward Site and Downstream. Direct impacts to this species will be limited to the potential for ship strikes by the barges and tugs moving through the area between the Bonneville Dam and Port Westward and OGVs moving between Port Westward and the Columbia Bar. It is expected that when the project is operating at full capacity, three OGVs will make the round trip from the Columbia Bar to Port Westward each week. This represents an increase of 9 percent above current traffic levels but does not represent an increase above historic high levels of large-vessel traffic in this section of the Columbia River (see Table 3-6). Barge vessel traffic will increase by approximately 46 percent above current levels, and will represent approximately 98 percent of historic high levels (see Table 3-5), leading to a corresponding increase in the potential for an effect on Steller sea lions; however, this species is an agile swimmer and is expected to avoid contact with barges, tugs, and OGVs.

6.5.1.5 Killer Whale

Leatherback Turtle

Other Whales – Humpback, Fin, Sei, Sperm, Blue

Other Turtles – Green, Loggerhead, Olive Ridley

Port of Morrow Site. These species are not present at the Port of Morrow and will not be affected by the construction there.

Barge Traffic Between the Port of Morrow and Port Westward. These species are not present between the Port of Morrow and Port Westward and will not be affected by barge traffic.

Port Westward Site and Downstream. Direct impacts to these species may occur through the potential for ship strikes by OGVs moving through the area

between the mouth of the Columbia River and the Columbia Bar, as discussed in Section 6.3, Ship Strike Effects, above. It is expected that when the project is operating at full capacity, three OGVs will make the round trip from the Columbia Bar to Port Westward each week.

6.5.2 Critical Habitat Impacts

The proposed action could affect critical habitat for listed species. In the short term, a temporary increase in turbidity and disturbance of in-stream habitat at the Port of Morrow construction site will occur during piling installation and removal. Implementation of the conservation measures in Section 7.0 is expected to minimize the project's potential temporary adverse effects on aquatic habitat. Approximately 249 square feet of riverbed at the Port of Morrow will be permanently impacted by the installation of the pilings. Tug and barge operation at the Port of Morrow has the potential to disturb sediments, leading to increased turbidity and possibly releasing pollutants contained in the sediment.

Barge traffic between the Port of Morrow and Port Westward is not expected to significantly affect critical habitat, as it is an activity that is currently taking place. Tug and barge operations at the Port of Morrow, tug, barge, and OGV operation at Port Westward, and OGV operations downstream of Port Westward have the potential to disturb sediments, leading to increased turbidity and possibly releasing pollutants contained in the sediment.

The critical habitat PCEs include sites essential to support one or more life stages of these ESUs/DPSs (sites for spawning, rearing, migration, and foraging). In turn, these sites contain physical or biological features essential to the conservation of these ESUs/DPSs (e.g., spawning gravels, water quality and quantity, side channels, prey species). Effects to specific types of sites and the features associated with them for the various critical habitat listings of the species addressed in this BA are as follows:

6.5.2.1 Steelhead:	Upper Columbia River DPS
	Middle Columbia River DPS
	Lower Columbia River DPS
	Upper Willamette River DPS
	Snake River Basin DPS
Chinook Salmon:	Upper Columbia River Spring-run ESU
	Lower Columbia River ESU
	Upper Willamette River ESU
Chum Salmon:	Columbia River ESU

The September 2005 Federal Register (70 FR 52630) identifies six PCEs of critical habitat for these nine DPSs/ESUs, including:

1. ***Freshwater spawning sites.*** The action area is not used by steelhead (UCR, MCR, LCR, UWR, or SR), UCR spring-run Chinook salmon, or UWR Chinook salmon for spawning.

The area immediately downstream of Bonneville Dam is used for spawning by LCR Chinook salmon and CR chum salmon. The only effects to this area will be from the increased barge traffic in established shipping lanes on the river. This traffic will not affect existing water quantity, salinity, or natural cover conditions in this area. There may be a slightly increased risk to water quality, as the potential for fuel spills and other environmental contamination will increase with increased barge traffic. Similarly, juvenile forage could be affected if reduced water quality affects prey species distribution and abundance.

2. ***Freshwater rearing sites.*** Existing water quantity, floodplain connectivity, side channels, large wood, aquatic vegetation, and other natural cover will not be affected by the proposed project. There may be a slightly increased risk to water quality, as construction at the Port of Morrow may temporarily increase turbidity in the immediate area, and the potential for fuel spills and other environmental contamination will increase with increased barge traffic. Similarly, juvenile and adult forage could be affected if reduced water quality affects prey species distribution and abundance.
3. ***Freshwater migration corridors.*** Freshwater migration corridors will not be significantly impacted by the proposed project. Existing large wood, side channels, aquatic vegetation, and other natural cover will not be affected by the proposed project. Existing impediments to migration will not be affected. There may be an increased risk of predation on juveniles at the Port of Morrow site as a result of shading by the dolphins, above-water structures, and barges, and creation of microhabitats with reduced velocity. There may be a slightly increased risk to water quality, as construction at the Port of Morrow may temporarily increase turbidity in the immediate area, and the potential for fuel spills and other environmental contamination will increase with increased shipping traffic. Similarly, juvenile and adult forage could be affected if reduced water quality affects prey species distribution and abundance.
4. ***Estuarine areas.*** The only effect to the estuarine environment will be the increased vessel traffic in established shipping lanes in the lower Columbia River. This traffic will not affect existing water quantity, salinity, or natural cover conditions in this area. There may be a slightly increased risk to water quality, as the potential for fuel spills and other environmental contamination will increase with increased shipping

traffic. Similarly, juvenile and adult forage could be affected if reduced water quality affects prey species distribution and abundance.

5. ***Nearshore marine areas.*** The only effect to the nearshore marine environment will be the increased vessel traffic in established shipping lanes beyond the mouth of the Columbia River. This traffic will not affect existing water quantity or natural cover conditions in this area. There may be a slightly increased risk to water quality, as the potential for fuel spills and other environmental contamination will increase with increased shipping traffic. OGV traffic will increase by 9 percent above current levels, but will not exceed historic levels (see Table 3-5).
6. ***Offshore marine areas.*** No offshore marine areas occur in the action area, so this PCE will not be affected by the proposed project.

6.5.2.2 Chinook Salmon: **Snake River Fall-run ESU**
 Snake River Spring/summer-run ESU

Sockeye Salmon: **Snake River ESU**

The December 1993 Federal Register (58 FR 68543) identifies four components of critical habitat for these three ESUs:

1. ***Spawning and Juvenile Rearing Areas.*** The action area is not used by these species for spawning, but does provide rearing habitat. The proposed project will not affect water quantity, water temperature, riparian vegetation, or available space. There may be an effect on water quality through increased turbidity from construction, sediment disruption by vessel operation at the docks, and by the increased risk of toxic chemical release from the vessels. Similarly, juvenile forage could be affected if reduced water quality affects prey species distribution and abundance.
2. ***Juvenile Migration Corridors.*** Freshwater migration corridors will not be significantly impacted by the proposed project. Existing large wood, side channels, aquatic vegetation, and other natural cover will not be affected by the proposed project. Existing impediments to migration will not be affected. There may be an increased risk of predation on juveniles at the Port of Morrow site, as a result of shading by the dolphins, above-water structures, and barges, and creation of low velocity microhabitats. There may be a slightly increased risk to water quality, as construction at the Port of Morrow may temporarily increase turbidity in the immediate area, and the potential for fuel spills and other environmental contamination will increase with increased barge and OGV traffic. Ship traffic through the nearshore marine portion of the action area will

represent an increase of 9 percent above current levels but will remain lower than historic OGV traffic levels (see Table 3-6). Similarly, juvenile and adult forage could be affected if reduced water quality affects prey species distribution and abundance.

3. ***Areas for Growth and Development to Adulthood.*** Areas for growth and development to adulthood refer to ocean habitat, which will not be affected by the proposed project.
4. ***Adult Migration Corridors.*** Adult migration corridors have the same habitat components as identified in the juvenile corridors. See paragraph 2 above.

6.5.2.3 Coho Salmon: Lower Columbia River ESU

Critical habitat has not been designated for coho salmon.

6.5.2.4 Bull Trout: Columbia River DPS

Bull trout critical habitat is described in terms of the following nine PCEs (75 FR 63898):

1. ***Water quality and thermal refugia.*** This project will not affect existing springs, seeps, or other groundwater inputs to the Columbia River that may affect water temperature and thermal refugia.
2. ***Migration corridors.*** This project will not affect existing bull trout migration corridors.
3. ***Food availability.*** This project will have a minimal effect on food availability in the action area. Some in-stream habitat disruption will take place at the Port of Morrow site as a result of the construction of the dolphins and related facilities requiring piles; however, this impact will be mitigated by the removal of existing derelict piles from the Columbia River at a future location to be developed in cooperation with NMFS. The number of derelict piles and their location are yet to be determined. Turbidity may be temporarily impacted during construction as a result of installing the permanent pilings and installing and removing the temporary pilings. Vessel operation may also create periodic localized turbidity plumes at the Port of Morrow and Port Westward sites. Increased turbidity may elicit an avoidance response from bull trout and reduce prey availability in the area.

4. ***In-stream habitat.*** The proposed project will not have a significant impact on in-stream habitat complexity. The installation of dolphins at the Port of Morrow site represents a localized increase in cover.
5. ***Water temperature.*** The Columbia River is listed on the DEQ 303(d) list for temperature. The proposed project will not affect the current temperature regime in the river.
6. ***Substrate characteristics.*** The action area is not used by bull trout for spawning, so this PCE will not be affected.
7. ***Stream flow.*** The Columbia River does not currently exhibit a natural hydrograph or flow timing, due to the operations of the hydroelectric dams. This PCE will not be affected by the proposed project.
8. ***Water quantity and quality.*** The proposed project will not affect the water quantity available in the Columbia River. Water quality may be affected through increased turbidity from construction, sediment disruption by vessel operation at the docks, and by the increased risk of toxic chemical release from the vessels.
9. ***Non-native species.*** Non-native species, such as smallmouth bass, are present in the Columbia River and may use the dolphins at the Port of Morrow site as cover, increasing their predation on juvenile salmonids. This effect will be minimized by decreasing shading through elevating the walkway and conveyor and using metal grating for the walkway. Removal of derelict piles will also mitigate for this effect.

6.5.2.5 Green Sturgeon: Southern DPS

Green sturgeon critical habitat is described in terms of PCEs for the following three areas used by different life stages of the species (74 FR 52300):

1. ***Freshwater riverine systems (including food, substrate, water flow, water quality, migratory corridors, depth, and sediment quality).*** No designated freshwater critical habitat is located in the action area, so this PCE will not be affected by the proposed project. However, adult and subadult green sturgeon do use freshwater portions of the Columbia River as summer foraging habitat. There may be an increased risk to water quality, as the potential for fuel spills and other environmental contamination will increase with increased shipping traffic. Similarly, adult and subadult forage could be affected if reduced water quality affects prey species distribution and abundance. Sediment quality could be locally impacted at the Port Westward dock as propeller wash from

the tugs and OGV disturbs the riverbed sediments and potentially exposes toxic contaminants.

2. ***Estuarine areas (including food resources, water flow regime, water quality, migratory corridors, depth, and sediment quality).*** The habitat components of water flow regime, migratory corridors, depth, and sediment quality will not be affected by the proposed project. Impacts to water quality and food resources are the same as for freshwater areas, above.
3. ***Nearshore marine waters (including migratory corridors, water quality, and food resources).*** The only nearshore marine waters within the action area are between the mouth of the Columbia River and the Columbia Bar, approximately five miles offshore. This project will not impact nearshore migratory corridors, but water quality and food resources may be impacted by the increased risk of environmental contamination from increased ship traffic. Ship traffic through the nearshore marine portion of the action area will represent an increase of 9 percent above current levels but will remain lower than historic OGV traffic levels (see Table 3-6).

6.5.2.6 Eulachon: Southern DPS

Southern DPS eulachon critical habitat is described in terms of the following three essential features (76 FR 65324):

1. ***Freshwater spawning and incubation sites (including flow regime, water quality, water temperature, and spawning substrate).*** The habitat components of flow regime and water temperature will not be affected by the proposed project. There may be an increased risk to water quality, as the potential for fuel spills and other environmental contamination will increase with increased shipping traffic. Spawning substrate could be locally impacted at the Port Westward dock, as propeller wash from the tugs and OGV may disturb riverbed sediments, increase turbidity, and potentially expose toxic contaminants.
2. ***Freshwater and estuarine migration corridors (including migratory corridors, flow, water quality, and food).*** The habitat components of migratory corridors and flow will not be affected by the proposed project. Larval forage could be affected if reduced water quality affects prey species distribution and abundance. Impacts to water quality are the same as for freshwater spawning areas, above.
3. ***Nearshore and offshore marine foraging habitat (including food and water quality).*** The only nearshore marine waters within the action area

are between the mouth of the Columbia River and the Columbia Bar, approximately five miles offshore. There may be an increased risk to water quality, as the potential for fuel spills and other environmental contamination will increase with increased shipping traffic. Ship traffic through the nearshore marine portion of the action area will represent an increase of 9 percent above current levels but will remain lower than historic OGV traffic levels (see Table 3-6). Adult and juvenile food resources could be affected if reduced water quality affects prey species distribution and abundance.

6.5.2.7 Steller Sea Lion: Eastern DPS

The closest areas of designated critical habitat for eastern DPS Steller sea lion are the Oregon rookery areas, located at Rogue Reef (Pyramid Rock) and Orford Reef (Long Brown Rock and Seal Rock) (58 FR 45269). These areas are approximately 240 miles south of the Columbia River and will not be affected by the proposed project.

6.5.2.8 Killer Whale: Southern Resident DPS

All designated areas of critical habitat for southern resident DPS killer whales are located in the Puget Sound and Strait of Juan de Fuca regions of Washington State (71 FR 69054). These areas are approximately 150 miles north of the Columbia River and will not be affected by the proposed project.

6.5.2.9 Other Whales: Humpback, Fin, Sei, Sperm, Blue

Critical habitat has not been designated for these species.

6.5.2.10 Leatherback Turtle

Leatherback turtle critical habitat is described in terms of one PCE, the occurrence of jellyfish prey species (77 FR 4170). This PCE will not be affected by the proposed project, as the only impact to the nearshore marine environment will be ship traffic through established shipping lanes at the mouth of the Columbia River. Ship traffic through the nearshore marine portion of the action area will represent an increase of 9 percent above current levels but will remain lower than historic OGV traffic levels (see Table 3-6), and will not affect jellyfish occurrence or distribution.

6.5.2.11 Other Turtles: Green, Loggerhead, Olive Ridley

Of these three species, critical habitat has been designated only for the green turtle. This critical habitat is located entirely in the waters around Culebra

Island, Puerto Rico (63 FR 46693) and will not be affected by the proposed project.

6.5.3 Indirect Impacts

The construction of the coal handling facility at the Port of Morrow will alter the existing land use of this area, as this area has historically been used as an agricultural area and is currently vegetated with a disturbed sagebrush community. The project will not change the existing land uses at Port Westward since no terrestrial development is anticipated as part of the proposed project and the dock has historically been used for commercial and industrial purposes.

Streambed and bank modifications associated with the construction and operation of the facility at the Port of Morrow may temporarily impact salmonid food sources and predator/prey relationships by increasing turbidity and disturbing the balance of microorganism populations found within this reach of the Columbia River. The operation of the transloading facility at Port Westward may have a similar effect on the salmonid, green sturgeon, and eulachon food sources at that site.

Indirect impacts to Steller sea lions and killer whales may occur as a result of impacts to prey species, particularly Chinook salmon. Direct effects to adult fish are expected to be minimal, mainly resulting from increased risk of injury or mortality from contact with vessel hulls and propellers. In addition to direct contact with vessel propellers, juvenile salmon are at risk from increased wake stranding as a result of increased OGV traffic downstream of Port Westward. Barge tow traffic will increase by 46 percent above current levels, which represents approximately 98 percent of historic high levels (see Table 3-5), and OGV traffic will increase by 9 percent above current levels, which represents 70 percent of historic levels (see Table 3-6); the risk of impacts to fish will increase accordingly. However, this traffic is expected to have a minimal effect on overall salmon populations and the marine mammals that prey on salmon.

7.0 CONSERVATION MEASURES

Conservation measures are intended to minimize or avoid environmental impacts to listed species or critical habitat. To be in compliance with federal ESA regulations, additional conservation measures may be agreed upon by state and federal government representatives as terms and conditions of the resulting Biological Opinion from agency review of this BA. The following BMPs will be used during the project activities:

Construction at the Port of Morrow:

1. Any spoils material will be disposed of at an upland site.
2. The pile driving barge will remain in waters that have a minimum depth of 6 feet to avoid grounding on and potentially impacting the near shore.
3. A vibratory hammer will be used for installation of piles (to the extent possible) to limit adverse effects.
4. A bubble curtain will be required when an impact hammer is used for pile installation. Acoustic monitoring will take place when pile driving is conducted with an impact hammer. Work will cease and additional noise mitigation will be applied if underwater noise reaches an unacceptable threshold level, as determined by NMFS.
5. Because use of a bubble curtain for impact pile driving is difficult and has not often been implemented successfully, selection of a contractor for pile driving will be based on demonstrated past successful experience using bubble curtains for impact pile driving projects.
6. All in-water work will be performed within the ODFW in-water work window.
7. A Stormwater Pollution Prevention Plan (SWPP) will be prepared for the Port of Morrow site to protect the riparian area from erosion and runoff.
8. All upland staging, refueling, and storage of heavy equipment will be kept at least 150 feet away from water. For track-mounted equipment, large cranes, and other equipment whose limited mobility makes it impractical to move it for refueling, precautions to minimize the risk of fuel reaching the Regulated Work Area will be taken. Spill prevention measures will be implemented and fuel containment systems will be designed to completely contain a potential spill. Other pollution control devices and measures (such as diapering, parking on absorbent material, etc.) adequate to provide containment of hazardous material will also be used as necessary. Refueling operations will be completed

in a way that will minimize the amount of fuel remaining in vehicles stored during non-work times.

9. The contractor will limit alteration or disturbance of riverbank or riparian vegetation to only those areas necessary for construction.
10. A temporary erosion control plan will be used to prevent sediment from entering the water. Sediment control BMPs will include the use of sediment fencing and sediment barriers (i.e., bio-filter, sandbags, straw bales, and wattles), minimizing vegetation removal, and covering bare soil and stockpiles. BMPs shall conform to DEQ requirements for stormwater discharges associated with industrial activities.
11. Erosion control devices will be inspected daily during the rainy season and weekly during the dry season. If inspection reveals that erosion controls are ineffective, the contractor will immediately mobilize work crews during work or non-work hours to make repairs, install replacements, or install additional controls as necessary.
12. Heavy equipment will be checked for leaks prior to the start of the work day. The contractor will complete all necessary repairs prior to commencing work activities.
13. Over-water concrete work will be completely contained and no concrete will be allowed to enter the water.
14. All construction debris and waste will be disposed of at designated sites. Garbage will be disposed of in dumpsters in upland locations. Excess waste materials will not be disposed of in waters. Any debris or garbage that enters water will be retrieved by the contractor.
15. Work on the bank, including excavation or fill, is not anticipated.
16. Barges and equipment will carry hazardous materials cleanup kits at all times.
17. Additional mitigation for near-shore habitat loss will be accomplished through the removal of existing derelict piles from the Columbia River at a future location to be developed in cooperation with NMFS. The number of derelict piles and their location are yet to be determined.
18. Dock shading will be reduced through constructing the walkway and conveyor structures at a sufficient height (+9 feet) above the mean pool elevation, use of expanded metal grating for the walkway deck, and managing the staging of vessels to minimize the length of time that the vessels are stationary and shading the nearshore area.

Project Operation.

19. The coal storage facility at the Port of Morrow was designed with an enclosed rail unloading barn. The storage facility will be fully enclosed and under negative pressure, with a wet scrubber system to control and prevent dust from escaping into the environment. Process water will be fully contained on site and will be reused during operations.
20. The barge loading system at the Port of Morrow will be fully enclosed to contain coal dust. The system features fully enclosed conveyors from the storage barns to the barges. A telescoping chute loader will ensure that coal is placed near the bottom of the barge. The coal barges will be equipped with sliding doors to fully enclose the barge once loaded.
21. The transloader at Port Westward will have an enclosed and telescoping chute to transfer the coal from the barges to the OGV to prevent coal from spilling and to minimize the amount of dust generated.
22. Spill prevention and containment plans will be in place for the barges and ships, as well as at the two port facilities, to reduce the risk of toxic materials from entering the environment.

8.0 ESSENTIAL FISH HABITAT CONSULTATION

Public Law 94-265, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to establish new requirements for EFH descriptions in federal fishery management plans and to require federal agencies to consult with NMFS on activities that may adversely affect EFH. The MSA states, "*Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.*" The Pacific Fisheries Management Council (PFMC) described and identified EFH for three species of Pacific Coast salmon (PFMC, 2012), coastal pelagic species (PFMC, 2009), and Pacific Coast groundfish (PFMC, 2011). These Fishery Management Plans have recommended an EFH designation for these fisheries that would include those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery (i.e., properly functioning habitat conditions necessary for the long-term survival of the species through the full range of environmental variation).

The MSA requires consultation for all actions that may adversely affect EFH and does not distinguish between actions in EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities that may have an adverse effect on EFH. Therefore, EFH consultation with NMFS is required by federal agencies undertaking, permitting, or funding activities that may adversely affect EFH, regardless of its location. The Morrow Pacific project may affect Pacific salmon species (Chinook salmon and coho salmon), groundfish, and coastal pelagic species.

8.1 Pacific Coast Salmon

Identification of Essential Fish Habitat. Salmon fishery EFH includes all those freshwater streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to Pacific salmon species in Washington, Oregon, Idaho, and California, except above the impassable barriers identified by the PFMC (2012). Chief Joseph Dam, Dworshak Dam, and the Hells Canyon Complex (Hells Canyon, Oxbow, and Brownlee Dams) are among the listed manmade barriers that represent the upstream extent of the Pacific salmon fishery EFH. Salmon EFH also excludes areas upstream of longstanding naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years). The riparian zone adjacent to the designated waterways is also considered EFH. This zone provides shade, sediment, nutrient/chemical regulation, streambank stability, and large woody debris/organic matter. In the estuarine and marine areas, designated salmon EFH extends from the near shore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California north of Point Conception (PFMC, 2012).

All currently viable waters and most habitats historically accessible to Chinook and coho salmon, including the Columbia River, have been designated as Pacific salmon EFH. Short-term impacts to freshwater EFH include localized riverbank and riverbed modifications at the Port of

Morrow that may yield temporary sediment pulses in the river. Erosion control measures and streambank stabilization with seeding will help to minimize impacts to freshwater EFH.

Impacts to estuarine and nearshore marine EFH are limited to the operation of tugs, barges, and OGVs, which may cause localized sediment disturbance in the vicinity of the dock at Port Westward. Barge and vessel traffic will be above current levels (46 percent increase for barge tows and 9 percent increase for OGVs, as shown in Tables 3-5 and 3-6), but will not exceed historic levels and will have minimal effects on Pacific salmon EFH.

Conclusion. The effects of project construction at the Port of Morrow may result in unavoidable temporary increases in noise and turbidity, minimal loss of herbaceous riparian vegetation, and modification of in-stream habitat where pilings are installed. These impacts are adverse to EFH. However, seeding and planting the disturbed areas after construction, and the conservation measures described in Section 7.0, Conservation Measures, will help minimize the adverse effects on EFH associated with project construction. Impacts to EFH from operation of the project include sediment disturbance from tug propeller wash at the Port of Morrow and Port Westward docks. Following analysis of the possible impacts that may result from the Morrow Pacific project, a determination of **may affect, likely to adversely affect** is indicated for designated Pacific Coast salmon EFH.

8.2 Coastal Pelagic Species

Identification of Essential Fish Habitat. Coastal pelagic species EFH is designated for four species of finfish (northern anchovy, Pacific sardine, Pacific [chub] mackerel, and jack mackerel) and one invertebrate (market squid). In 2009, the Fishery Management Plan was amended to include all krill species and to prohibit their harvest (PFMC, 2009). Designated EFH includes all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone and above the thermocline where sea surface temperatures range between 10°C and 26°C (50°F to 79°F). The northern boundary of EFH is dynamic, varying as the sea surface temperature is seasonally and annually cooled (PFMC, 2009).

The portions of the action area in the Columbia River estuary and out to the Columbia Bar are included in designated coastal pelagic species EFH. The potential impact to this habitat is limited to OGV traffic in established shipping lanes, which will increase by 9 percent above current levels but is not expected to exceed historic levels (see Table 3-6), and will have minimal effects on coastal pelagic species EFH.

Conclusion. The only aspect of the proposed project that may affect coastal pelagic species EFH is the operation of OGVs through the lower Columbia River estuary to the Columbia Bar, which is not expected to significantly affect the estuarine and coastal nearshore region of the action area. Following analysis of the possible impacts that may result from the Morrow Pacific project, a determination of **no effect** is indicated for designated coastal pelagic species EFH.

8.3 Pacific Coast Groundfish

Identification of Essential Fish Habitat. Pacific Coast groundfish EFH is designated for 82 species of groundfish. Based on habitat suitability probability maps provided in Appendix B, Section B-4 of the Fishery Management Plan (PFMC, 2011), and surveys cited in the Lewis and Clark National Wildlife Refuge and Julia Butler Hansen Refuge for the Columbian White-tailed Deer: Comprehensive Conservation Plan and Environmental Impact Statement (USFWS, 2010), 33 of these species may occur in the action area, as shown in Table 8-1. Groundfish EFH is described as all waters from the high tide line (and parts of estuaries) to 3,500 meters in depth. Habitat Areas of Particular Concern (HAPC) are a subset of EFH used to focus management and restoration efforts. The current HAPC types are estuaries, canopy kelp, seagrass, rocky reefs, and areas of interest, which are defined as a variety of submarine features such as banks, seamounts, and canyons, along with Washington State waters (PFMC, 2011).

The portions of the action area in the Columbia River estuary and out to the Columbia Bar are included in designated Pacific Coast groundfish EFH. The potential impact to the majority of this area is limited to OGV traffic in established shipping lanes, which represents a 9 percent increase above current levels, but is not expected to exceed historic levels (see Table 3-6), and will have minimal effects on Pacific Coast groundfish EFH. Increased turbidity from tug and OGV propeller wash may adversely impact groundfish foraging and movement in the area around the Port Westward site, which is within the range of some species of groundfish that can enter fresh water (e.g., starry flounder) (PFMC, 2011).

Conclusion. The only aspects of the proposed project that may affect Pacific Coast groundfish EFH are the operation of OGV through the Columbia River estuary to the Columbia Bar and periodic increased turbidity and shading at the Port Westward dock. OGV traffic will not significantly affect the estuarine and coastal nearshore region. Increased turbidity levels and increased shading at the Port Westward dock will be periodic, while vessels are operating at the dock, and fish will be able to disperse to other areas to avoid the turbidity plume and shaded areas. Following analysis of the possible impacts that may result from the Morrow Pacific project, a determination of **may affect, not likely to adversely affect** is indicated for designated Pacific Coast groundfish EFH.

Table 8-1. Species in the Action Area Potentially Affected by EFH Regulations

Species		Life Stage present in AA				EFH Determination
		Adult	Juvenile	Larva	Egg	
Pacific salmon	Chinook salmon	X	X	X	X	LTAA
	Coho salmon	X	X	X	X	
Coastal pelagic fish	Northern anchovy	X	X	X	X	No Effect
	Pacific sardine	X*	X*	X*	X*	
	Pacific (chub) mackerel	X*	X*	X*	X*	
	Jack mackerel	X				
	Market squid	X	?	?	?	
Pacific coast groundfish	Arrowtooth flounder	X	X	X	X	NLTA
	Big skate	X	X		X	
	Black rockfish		X			
	Blue rockfish			X		
	Bocaccio		X	X		
	Butter sole	X				
	Cabezon	X				
	California skate	X	X		X	
	Chilipepper		X			
	Curlfin sole	X				
	Dover sole	X	X			
	English sole	X	X	X		
	Flathead sole	X	X			
	Kelp greenling			X		
	Lingcod		X	X	X	
	Longnose skate	X	X		X	
	Pacific cod			X	X	
	Pacific Ocean perch			X		
	Pacific rattail			X	X	
	Pacific sanddab	X				
	Pacific whiting	X				
	Petrale sole		X			
	Ratfish	X	X		X	
	Rex sole		X			
	Rock sole	X				
	Sablefish	X	X		X	
	Sand sole	X	X	X		
	Soupfin shark	X	X			
	Spiny dogfish	X	X			
	Splitnose rockfish		X	X		
	Starry flounder	X	X		X	
	Stripetail rockfish		X			
	Widow rockfish		X			

*Denotes presence during periods of warm water and high abundance.

9.0 INTERRELATED AND INTERDEPENDENT EFFECTS

Interrelated actions include actions that are part of a larger action and depend on the larger action for justification. Interdependent actions are defined as actions with no independent utility apart from the proposed action. The coal that is being exported by the proposed project is mined in Montana and will be transported by rail to the Port of Morrow. This rail transportation could be considered an interrelated and interdependent action, and the effects of the rail portion of the project are addressed in the Morrow Pacific Project Environmental Assessment.

10.0 CUMULATIVE EFFECTS

Cumulative effects are defined as the effects of future state, local, or private activities (non-federal) that are reasonably certain to occur in the project's watershed.

No specific non-federal actions are known for the Port Westward area at this time (Columbia County, 2012). Known non-federal actions in or near the Port of Morrow include:

- The Umatilla Basin Aquifer Restoration Project in Morrow and Umatilla Counties. Effects include diversion of water from the Columbia River during the month of October and the months of December through March. Construction of some new pipeline will be necessary to reach the aquifer recharge area (Langford, 2010). The project is currently in Stage I, with some water diversion and monitoring underway (Langford, 2012; Morrow County, 2012).
- Continued industrial development at the Port of Morrow, including Port infrastructure (road improvements, etc.), agricultural product processing facilities, data centers, and others (Morrow County, 2012).

Additional projects within the watershed will occur as population growth and urban development continue. Current agricultural, logging, commercial, and industrial practices will continue in the region.

Projects with a federal nexus that are reasonably certain to occur are discussed in Section 6.1, Effects on NMFS and USFWS Matrix Indicators, under Watershed Conditions.

11.0 FINDING OF EFFECT

11.1. Statement of Take for Fish

Although listed fish species are present in the action area and may be exposed to harm from the construction activities at the Port of Morrow and from the operational activities at the Port of Morrow, along the Columbia River, and at Port Westward, it is not possible to quantify the number of fish that will be exposed to underwater noise, construction activities, and operational activities. Construction activities will occur during the approved in-water work window, when salmonid abundance is at seasonal minimums for the area and direct effects will primarily be behavioral avoidance of noise and turbidity. Potential impacts are summarized in the individual species accounts below.

11.2. Steelhead and Critical Habitat

11.2.1. Upper Columbia River DPS Middle Columbia River DPS Snake River DPS

Project construction activities at the Port of Morrow site will affect these DPSs through noise impacts, turbidity, and other habitat impacts (such as shading and the potential for accidental spills) during project construction. Shading from the conveyor, walkway, and pilings at the Port of Morrow, as well as staged barges and tugs, may increase predation in the area around the new mooring facility. Habitat disturbance and shading will also occur from vessel operation at the Port of Morrow dock.

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance from vessel operation at the Port of Morrow and Port Westward docks. Juvenile fish are susceptible to wake stranding from OGV traffic downstream of Port Westward. Shading from the conveyor, walkway, and pilings at the Port of Morrow, as well as staged barges and tugs, may increase predation in the area around the new barge loading facility.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for these three DPSs. Although conservation measures, such as use of vibratory pile driving when feasible, use of a bubble curtain during impact pile driving, erosion control measures, and an in-water work period, as well as enclosed coal barges, storage, and loading facilities, will be implemented to substantially reduce the chance for adverse impacts, direct harm cannot be ruled out. In addition, vessel traffic (tug and OGV) may have direct impacts on these DPSs. The proposed project **may affect**, and is **likely to adversely affect**, UCR steelhead, MCR steelhead, and SR steelhead.

Critical habitat components for steelhead will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Temporary negative impacts to water quality and food resources may occur as a result of the proposed improvements at the Port of Morrow site, and are expected to occur during the four-month in-water construction period. Ongoing negative impacts to water quality, substrate at the docks, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for UCR steelhead, MCR steelhead, and SR steelhead.

11.2.2. Lower Columbia River DPS Upper Willamette River DPS

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance from vessel operation at the Port Westward dock. Juvenile fish are susceptible to wake stranding from OGV traffic downstream of Port Westward. Shading from staged barges and tugs may increase predation in the dock area at Port Westward.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for these two DPSs. Although established safe vessel operating procedures and conservation measures, such as enclosed coal barges and loading facilities and minimal staging of barges, will be implemented to reduce the chance for adverse impacts to the fish and their environment, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, LCR steelhead and UWR steelhead.

Critical habitat components for steelhead will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Ongoing negative impacts to water quality, substrate at the docks, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for LCR steelhead and UWR steelhead.

11.3. Chinook Salmon and Critical Habitat

11.3.1. Upper Columbia River Spring-run ESU Snake River Fall-run ESU Snake River Spring/summer-run ESU

Project construction activities at the Port of Morrow site will affect these ESUs through noise impacts, turbidity, and other habitat impacts (such as shading and the potential for accidental spills) during project construction. Shading from the conveyor, walkway, and pilings at the Port of Morrow, as well as staged barges and tugs, may increase

predation in the area around the new mooring facility. Habitat disturbance and shading will also occur from vessel operation at the Port of Morrow dock.

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance from vessel operation at the Port of Morrow and Port Westward docks. Juvenile fish are susceptible to wake stranding from OGV traffic downstream of Port Westward. Shading from the conveyor, walkway, and pilings at the Port of Morrow site, as well as staged barges and tugs, may increase predation in the area around the new mooring facility.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for these three ESUs. Although conservation measures such as use of vibratory pile driving when feasible, use of a bubble curtain during impact pile driving, erosion control measures, and an in-water work period, as well as enclosed coal barges, storage, and loading facilities, will be implemented to substantially reduce the chance for adverse impacts, direct harm cannot be ruled out. In addition, vessel traffic (tug and OGV) may have direct impacts on this species. The proposed project **may affect**, and is **likely to adversely affect**, UCR spring-run Chinook salmon, SR fall-run Chinook salmon, and SR spring/summer-run Chinook salmon.

Critical habitat components for Chinook salmon will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Temporary negative impacts to water quality and food resources may occur as a result of the proposed improvements at the Port of Morrow site, and are expected to occur during the four-month in-water construction period. Ongoing negative impacts to water quality, substrate at the docks, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for UCR spring-run Chinook salmon, SR fall-run Chinook salmon, and SR spring/summer-run Chinook salmon.

11.3.2. Lower Columbia River ESU Upper Willamette River ESU

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance from vessel operation at the Port Westward dock. Juvenile fish are susceptible to wake stranding from OGV traffic downstream of Port Westward. Shading from staged barges and tugs may increase predation in the dock area at Port Westward.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for these two ESUs. Although established safe vessel operating procedures and conservation

measures, such as enclosed coal barges and loading facilities and minimal staging of barges, will be implemented to reduce the chance for adverse impacts to the fish and their environment, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, LCR Chinook salmon and UWR Chinook salmon.

Critical habitat components for Chinook salmon will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Ongoing negative impacts to water quality, substrate at the docks, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for LCR Chinook salmon and UWR Chinook salmon.

11.4. Columbia River ESU Chum Salmon and Critical Habitat

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance from vessel operation at the Port Westward dock. Juvenile fish are susceptible to wake stranding from OGV traffic downstream of Port Westward. Shading from staged barges and tugs may increase predation in the dock area at Port Westward.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for this species. Although established safe vessel operating procedures and conservation measures, such as enclosed coal barges and loading facilities and minimal staging of barges, will be implemented to reduce the chance for adverse impacts to the fish and their environment, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, Columbia River chum salmon.

Critical habitat components for chum salmon will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Ongoing negative impacts to water quality, substrate at the dock, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for Columbia River chum salmon.

11.5. Lower Columbia River ESU Coho Salmon

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance from vessel operation at the Port Westward dock. Juvenile fish are susceptible to wake stranding from OGV traffic downstream of Port Westward. Shading from staged barges and tugs may increase predation in the dock area at Port Westward.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for this species. Although established safe vessel operating procedures and conservation measures, such as enclosed coal barges and loading facilities and minimal staging of barges, will be implemented to reduce the chance for adverse impacts to the fish and their environment, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, Lower Columbia River coho salmon.

Critical habitat has not been designated for Lower Columbia River coho salmon.

11.6. Snake River ESU Sockeye Salmon and Critical Habitat

Project construction activities at the Port of Morrow site will affect this species through noise impacts, turbidity, and other habitat impacts (such as shading and the potential for accidental spills) during project construction.

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance from vessel operation at the Port of Morrow and Port Westward docks. Juvenile fish are susceptible to wake stranding from OGV traffic downstream of Port Westward. Shading from the conveyor, walkway, and pilings at the Port of Morrow site, as well as staged barges and tugs, may increase predation in the area around the new mooring facility.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for this species. Although conservation measures (such as use of vibratory pile driving when feasible, use of a bubble curtain during impact pile driving, erosion control measures, and an in-water work period, as well as enclosed coal barges, storage, and loading facilities) will be implemented to substantially reduce the chance for adverse impacts, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, SR sockeye salmon.

Critical habitat components for sockeye salmon will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Temporary negative impacts to water quality and food resources may occur as a result of the proposed improvements at the Port of Morrow site, but are expected to be of short duration. Ongoing negative impacts to water quality, substrate at the docks, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for SR sockeye salmon.

11.7. Columbia River DPS Bull Trout and Critical Habitat

Project construction activities at the Port of Morrow site will affect this species through noise impacts, turbidity, and other habitat impacts (such as shading and the potential for accidental spills) during project construction. Shading from the conveyor, walkway, and pilings,

as well as staged barges and tugs, may increase predation in the area around the new mooring facility. Habitat disturbance and shading will also occur from vessel operation at the Port of Morrow dock.

During project operation, the increased barge traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug or barge hulls and propellers, and habitat disturbance from vessel operation at the Port of Morrow dock. Bull trout are unlikely to be present in the lower Columbia River, but if they were present, they could potentially be impacted by barge, tug, and OGV traffic.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for this species. Although conservation measures (such as use of vibratory pile driving when feasible, use of a bubble curtain during impact pile driving, erosion control measures, and an in-water work period, as well as enclosed coal barges, storage, and loading facilities) will be implemented to substantially reduce the chance for adverse impacts, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, Columbia River bull trout.

Critical habitat components for bull trout will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Temporary negative impacts to water quality and food resources may occur as a result of project construction at the Port of Morrow site, but are expected to be of short duration. Ongoing negative impacts to water quality, substrate at the docks, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for Columbia River bull trout.

11.8. Southern DPS Green Sturgeon and Critical Habitat

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with OGV hulls and propellers and habitat disturbance from vessel operation at the Port Westward dock.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for this species. Although established safe vessel operating procedures and conservation measures, such as enclosed coal barges and loading facilities, will be implemented to reduce the chance for adverse impacts to the fish and their environment, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, southern DPS green sturgeon.

Critical habitat components for green sturgeon will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Ongoing negative impacts to water quality, substrate at the dock, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for southern green sturgeon.

11.9. Southern DPS Eulachon and Critical Habitat

During project operation, the increased barge and OGV traffic on the Columbia River may lead to increased risk of injury or mortality from direct contact with tug, barge, or OGV hulls and propellers, and habitat disturbance and shading from vessel operation at the Port Westward dock. Shading from staged barges and tugs may increase predation on this species in the dock area at Port Westward.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for this species. Although established safe vessel operating procedures and conservation measures, such as enclosed coal barges and loading facilities and minimal staging of barges, will be implemented to reduce the chance for adverse impacts to the fish and their environment, direct harm cannot be ruled out. The proposed project **may affect**, and is **likely to adversely affect**, southern DPS eulachon.

Critical habitat components for eulachon will be affected by the proposed project. Conservation measures have been incorporated to minimize the long-term impacts to critical habitat. Ongoing negative impacts to water quality, substrate at the dock, and food resources may occur as a result of project operations. As a result, the proposed project **may affect**, and is **likely to adversely modify**, critical habitat for southern DPS eulachon.

11.10. Eastern DPS Steller Sea Lion and Critical Habitat

The project could directly affect this species through the increased risk of ship strikes as barge and OGV traffic in the lower Columbia River increases, and indirectly as project components impact Chinook salmon and eulachon populations that represent important prey species for Steller sea lions.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for Steller sea lions. Steller sea lions are the most abundant listed marine mammal in the action area, with a total of 75 individuals observed at the Bonneville Dam in 2010 (Stansell, 2010). These individuals could potentially be impacted by barge and OGV traffic as they travel from the Pacific Ocean to the dam. Although this species is an agile swimmer and it is unlikely that ship strikes present a significant threat, direct harm cannot be ruled out and indirect effects may result from impacts to Chinook salmon and eulachon populations. These impacts are expected to be minor; therefore, the proposed project **may affect**, but is **not likely to adversely affect**, eastern DPS Steller sea lion.

Critical habitat for eastern DPS Steller sea lions consists of (a) Alaska rookeries, haulouts, and associated areas; (b) California and Oregon rookeries and associated areas; and (c) three special aquatic foraging areas in Alaska. None of these areas occur in the action area, and, as a result, the proposed project will cause **no adverse modification** to eastern DPS Steller sea lion critical habitat.

11.11. Southern Resident DPS Killer Whale and Critical Habitat

The project could directly affect this species through the increased risk of ship strikes as OGV traffic in the nearshore marine environment increases, and indirectly as project components impact Chinook salmon populations that represent an important prey species for southern resident killer whales.

After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for southern resident DPS killer whales. Although it is unlikely that killer whales are found inside the Columbia Bar, direct harm from ship strikes cannot be ruled out, and indirect effects may result from impacts to Chinook salmon populations. These effects are expected to be minor; therefore, the proposed project **may affect**, but is **not likely to adversely affect**, southern resident DPS killer whales.

All designated areas of critical habitat for southern resident killer whales are located in the Puget Sound and Strait of Juan de Fuca regions of Washington State, and, as a result, the proposed project will cause **no adverse modification** to southern resident DPS killer whale critical habitat.

11.12. Other Whales – Humpback, Fin, Sei, Sperm, and Blue

The project could affect these five species through the increased risk of ship strikes as OGV traffic in the nearshore marine environment increases. After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for these five species, although it is unlikely since these whales are more commonly found in the Pacific Ocean where they could more easily forage outside of traditional shipping lanes. In addition, ship traffic through the nearshore marine portion of the action area will represent an increase of 9 percent for recent ship traffic but will be less than historic ship traffic levels (see Table 3-6). However, direct harm from ship strikes cannot be ruled out and, therefore, the proposed project **may affect**, but is **not likely to adversely affect**, humpback, fin, sei, sperm, and blue whales.

Critical habitat has not been designated for these species.

11.13. Leatherback Turtle and Critical Habitat

The project could affect this species through the increased risk of ship strikes as OGV traffic in the nearshore marine environment increases. After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for leatherback turtles, although it is unlikely since this species is more commonly found beyond the seaward end of the action area. However, direct harm from ship strikes cannot be ruled out and, therefore, the proposed project **may affect**, but is **not likely to adversely affect**, leatherback turtles.

Critical habitat components for leatherback turtles will be not affected by the proposed project, as the only component identified is the presence of adequate populations of jellyfish prey. Ship traffic through the nearshore marine portion of the action area will represent an increase of 9 percent above current ship traffic but will remain lower than historic ship traffic levels (see Table 3-6) and will not affect jellyfish occurrence or distribution. As a result, the proposed project will cause **no adverse modification** to critical habitat for leatherback turtles.

11.14. Other Turtles – Green, Loggerhead, and Olive Ridley

The project could affect these species through the increased risk of ship strikes as OGV traffic in the nearshore marine environment increases. After evaluating the potential effects, it has been determined that the proposed action described for the Morrow Pacific project could result in a probability of take for these three turtles, although it is unlikely since these turtles are more commonly found beyond the seaward end of the action area. In addition, ship traffic through the nearshore marine portion of the action area will represent an increase of 9 percent above current ship traffic but will remain lower than historic ship traffic levels (see Table 3-6). However, direct harm from ship strikes cannot be ruled out and, therefore, the proposed project **may affect**, but is **not likely to adversely affect**, green, loggerhead, and olive ridley turtles.

Critical habitat has not been designated for loggerhead and olive ridley turtles. Green turtle critical habitat is entirely located in the waters around Culebra Island, Puerto Rico, and, as a result, the proposed project will cause **no adverse modification** to critical habitat for green turtles.

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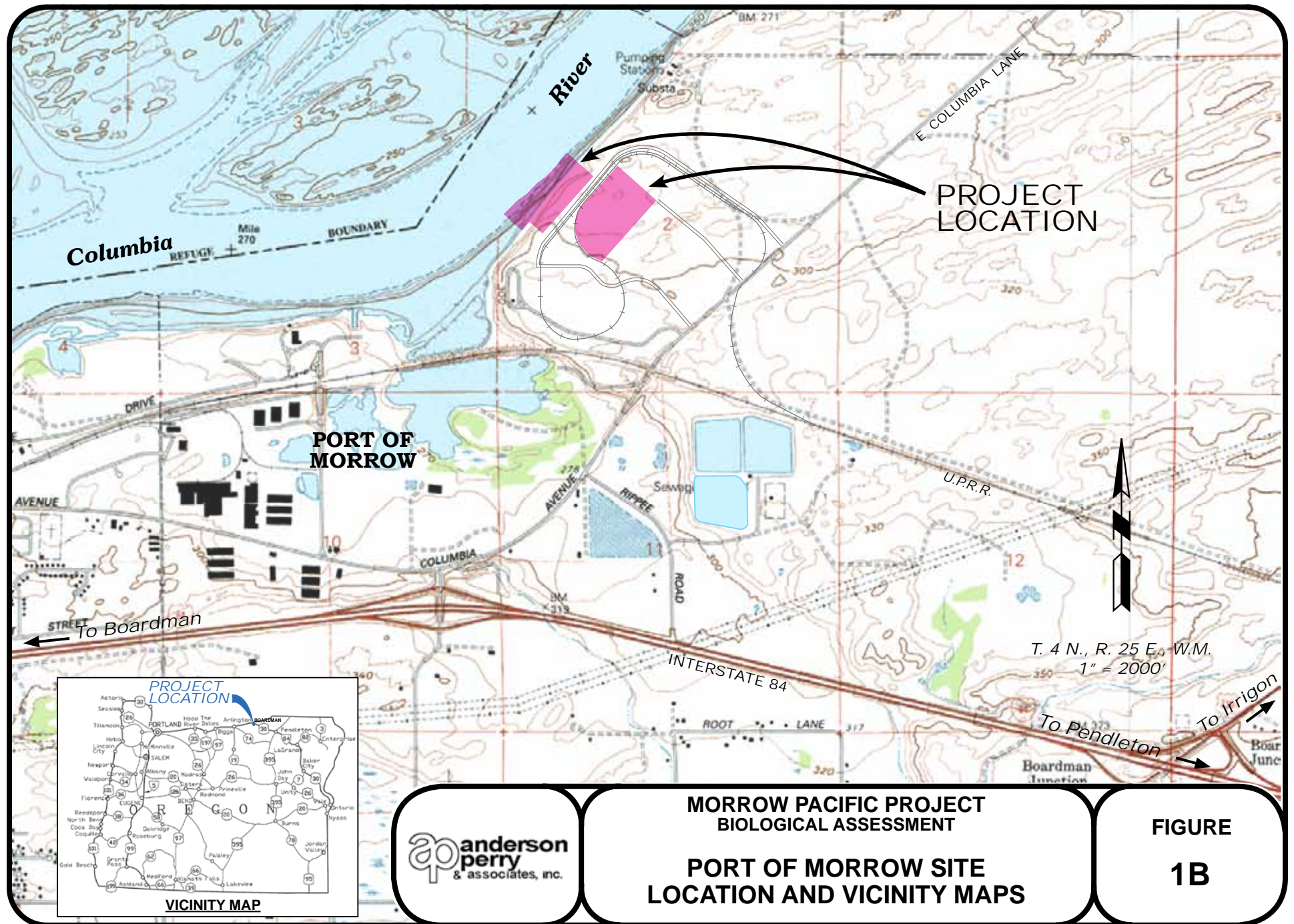
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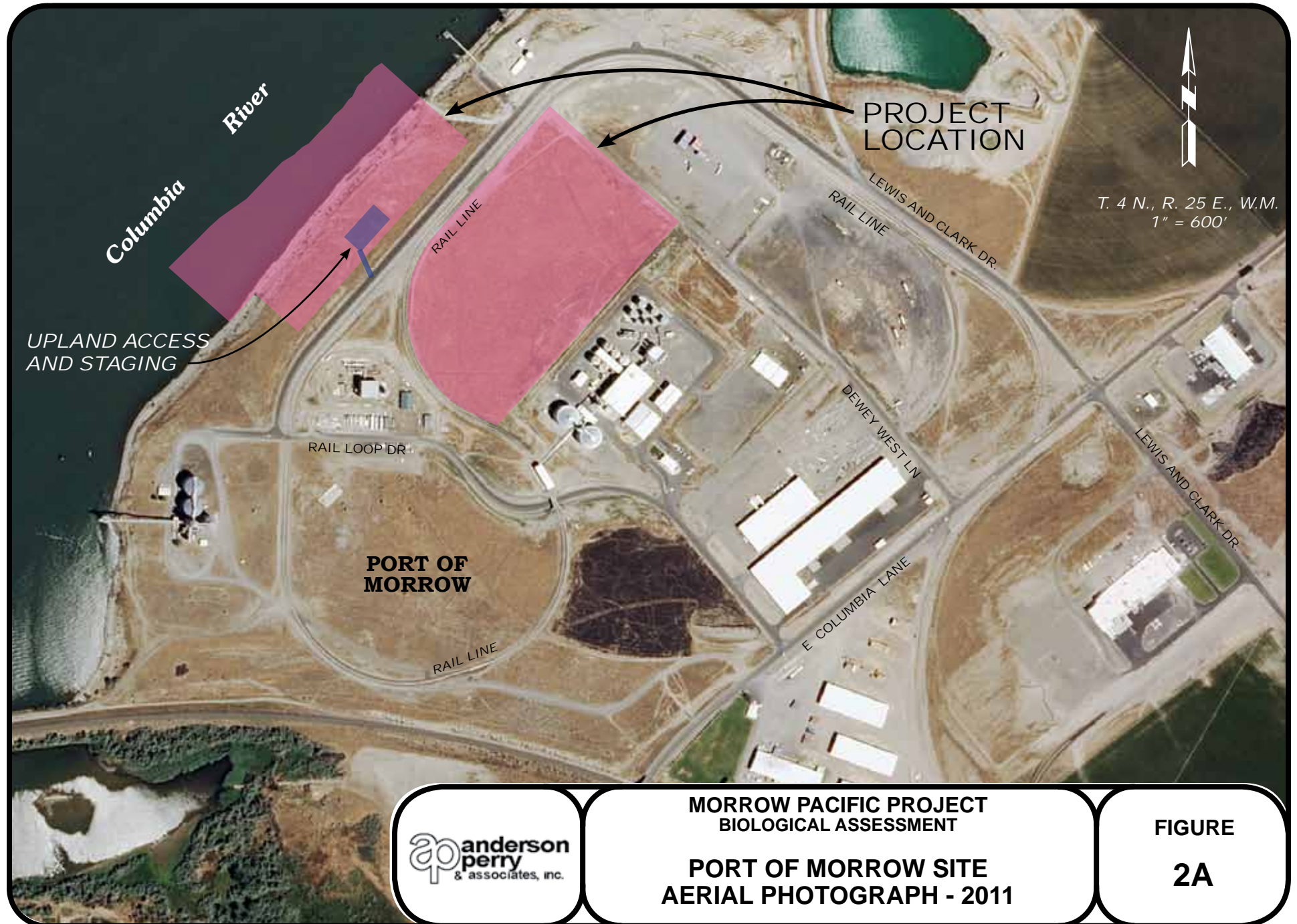
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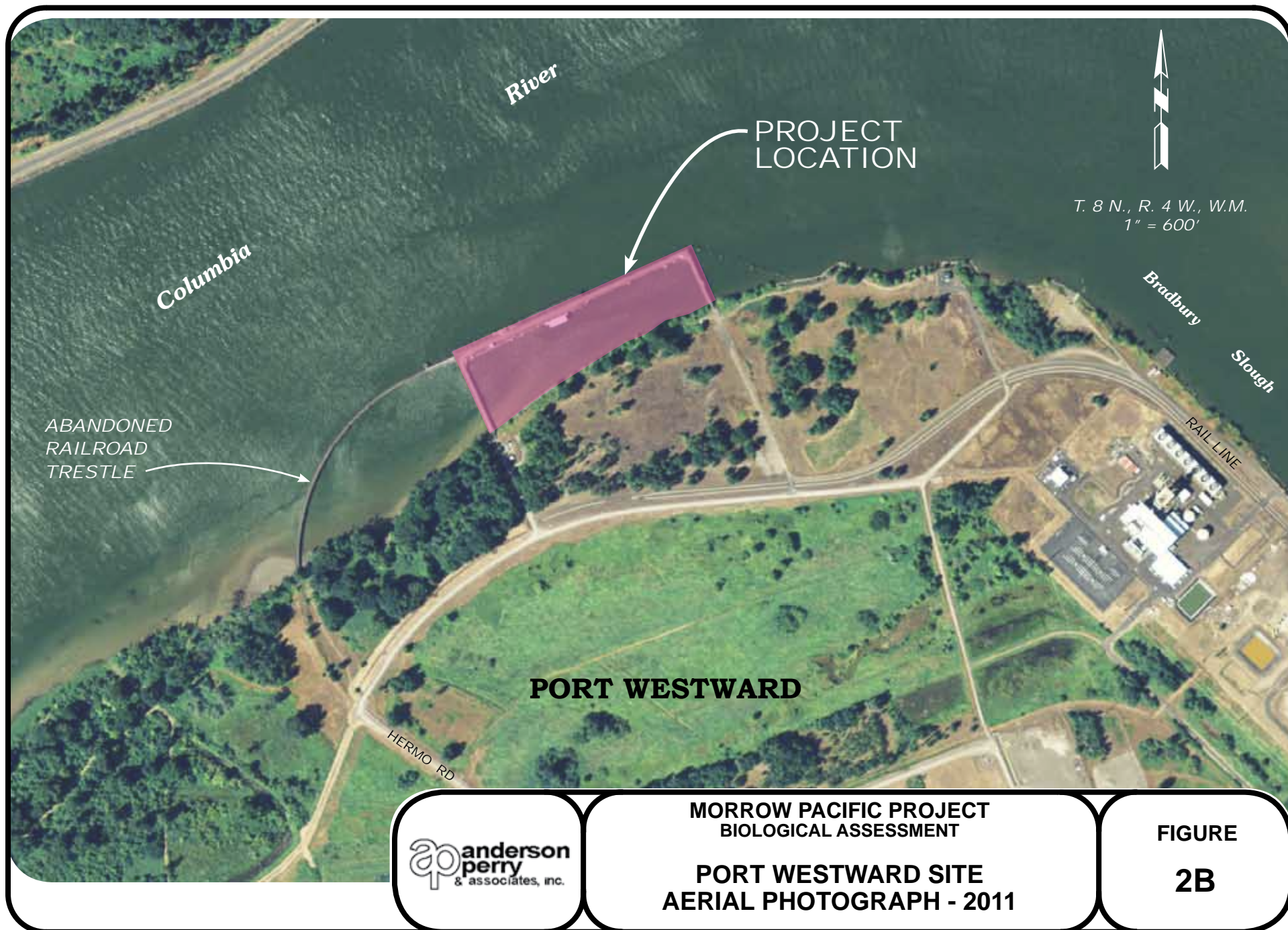
Figures

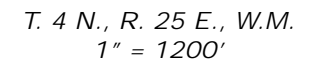


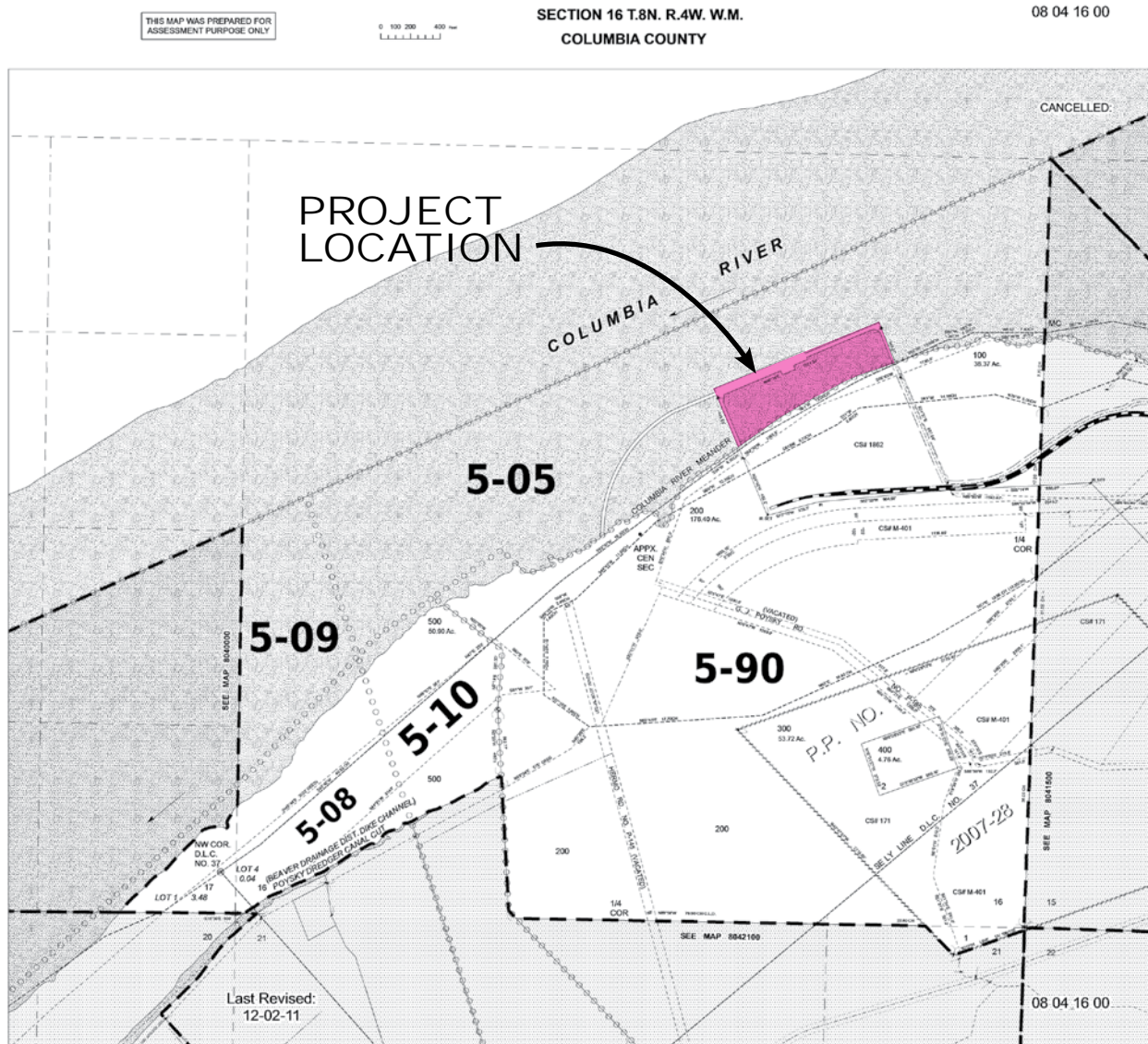












T. 8 N., R. 4 W., W.M.
1" = 1200'

ap anderson
perry
& associates, inc.

**MORROW PACIFIC PROJECT
BIOLOGICAL ASSESSMENT**

**PORT WESTWARD SITE
TAX LOT MAP**

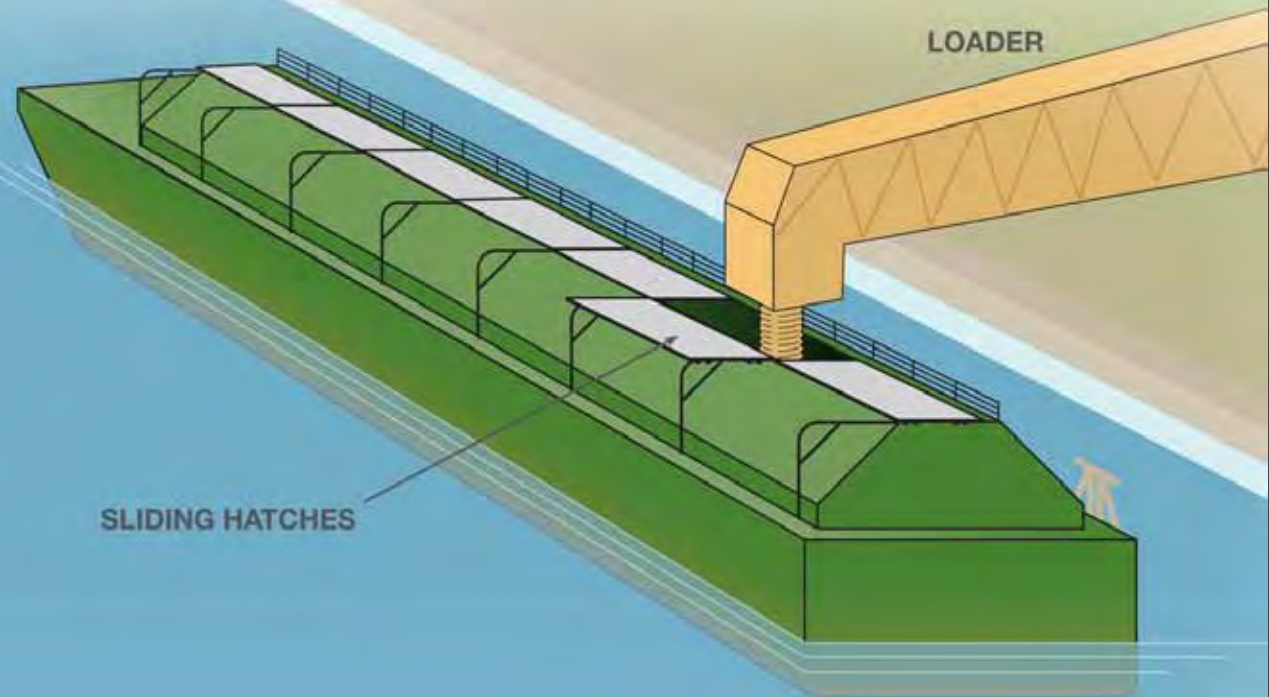
FIGURE

3B



the
Morrow
Pacific
project

Covered Barge Concept



ambreenergy

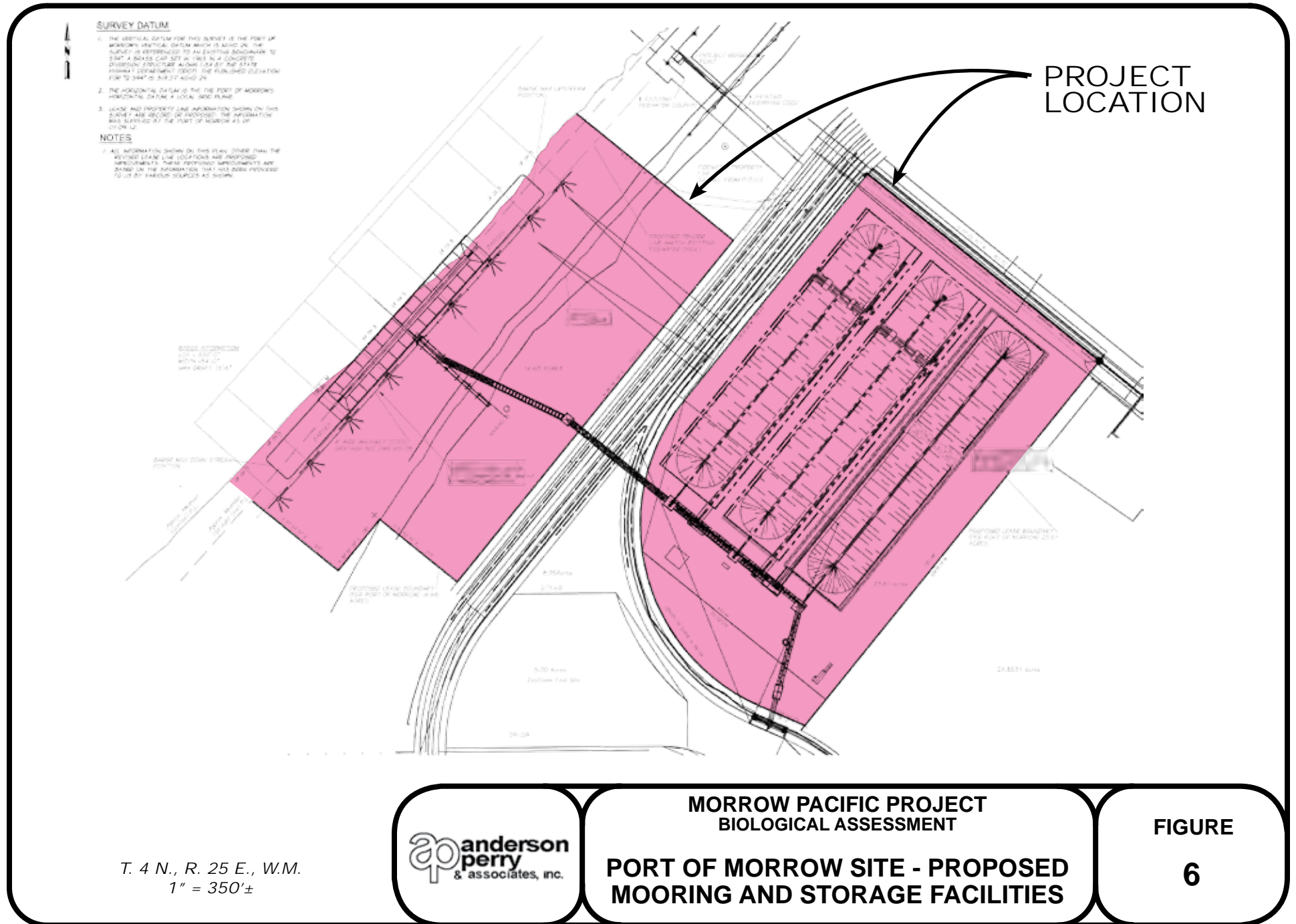
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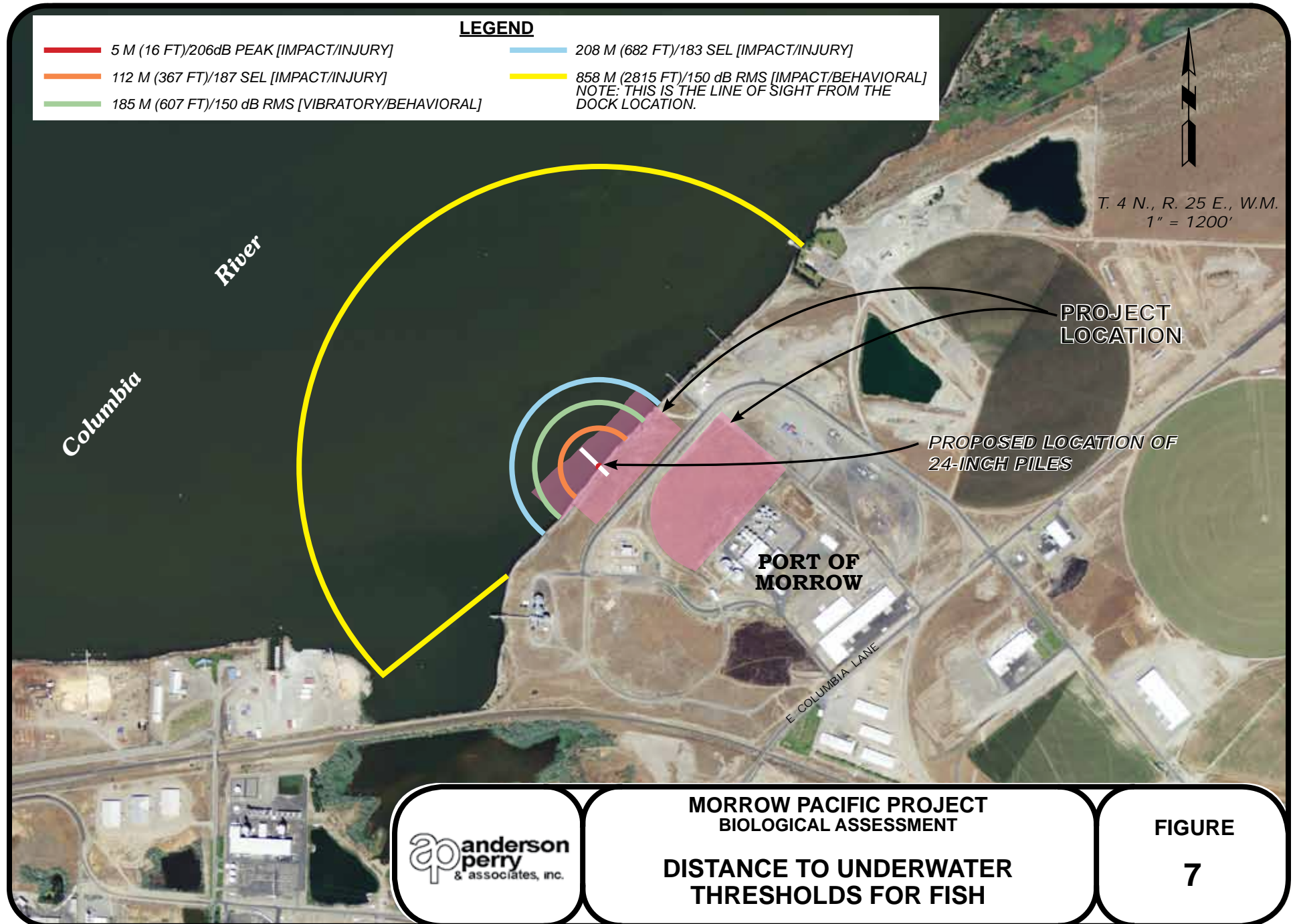
**MORROW PACIFIC PROJECT
BIOLOGICAL ASSESSMENT**

COVERED BARGE

FIGURE

5

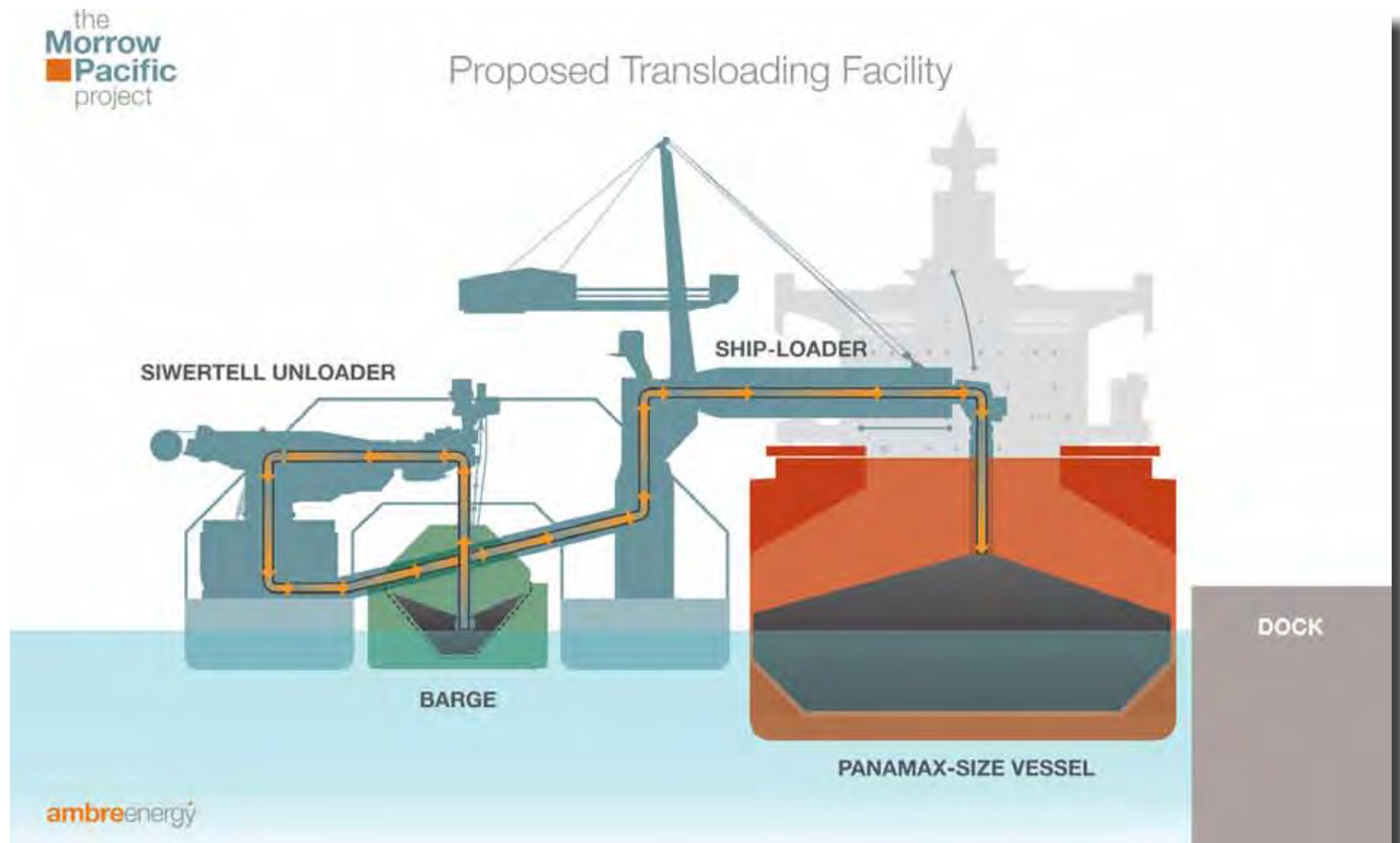






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APPENDIX B

Project Site Photographs



PHOTOGRAPH 1 - Shoreline looking east toward the existing loading facility. Photograph taken by Brad Baird on November 9, 2011.



PHOTOGRAPH 2 - Shoreline looking west. Photograph taken by Brad Baird on November 9, 2011.



PHOTOGRAPH 3 - Looking west to upland site. Photograph taken by Brad Baird on November 9, 2011.



PHOTOGRAPH 4 - Typical bank in project area. Photograph taken by Brad Baird on November 9, 2011.



**PHOTOGRAPH 5 - Loading facility immediately east of project site.
Photograph taken by Brad Baird on November 9, 2011.**



**PHOTOGRAPH 6 - Upland staging area. Photograph taken by Brad Baird
on December 22, 2011.**



PHOTOGRAPH 7 - Site access. Photograph taken by Brad Baird on December 22, 2011.



PHOTOGRAPH 8 - Facility construction site - spoils area looking south. Photograph taken by Brad Baird on December 22, 2011.



PHOTOGRAPH 9 - West end of the existing dock looking downstream.
Photograph taken by Sue Brady on January 19, 2012.



PHOTOGRAPH 10 - East end of the existing dock looking upstream.
Photograph taken by Sue Brady on January 19, 2012.



**PHOTOGRAPH 11 - Shoreline at the west end of the project area.
Photograph taken by Sue Brady on January 19, 2012.**



**PHOTOGRAPH 12 - Shoreline at the east end of the project area.
Photograph taken by Sue Brady on January 19, 2012.**



PHOTOGRAPH 13 - Existing access road to project site. Photograph taken by Sue Brady on January 19, 2012.

APPENDIX C

Project Plan Sheets

BARGE LOADING DOCK

DRAWING INDEX		
DRAWING NO.	SHEET NO.	TITLE
GENERAL		
0501-MG-01	1 OF 1	DRAWING INDEX & VICINITY MAP
STRUCTURAL		
0501-MS-00	1 OF 1	GENERAL NOTES
0501-MS-01	1 OF 1	BERTHING PLAN
0501-MS-02	1 OF 1	DOCK PILING/FRAMING PLAN
0501-MS-03	1 OF 1	CONVEYOR SUPPORT DETAILS
0501-MS-04	1 OF 1	DOCK SECTIONS & DETAILS SHT 1
0501-MS-05	1 OF 1	DOCK SECTIONS & DETAILS SHT 2
0501-MS-06	1 OF 1	BREASTING DOLPHIN PLAN AND DETAILS
0501-MS-07	1 OF 1	MOORING DOLPHIN PLAN AND DETAILS
0501-MS-08	1 OF 1	WALKWAY PLANS
0501-MS-09	1 OF 1	WALKWAY SECTIONS AND DETAILS



VICINITY MAP
SCALE: NTS

PRELIMINARY

PROJECT LOCATION
BOARDMAN, OREGON



ALPHA TECHNICAL GROUP INC.
2929 NW 29th AVE., PORTLAND, OR. 97210
Tel: (503) 227-3317 / Fax: (503) 227-3244

ATGI PROJECT NUMBER

05-01

DWG. NUMBER	REFERENCE DRAWINGS	REV.	DATE	REVISED	DRAWN	CKD.	APPV.	<div> 170 SOUTH MAIN STREET SUITE 700 SALT LAKE CITY, UT 84101</div>	SCALE: 1"=1"		AMBRE ENERGY BOARDMAN, OREGON				
		A	01/04/12	ISSUE FOR REGULATORY PERMITS	CWP	JPD	JPD		DRAWN BY	CWP	PORT OF MORROW BARGE LOADING DOCK DRAWING INDEX AND VICINITY MAP				
		B	01/20/12	REISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD		DESIGNED BY	JPD					
									CHECKED BY						
									PROJECT NUMBER		DATE		DRAWING NO.	SHEET	REV.
											12/30/11		0501-MG-01	1 OF 1	B

GENERAL NOTES

DESIGN CRITERIA/CODES

1. BUILDING CODES

a. IBC 2009/O.S.S.C. 2010.

b. ASCE 7-05.
2. WIND/SEISMIC LOADS

a. SEISMIC DESIGN PARAMETERS:

1. $S_s = 0.47/S_1=0.15$ (MCE VALUES)

2. $S_{ds} = 0.45/S_{d1}=0.22$ (MODIFIED - SITE CLASS D)

b. WIND = 95 MPH (3 SEC GUST) EXPOSURE "C"
3. GRAVITY LOADS

a. DEAD - CALC'D PER DWGS.

b. CATWALK LIVE = 50 PSF

c. CONVEYOR DEAD AND LIVE LOADS PROVIDED BY MILL CREEK ENGINEERING
4. BERTHING/MOORING LOADS/DESIGN CRITERIA

a. MAX APPROACH VEL = 6"/S

b. MAX APPROACH ANGLE = 5 DEG.

c. BASIC WIND SPEED = 80MPH STANDARD OPERATING PROCEDURES REQUIRE BARGES SECURED TO DOCK AT ALL TIMES. (NOT ABLE TO TAKE ON BALLAST/ANCHOR IN MAIN CHANNEL)

PILES AND PILE DRIVING

1. DESIGN DATA

a. PILING DESIGN LOADS, MATERIAL SPECIFICATIONS AND EMBEDMENT REQUIREMENTS ARE AS NOTED ON THE DESIGN DRAWINGS AND ARE BASED ON PAST PROJECTS AT SITE.
2. SUBSURFACE CONDITIONS

a. PILE TIP ELEVATIONS SHOWN IN THE DRAWINGS FOR PILES ARE ESTIMATES ONLY. ACTUAL PILE TIP ELEVATIONS MAY VARY FROM THIS ESTIMATED TIP ELEVATION DUE TO VARYING SOIL CONDITIONS. IF THE LOAD BEARING CAPACITY OF THE PILE HAS NOT BEEN REACHED AT THE INDICATED TIP ELEVATION, DRIVING SHALL CONTINUE UNTIL THE LOAD BEARING CAPACITY IS REACHED, AS DIRECTED BY ENGINEER.
3. MATERIALS

a. ALL STEEL PIPE PILING SHALL CONFORM TO ASTM A252 GR. 3 (Fy= 45 KSI MIN).

b. ALL STEEL HP PILING SHALL CONFORM TO ASTM A690 (Fy=50 ksi MIN)

5. EXECUTION

a. ALL DRIVING EQUIPMENT SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER. ALL BEARING PILES SHALL BE DRIVEN TO REFUSAL ONTO BEDROCK. REFUSAL IS DEFINED BY MINIMUM OF 10 BLOWS/IN. WITH 30,000 FT.LB IMPACT HAMMER.

b. PILE SPlicing, IF REQUIRED, SHALL BE A FULL PENETRATION BUTT WELD WITH MIN. 1/4" BACKING RING PER A.W.S. D1.1. ALL WELDERS SHALL BE QUALIFIED FOR THE WORK, AS PRESCRIBED IN AWS D1.1 AND COPIES OF THEIR CERTIFICATION SHALL BE SUBMITTED TO OWNER'S REPRESENTATIVE.

c. PILE CUT-OFFS ARE THE PROPERTY OF THE CONTRACTOR.

d. PILING SHALL BE INSTALLED TO THE FOLLOWING TOLERANCES UNLESS NOTED:

-3" MAX HORIZONTAL DEVIATION FROM DESIGN LOCATION AT THE CUT OFF ELEVATION.

- 1% MAX. VERTICAL/SLOPE DEVIATION FROM DESIGN LOCATION - 3/8" MAX VERT CUT OFF TOLERANCE.

e. ALL "IN WATER" WORK SHALL BE DONE IN ACCORDANCE WITH CONDITIONS OUTLINED IN U.S. ARMY CORPS OF ENGINEERS' PERMIT. CONTRACTOR SHALL MAINTAIN A COPY OF PERMIT ON SITE.
6. SUBMITTALS

a. SUBMIT DESCRIPTIONS OF PILE DRIVING EQUIPMENT FOR APPROVAL PRIOR TO COMMENCEMENT OF PILE INSTALLATIONS. INCLUDE DETAILS OF THE PILE HAMMER, POWER PLANT, LEADS, CUSHION MATERIAL AND HELMET.

b. SUBMIT MATERIAL CERTIFICATIONS TO SHOW CONFORMANCE TO SPECIFICATIONS.

CONCRETE

1. CONCRETE SHALL DEVELOP 4000 PSI COMPRESSIVE STRENGTH IN 28 DAYS UNLESS NOTED & CONFORM TO THE FOLLOWING:

a. SLUMP SHALL BE 4" (±1" TOL.) PER ASTM

b. C143 TESTING STANDARD.

c. CONCRETE SHALL BE AIR ENTRAINED TO CONTAIN 5% AIR (±1% TOL.)

d. COARSE AGGREGATE SIZE 3/4" MAX.CEMENT SHALL BE TYPE II.
2. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615 GRADE 60. ALL REINFORCING STEEL THAT IS TO BE WELDED SHALL BE DEFORMED BARS CONFORMING TO ASTM A706.
3. SPLICES SHALL BE LAPPED 42 BAR DIAMETERS OR 2'-0" MIN U.N.O
4. GROUT SHALL BE A NON-SHRINK, NON METALLIC FLOWABLE HIGH-STRENGTH GROUT (5 STAR OR EQUAL).

STRUCTURAL STEEL

1. DESIGN FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STEEL CONSTRUCTION" OF AMERICAN INSTITUTE OF STEEL CONSTRUCTION, 13th EDITION, UNLESS OTHERWISE MODIFIED ON THE DRAWING OR IN THE SPECIFICATIONS.
2. ERECTOR SHALL PROVIDE ALL TEMPORARY SHORING AND BRACING NEEDED FOR STABILITY UNTIL THE STRUCTURE IS COMPLETED.
3. MATERIAL SHALL MEET THE REQUIREMENTS OF THE FOLLOWING SPECIFICATIONS, UNLESS NOTED OTHERWISE:

STRUCTURAL STEEL - ASTM A36

WELDED STEEL - AWS D1.1

ELECTRODES - E70XX

HIGH STRENGTH BOLTS - ASTM A325 - 3/4"Ø GALV. BOLTS, NUTS & WASHERS UNLESS OTHERWISE NOTED.
4. ALL STEEL FRAMING IS UNPAINTED U.N.

STRUCTURAL OBSERVATIONS

THE FOLLOWING "STRUCTURAL OBSERVATIONS" ARE REQUIRED BY THE ENGINEER OF RECORD (EOR), IN ACCORDANCE WITH CHAPTER 17 OF THE I.B.C;

1. THE EOR SHALL OBSERVE CONSTRUCTION AT FOLLOWING STAGES:

a. AT COMPLETION OF BEARING PILE INSTALLATION.

b. AT COMPLETION OF ALL STRUCTURAL FRAMING AND BRACING.

SPECIAL INSPECTIONS

THE FOLLOWING SPECIAL INSPECTIONS ARE REQUIRED FOR THIS PROJECT IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE:

1. PILE DRIVING (CONTINUOUS)

VERIFY ALL PILING IS INSTALLED PER DESIGN DRAWINGS/SPECS INCLUDING:

a. VERIFY THAT ADEQUATE LOAD BEARING IS REACHED IN BEARING PILES AS DIRECTED BY THE ENGINEER,

b. VERIFY THAT THE PROPER EMBEDMENT IS OBTAINED.
2. STRUCTURAL WELDING (PERIOIC)

VERIFY ALL STRUCTURAL WELDING IS PERFORMED PER DESIGN DRAWINGS/SPECS.

a. ALL WELDERS SHALL BE QUALIFIED FOR THE WORK, AS PRESCRIBED IN A.W.S. D1.1 AND COPIES OF THEIR CERTIFICATION SHALL BE PROVIDED TO THE SPECIAL INSPECTOR.

b. THE OWNER SHALL RETAIN A CERTIFIED SPECIAL INSPECTOR TO PERFORM THE INSPECTIONS OUTLINED ABOVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE INSPECTOR TWO DAYS PRIOR TO ALL REQUIRED INSPECTIONS.


c. SEE O.S.S.C 2010 TABLE 1704.3 FOR ADDITIONAL REQUIREMENTS.

d. FULL PENETRATION GROVE WELD (I.E. PILES) REQUIRE "CONTINUOUS INSPECTION.

e. SINGLE PASS FILLET WELDS ≤ 5/16" REQUIRE "PERIODIC" INSPECTION ONLY.

NOTE: OHWE = ORDINARY HIGH WATER ELEVATION

PRELIMINARY

DWG. NUMBER	REFERENCE DRAWINGS	REV.	DATE	REVISED	DRAWN	CKD.	APPV.	<div><div>170 SOUTH MAIN STREET SUITE 700 SALT LAKE CITY, UT 84101</div></div>	SCALE: 1"=1"	ATGI PROJECT NUMBER			
		A	01/04/12	ISSUE FOR REGULATORY PERMITS	CWP	JPD	JPD		DRAWN BY CWP	AMBRE ENERGY BOARDMAN, OREGON			
		B	01/20/12	REISSUE FOR REGULATORY PERMITS	CWP	JPD	JPD		DESIGNED BY JPD	PORT OF MORROW BARGE LOADING DOCK GENERAL NOTES			
		C	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD		CHECKED BY				
									PROJECT NUMBER				
								DATE	DRAWING NO.	SHEET	REV.		
								12/30/11	0501-MS-00	1 OF 1	C		

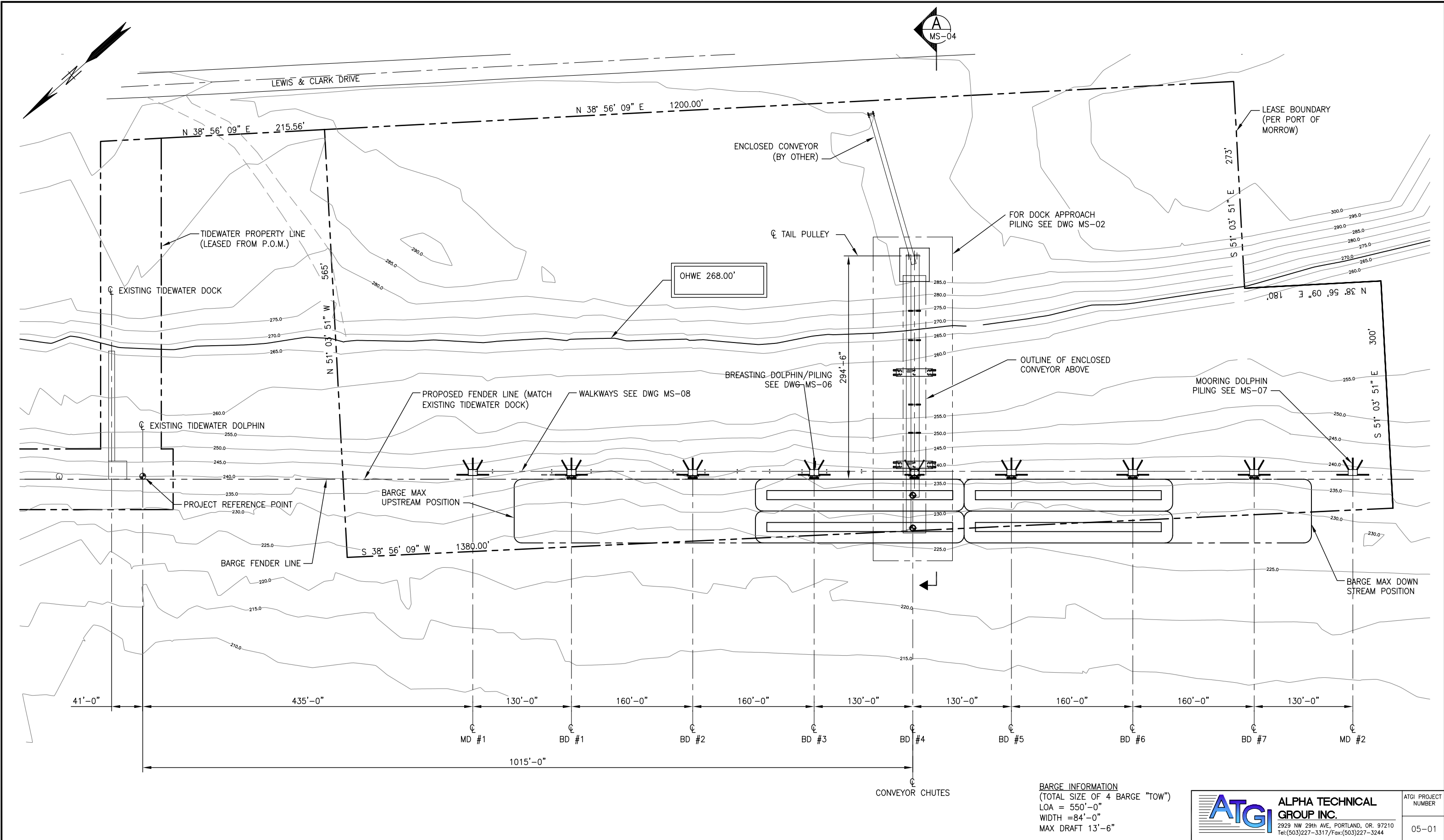


ALPHA TECHNICAL GROUP INC.

2929 NW 29th AVE, PORTLAND, OR. 97210
Tel:(503)227-3317/Fax:(503)227-3244

ATGI PROJECT NUMBER

05-01



BARGE INFORMATION
(TOTAL SIZE OF 4 BARGE "TOW")
LOA = 550'-0"
WIDTH = 84'-0"
MAX DRAFT 13'-6"



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05-01

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60' 30' 0' 60' 120'
SCALE: 1"=60' (22x34)
SCALE: 1"=120' (11x17)

DWG. NUMBER	REFERENCE DRAWINGS	REV.	DATE	REVISED	DRAWN	CKD.	APPV.
		A	11/17/11	FOR REVIEW AND COMMENT	KLD	JPD	JPD
		B	12/21/11	REISSUED FOR REVIEW AND COMMENT	KLD	JPD	JPD
		C	01/04/12	ISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		D	01/20/12	REISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD

ambreenergy

170 SOUTH MAIN STREET
SUITE 700
SALT LAKE CITY, UT 84101

SCALE:	
DRAWN BY	KLD
DESIGNED BY	JPD
CHECKED BY	
PROJECT NUMBER	

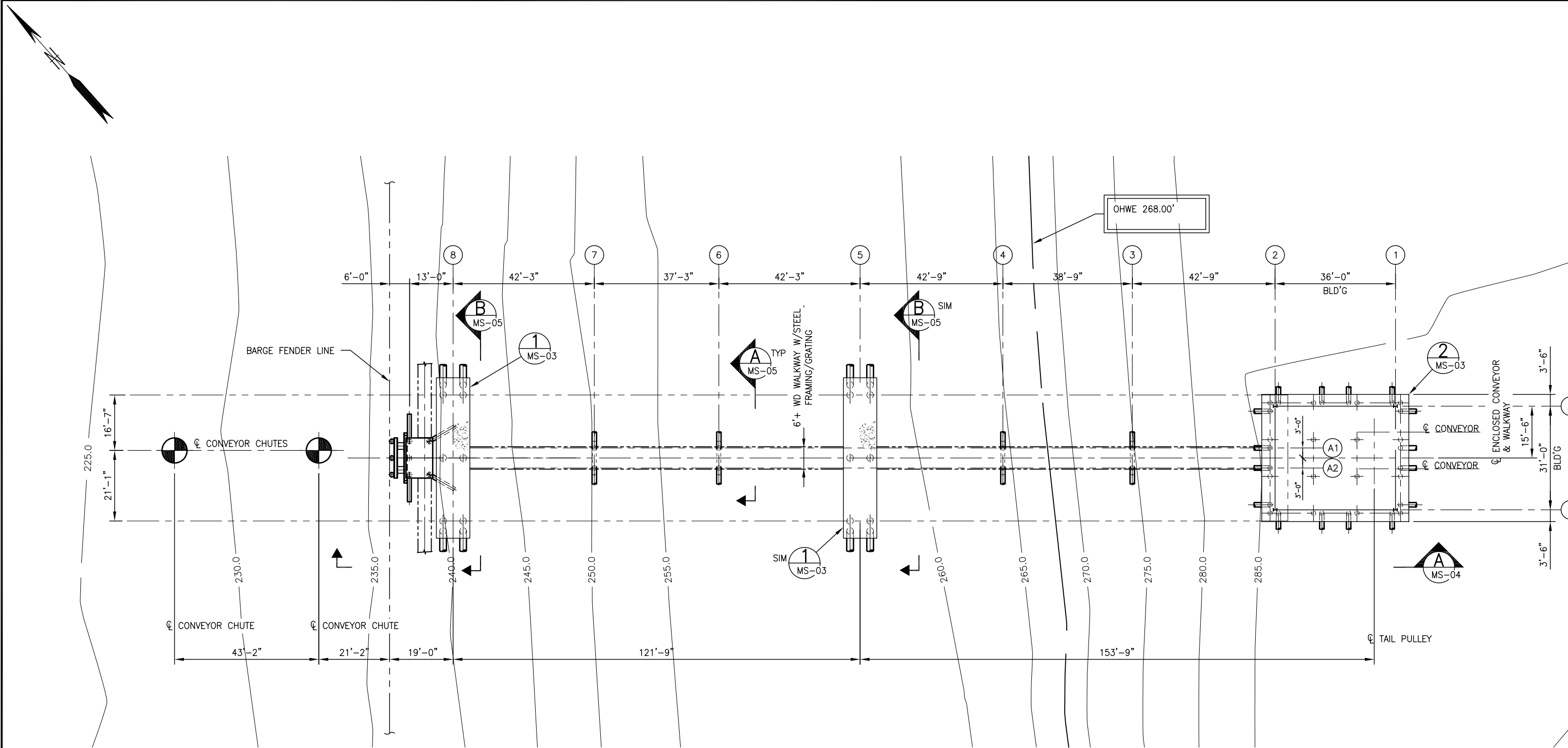
DATE
11/15/11

AMBRE ENERGY
BOARDMAN, OREGON

PORT OF MORROW
BARGE LOADING DOCK
BERTHING PLAN

DRAWING NO.
0501-MS-01

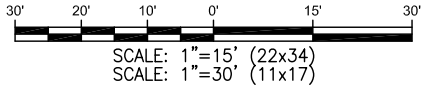
SHEET
1 OF 1
REV.
E



NOTE:
1. BENTS ①, ②, ⑤, ⑧ HAVE CONCRETE SURFACE PADS. ALL ELSE IS METAL GRATED WALKWAY.

DOCK PILING PLAN
1"=15'-0"

PRELIMINARY





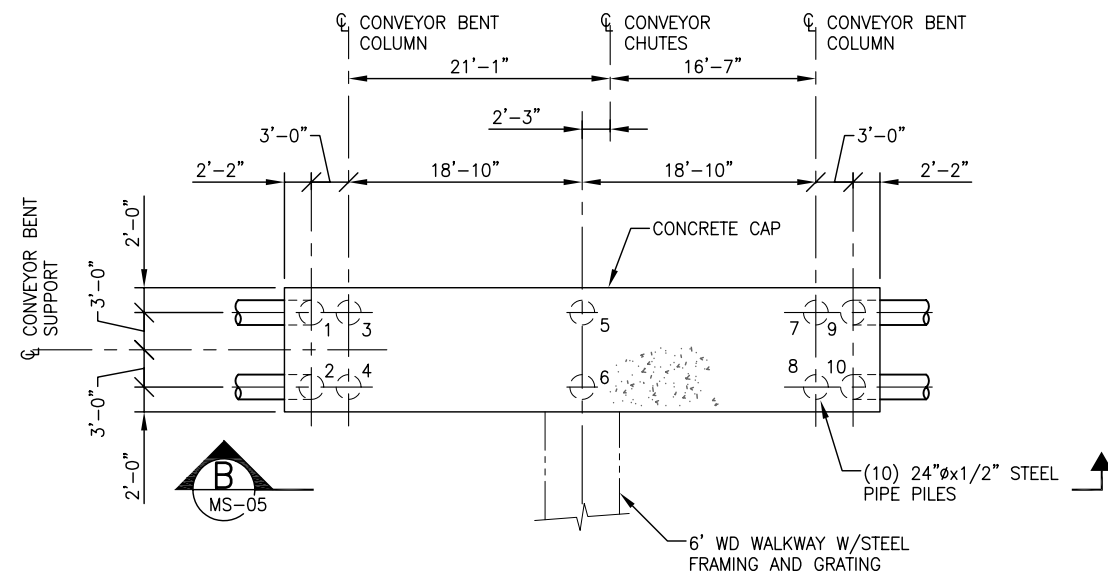
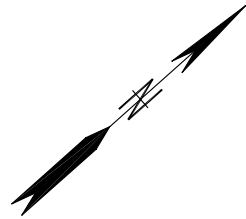
ALPHA TECHNICAL GROUP INC.
2929 NW 29th AVE, PORTLAND, OR. 97210
Tel:(503)227-3317/Fax:(503)227-3244

ATGI PROJECT NUMBER
05-01

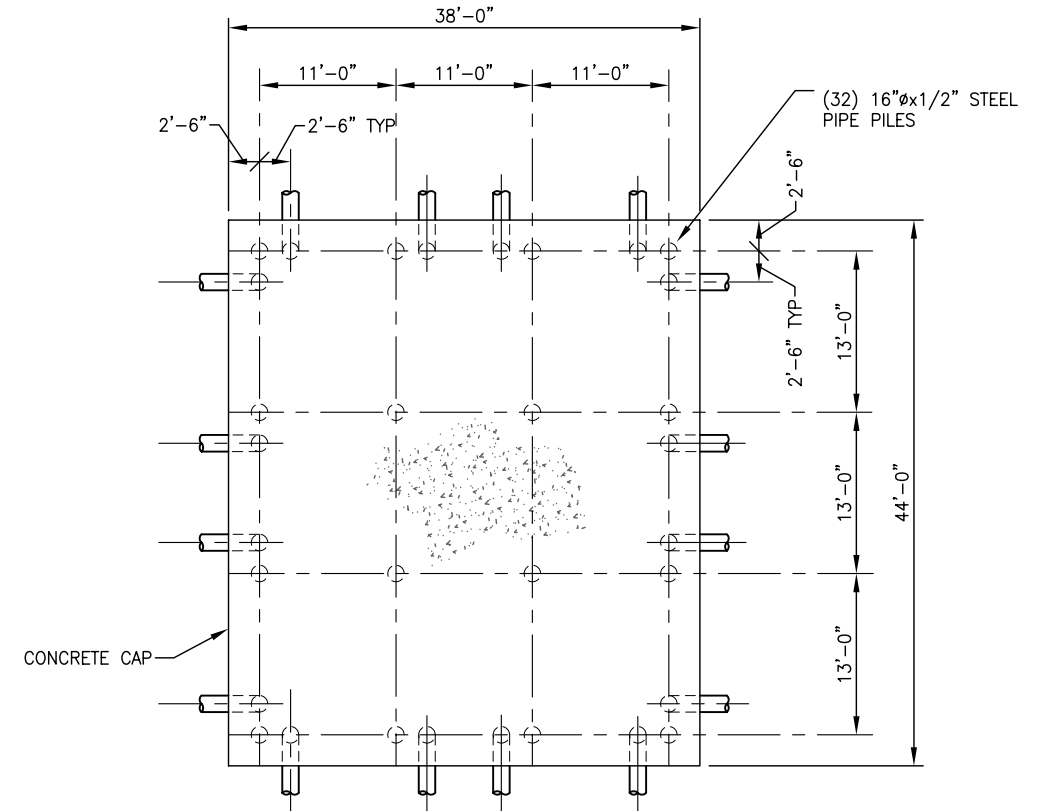
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		B	12/21/11	REISSUED FOR REVIEW AND COMMENT	KLD	JPD	JPD
		C	01/04/12	ISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		D	01/20/12	REISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD

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170 SOUTH MAIN STREET
SUITE 700
SALT LAKE CITY, UT 84101

SCALE: AS SHOWN	AMBRE ENERGY BOARDMAN, OREGON			
DRAWN BY KLD	PORT OF MORROW BARGE LOADING DOCK DOCK PILING/FRAMING PLAN			
DESIGNED BY JPD				
CHECKED BY PROJECT NUMBER				
DATE 11/15/11	DRAWING NO. 0501-MS-02	SHEET 1 OF 1	REV. E	

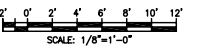


DETAIL 1 (CONVEYOR SUPPORT "OVER WATER")
MS-02, MS-04



DETAIL 2 (CONVEYOR SUPPORT "UPLAND")
MS-02, MS-04


PRELIMINARY

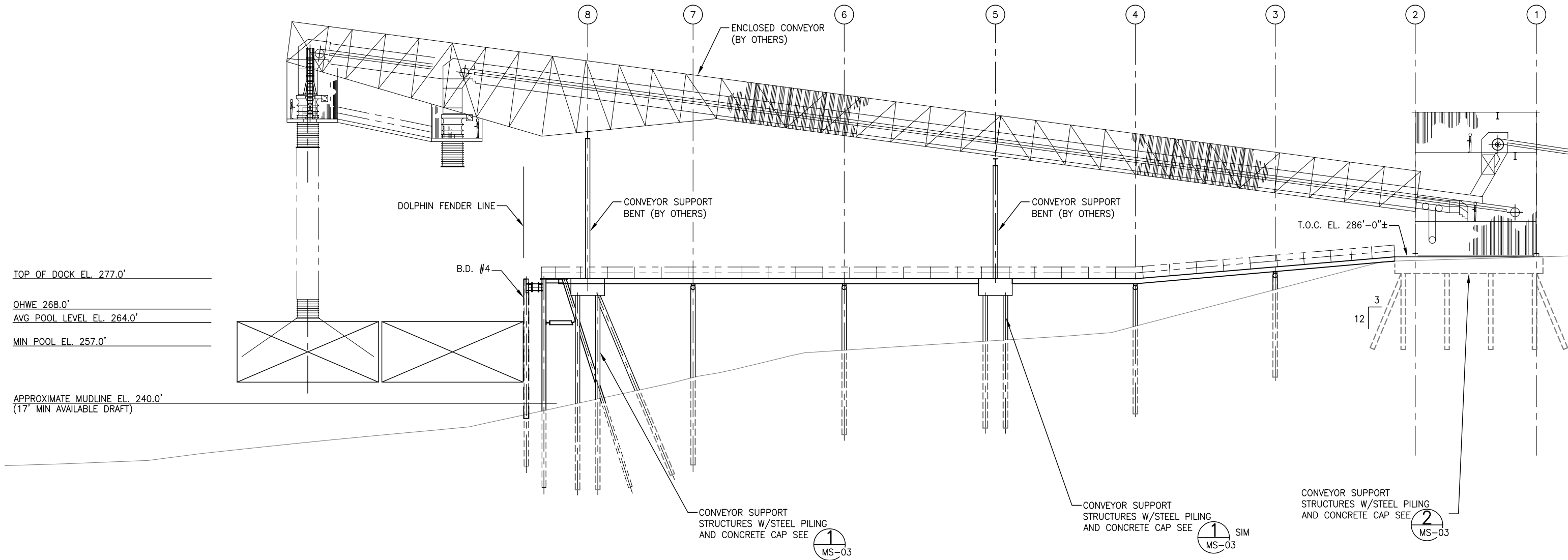




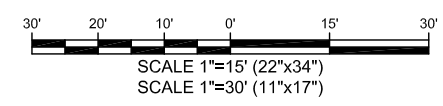
ALPHA TECHNICAL GROUP INC.
2929 NW 29th AVE, PORTLAND, OR. 97210
Tel:(503)227-3317/Fax:(503)227-3244

ATGI PROJECT NUMBER
05-01

DWG. NUMBER	REFERENCE DRAWINGS	REV.	DATE	REVISED	DRAWN	CKD.	APPV.	<div> 170 SOUTH MAIN STREET SUITE 700 SALT LAKE CITY, UT 84101</div>	SCALE: AS SHOWN		AMBRE ENERGY BOARDMAN, OREGON			
		A	11/17/11	FOR REVIEW AND COMMENT	KLD	JPD	JPD		DRAWN BY	KLD	PORT OF MORROW BARGE LOADING DOCK CONVEYOR SUPPORT DETAILS			
		B	12/21/11	REISSUED FOR REVIEW AND COMMENT	KLD	JPD	JPD		DESIGNED BY	JPD				
		C	01/04/12	ISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD		CHECKED BY					
		D	01/20/12	REISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD		PROJECT NUMBER					
		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD				DATE	DRAWING NO.	SHEET	REV.
									11/15/11	0501-MS-03	1 OF 1	E		



SECTION A
1"=15'-0" MS-01




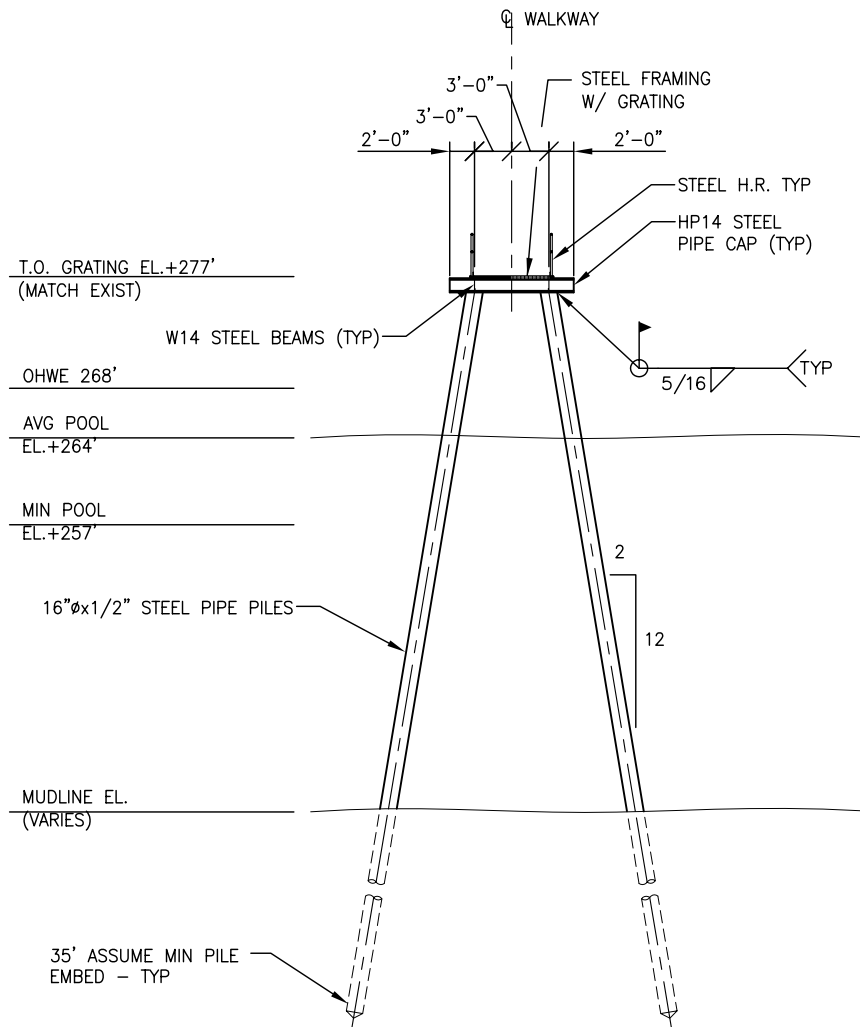
PRELIMINARY



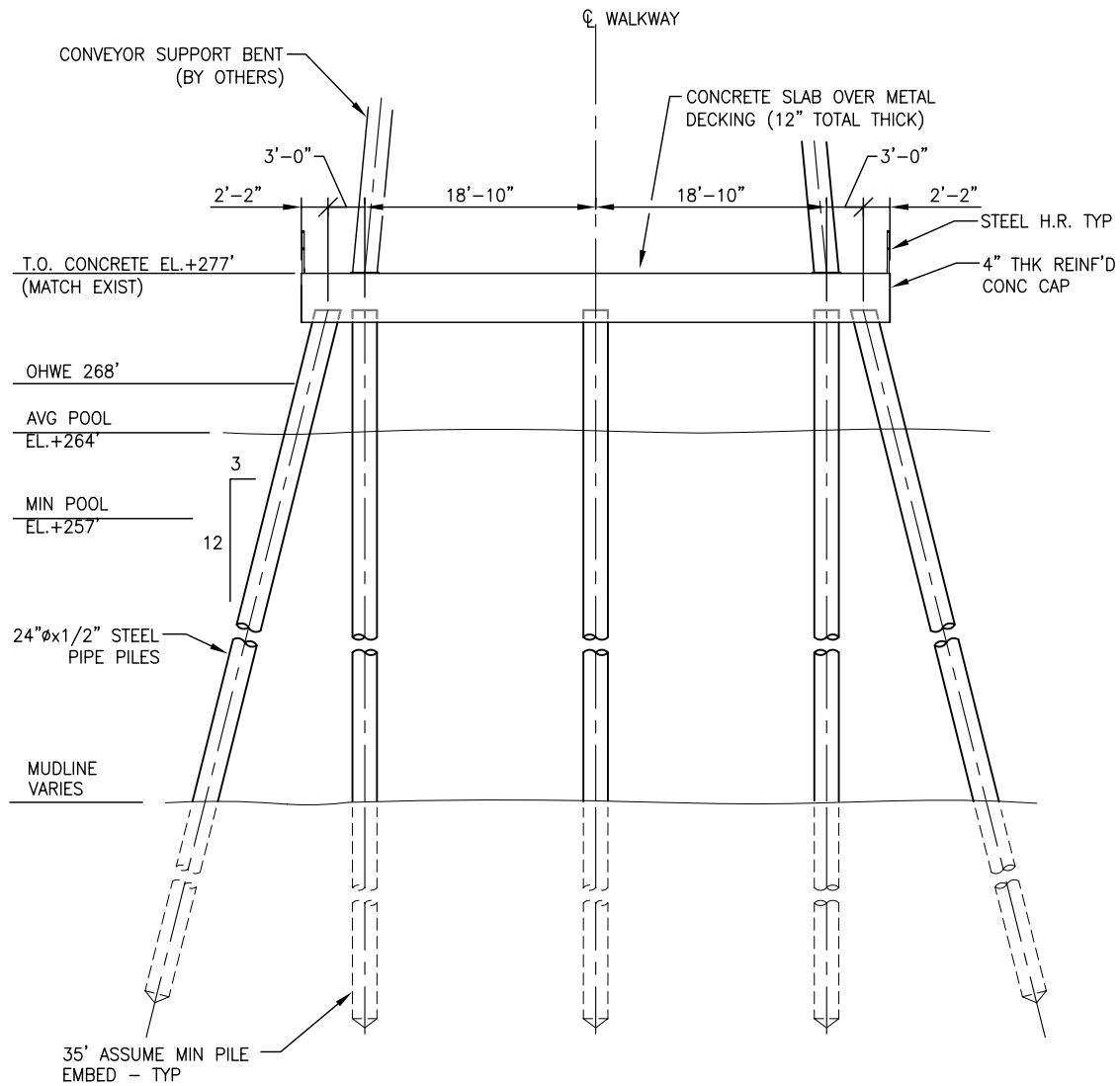
ALPHA TECHNICAL GROUP INC.
2929 NW 29th AVE, PORTLAND, OR. 97210
Tel:(503)227-3317/Fax:(503)227-3244

ATGI PROJECT NUMBER
05-01

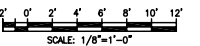
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		A	11/17/11	FOR REVIEW AND COMMENT	KLD	JPD	JPD		DRAWN BY	KLD				
		B	12/21/11	REISSUED FOR REVIEW AND COMMENT	KLD	JPD	JPD		DESIGNED BY	JPD	PORT OF MORROW BARGE LOADING DOCK SECTION "A"			
		C	01/04/12	ISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD		CHECKED BY					
		D	01/20/12	REISSUE FOR REGULATORY PERMIT	KLD	JPD	JPD		PROJECT NUMBER					
		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD				DATE	DRAWING NO.	SHEET	REV.
											11/15/11	0501-MS-04	1 OF 1	E



SECTION A-A (DOCK APPROACH WALKWAY)
MS-01, MS-02, MS-03



SECTION B-B (CONVEYOR SUPPORT STRUCT'S)
MS-01, MS-02, MS-03

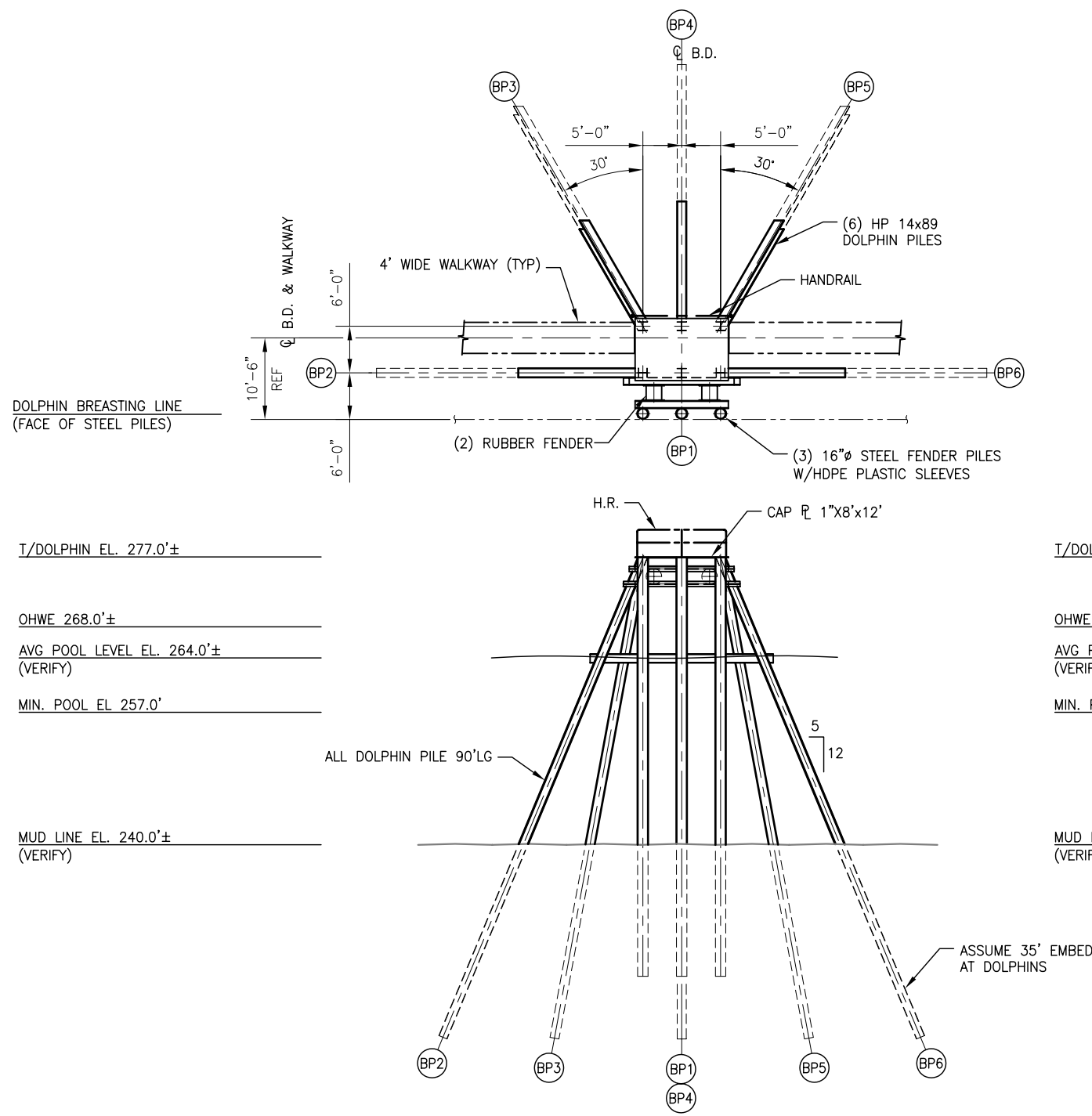


PRELIMINARY

DWG. NUMBER	REFERENCE DRAWINGS	REV.	DATE	REVISED	DRAWN	CKD.	APPV.
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		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD

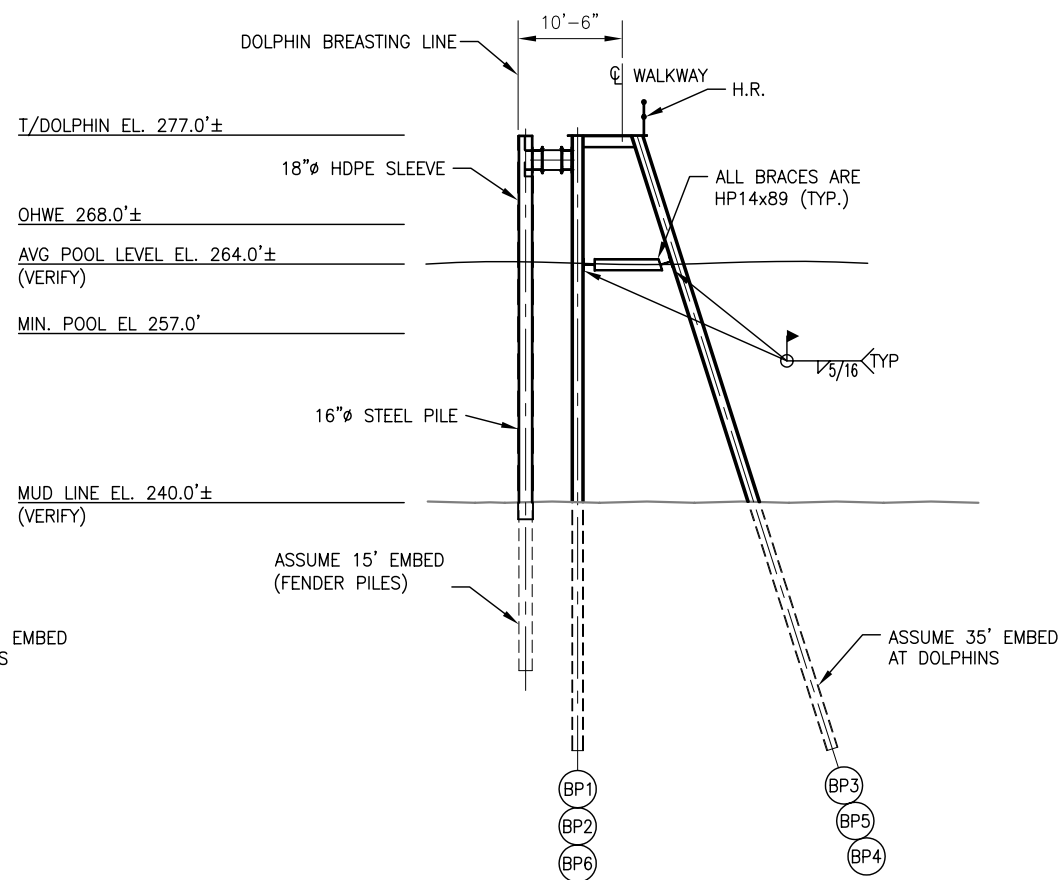
ambreenergy
170 SOUTH MAIN STREET
SUITE 700
SALT LAKE CITY, UT 84101

ATGI ALPHA TECHNICAL GROUP INC. 2929 NW 29th AVE, PORTLAND, OR. 97210 Tel:(503)227-3317/Fax:(503)227-3244		ATGI PROJECT NUMBER 05-01	
SCALE: AS SHOWN DRAWN BY: KLD DESIGNED BY: JPD CHECKED BY: PROJECT NUMBER:		AMBRE ENERGY BOARDMAN, OREGON PORT OF MORROW BARGE LOADING DOCK SECTION "A" & "B"	
DATE: 11/15/11	DRAWING NO.: 0501-MS-05	SHEET: 1 OF 1	REV.: E



RIVER SIDE ELEV.

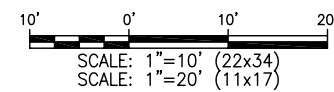
BREASTING DOLPHIN
DETAIL A
1"=10'-0"



DOWN RIVER SIDE ELEV.

NOTE:
ELEVATION OF STEEL BRACING
SHOWN IS APPROX. LOCATE BRACING
2"0" ABOVE WATER LEVEL AT TIME
OF CONSTRUCTION

PRELIMINARY



SCALE: 1"=10' (22x34)
SCALE: 1"=20' (11x17)

DWG. NUMBER	REFERENCE DRAWINGS	REV.	DATE	REVISED	DRAWN	CKD.	APPV.
		A	11/17/11	FOR REVIEW AND COMMENT	KLD	JPD	JPD
		B	12/21/11	REISSUED FOR REVIEW AND COMMENT	KLD	JPD	JPD
		C	01/04/12	ISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		D	01/20/12	REISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD

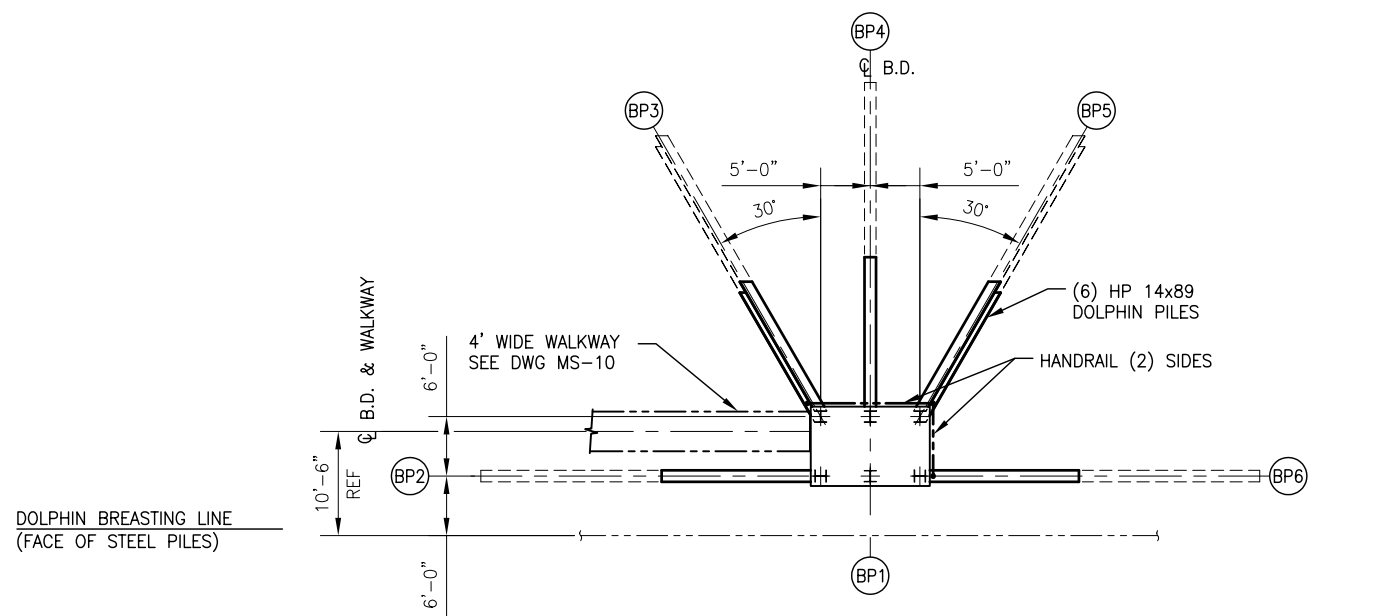
ambreenergy
170 SOUTH MAIN STREET
SUITE 700
SALT LAKE CITY, UT 84101



ALPHA TECHNICAL GROUP INC.
2929 NW 29th AVE, PORTLAND, OR. 97210
Tel:(503)227-3317/Fax:(503)227-3244

ATGI PROJECT NUMBER
05-01

SCALE: 1"=10'-0"	AMBRE ENERGY BOARDMAN, OREGON		
DRAWN BY: KLD	PORT OF MORROW BARGE LOADING DOCK BREASTING DOLPHIN PLAN AND DETAILS		
DESIGNED BY: JPD			
CHECKED BY:			
PROJECT NUMBER:			
DATE: 11/15/11	DRAWING NO.: 0501-MS-06	SHEET: 1 OF 1	REV.: E



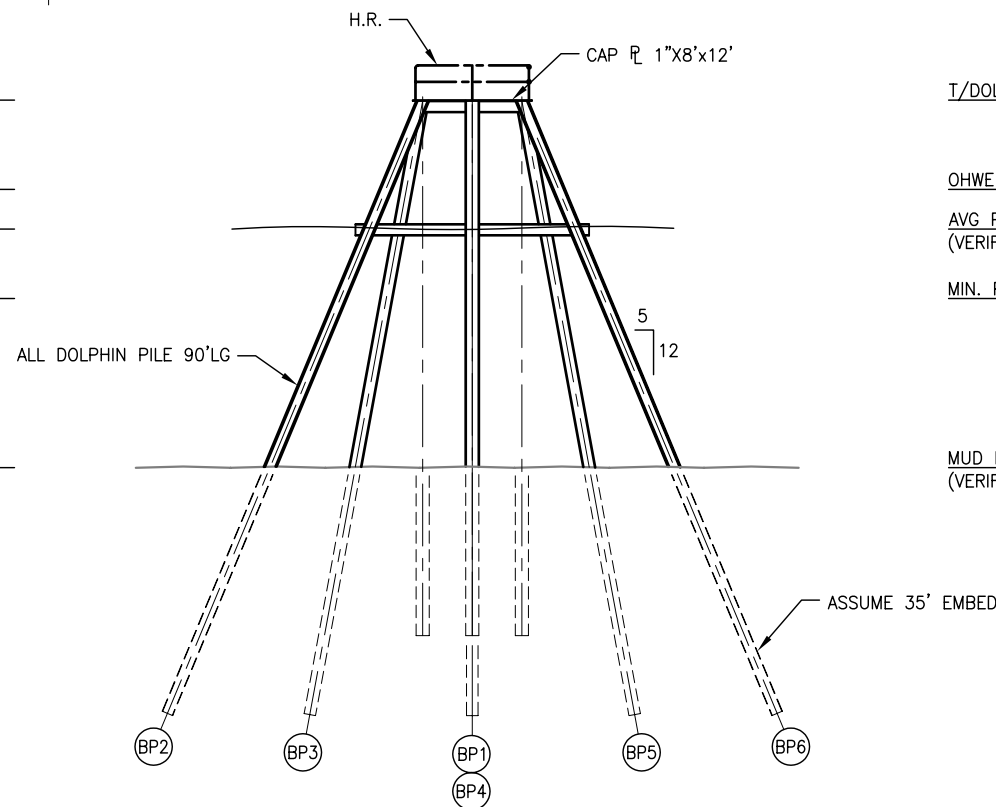
T/DOLPHIN EL. 277.0'±

OHWE 268.0'±

AVG. POOL LEVEL EL. 264.0'±
(VERIFY)

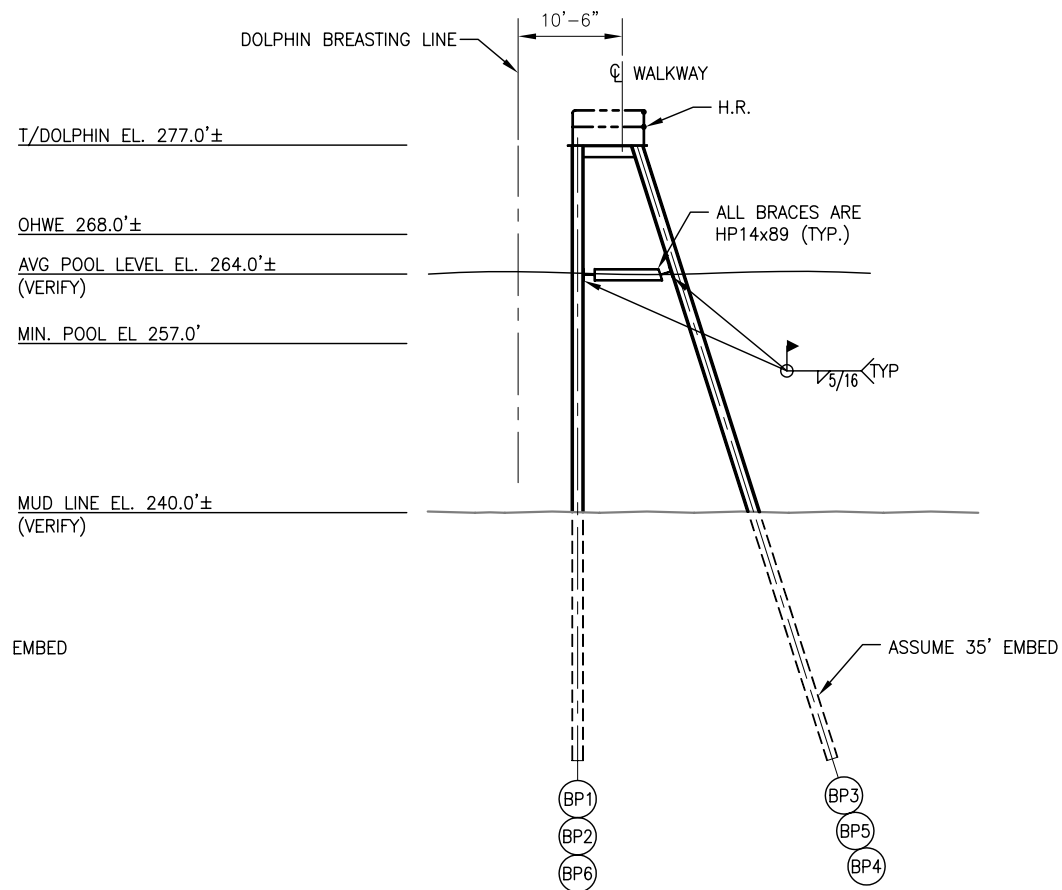
MIN. POOL EL. 257.0'

MUD LINE EL. 240.0'±
(VERIFY)



RIVER SIDE ELEV.

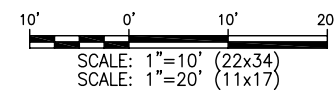
MOORING DOLPHIN
DETAIL A
1"=10'-0"



DOWN RIVER SIDE ELEV.

NOTE:
ELEVATION OF STEEL BRACING
SHOWN IS APPROX. LOCATE BRACING
2"0" ABOVE WATER LEVEL AT TIME
OF CONSTRUCTION

PRELIMINARY



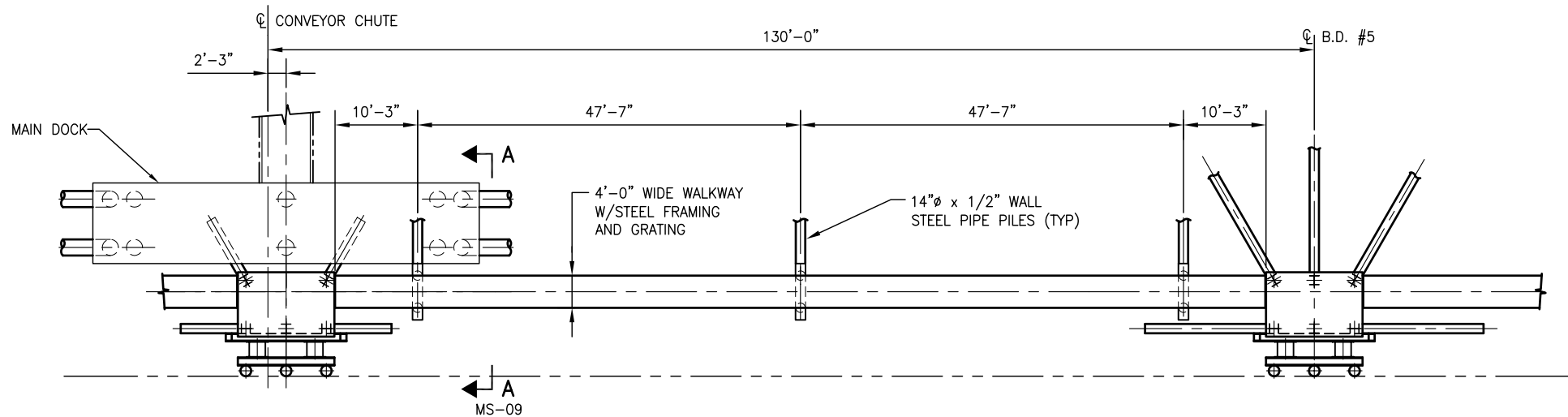
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		B	12/21/11	REISSUED FOR REVIEW AND COMMENT	KLD	JPD	JPD
		C	01/04/12	ISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		D	01/20/12	REISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD

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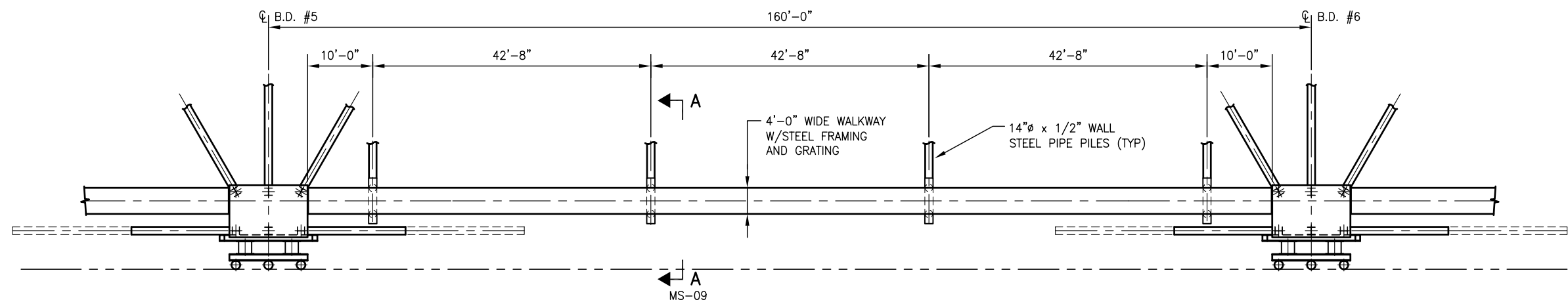
170 SOUTH MAIN STREET
SUITE 700
SALT LAKE CITY, UT 84101

ATGI	ALPHA TECHNICAL GROUP INC.	ATGI PROJECT NUMBER
2929 NW 29th AVE, PORTLAND, OR. 97210 Tel:(503)227-3317/Fax:(503)227-3244		05-01

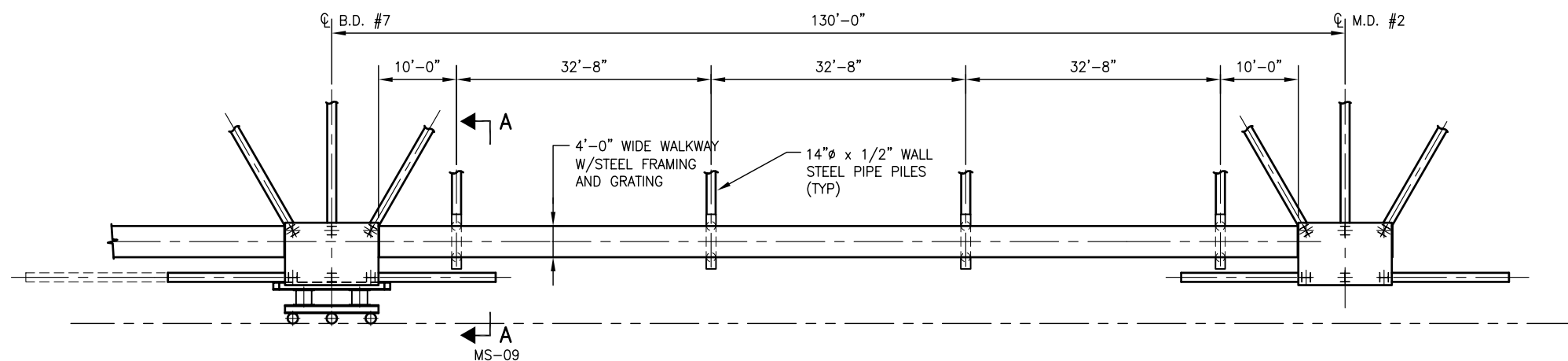
SCALE: 1"=10'-0"	AMBRE ENERGY BOARDMAN, OREGON		
DRAWN BY: KLD	PORT OF MORROW BARGE LOADING DOCK MOORING DOLPHIN PLAN AND DETAILS		
DESIGNED BY: JPD			
CHECKED BY:			
PROJECT NUMBER:			
DATE: 11/15/11	DRAWING NO.: 0501-MS-07	SHEET: 1 OF 1	REV.: E



WALKWAY PLAN – DOCK/B.D. #5 (SIM @ DOCK/B.D. #3)
(TYP 2)

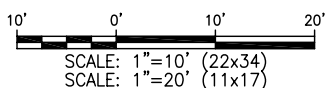


WALKWAY PLAN – B.D. #5/6 (SIM @ B.D. #6/7, 2/3, 1/2)
(TYP 4)



WALKWAY PLAN – B.D. #7/M.D. #2 (SIM @ B.D. #1/M.D. #1)
(TYP 2)

PRELIMINARY



	ALPHA TECHNICAL GROUP INC. 2929 NW 29th AVE, PORTLAND, OR. 97210 Tel:(503)227-3317/Fax:(503)227-3244		ATGI PROJECT NUMBER 05-01

DWG. NUMBER	REFERENCE DRAWINGS	REV.	DATE	REVISED	DRAWN	CKD.	APPV.
		A	11/17/11	FOR REVIEW AND COMMENT	KLD	JPD	JPD
		B	12/21/11	REISSUED FOR REVIEW AND COMMENT	KLD	JPD	JPD
		C	01/04/12	ISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		D	01/20/12	REISSUE FOR REGULATORY PERMITS	KLD	JPD	JPD
		E	01/25/12	REISSUE FOR REGULATORY PERMITS	HVT	JPD	JPD

170 SOUTH MAIN STREET
 SUITE 700
 SALT LAKE CITY, UT 84101

SCALE: 1"=10'-0"	AMBRE ENERGY BOARDMAN, OREGON		
DRAWN BY KLD	PORT OF MORROW BARGE LOADING DOCK WALKWAY PLANS		
DESIGNED BY JPD			
CHECKED BY			
PROJECT NUMBER			
DATE	DRAWING NO.	SHEET	REV.
11/15/11	0501-MS-08	1 OF 1	E



PRELIMINARY

SCALE: AS SHOWN		AMBRE ENERGY BOARDMAN, OREGON		
DRAWN BY	KLD	PORT OF MORROW BARGE LOADING DOCK WALKWAY SECTION		
DESIGNED BY	JPD			
CHECKED BY				
PROJECT NUMBER				
DATE		DRAWING NO.	SHEET	REV.
11/15/11		0501-MS-09	1 OF 1	E

APPENDIX D

Agency Correspondence



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Oregon Fish and Wildlife Office

2600 SE 98th Avenue, Suite 100

Portland, Oregon 97266

Phone: (503) 231-6179 FAX: (503) 231-6195

January 7, 2012

Subject: Lists of threatened and endangered species that may occur in selected Oregon counties

To Whom It May Concern:

This letter accompanies a species list(s) downloaded from our website (<http://www.fws.gov/oregonfwo/Species/Lists/RequestList.asp>), which shows threatened and endangered species that may occur within the area of your proposed project. The species list(s) fulfills the requirement of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, Federal agencies are required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species or critical habitats. Recommended contents of a Biological Assessment are described in Enclosure A, as well as 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that threatened and endangered species and/or designated critical habitat may be affected by the project, the agency is required to consult with the Service following the requirements of the regulations that implement the Act (50 CFR 402).

The county species list(s) includes a list of candidate species under review for listing and those species that the Service considers "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to the completion of your project. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.



If a proposed project may affect only candidate species or species of concern, you are not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends minimizing impacts to these species to the extent possible in order to prevent potential future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, your agency may wish to request technical assistance from this office.

If your project includes communications or cell towers, you should be aware that migratory birds, another of our Trust Resources, can suffer significant mortality from collisions with towers. Further information on this issue can be obtained from the following web sites: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm> and <http://www.towerkill.com>. Please refer to the recently approved Service Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers (<http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>). We recommend its application to relevant projects. We also recommend the tower site evaluation form (found on the guidance webpage), which you may find useful in helping to determine the effects of your proposed project to endangered species and migratory birds.

The bald eagle (*Haliaeetus leucocephalus*) has recovered and was removed from the Federal List of Endangered and Threatened Wildlife and Plants in 2007. The bald eagle occurs in all Oregon counties, and the species continues to be protected under the Bald and Golden Eagle Protection Act. For more information on bald eagles, and for the Service's "National Bald Eagle Management Guidelines," please visit the Service's regional webpage devoted to the bald eagle (<http://www.fws.gov/pacific/eagle/>).

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. Please include a copy of this letter and any species lists downloaded from our website with any request for consultation or correspondence about your project that you submit to our office. If you have questions regarding your responsibilities under the Act, please contact Cat Brown at (503) 231-6179. For questions regarding listed salmon and steelhead trout, please contact NOAA Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

Enclosure A

RESPONSIBILITIES OF FEDERAL AGENCIES UNDER SECTION 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Section 7(a) of the Act requires:

1. Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;
2. Consultation with the U.S. Fish and Wildlife Service (Service) when a Federal action may affect a listed endangered or threatened species or designated critical habitat to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. The process is initiated by the Federal agency after it has determined if its action may affect a listed species; and
3. Conference with the Service when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Preparation of a Biological Assessment

Section 7(c) of the Act requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects.¹ For actions that are not construction projects, we recommend that a biological evaluation similar to a BA be prepared to evaluate the effects of the proposed project on listed and proposed species and critical habitats. The purpose of the BA or biological evaluation is to identify listed and proposed species which are likely to be affected by a proposed project. The process is initiated by a Federal agency by requesting a list of threatened and endangered species and critical habitats. The BA or biological evaluation should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with the Service. No irreversible commitment of resources is to be made during the preparation of the BA which would foreclose reasonable and prudent alternatives to jeopardy to listed species. Planning, design, and administrative actions may be taken; however, no construction may begin.

A biological assessment or biological evaluation should include the following information:

1. Description of proposed action (project).

Describe the following and attach any relevant maps, diagrams, or designs;

- **Who** is proposing the action?
- **Where** is the action? Be as specific as possible. Include maps, county, township, range, stream, and any other pertinent information.
- **What** is the proposed action? Describe what is planned, the objectives of the action, include designs, diagrams, and best management practices applied, etc.
- **How** is the action going to be implemented? Give specific details, such as what type

¹ A construction project (or other undertaking having similar physical impacts) is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332. (2)c).

of equipment is used, how the action area will be accessed, etc.

- **When** will the action be implemented?

2. Description of listed and proposed species and critical habitat, status, distribution and habitat use by the species in the project area.

Identify which listed, proposed and candidate species and critical habitats may potentially be affected (beneficially or adversely) by the action. Describe how the species use the project area. Assistance with this information can be obtained from local offices of the Service.

3. Description of the action area.

Describe all areas affected by the proposed project. The action area refers to the area directly or indirectly affected by the proposed action; this area will usually be larger than the project footprint. Include on-site inspection or survey data, views of recognized experts (e.g., ODFW), and literature reviews.

4. Effects of the proposed action on listed and proposed species and designated or proposed critical habitat.

Describe in detail the effects of the action on the species and their habitats including direct and indirect effects, as well as effects that are interrelated and interdependent effects. Summarize your analysis of all project effects.

5. Description of measures to minimize effects to listed species, and proposed project monitoring.

Describe methods to be used to avoid, minimize and correct adverse short and long-term effects. Describe what will be monitored, who will monitor and the frequency of monitoring.

6. Determination of effect.

Clearly state your final effects determination for each listed and proposed species and designated and proposed critical habitat. Effects determinations may be:

- no effect
- may affect, not likely to adversely affect (appropriate for actions that have only beneficial, insignificant, or discountable effects)
- may affect, likely to adversely affect (appropriate for actions with effects to listed species or designated critical habitat that are not entirely insignificant, discountable or wholly beneficial)

7. Attachments.

Attachments should include all relevant information supporting the above categories such as maps, project design, drawings, specifications, pollution control plan, photos of project site and adjacent area, site survey data, and literature cited.

For more information on consultation under section 7 of the Endangered Species Act, visit the Service's national consultation website at <http://www.fws.gov/endangered/what-we-do/consultations-overview.html>.

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN COLUMBIA COUNTY, OREGON

LISTED SPECIES

Mammals

Terrestrial:

Columbian white-tailed deer (Columbia River distinct population segment)	<i>Odocoileus virginianus leucurus</i>	E
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Birds

Northern spotted owl	<i>Strix occidentalis caurina</i>	CH T
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Plants

Water howellia	<i>Howellia aquatilis</i>	T
Nelson's checker-mallow	<i>Sidalcea nelsoniana</i>	T

PROPOSED SPECIES

None

No Proposed Endangered Species	PE
No Proposed Threatened Species	PT

CANDIDATE SPECIES

Mammals

Red tree vole (North Oregon Coast distinct population segment)	<i>Arborimus longicaudus</i>
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Birds

Streaked horned lark	<i>Eremophila alpestris strigata</i>
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SPECIES OF CONCERN

Mammals

White-footed vole	<i>Arborimus albipes</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Long-eared myotis bat	<i>Myotis evotis</i>
Fringed myotis bat	<i>Myotis thysanodes</i>
Long-legged myotis bat	<i>Myotis volans</i>
Yuma myotis bat	<i>Myotis yumanensis</i>
Camas pocket gopher	<i>Thomomys bulbivorus</i>

Birds

Olive-sided flycatcher	<i>Contopus cooperi</i>
Yellow-breasted chat	<i>Icteria virens</i>
Lewis' woodpecker	<i>Melanerpes lewis</i>
Mountain quail	<i>Oreortyx pictus</i>

**FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN COLUMBIA COUNTY, OREGON**

Band-tailed pigeon
Oregon vesper sparrow
Purple martin

Patagioenas fasciata
Pooecetes gramineus affinis
Progne subis

Reptiles and Amphibians

Northern Pacific pond turtle
Coastal tailed frog
Northern red-legged frog

Actinemys marmorata marmorata
Ascaphus truei
Rana aurora aurora

Fish

Malheur mottled sculpin
River lamprey
Pacific lamprey
Coastal cutthroat trout

Cottus bairdi ssp.
Lampetra ayresi
Lampetra tridentata
Oncorhynchus clarki ssp

Invertebrates

Clams:

California floater mussel

Anodonta californiensis

Plants

Oregon sullivantia

Sullivantia oregana

DELISTED SPECIES

Birds

Aleutian Canada goose
American Peregrine falcon
Bald eagle

Branta canadensis leucopareia
Falco peregrinus anatum
Haliaeetus leucocephalus

Definitions:

Listed Species: An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future.

Proposed Species: Taxa for which the Fish and Wildlife Service or National Marine Fisheries Service has published a proposal to list as endangered or threatened in the Federal Register.

Candidate Species: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

Species of Concern: Taxa whose conservation status is of concern to the U.S. Fish and Wildlife Service (many previously known as Category 2 candidates), but for which further information is still needed. Such species receive no legal protection and use of the term does not necessarily imply that a species will eventually be proposed for listing.

Delisted Species: A species that has been removed from the Federal list of endangered and threatened wildlife and plants.

Key:

**FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN COLUMBIA COUNTY, OREGON**

E Endangered
T Threatened
CH Critical Habitat has been designated for this species
PE Proposed Endangered
PT Proposed Threatened
PCH Critical Habitat has been proposed for this species

Notes:

Marine & Anadromous Species: Please consult the National Marine Fisheries Service (NMFS) (<http://www.nmfs.noaa.gov/pr/species/>) for marine and anadromous species. The National Marine Fisheries Service (NMFS) manages mostly marine and anadromous species, while the U.S. Fish and Wildlife Service manages the remainder of the listed species, mostly terrestrial and freshwater species.

Marine Turtle Conservation and Management: All six species of sea turtles occurring in the U.S. are protected under the Endangered Species Act of 1973. In 1977, NOAA Fisheries and the U.S. Fish and Wildlife Service signed a Memorandum of Understanding to jointly administer the Endangered Species Act with respect to marine turtles. NOAA Fisheries has the lead responsibility for the conservation and recovery of sea turtles in the marine environment and the U.S. Fish and Wildlife Service has the lead for the conservation and recovery of sea turtles on nesting beaches. For more information, see the NOAA Fisheries webpage on sea turtles <http://www.nmfs.noaa.gov/pr/species/turtles/>.

Gray Wolf: In 2008, the Service published a final rule that established a distinct population segment of the gray wolf (*Canis lupis*) in the northern Rocky Mountains (which includes a portion of Eastern Oregon, east of the centerline of Highway 395 and Highway 78 north of Burns Junction and that portion of Oregon east of the centerline of Highway 95 south of Burns Junction). Any wolves found west of this line in Oregon belong to the conterminous USA population [see 73 FR 10514]. On May 5, 2011, the Fish and Wildlife Service published a final rule – as directed by legislative language in the Fiscal Year 2011 appropriations bill – reinstating the Service's 2009 decision to delist biologically recovered gray wolf populations in the Northern Rocky Mountains. Gray wolves in Oregon are State-listed as endangered, regardless of location.

FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN MORROW COUNTY, OREGON

PROPOSED SPECIES

None

No Proposed Endangered Species
No Proposed Threatened Species

PE
PT

CANDIDATE SPECIES

Mammals

Terrestrial:

Washington ground squirrel

Uroditellus washingtoni

SPECIES OF CONCERN

Mammals

Silver-haired bat
Small-footed myotis bat
Long-eared myotis bat
Yuma myotis bat

Lasionycteris noctivagans
Myotis ciliolabrum
Myotis evotis
Myotis yumanensis

Birds

Northern goshawk
Western burrowing owl
Ferruginous hawk
Olive-sided flycatcher
Willow flycatcher
Yellow-breasted chat
Lewis' woodpecker
Mountain quail
White-headed woodpecker

Accipiter gentilis
Athene cunicularia hypugaea
Buteo regalis
Contopus cooperi
Empidonax traillii adastus
Icteria virens
Melanerpes lewis
Oreortyx pictus
Picoides albolarvatus

Reptiles and Amphibians

Northern sagebrush lizard

Sceloporus graciosus graciosus

Fish

Margined sculpin
Pacific lamprey

Cottus marginatus
Lampetra tridentata

Plants

Robinson's onion
Laurence's milk-vetch

Allium robinsonii
Astragalus collinus var. laurentii

DELISTED SPECIES

Birds

**FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
AND SPECIES OF CONCERN
UNDER THE JURISDICTION OF THE FISH AND WILDLIFE SERVICE
WHICH MAY OCCUR WITHIN MORROW COUNTY, OREGON**

American Peregrine falcon
Bald eagle

Falco peregrinus anatum
Haliaeetus leucocephalus

Definitions:

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Delisted Species: A species that has been removed from the Federal list of endangered and threatened wildlife and plants.

Key:

E	Endangered
T	Threatened
CH	Critical Habitat has been designated for this species
PE	Proposed Endangered
PT	Proposed Threatened
PCH	Critical Habitat has been proposed for this species

Notes:

Marine & Anadromous Species: Please consult the National Marine Fisheries Service (NMFS) (<http://www.nmfs.noaa.gov/pr/species/>) for marine and anadromous species. The National Marine Fisheries Service (NMFS) manages mostly marine and anadromous species, while the U.S. Fish and Wildlife Service manages the remainder of the listed species, mostly terrestrial and freshwater species.

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**FEDERALLY LISTED, PROPOSED, CANDIDATE SPECIES
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conterminous USA population [see 73 FR 10514]. On May 5, 2011, the Fish and Wildlife Service published a final rule – as directed by legislative language in the Fiscal Year 2011 appropriations bill – reinstating the Service's 2009 decision to delist biologically recovered gray wolf populations in the Northern Rocky Mountains. Gray wolves in Oregon are State-listed as endangered, regardless of location.

Endangered Species Act Status of West Coast Salmon & Steelhead

(Updated Aug. 11, 2011)

Species ¹			Current Endangered Species Act Listing Status ²	ESA Listing Actions Under Review
Sockeye Salmon (<i>Oncorhynchus nerka</i>)	1	Snake River	Endangered	
	2	Ozette Lake	Threatened	
	3	Baker River	Not Warranted	
	4	Okanogan River	Not Warranted	
	5	Lake Wenatchee	Not Warranted	
	6	Quinalt Lake	Not Warranted	
	7	Lake Pleasant	Not Warranted	
Chinook Salmon (<i>O. tshawytscha</i>)	8	Sacramento River Winter-run	Endangered	
	9	Upper Columbia River Spring-run	Endangered	
	10	Snake River Spring/Summer-run	Threatened	
	11	Snake River Fall-run	Threatened	
	12	Puget Sound	Threatened	
	13	Lower Columbia River	Threatened	
	14	Upper Willamette River	Threatened	
	15	Central Valley Spring-run	Threatened	
	16	California Coastal	Threatened	
	17	Central Valley Fall and Late Fall-run	Species of Concern	
	18	Upper Klamath-Trinity Rivers	Not Warranted	
	19	Oregon Coast	Not Warranted	
	20	Washington Coast	Not Warranted	
	21	Middle Columbia River spring-run	Not Warranted	
Coho Salmon (<i>O. kisutch</i>)	22	Upper Columbia River summer/fall-run	Not Warranted	<ul style="list-style-type: none"> Critical habitat
	23	Southern Oregon and Northern California Coast	Not Warranted	
	24	Deschutes River summer/fall-run	Not Warranted	
	25	Central California Coast	Endangered	
	26	Southern Oregon/Northern California	Threatened	
	27	Lower Columbia River	Threatened	
Chum Salmon (<i>O. keta</i>)	28	Oregon Coast	Threatened	
	29	Southwest Washington	Undetermined	
	30	Puget Sound/Strait of Georgia	Species of Concern	
	31	Olympic Peninsula	Not Warranted	
Steelhead (<i>O. mykiss</i>)	32	Hood Canal Summer-run	Threatened	
	33	Columbia River	Threatened	
	34	Puget Sound/Strait of Georgia	Not Warranted	
	35	Pacific Coast	Not Warranted	
Steelhead (<i>O. mykiss</i>)	36	Southern California	Endangered	
	37	Upper Columbia River	Threatened	
	38	Central California Coast	Threatened	
	39	South Central California Coast	Threatened	
	40	Snake River Basin	Threatened	
	41	Lower Columbia River	Threatened	
	42	California Central Valley	Threatened	
	43	Upper Willamette River	Threatened	
	44	Middle Columbia River	Threatened	
	45	Northern California	Threatened	
	46	Oregon Coast	Species of Concern	
	47	Southwest Washington	Not Warranted	
	48	Olympic Peninsula	Not Warranted	
	49	Puget Sound	Threatened	
	50	Klamath Mountains Province	Not Warranted	
Pink Salmon (<i>O. gorbuscha</i>)	51	Even-year	Not Warranted	
	52	Odd-year	Not Warranted	

¹ The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA Fisheries Service has delineated distinct population segments (DPSs) for consideration as "species" under the ESA.



Northwest Regional Office

NOAA's National Marine Fisheries Service

[ESA Salmon Listings](#) [ESA Regulations & Permits](#) [Salmon Habitat](#) [Salmon Harvest & Hatcheries](#) [Marine Mammals](#)
[Salmon & Hydropower](#) [Salmon Recovery Planning](#) [Groundfish & Halibut](#) [Permits & Other Marine Species](#)

[Home](#) > [Marine Mammals](#) > [ESA MM List](#)

ESA-Listed Marine Mammals

Under the jurisdiction of NOAA Fisheries that may occur:

off Washington & Oregon

- [Southern Resident killer whale](#) (*Orcinus orca*) (E); [critical habitat](#)
- [humpback whale](#) (*Megaptera novaeangliae*) (E)
- [blue whale](#) (*Balaenoptera musculus*) (E)
- [fin whale](#) (*Balaenoptera physalus*) (E)
- [sei whale](#) (*Balaenoptera borealis*) (E)
- [sperm whale](#) (*Physeter macrocephalus*) (E)
- [Steller sea lion](#) (*Eumetopias jubatus*) (T); [critical habitat](#)

in Puget Sound

- [Southern Resident killer whale](#) (*Orcinus orca*) (E); [critical habitat](#)
- [humpback whale](#) (*Megaptera novaeangliae*) (E)
- [Steller sea lion](#) (*Eumetopias jubatus*) (T); [critical habitat](#)

(E) = Endangered

(T) = Threatened

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Page last updated: December 15, 2011



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to NMFS No:
2010/06104

March 18, 2011

Joyce E. Casey
Chief, Environmental Resources Branch
U.S. Army Corps of Engineers, Portland District
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Biological Opinion and Conference Report and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Major Rehabilitation of the Jetty System at the Mouth of the Columbia River.

Dear Ms. Casey:

The enclosed document contains a biological opinion (Opinion) and conference report prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the U.S. Army Corps of Engineers' proposed major rehabilitation of the jetty system at the mouth of the Columbia River. The Corps' authority for this action comes from the original authority for construction of the project granted by Senate Executive Document 13, 47th Congress, 2nd Session (5 July 1884), and subsequently renewed with authorizations related to construction, operation and maintenance of the Columbia River navigation channel. In this Opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of eulachon (*Thaleichthys pacificus*), Steller sea lions (*Eumetopias jubatus*), and humpback whales (*Megaptera novaeangliae*).

Furthermore, NMFS concluded that the proposed action may affect, but is not likely to adversely affect the following species:

- Fin whale (*Balaenoptera physalus*)
- Southern Resident killer whale (*Orcinus orca*)
- Sperm whale (*Physeter macrocephalus*)
- Sei whale (*B. borealis*)
- Blue whale (*B. musculus*)
- Leatherback sea turtle (*Dermochelys coriacea*)#
- Lower Columbia River (LCR) Chinook salmon (*O. tshawytscha*)*
- Upper Willamette River (UWR) Chinook salmon (*O. tshawytscha*)*
- Upper Columbia River (UCR) spring-run Chinook salmon (*O. tshawytscha*)*
- Snake River (SR) spring/summer-run Chinook salmon (*O. tshawytscha*)*
- SR fall-run Chinook salmon (*O. tshawytscha*)*
- Columbia River (CR) chum salmon (*O. keta*)*



- LCR coho salmon (*O. kisutch*)#
- Oregon Coast coho salmon (*O. kisutch*)
- Southern Oregon/Northern California Coasts coho salmon (*O. kisutch*)
- SR sockeye salmon (*O. nerka*)*
- LCR steelhead (*O. mykiss*)*
- UWR steelhead (*O. mykiss*)*
- Middle Columbia River steelhead (*O. mykiss*)*
- UCR steelhead (*O. mykiss*)*
- SR basin steelhead (*O. mykiss*)*
- Southern distinct population segment (DPS) green sturgeon (*Acipenser medirostris*)*

Additionally, NMFS concluded that the proposed action is not likely to adversely affect designated critical habitat for the above species or proposed critical habitat for eulachon, leatherback turtles, and LCR coho salmon.

The Corps also requested a conference report for critical habitat that NMFS proposed for leatherback turtles, LCR coho salmon, and eulachon. An action agency is not required to consult on proposed critical habitat unless its action is likely to destroy or adversely modify the proposed critical habitat. Nonetheless, NMFS encourages action agencies to complete a conference process to identify and resolve any conflicts that may arise between a proposed action and proposed critical habitat. Here, the effects of the proposed action on proposed critical habitat are likely to be similar to the effects on critical habitats that are already designated in the action area. Please note, however, that the Corps has a duty to reinstate this consultation if NMFS designates these critical habitats before the action is completed and may comply with that duty by requesting that NMFS adopt the conference report as a final report or biological opinion.

The NMFS is not including an incidental take statement for eulachon as NMFS has not issued protective regulations for eulachon under section 4(d) of the ESA. Additionally, NMFS is not including an incidental take authorization for marine mammals at this time because the incidental take of marine mammals has not been authorized under section 101(a)(5) of the Marine Mammal Protection Act and/or its 1994 Amendments. Following issuance of such regulations or authorizations for marine mammals, NMFS may amend this biological opinion to include an incidental take statement for marine mammals, as appropriate.

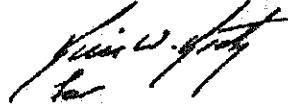
This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes no conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH, as NMFS determined that there are no conservation recommendations, in addition to those proposed by the Corps, that can be implemented that would avoid, minimize, or offset potential adverse effects. Therefore, no response is required.

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

EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted, if applicable.

If you have questions regarding this consultation, please contact Robert Anderson, Fishery Biologist with the Oregon State Habitat Office, at 503.231.2226, or Zachary Radmer, Fishery Biologist with the Oregon State Habitat Office, at 503.872.2738. For questions about the marine mammal determinations contact Alison Agness of the Northwest Region, Protected Resources Division at 206.526.6152.

Sincerely,

A handwritten signature in black ink, appearing to read "William W. Stelle, Jr.", written in a cursive style.

William W. Stelle, Jr.
Regional Administrator