

Section 3.4 Habitat, Vegetation, Fish, and Wildlife

The purpose of this section is to document the habitat, vegetation, fish, and wildlife resources that could be affected by the construction, operation, decommissioning, or abandonment of the proposed project. A biological resources report, which provides additional detail about biological resources present in the vicinity of the project, including detailed habitat descriptions, species life histories, and impacts assessments, is included as an appendix to this application (Appendix H.1).

Figure 3.4-1 is an overview of the biological resources in the study area and of the important habitat areas and features that are referred to in this section. Because mappable biological resources (habitat types, wetlands, surface waters) at the project site are limited, this analysis did not include detailed mapping of biological resources.

3.4.1 Methodology

3.4.1.1 Study Area

The assessment of biological resources examined the project study area, defined as all of the areas that could be affected directly or indirectly by the proposed project, and was conducted at three scales.

Project Site

Most of the analysis is focused at the project site scale, where effects to biological resources have the greatest potential to occur. The project site is limited to the proposed physical footprint of the project. Ground-disturbing activities associated with project construction will occur in the area within the project footprint, and may result in impacts to biological resources.

Project Vicinity

The project vicinity includes parcels adjacent to the proposed project site as well as biologically important features within approximately 1 mile of the site. Examples of features included within the project vicinity biological area of potential effect (BAPE) include the wetland complexes associated with Vancouver Lake and the Shillapoo National Wildlife Refuge (NWR), the CRWMB, the Port's Parcel 1A and Parcel 2 wetland mitigation sites, and wetlands and agricultural habitats on Port Parcel 3. Biological resources present within the project vicinity would not be impacted directly by the proposed project, but may be subject to indirect effects associated such as elevated noise from construction or operation, or by issues related to water quality.

Project Shipping Prism

Finally, the analysis included a third scale – the project's shipping prism, defined as the area in which effects associated with increased shipping could occur. This BAPE includes the entirety of the Lower Columbia River downstream of the site, as well as marine habitat off the coasts of Washington, Oregon, and California, out to the extent of the Washington Coastal Zone Exclusive Economic Zone (EEZ), a distance of 200 3 nautical miles offshore. Biological resources that are outside the immediate project site and vicinity could be affected by the effects associated with increased shipping traffic such as potential for ship wake stranding of fish, bank erosion from ship propeller (prop) wash, transport of exotic species, ballast water issues, and/or direct injury as a result of ship strikes (potentially including marine mammals).

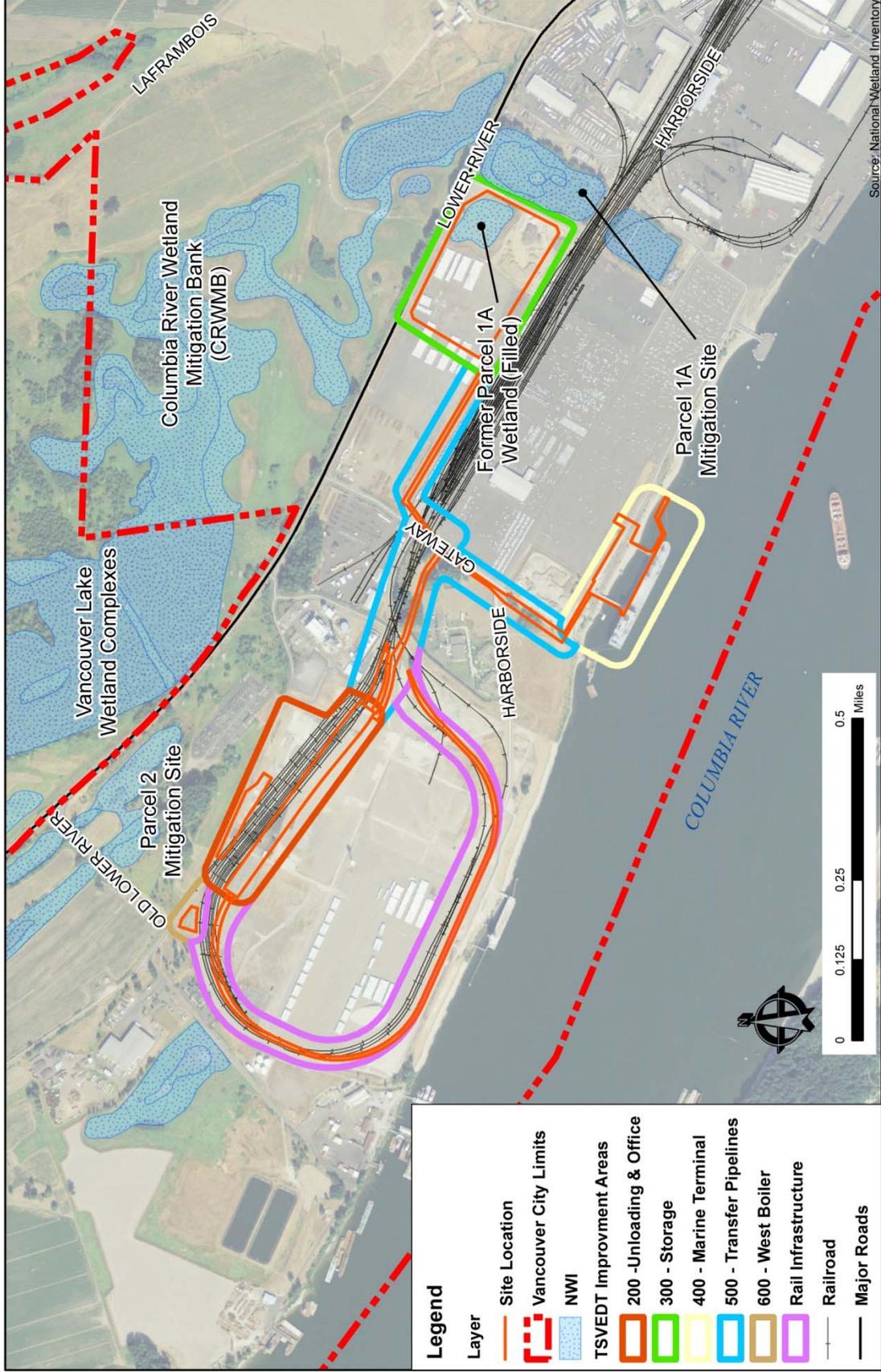


Figure 3.4-1. Biological Resource Overview



3.4.1.2 Methodology

Project scientists coordinated with regulatory agency biologists, conducted a review of existing literature and reference material, and conducted field investigations at the project site.

Information regarding the potential presence of special status plant species was obtained from the USFWS web site (USFWS 2013), and from a review of the Washington Natural Heritage Program (WNHP) database (WNHP 2013a). A list of species documented as occurring within the project vicinity, or with the potential to occur, was generated based on the potential presence or absence of appropriate habitat for each species.

Information regarding the potential presence of special status fish and wildlife species was obtained from the USFWS web site (USFWS 2013) and the NMFS web site (NMFS 2013) on June 27, 2013. Additional information came from data provided by WDFW's two on-line databases, Priority Habitat and Species (PHS) on the Web (WDFW 2013a) and Salmonscape (WDFW 2013b), as well as from the 2008 PHS list (WDFW 2008).

Information regarding the potential presence of wetlands at the project site included reviews of National Wetlands Inventory (NWI) (USFWS 1989) and soils data (NRCS 2013) and review of recent and historic permitting documentation.

Biologists from BergerABAM visited the site on May 28 and June 27, 2013 to delineate the OHWM of the Columbia River, conduct a riparian habitat assessment and tree inventory, and assess terrestrial site conditions throughout the project site.

3.4.2 Habitat and Vegetation

Habitat and vegetation resources are addressed together in this section of the document, as habitat function and suitability is largely dictated by the species composition of the vegetation community. This section describes the habitat types that are present at the project site and within the vicinity and shipping prism and the special status plant species that have the potential to occur within the project site or vicinity. The shipping prism does not provide habitat for any special status plant species, and there are no special status plant species known to occur within the shipping prism, and therefore an analysis of impacts to special status plants in the shipping prism is not necessary.

3.4.2.1 Existing Conditions

Habitat and Vegetation

Project Site – Terrestrial vegetation and wildlife habitat at the project site is of limited quality and quantity. As a result of past development and cleanup activities, there is very little vegetation or wildlife habitat present on the upland portions of the site. Most of the project site has been filled, paved, and/or capped in association with previous development and cleanup activities. Terrestrial habitat at the project site can be described according to the following subcategories.

- *Unvegetated Industrial* – The unvegetated industrial habitat type comprises most of the project site (over 95 percent of the relative cover at the site), and consists of unvegetated areas that are completely developed with industrial infrastructure such as buildings, rail lines, roads, and other paved and graveled surfaces. These areas are devoid, or nearly devoid, of vegetation and largely impervious. They provide little to no wildlife habitat function.

- *Ruderal Upland Grass/Forb* – Upland vegetation within the ruderal upland grass/forb habitat type is primarily limited to small patches of grasses and a mix of native and non-native weedy herbaceous species including colonial bentgrass (*Agrostis capillaris*), rabbitfoot clover (*Trifolium arvense*), white sweet clover (*Melilotus alba*), and Canada thistle (*Cirsium arvense*).¹⁵ This vegetation type represents approximately 2 percent of the relative cover at the project site. These areas provide very little vegetation or wildlife habitat function, as they are small, isolated patches of vegetation with little potential or opportunity to provide significant function.
- *Riparian* – The extent and quality of riparian habitat within the project site is very limited, as the bank drops steeply from the upland portion of the property down to the river, and the upland extent of functional riparian habitat is limited by existing impervious surfaces. Riparian habitat represents less than 1 percent of the relative cover at the project site. The riparian area within the proposed project site is mostly devoid of vegetation, with the exception of scattered trees and vegetation below the top of the bank. Impervious surfaces include existing roadways, material laydown areas, compacted soil, access trestles, and stormwater facilities. Vegetation within the functional portion of the riparian habitat at the site consists primarily of small-diameter black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), willows (*Salix* spp.), non-native false indigo bush (*Amorpha fruticosa*), and Himalayan blackberry (*Rubus armeniacus*). The bank is armored with riprap, and above the riprap, there is a narrow band of ruderal grass/forb habitat.

The terrestrial portion of the riparian buffer most likely provides a small amount of habitat for wildlife species that can tolerate a wide range of habitat conditions and are conditioned to living in industrialized environments (e.g., ground squirrels, rabbits, opossum, raccoons, coyote, and common rodent species). In addition to these terrestrial mammals, the riparian buffer likely provides a small amount of seasonal foraging habitat for resident and migratory songbirds and shorebirds, as well as raptors.

Riparian habitats are defined by WDFW as a priority habitat for the important hydrologic, water quality, and habitat functions they provide (WDFW 2008). However, due to the highly altered nature of the riparian habitat at the site (i.e. riprap armored bank, minimal riparian vegetation, lack of structural complexity), riparian habitat at the project site does not provide any significant hydrologic, water quality or habitat functions.

- *Upland Cottonwood Stands* – Small upland stands of black cottonwood are present on the County Jail Work Center (Jail Work Center) property adjacent to the project site. This habitat type represents approximately 2 percent of the relative cover at the project site. These are small stands dominated almost exclusively by a closed canopy black cottonwood overstory, with occasional Oregon ash (*Fraxinus latifolia*) and limited understory vegetation. These stands are isolated from other forested areas in the vicinity by industrial infrastructure including rail tracks, roads, fences, and other paved surfaces. The isolated nature of these stands limits their habitat function and values. However, they do likely provide refuge and foraging habitat for migratory songbirds and small mammals as well as perching and nesting habitat for raptors.

¹⁵ Definition of ruderal: Weedy vegetation growing on compacted, plowed, or otherwise disturbed ground and showing a preference for this type of habitat. Source: <http://www.biology-online.org/dictionary/Ruderal>

A previously permitted project for the Clark Public Utilities substation is removing 246 trees greater than 6 inches in diameter, over approximately 1.1 acres. This project has yet to be constructed, but when complete would alter the quality of the existing forested habitat.

Project Vicinity – While there is little habitat present at the project site, there are several areas of relatively higher quality habitat adjacent to the project site, and within the immediate vicinity. These include emergent and forested wetland and forested habitats, and agricultural lands.

- **Wetlands** – The project site is located within the Vancouver Lake Lowlands, an area historically subject to seasonal flooding from Vancouver Lake and the Columbia River. Human activities, including dam construction, floodplain fills, diking, and streambank armoring, have significantly altered the hydrology of the Columbia River. These activities also resulted in a significant reduction in the quantity and quality of wetland habitats in the Vancouver Lake Lowlands. However, there are still significant portions of the Vancouver Lake Lowlands that remain influenced by seasonal inundation and high groundwater tables, and these wetland habitats provide important water quality, hydrology, and habitat function. The highest quality forested and emergent wetland habitat in the project vicinity is associated with the southern end of Vancouver Lake. The CRWMB, an approximately 154-acre wetland mitigation bank established in 2010, is located at the southern extent of this wetland complex. These wetlands provide high quality seasonally inundated habitats that most closely resemble the original hydrologic and wetland habitat functions of the Vancouver Lake Lowlands.

There are also two wetland mitigation sites in the vicinity of the project site. These sites were created and/or enhanced from upland sites, as compensatory mitigation for wetland impacts. The Parcel 1A wetland mitigation site, located immediately east of Parcel 1A, was created in 1994. The site is an approximately 7.9-acre depressional, palustrine, forested wetland, vegetated with mature black cottonwood trees and a variety of native shrubs and herbaceous species. The fifth and final year of monitoring was conducted in 2001 (David Evans and Associates 2001). This site is owned and maintained by the Port.

The Parcel 2 wetland mitigation site, also owned and maintained by the Port, is an approximately 16.4-acre mitigation site, situated on an approximately 31.3-acre parcel north of the existing Terminal 5 site. The mitigation site was established in 2000, and received final regulatory approval and release from further monitoring obligation from USACE in 2007. The site is currently a mosaic of forested, scrub-shrub, and emergent vegetation.

Several emergent wetlands also exist on Port parcels 3, 4, and 5, west of the Terminal 5 site. Because of their limited structural diversity, these wetlands primarily provide water quality functions but likely also provide some wildlife habitat functions.

Freshwater wetlands are a WDFW priority habitat, and they provide important habitat functions in addition to water quality and hydrologic functions. Wetlands can provide habitat for several species of waterfowl (i.e., mallard ducks, pintail, wigeon, merganser, gadwalls, green-winged teal, Canada goose, and snow goose), great blue heron, sandhill crane, and a variety of migratory songbird species. Mammals typically found in wetland habitats in the vicinity include beaver, raccoon, and coyote. Various reptile and amphibian species are frequently encountered as well.

- *Riparian* – Riparian habitats throughout most of this industrial reach of the Columbia River are heavily armored, with little native vegetation and little habitat function. While most of the shoreline within the Port is armored, some shoreline areas contain sandy banks, scattered rock, and large woody debris. According to the natural resources inventory management plan completed for the Port in 2004, the shoreline area located at Berth 10 (east of the Facility) consists of sandy shorelines with willows and cottonwoods colonizing portions of the riprap bank (Vigil Agrimis, Inc. and Herrera Environmental Consulting 2004). This stretch of sandy shoreline provides higher levels of habitat functions compared to the armored shorelines within the Port. In addition, there is an existing aquatic habitat enhancement site approximately 350 feet downstream of the Berth 14 trestle and the Port plans to place large woody debris upstream of the project site as part of the mitigation efforts for the WVFA project.
- *Upland Cottonwood Stands* – Several upland stands of black cottonwood are present throughout the immediate project vicinity. These are small stands dominated almost exclusively by black cottonwood and Oregon ash, typically with limited understory vegetation. These stands are frequently located near wetland and aquatic habitats and, as such, likely provide higher quality habitat than the upland cottonwood stands at the project site. The stands near wetland and aquatic habitats provide refuge and foraging habitat for migratory songbirds and small mammals, perching and nesting habitat for raptors, and cover and foraging habitat for upland mammals.
- *Agricultural Lands* – The Port’s Parcel 3, located east and northeast of the Terminal 5 site, is leased for agricultural activities. Parcel 3, an approximately 517-acre parcel, is used mostly for row crops and pasture for horses and cattle. A few remnant sloughs, oriented roughly parallel to the Columbia River, are present in the eastern portion of the parcel, and the northernmost of these sloughs is hydrologically connected to the Parcel 2 wetland mitigation site. A cottonwood-dominated riparian forest borders the river, inland from a sandy beach and levee. Several emergent wetlands have been delineated on this parcel. These lands provide significant foraging habitat for geese and sandhill cranes as well as for other migratory birds and for a variety of small mammal species.

Project Shipping Prism – ~~There are no terrestrial vegetation or terrestrial habitat resources present in the Project Shipping Prism. The rail prism includes portions of nearly every major watershed and habitat type, ranging from forested to grasslands, within the state. The project’s rail prism also crosses or parallels numerous freshwater rivers and smaller tributaries to the Columbia River and to Puget Sound. The WDFW priority species list identifies 20 habitat types as having priority status within the state (WDFW 2008), all of which likely occur within the project’s rail prism. A detailed discussion of each of these habitats is beyond the scope of this document, as the anticipated potential for and extent of impacts to priority habitats within the shipping prism are expected to be low, and are addressed programmatically within this document.~~

Aquatic habitat within the project’s vessel prism includes the mainstem Columbia River from the project site downstream to the river mouth. The Columbia River Navigation Channel begins at the mouth of the Columbia River and is maintained at a depth of approximately 43 feet deep and approximately 600 feet wide up to the project site. This reach of the river provides habitat for a variety of freshwater aquatic species including Pacific salmon and other resident and

anadromous fish species, marine mammals (Steller sea lion, California sea lion, and harbor seal), and several species of aquatic reptiles and amphibians.

Special Status Plant Species

This section evaluates the potential for special status plant species to occur within the project study area. Special-status species are defined for purposes of this report as those identified for protection under federal or state laws. They are listed under the federal Endangered Species Act of 1973 (ESA); plant species identified as endangered, threatened or sensitive by the Washington Natural Heritage Program (WNHP); and species identified as PHS, species of concern, or species of greatest conservation need (SGCN) by WDFW.

At the federal level, a listing of species of concern is for advisory and management purposes only, as there may be insufficient information to support listing. The category of threatened is applied to plants that are likely to become endangered within the near future if factors contributing to their population decline or habitat degradation or loss continue. Plants listed as federally threatened or endangered are protected under the ESA, which is administered by the USFWS.

State-listed threatened or endangered plant species are not protected by state legislation or regulation, but are listed as threatened or endangered to assist with agency management and decision-making. Although the WNHP places a management priority on the preservation of high-quality native plant communities, no such communities exist on the property.

A review of the WNHP database did not identify any documented occurrences of any special status plant species within the township/range/sections in which the project site is located (WNHP 2013a). No special status plant species have been documented at the project site and it does not provide suitable habitat for any special status plant species. The project vicinity does provide several higher-functioning wetland, riparian, and aquatic habitats as well as upland and riparian forested habitats that may provide potentially suitable habitat for one or more special status plant species, but plants within these habitats would be unaffected by the proposed project.

Table 3.4-1 summarizes the special status plant species known to, or with the potential to, occur at the project site or within the vicinity based on an evaluation of the presence or absence of species-appropriate habitat at the project site and vicinity scales.

Although a number of protected species plants have the potential to occur in the vicinity of the project, project site conditions do not provide any suitable habitat for any of the species listed.

Table 3.4-1. Special Status Plant Species and Their Potential to Occur within the Project Site or Vicinity

Species	Federal		State		Potential for Occurrence	
	ESA Listing Status ¹	State Listing Status ²	Project Site	Project Vicinity	Project Site	Project Vicinity
Oregon Bolandra (<i>Bolandra oregana</i>)	None	SC	Low – no suitable habitat on site	Low – riparian species requiring deep shade	Low – no suitable habitat on site	Low – riparian species requiring deep shade
Dense Sedge (<i>Carex densa</i>)	None	ST	Low – no suitable habitat on site	Low – peripheral species of intertidal marshlands	Low – no suitable habitat on site	Low – peripheral species of intertidal marshlands
Golden Paintbrush (<i>Castilleja levisecta</i>)	FT	SE	Low – no suitable habitat on site	Low – rare species of open grasslands in Puget trough on glacial outwash	Low – no suitable habitat on site	Low – rare species of open grasslands in Puget trough on glacial outwash
Tall Bugbane (<i>Cimicifuga elata</i>)	FSC	SS	Low – no suitable habitat on site	Low – understory species of lowland forests	Low – no suitable habitat on site	Low – understory species of lowland forests
Few-Flowered Collinsia (<i>Collinsia sparsiflora</i> var. <i>brucea</i>)	None	SS	Low – no suitable habitat on site	Low - thin soils over basalt on a variety of slopes in Columbia Gorge.	Low – no suitable habitat on site	Low - thin soils over basalt on a variety of slopes in Columbia Gorge.
Clackamas Corydalis (<i>Corydalis aquae-gelidae</i>)	FSC	SS	Low – no suitable habitat on site	Low – mid-elevation riparian species of hemlock and fir forests.	Low – no suitable habitat on site	Low – mid-elevation riparian species of hemlock and fir forests.
Oregon Coyote-Thistle (<i>Eryngium petiolatum</i>)	None	ST	Low – no suitable habitat on site	Moderate – rare species of wet prairies and low ground	Low – no suitable habitat on site	Moderate – rare species of wet prairies and low ground
Western Wahoo (<i>Euonymus occidentalis</i>)	None	ST	Low – no suitable habitat on site	Low – shaded forest understory species	Low – no suitable habitat on site	Low – shaded forest understory species
Western Sweetvetch (<i>Hedysarum occidentale</i>)	None	ST	Low – no suitable habitat on site	Low – high elevation species	Low – no suitable habitat on site	Low – high elevation species
Water Howellia (<i>Howellia aquatilis</i>)	FT	ST	Low – no suitable habitat on site	Moderate – aquatic species of small vernal ponds	Low – no suitable habitat on site	Moderate – aquatic species of small vernal ponds
Nuttall's Quillwort (<i>Isoetes nuttallii</i>)	None	SS	Low – no suitable habitat on site	Low – Terrestrial species of wet ground, seeps, and in mud near vernal pools.	Low – no suitable habitat on site	Low – Terrestrial species of wet ground, seeps, and in mud near vernal pools.
Smooth Goldfields (<i>Lasthenia glaberrima</i>)	None	SE	Low – no suitable habitat on site	Moderate – rare species of wet stream banks and vernal pools.	Low – no suitable habitat on site	Moderate – rare species of wet stream banks and vernal pools.
Torrey's Peavine (<i>Lathyrus torreyi</i>)	FSC	FT	Low – no suitable habitat on site	Low – open areas within Douglas fir dominated sites	Low – no suitable habitat on site	Low – open areas within Douglas fir dominated sites
Bradshaw's Lomatium (<i>Lomatium bradshawii</i>)	FE	SE	Low – no suitable habitat on site	Moderate – wet, seasonally flooded prairies and grasslands near creeks and small rivers.	Low – no suitable habitat on site	Moderate – wet, seasonally flooded prairies and grasslands near creeks and small rivers.
Branching Montia (<i>Montia diffusa</i>)	Non	SS	Low – no suitable habitat on site	Low – moist Douglas-fir forests	Low – no suitable habitat on site	Low – moist Douglas-fir forests
California Broomrape (<i>Orobanchace californica</i> ssp. <i>grayana</i>)	None	X	Low – no suitable habitat on site	Low – Thought to be extirpated from WA.	Low – no suitable habitat on site	Low – Thought to be extirpated from WA.

Species	Federal		State		Potential for Occurrence	
	ESA Listing Status ¹	State Listing Status ²	Project Site	Project Vicinity		
Western Yellow Oxalis (<i>Oxalis suksdorfii</i>)	None	ST	Low – no suitable habitat on site	Low - meadows and moist woods, rare in Clark County		
Western False Dragonhead (<i>Physostegia parviflora</i>)	None	SS	Low – no suitable habitat on site	Low – wet to mesic prairies, damp thickets, and banks of streams and ponds		
Wheeler's Bluegrass (<i>Poa nervosa</i>)	None	SS	Low – no suitable habitat on site	Low - rock outcrops, cliff crevices, and occasionally in talus		
Great Polemonium (<i>Polemonium carneum</i>)	None	ST	Low – no suitable habitat on site	Low - woody thickets, open and moist forests, prairie edges, roadsides, fence lines		
Idaho Gooseberry (<i>Ribes oxycanthoides</i> ssp. <i>irriguum</i>)	None	ST	Low – no suitable habitat on site	Low – streams and canyons in eastern Washington.		
Soft-leaved willow (<i>Salix sessilifolia</i>)	None	SS	Low – no suitable habitat on site	Moderate – Variety of lowland riparian habitats		
Hairy-Stemmed Checkermallow (<i>Sidalcea hirtipes</i>)	None	ST	Low – no suitable habitat on site	Moderate – prairie fragments along fencerows and openings along drainages		
Western Ladies Tresses (<i>Spiranthes porrifolia</i>)	None	SS	Low – no suitable habitat on site	Moderate – Wet meadows, along streams, in bogs, and on seeps. Have previously been found on the Port's Parcel 3		
Hall's Aster (<i>Symphyotrichum hallii</i>)	None	ST	Low – no suitable habitat on site	Moderate – dry to moist prairies in valleys and plains.		
Small-Flowered Trillium (<i>Trillium parviflorum</i>)	None	SS	Low – no suitable habitat on site	Moderate – moist forested habitats dominated by hardwoods		
California Compassplant (<i>Wyethia angustifolia</i>)	None	SS	Low – no suitable habitat on site	Moderate – grasslands, meadows, and other open habitats		

1. ESA Classifications: FE = federal endangered; FT = federal threatened low – no suitable habitat on site; FSC = species of concern; FP = federal proposed; FC = federal candidate.

2. State Status: SE = state endangered; ST = State threatened; SS = State Sensitive; X = possibly extinct or extirpated;

Source: WNHP 2012

3.4.2.2 Impacts

Construction

The primary effect to terrestrial habitat and vegetation at the project site will be the direct, permanent removal of vegetation during construction of the terrestrial components of the project. There is very little terrestrial vegetation or wildlife habitat present at the project site. Most of the site has been filled, paved, and/or capped in association with previous development and cleanup activities. What little natural vegetation is present is small and isolated, and/or significantly disturbed from its natural condition. As such, construction of the proposed project will have little direct impact to terrestrial vegetation and wildlife habitat.

Construction of the upland portion of the project will occur almost exclusively within the unvegetated industrial habitat type. This vegetation type provides little or no wildlife habitat function, and direct permanent impacts to this vegetation will not result in any impacts to vegetation or habitat resources.

Approximately 42,000 square feet of ruderal upland grass/forb habitat will be permanently impacted by construction in Area 200 related to the office building and Area 500 related to portions of the pipeline. These areas provide very little habitat function because of their isolated and disturbed nature. Impacts to ruderal upland grass/forb habitat will not result in any significant impacts to vegetation or habitat resources.

Construction of portions of the pipeline will result in direct permanent impact to approximately ~~6,300~~ 3,252 square feet of a small, isolated upland cottonwood stand north of the Jail Work Center. This stand contains approximately 273 trees, ~~171~~ 246 of which ~~are~~ have previously been permitted for removal from 1.1 acres of the stand for the construction of the proposed construction of a CPU substation adjacent to that location (BergerABAM, 2012). ~~These areas are primarily grass and weedy herbaceous vegetation, with approximately 25 cottonwood and pine trees. These trees~~ The current stand provides only moderate habitat function, which would be reduced to low quality following construction of the CPU substation because of the limited number and extent of the remaining trees. because of their isolated nature and previously approved development. The proposed pipeline will remove 9 of the remaining 27 trees, which are not already permitted for removal associated with the CPU project (see Figure 3.4-2). The tree removal is not expected to change habitat quality, the trees to be removed are located on the fringes and would not increase fragmentation of the remnant stand.

While the proposed pipeline will pass through a portion of the riparian area, this will occur primarily in an unvegetated portion of the riparian area. Construction of the pipeline will result in the removal of approximately 4,250 square feet of ruderal upland grass/forb habitat near the marine terminal in Area 400, although no high quality vegetation will be removed and riparian function will not be affected. Vegetation within the riparian area consists primarily of small-diameter black cottonwood (*Populus trichocarpa*) and willows (*Salix* spp.), and non-native false indigo bush (*Amorpha fruticosa*), and Himalayan blackberry (*Rubus armeniacus*). No riparian trees or vegetation will be removed, and no impacts to bank margin habitat are anticipated.



Figure 3.4-2. CPU Tree Plan

The proposed project would not result in any significant temporary impacts to vegetation or habitat resources.

Construction of the proposed project would not result in any direct or indirect impacts to vegetation or terrestrial habitat resources at either the project vicinity scale, nor within the shipping prism. Construction-related impacts to vegetation will be limited to the direct, permanent impacts to on-site vegetation associated with project construction. In general, construction of the proposed project will have only minor effects to terrestrial vegetation and wildlife habitat. Table 3.4-1i summarizes the impacts to each of the habitats present resulting from construction of the Facility.

Table 3.4-1i. Summary of Habitat Acreage Impacts

Habitat	Acreage of Habitat Impacted by Area						Total Impacted
	Area 200	Area 300	Area 400	Area 500	Area 600	Rail Improvements	
<u>Unvegetated Industrial</u>	<u>6.63</u>	<u>20.84</u>	<u>7.53</u>	<u>2.55</u>	<u>0.79</u>	<u>5.45</u>	<u>43.79</u>
<u>Ruderal Upland Grass Forb</u>	<u>0.96</u>	<u>0.00</u>	<u>0.10</u>	<u>0.00⁽¹⁾</u>	<u>0.00</u>	<u>0.00</u>	<u>1.06</u>
<u>Upland Cottonwood Stands</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.07</u>	<u>0.00</u>	<u>0.00</u>	<u>0.07</u>
<u>Riparian</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00⁽²⁾</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total Acreage	<u>7.59</u>	<u>20.84</u>	<u>7.63</u>	<u>2.62</u>	<u>0.79</u>	<u>5.45</u>	<u>44.92</u>

(1) Impacts to ruderal upland/grass forb habitats are less than 0.01 acre.

(2) Facility elements will be constructed in an area with scarce vegetation and no high-quality vegetation will be removed or existing riparian habitat function will be negatively impacted.

Operation

~~Terrestrial vegetation and wildlife habitats will not be affected significantly by any potential water quality impacts associated with operation of the proposed project. Terrestrial habitats that would remain at the project site post-construction could potentially be affected by an increased potential for spills or leaks. A spill to surface water would not be likely to affect terrestrial vegetation or wildlife habitats.~~

~~At the project vicinity and project shipping prism scales, terrestrial habitat and vegetation resources are unlikely to be affected by the proposed project. These terrestrial resources would not be directly or indirectly affected by any aspect of operations. The operation of the proposed project could affect vegetation and terrestrial wildlife habitats through operational water quality impacts, including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment, and through an increased potential for catastrophic accidents such as a spill to surface water. The operation of the Facility also could result in effects associated with the shipping traffic that will occur in conjunction with the proposed project.~~

Operational Water Quality Impacts – Operational water quality impacts that could be associated with the proposed project include an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and

machinery, and a potential for catastrophic accidents such as an inadvertent crude oil release to surface water.

The project has the potential to increase stormwater runoff at the site, which could affect water quality and quantity as described in section 2.11 of this application. The entire Facility is located on 44.9 acres, and the proposed construction will result in approximately 38.2 acres of impervious surface. Treatment for stormwater will include enhanced treatment at Area 300 (Storage) and basic treatment at other areas of the Facility, with discharge to existing stormwater systems at Terminal 4 and Terminal 5. The proposed facilities will provide both water quality and water quantity treatment and will be designed to handle the 6-month, 24-hour event as estimated using Ecology's Western Washington Continuous Simulation Hydrology Model (Ecology's hydrology model).

The operation of the Facility also has the potential to increase the risk of inadvertent releases of crude oil to the environment. While the likelihood of such events is exceedingly low, the possibility must be addressed. According to projected volumes, the proposed project will result in approximately 140 shipping trips annually in 2016 (first full year of operations) up to 365 shipping trips per year at full capacity. Spills could occur at the project site or while docking or filling, or in transit downstream on the Columbia River or in marine waters.

Terrestrial vegetation and wildlife habitats will not be affected significantly by any potential water quality impacts associated with operation of the proposed project. Terrestrial habitats that would remain at the project site post-construction could potentially be affected by an increased potential for spills or leaks. The project has implemented several impact minimization measures and BMPs to reduce the potential for any spills or release of materials to occur, and to minimize the extent of any impacts resulting from any accidental spill or release. A spill to surface water would not be likely to affect terrestrial vegetation or terrestrial wildlife habitats.

Shipping – The operation of the Facility will result in ships transiting the Columbia River within the project site, vicinity, and shipping prism. It is estimated that the proposed Facility will result in approximately 140 vessel calls per year in 2016 (first full year of operations) up to 365 vessel calls per year at full operational capacity. Marine traffic on the Columbia River has the potential to result in impacts to vegetation and wildlife habitats through increases in the potential for shoreline erosion associated with propeller wash, and through the introduction of exotic species.

- *Bank Erosion* – Propeller wash from ships in transit, as well as wakes breaking on shore, could cause increased erosion along unarmored sections of the shoreline. This could result in a decrease in the quantity and quality of vegetation and terrestrial wildlife habitat.
- *Exotic Species* – Ships in transit could import exotic and/or invasive species on their hulls and exterior equipment and/or in ballast water. Introduced species can often out-compete native species, and have the potential to alter natural habitats significantly. Once an aggressive exotic species is introduced, it may be nearly impossible to eradicate it. However, the BMPs that will be in place for the proposed operation of the terminal including hull maintenance and ballast water practices (section 2.23.3.3) will greatly minimize the potential for any transport of these species. For these reasons, the proposed project is unlikely to result in a significant risk of the increased transport of exotic and/or invasive species.

3.4.2.3 Mitigation Measures

The project will implement several impact minimization measures and BMPs to minimize the potential for impacts to terrestrial habitats and vegetation.

Direct Habitat Modification

The proposed project has been designed to avoid and/or minimize impacts to biological resources to the greatest extent possible. The upland facilities associated with the project have been located on developed portions of an existing industrial site, which in its current state provides very little habitat function and very little native vegetation. By siting the project in a developed location, impacts to native terrestrial habitats and native species of vegetation, including special status species, have been avoided.

Ground disturbance and vegetation removal will be limited to the amount necessary to construct the project, and construction fencing will be used to protect existing vegetation to be retained. ~~The project will install urban landscaping including trees and shrubs in Areas 200 and 300. These landscaped areas will provide wildlife habitat typical in an urban environment.~~

The following mitigation is proposed for each of the habitats impacted by construction of the facility as follows:

- Unvegetated Industrial: Impacts to unvegetated industrial land do not require mitigation.
- Ruderal Upland Grass/Forb and Upland Cottonwood Stands: As noted above, the 1.06 acres of ruderal upland grass/forb habitat have very limited value; nevertheless, even if no net loss to this impact was required, together with the Upland Cottonwood Stands (0.07 acre) 1.13 acres of compensatory habitat mitigation is warranted for no-net loss. To mitigate for the removal of these habitats, the project will install urban landscaping including trees and shrubs in Areas 200 and 300. These landscaped areas will provide wildlife habitat typical in an urban environment, including perching and foraging opportunities for migratory birds. This action also complies with VMC 20.770 and will plant additional trees to compensate for development that will impact pervious surfaces. Trees will be planted as part of landscaped buffers and parking lot landscaping where currently no trees exist. In total approximately 2.21 square feet of planted areas will be completed.
- Riparian: As noted above, the rip-rapped bank has very limited riparian vegetation, and the Applicant is not disturbing any existing high quality vegetation or negatively impacting existing habitat function. No mitigation is therefore warranted.

These impact minimization measures and BMPs fully mitigate for the direct habitat modification effects associated with the project.

These impact minimization measures and BMPs fully mitigate for the operational water quality effects associated with the project. The proposed project has the potential to result in effects to vegetation and terrestrial wildlife habitats through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters. The Facility will discharge to existing Columbia River outfalls through existing manmade conveyance pipelines, and is categorically exempt from the flow control provisions of the Ecology stormwater manual. According to Appendix I-E of the manual, the Columbia River is listed as a flow control-exempt water body.

As described in section 2.11 of this application, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. Stormwater from the storage area will be treated to enhanced water quality standards and discharged to the Terminal 4 stormwater system. Stormwater from Areas 200, 500, and 600 and the rail improvements will be treated to basic levels and discharged to the existing Terminal 5 stormwater system. Stormwater from Area 400 will be treated to an enhanced treatment level and conveyed to existing infiltration swales located immediately north of the site. Stormwater treatment facilities will be sized to accommodate the 6-month, 24-hour event as estimated using Ecology's hydrology model. The proposed stormwater treatment will provide treatment to a level that is consistent with the discharge permits applicable to the Facility and will ensure that vegetation and terrestrial wildlife habitat are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport vessels calling at the Facility will be constructed with double hulls to minimize the potential for the release of cargo in the event of a spill. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic spill is very low, and the proposed Facility BMPs and safety and security measures will minimize the risk of impacts to vegetation and terrestrial wildlife habitat.

These impact minimization measures and BMPs fully mitigate for the operational water quality impacts associated with the project.

Shipping

The proposed project will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full capacity. Oceangoing vessel traffic on the Columbia River has the potential to result in impacts to vegetation and terrestrial wildlife habitat through increased potential for shoreline erosion associated with propeller wash, and through the potential introduction of exotic species.

The risk of adverse effects to vegetation and terrestrial wildlife habitat from increased bank erosion is low. Streambanks at the site are well armored, and not particularly sensitive to erosion.

so these habitats likely will not be affected. Elsewhere in the project vicinity and shipping prism, there are unarmored banks, which could potentially be susceptible to increased erosion from propeller wash. Effects associated with bank erosion would be temporary and localized, and would result in only minor negative impacts to vegetation and terrestrial wildlife habitat.

Operators of commercial vessels have a significant economic interest in maintaining underwater body hull platings in a clean condition. Fouled bottom platings result in increased fuel costs and can reduce the vessel's maximum transit speed. To prevent fouling and higher costs, operators preserve and maintain the hulls of their ships aggressively (FERC 2008), greatly reducing the risk of the transport of exotic species. Additionally, the USCG has developed mandatory practices for all vessels with ballast tanks in all waters of the United States. Washington has developed similar requirements. These practices include requirements for ballast water exchange, to rinse anchors and anchor chains during retrieval to remove organisms and sediments at their place of origin, to regularly remove fouling organisms from the hull, piping, and tanks, and to dispose of any removed substances in accordance with local, state, and federal regulations.

These impact minimization measures and BMPs mitigate for the increased shipping-related impacts associated with the project.

Cumulative Impacts

The impact minimization measures that have been incorporated into the design of the project are the same measures that will reduce the potential for cumulative impacts. The project has been designed to minimize the extent of impacts to habitat and vegetation to the extent practicable, and this will reduce the potential for cumulative effects to these resources as well. The project itself will not result in any cumulative impacts to habitat and vegetation resources.

3.4.3 Fish

3.4.3.1 Existing Conditions

Baseline Habitat Conditions

In general, the environmental baseline conditions for fish habitat within the reach of the Columbia River that flows through the project site are typical of those associated with an urbanized and industrial reach of the Columbia River. At the watershed scale, the natural fluvial processes of the river have been altered dramatically. The main channel of the river is maintained as a navigation channel for deep draft shipping traffic, limiting the potential for any dynamic migration of the river thalweg. In addition, dam construction and streambank armoring throughout the watershed have limited floodplain connectivity and greatly reduced the quantity and quality of available backwater and off-channel habitats.

Project Site – At the project site scale, the entire streambank has been armored with riprap, and the entire portion of the site that is above OHWM has been isolated from the historic floodplain. A narrow band of vegetation, primarily small-diameter black cottonwood, willows, and non-native false indigo bush and Himalayan blackberry, is established in and immediately above the riprapped slope. Above this vegetated habitat, there is a narrow band of ruderal grass/forb habitat. The low quality and quantity of riparian habitat at the site provides very little aquatic habitat function.

Water quality conditions at the site are generally appropriate for aquatic life. While this reach of the Columbia River within the action area is not identified on the Ecology 2008 303(d) list for elevated water temperatures (Ecology 2008), data published by the USGS in 2012 indicate that summer water temperatures downstream of Bonneville Dam routinely exceed 70°F (Tanner et al. 2012). These temperatures are higher than the water quality criterion for temperature that would likely apply in the project area. The reach of the lower Columbia River in the vicinity of the project site also has several areas listed on the 2008 Ecology 303(d) list for chemical- and nutrient-related contamination (Ecology 2008).

Project Vicinity – At the project vicinity scale, in-stream habitat complexity is limited, and there is no overhanging vegetation. As part of the WVFA project, some large woody debris will be installed along the shoreline of Terminal 4 just upriver from the project site. Sediments at the project site are predominantly fine-grained, which is the natural condition for the lower reaches of a large river. No substrate present is adequate for salmonid spawning. Below the riprapped streambank, there is an area of gradual transition to deep water that provides some shallow water nearshore habitat, which many juvenile species of fish prefer. However, the lack of any riparian vegetative cover and limited in-stream structural diversity limits the function of this nearshore habitat.

Project Shipping Prism – At the scale of the project's shipping prism, the Lower Columbia River and adjacent marine habitats provide high quality habitat for all life stages of Pacific salmon and other anadromous fish, as well as for other freshwater and marine species.

In general, the reach of the Columbia River that is within the project site, vicinity, and shipping prism, provides aquatic habitat conditions suitable as a migratory corridor for several species of native Columbia River fish including several native salmonids, trout, sturgeon, lamprey, minnows, and eulachon. Several non-native fish species are also present throughout the Lower

Columbia River. Several of these non-native species are present in numbers that may affect native fish populations.

Special Status Fish Species

The portion of the Columbia River that is within the project site, vicinity, and shipping prism represents documented and/or potentially suitable habitat for several special-status fish species, including species and critical habitats listed or proposed for listing under the federal ESA (NMFS 2013, USFWS 2013), Washington state-listed species, and WDFW priority species and SGCN (WDFW 2008). In addition, the Columbia River has been designated critical habitat for 13 ESU/DPS of Columbia River salmon, steelhead, and bull trout, and has been proposed for designation for Lower Columbia River coho salmon.

Information regarding the documented or potential presence of special status fish species was obtained from species lists maintained by USFWS (USFWS 2013) and NMFS (NMFS 2013) and data from WDFW's two on-line databases, PHS on the Web (WDFW 2013a) and Salmonscape (WDFW 2013b).

The biological resources report (Appendix H.1) lists the special status fish species known to, or with the potential to, occur at the project site, within the vicinity, and/or within the project's shipping prism. The report discusses each species' life history, listing status, and potential to occur within the project site or vicinity based on an evaluation of the presence or absence of appropriate habitat for it at the project site and vicinity scales. Table 3.4-2 summarizes this information.

3.4.3.2 Impacts

Construction

~~Construction of the in-water and overwater portions of the proposed dock improvements has the potential to directly and permanently affect fish habitat at the project site through direct modification of aquatic habitats associated with the new pile footprints and a new overwater structure. Fish habitat both at the project site and within the project vicinity also could be temporarily affected by the potential for temporarily reduced water quality conditions during construction and the generation of temporarily elevated levels of underwater and terrestrial noise during pile installation. At the scale of the shipping prism, fish and fish habitat would not be directly or indirectly affected by project construction. This section describes the direct and indirect impacts that could occur to fish or fish habitat associated with the proposed project. Due to the nature of the resource and the varying degree of use of the habitat by each species, it is not possible to meaningfully estimate the numbers of individuals that could potentially be affected. Instead, the extent of impacts to individual fish are established based on an interpretation of the extent of impact to suitable or potentially suitable habitat.~~

Construction

Construction of the overwater portions of the proposed dock improvements has the potential to affect fish habitat at the project site through changes in the amount and configuration of overwater coverage at the site. Fish habitat both at the project site and within the project vicinity also could be temporarily affected by the potential for temporarily reduced water quality conditions during construction and the generation of temporarily elevated levels of underwater noise during temporary pile installation and removal, and permanent pile removal. At the scale of the shipping prism, fish and fish habitat would not be directly or indirectly affected by project construction.

Table 3.4-2. Special-status Fish Species and Their Potential to Occur within the Project Area

Species	ESU/DPS ¹	Federal			State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site and Vicinity	Project Shipping Prism		
Salmon and Trout										
Bull trout (<i>Salvelinus confluentus</i>)	Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	Lower Columbia River ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
	Upper Willamette River ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
	Upper Columbia River spring-run ESU	FE	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
	Snake River spring/ summer-run ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
	Snake River fall-run ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
Chum salmon (<i>Oncorhynchus keta</i>)	Columbia River ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
Coho salmon (<i>Oncorhynchus kisutch</i>)	Lower Columbia River ESU	FT	Proposed	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		
Sockeye salmon (<i>Oncorhynchus nerka</i>)	Snake River ESU	FE	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.		

Species	ESU/DPS ¹	Federal			State			Potential for Occurrence	
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site and Vicinity	Project Shipping Prism	
Steelhead (Oncorhynchus mykiss)	Lower Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.	
	Upper Willamette River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.	
	Middle Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.	
	Upper Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.	
	Snake River Basin DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.	
Coastal Resident/Sea-run Cutthroat Trout (Oncorhynchus clarkii clarkii)	Southwest Washington ESU	FSC	N/A	None	3	N	Columbia River is documented migratory corridor	Columbia River and adjacent marine waters are documented habitat	
Pink salmon (Oncorhynchus gorbuscha)	N/A	None	N/A	None	2, 3	N	Columbia River is documented migratory corridor	Columbia River and adjacent marine waters are documented habitat	
Sturgeon									
Green Sturgeon (Acipenser medirostris)	Southern DPS	FT	Designated	None	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.	
White sturgeon (Acipenser transmontanus)	N/A	None	N/A	None	2, 3	N	Columbia River is documented migratory corridor	Columbia River and adjacent marine waters are documented habitat	
Lamprey									
Pacific Lamprey (Lampetra tridentata)	N/A	FSC	N/A	None	3	Y	Columbia River is documented habitat for all life stages	Columbia River and adjacent marine waters are documented habitat	
River Lamprey	N/A	FSC	N/A	SC	1	Y	Columbia River is documented habitat for all life stages	Columbia River and adjacent marine waters are documented habitat	

Species	ESU/DPS ¹	Federal			State			Potential for Occurrence	
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site and Vicinity	Project Shipping Prism	
Minnow									
Leopard Dace (<i>Rhinichthys falcatus</i>)	N/A	None	N/A	SC	1	Y	Historic observations in mainstem Columbia River. May provide suitable habitat.	Historic observations in mainstem Columbia River. May provide suitable habitat.	
Smelt									
Pacific Eulachon (<i>Thaleichthys pacificus</i>)	Southern DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented habitat and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.	

1 ESU = Evolutionarily Significant Unit; DPS = Distinct Population Segment

2 ESA Classifications: FE = federal endangered; FT = federal threatened; FSC = species of concern; FP = federal proposed; FC = federal candidate.

3 Washington Species of Concern Classifications: SE = state endangered; ST = state threatened; SS = state sensitive; SC = state candidate.

4 WDFW PHS Listing Criteria: Criterion 1 = State-listed and Candidate Species; Criterion 2 = Vulnerable Aggregations; Criterion 3 = Species of Recreational, Commercial, or Tribal Importance.

5 SGCN – As defined in WDFW's Comprehensive Wildlife Conservation Strategy (CWCS) (WDFW 2005).

Direct Habitat Modification—The project will not result in any net increase in permanent impacts below the OHWM of the Columbia River (Appendix H.2 JARPA). Removal of existing overwater structures and piles will offset the additional overwater coverage and pile placement associated with the project. Approximately 395 square feet of new benthic habitat impacts will be associated with the installation of seventy-six 24- and 36-inch steel piles for the mooring dolphins and walkways, but this impact will be offset by the proposed removal of 56 steel piles restoring 92 square feet of benthic habitat at the project site and the removal of timber piles at (approximately 220) at the Port's Terminal 2 area restoring approximately 305 square feet of benthic habitat.

In addition to permanent piles, temporary piles are expected to be used during construction to support the guides that will position and align the permanent piles and for the concrete formwork. It is estimated that up to approximately 40 temporary piles may be required. These temporary piles will be 18- to 24-inch diameter open-ended steel pipe or H-piles and will be installed with a vibratory hammer. The temporary piles will result in approximately 126 square feet of temporary impact to benthic habitat. These piles will only be placed for short period of time (on the order of hours or days) and any temporary loss of productivity will be minor and the area is expected to rapidly recolonize following removal.

Additionally, the project will result in a net reduction of approximately 295 square feet of solid overwater coverage and a net increase of approximately 785 square feet of grated overwater coverage associated with walkways. The removal of overwater coverage in excess of the amount placed by 295 square feet and the location of this removal in shallow water compensate for the small increase in grated structures.

Direct Habitat Modification – The project will not result in any net increase in permanent impacts below the OHWM of the Columbia River (Appendix H.2 JARPA). Removal of existing overwater structures and piles will offset the additional overwater coverage associated with the project. The project proposes to remove 15 steel piles (12 18-inch steel pipe piles and 4 12 ¾ inch steel pipe piles) restoring approximately 23 square feet of benthic habitat at the project site.

The project has been designed to minimize the extent of impact to the aquatic environment, and as such, will not require the installation of any permanent piles below the OHWM of the Columbia River. The project may, however, require the installation of up to 40 temporary piles to support the guides that will be used for the concrete formwork. It is estimated that up to approximately 40 temporary piles may be required. These temporary piles will be 18- to 24-inch-diameter open-ended steel pipe or H-piles and will be installed with a vibratory hammer. These piles will only be placed for short period of time (on the order of hours or days) and any temporary loss of productivity will be minor and the area is expected to rapidly recolonize following removal.

Additionally, the project will result in a net reduction of approximately 400 square feet of solid overwater coverage, 1,370 square feet of grated overwater coverage, and a net increase of approximately 920 square feet of open truss overwater coverage associated with walkways.

The aquatic portion of the project site provides habitat for a number of native fish species, including the 14 special status species identified in section 3.4-2. Nearshore habitats in particular (those less than approximately 20 feet deep) provide suitable migratory and foraging habitat for juvenile salmonids and trout, lamprey, minnows, eulachon, and other native fish species. Deep-

water habitats also provide these functions to a lesser degree, along with for returning adult ESA-listed salmon, and also provide suitable migratory and foraging habitat for sturgeon.

The project will not result in an increase in impacts to benthic habitat or overwater coverage and therefore impacts to fish habitat at the project site are not expected to result in any significant effect on the quality or function of the habitat. The impacts of ~~both new benthic habitat and new overwater coverage~~ will be offset by the removal of existing piles and overwater structure. Because the project will not result in a net increase in impact to either benthic habitat or overwater coverage, no significant impact is expected to the quality or function of habitat for special status fish species or to any designated or proposed critical habitats for them.

Temporary Water Quality Impacts – As with any construction project, there is a potential for leaks and/or spills from construction equipment. The proposed overwater work creates the potential for construction debris to enter the waterway. Equipment and storage containers associated with the proposed project also create slight potential for leaks and spills of fuel, hydraulic fluids, lubricants, and other chemicals.

The proposed project also has the potential to disturb sediments and increase turbidity temporarily at the project site during pile ~~installation and~~ removal activities. Increased levels of turbidity could have temporary negative impacts on aquatic habitats and, if any special-status fish species are present during the time of construction, could affect them directly.

These potential temporary water quality impacts have the potential to affect fish habitat function and special status fish species both at the project site and within the project vicinity, by reducing water quality, reducing visibility and increasing potential exposure to predators, and reducing habitat suitability for prey species. These effects would be temporary, and conditions would return to baseline conditions following completion of construction. At the scale of the project shipping prism, fish and fish habitat would not be affected by any temporary water quality impacts associated with construction, as these effects would be localized to the project vicinity.

During the in-water work period (~~anticipated to be November~~ October 1 to February 28), outmigrating juveniles and migrating adult salmon, steelhead, and bull trout could be present within the action area, as could migrating adult Pacific eulachon. Larval and juvenile eulachon are not expected to be present during the in-water work period. Similarly, green sturgeon will not be exposed to any direct effects of temporarily decreased water quality, as they are not expected to be present within the project vicinity during the in-water work period.

Special status salmon, steelhead, bull trout, and Pacific eulachon, if present, likely will be migrating through the project site and vicinity, and are not expected to be present for any significant period. Habitat suitability for adult and juvenile salmonids, steelhead, bull trout, and adult Pacific eulachon is limited at the site, and provides little function aside from a suitable migratory corridor. Fish are expected to move rapidly through the site and vicinity. Exposure to temporarily decreased water quality conditions, including temporarily elevated turbidity levels and/or potential debris contamination, is expected to be limited, and effects to fish habitat and special status fish species will be minor.

Designated and proposed critical habitats within the action area also may experience temporarily increased levels of turbidity during the proposed action. The geographic extent and duration of any potential short-term increases in sedimentation or turbidity are expected to be limited, and are not expected to exceed baseline sedimentation conditions measurably. Any temporarily

elevated sedimentation levels will not result in any significant effect to any PCE of designated or proposed critical habitat for any species.

Temporary Construction Noise—The proposed project has the potential to result in temporarily elevated terrestrial and underwater noise levels at the project site and within the project vicinity during pile driving activities.

Elevated underwater noise, particularly percussive sounds such as those generated during impact pile driving, has the potential to affect fish in several ways. The effects can range from the alteration of behavior to physical injury or mortality, depending on the intensity and characteristics of the sound, the distance and location of the fish in the water column relative to the sound source, the size and mass of the fish, and the fish's anatomical characteristics (Hastings and Popper 2005). The effects of temporarily elevated noise levels can range from mild disturbance to severe auditory damage or death.

The project will require the installation of approximately 76, 24- and 36-inch diameter steel pipe piles below the OHWM of the Columbia River. Pile driving will be completed using a vibratory hammer to drive all of the permanent structural piles to the extent practicable as well as all of the approximately 40 temporary piles. Following vibratory driving to refusal (the point at which the pile will no longer advance with the vibratory hammer), the project will use an impact hammer to drive piles to their final tip elevations. As well, an impact hammer will be needed to proof the structural piles. Proofing is the process of striking piles with an impact hammer to verify their load-bearing capacity. As part of impact minimization, a vibratory hammer will be used to remove approximately 56 piles from below the OHWM of the river at the marine terminal area and an additional 220 timber piles from the Port's Terminal 2. Pile removal is not expected to generate levels of underwater noise that will result in significant effects to fish habitat or species.

The zone of influence for underwater noise has been determined using the practical spreading loss model, currently recognized by both USFWS and NMFS as the best method to determine underwater noise attenuation rates, assumes a 4.5-decibel (dB) reduction per doubling of distance (WSDOT 2013). The baseline underwater noise level in the portion of the Columbia River that is within the action area is conservatively assumed to be approximately 120 dB_{RMS}¹⁶ (WSDOT 2012), although actual background underwater noise levels may be higher, given the amount of industrial shipping traffic. The impact pile installation of 24- and 36-inch diameter piles (with a bubble curtain providing 5 dB of noise attenuation) has the potential to generate temporary underwater noise levels of approximately 202 dB_{PEAK}, 189 dB_{RMS}, and 173 dB_{SEL} (CALTRANS 2009). To obtain pile capacity, it is anticipated that each pile will require approximately 1,000 blows with an impact hammer. An installation rate of 4 to 6 piles per day is estimated. At a maximum, the total number of blows per day will be approximately 6,000 requiring a total of up to 160 minutes of impact driving, spread out over each day. At a maximum installation rate of 6 piles per day, it is anticipated that 13 working days would be required to install 76 piles below the OHWM of the Columbia River. If pile installation is slower, fewer strikes per day can be struck, and additional days of pile driving may be required. A worst-case estimate is that

¹⁶ RMS—root mean square

installing all of the in-water piles to tip elevation could require up to 25 to 30 days of in-water work during the in-water work window.

NMFS has established 206 dB_{PEAK} as an underwater noise injury threshold for fish of all sizes. The noise attenuation analysis indicates that peak underwater noise levels could exceed this injury threshold within approximately 30 feet of each pile being driven. Any fish present within approximately 30 feet of the pile being driven could be injured; therefore, the suitability of fish habitat within the immediate vicinity of the pile driving activities will be significantly degraded while pile driving is being conducted. Fish in the vicinity will be expected to avoid the area temporarily during pile driving activity.

Additionally, the noise attenuation analysis indicates that the worst-case estimate of up to 6,000 strikes per day that may be necessary to drive piles to final elevation will result in exceedances of the cumulative underwater noise injury thresholds for fish greater than 2 grams (187 dB_{RMS}) and for fish less than 2 grams (183 dB_{RMS}) within approximately 1,119 feet of pile driving activity, respectively. Given the nature and quality of the habitat, however, most fish are expected to be moving through the action area; their exposure to the sound from all 6,000 strikes per day is not expected.

During the in-water work period, it is possible that native fish, including adults and/or juveniles of several ESU/DPS of salmon, steelhead, bull trout, and Pacific eulachon, could be present within the portion of the project site and vicinity where underwater noise could be temporarily elevated. Although run timing within the river is different for each ESU/DPS, it is possible that some individuals could be present in the vicinity, and could be exposed to temporarily elevated underwater noise levels resulting from pile installation.

Special status fish present within the portion of the project site where injury thresholds could be exceeded could be adversely affected, but this is unlikely. Special status fish species that could be present during the in-water work period will be expected to avoid the area within approximately 30 feet of the pile, and therefore will not be exposed to levels of peak underwater noise that would result in injury. Similarly, special status fish species are expected to be moving through the project site and vicinity, and therefore will not be exposed to the maximum 6,000 strikes per day. For this reason, special status fish species will not be exposed to cumulative underwater noise levels that could result in adverse effects.

While the underwater noise is temporarily elevated, fish may avoid the area temporarily, but this is unlikely to affect feeding and/or migratory activities significantly. Any elevated underwater noise levels associated with the proposed project will be temporary and will have no effect on any PCE of designated or proposed critical habitat. **Temporary Construction Noise – The proposed project has the potential to result in temporarily elevated terrestrial and underwater noise levels at the project site and within the project vicinity during temporary pile installation and removal and impact pile driving for shore-based mooring points.**

Elevated underwater noise has the potential to affect fish in several ways. The effects can range from the alteration of behavior to physical injury or mortality, depending on the intensity and characteristics of the sound, the distance and location of the fish in the water column relative to the sound source, the size and mass of the fish, and the fish's anatomical characteristics (Hastings and Popper 2005). The effects of temporarily elevated noise levels can range from mild disturbance to severe auditory damage or death.

In-Water Pile Installation and Removal. As part of impact minimization, a vibratory hammer will be used for all in-water pile driving. Construction of the marine terminal is expected to install and remove up to approximately 40 temporary piles with vibratory methods. A vibratory hammer will also likely be used to remove approximately 15 existing piles from below the OHWM of the river at the marine terminal area. Some piles may also be removed through direct-pull methods, which would further reduce the potential for temporarily elevated underwater noise levels.

This analysis assumes that forty 30-inch-diameter temporary steel piles would be installed to support dock modifications. ~~Since the exact type and size of temporary piles are not known, temporary piles would most likely be steel piles, and would not exceed 30 inches in diameter.~~ WSDOT recently published a memorandum reporting average root mean square (rms) values associated with vibratory installation of 30-inch steel piles as ranging from 164 to 176 dB_{RMS} with an overall average rms value of 171 dB_{RMS} (Laughlin-WSDOT 2010). WSDOT also published data in 2011 documenting average underwater sound pressure levels of 150 dB_{RMS} at a distance of 10 meters from the pile, during vibratory removal of timber piles (WSDOT 2011). For purposes of this analysis, therefore, it has been assumed that underwater noise associated with vibratory pile installation and removal will not exceed 176 dB_{RMS}.

Vibratory pile installation and removal is not expected to generate levels of underwater noise that will result in significant adverse effects to fish habitat or species. NMFS has established a disturbance threshold of 150 dB_{RMS} for fish of any size. Vibratory pile installation and removal may result in maximum underwater sound levels that meet or exceed this threshold at a distance of approximately 541 meters from the pile, respectively. Any fish that are present within this distance of the pile could be temporarily disturbed. During vibratory pile driving, fish may avoid the area temporarily, but this is unlikely to affect feeding and/or migratory activities significantly. Any elevated underwater noise levels associated with the proposed project will be temporary and will have no effect on any fish species, fish habitat, or any PCE of designated or proposed critical habitat for ESA-listed fish species.

Upland Impact Pile Installation. The project will conduct impact pile driving at the top of the bank within approximately 15 feet of the OHWM, to install two pile-supported shore-based mooring points and strengthen the access trestle. These structures would most likely be supported by 24- and/or 36-inch steel piles. Upland pile installation typically generates significantly lower levels of in-water noise than those generated during in-water pile driving. However, sound flanking (transmission of sound waves through substrate and into the aquatic environment) during upland pile driving has been documented in the literature (Batelle 2004; Caltrans 2012), and can potentially generate elevated underwater sound pressure levels in adjacent aquatic habitats.

Underwater sound pressure levels generated by upland pile driving have been documented during construction of the Geyserville Bridge in Geyserville, California, in 2006 (Caltrans 2012), and during construction of a temporary work trestle for replacement of a portion of the Hood Canal Bridge in 2004 (Batelle 2004). Data collected during the Geyserville Bridge project documented average sound pressure levels, recorded at a distance of approximately 30 to 35 meters from the pile, averaging approximately 186 dB_{PEAK}, 171 dB_{RMS}, and 162 dB_{SEL}, with maximum sound pressure levels approximately 5 dB higher (Caltrans 2012). Data collected during the Hood Canal Bridge project documented average peak sound pressure levels between approximately 164.3 and 179.6 dB_{PEAK}, and average RMS sound pressure levels ranging between

approximately 147.6 and 166.2 dB_{RMS}. While site conditions are likely an important and highly variable factor in the extent to which sound pressure is transmitted to the adjacent aquatic environment, for purposes of this consultation, a worst case estimate of underwater noise levels that could be generated during upland impact pile driving of 24- and 36-inch steel piles is estimated at approximately 191 dB_{PEAK}, 176 dB_{RMS}, and 167 dB_{SEL} (Caltrans 2012).

The noise attenuation analysis indicates that the worst-case estimate of up to 6,000 strikes per day that may be necessary to drive upland piles to final elevation could exceed the cumulative underwater noise injury thresholds for fish greater than 2 grams (187 dB_{RMS}) and for fish less than 2 grams (183 dB_{RMS}) within approximately 328 feet of pile driving activity. This would extend throughout the nearshore environment at the project site. Given the nature and quality of the habitat, however, most fish are expected to be moving through the action area; their exposure to the sound from all 6,000 strikes per day is not expected.

Since upland pile driving would not be restricted to an in-water work window, it is possible that fish, including special status fish species, could potentially be exposed to cumulative underwater sound pressure levels above the established injury threshold, which could result in adverse effects to individual fish. Since these effects will be temporary in nature, they are not expected to result in any adverse effects to fish habitat, or to any PCE of designated or proposed critical habitat for ESA-listed fish species.

Operation

The operation of the proposed project could permanently and indirectly affect fish habitat and special status fish species through operational water quality impacts, including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and through an increased potential for catastrophic accidents such as a spill to surface water. The operation of the Facility also could result in effects associated with the ~~increase in~~ shipping traffic that will occur in conjunction with the proposed project.

Operational Water Quality Impacts – Operational water quality impacts that could be associated with the proposed project include an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as an inadvertent crude oil release to surface water.

The project has the potential to increase stormwater runoff at the site, which could affect water quality and quantity as described in section 2.11 of this application. The entire Facility is located on 41,544.9 acres, and the proposed construction will result in approximately 38.2 acres of impervious surface. Treatment for stormwater will include enhanced treatment at Area 300 (Storage) and basic treatment at other areas of the Facility, with discharge to existing stormwater systems at Terminal 4 and Terminal 5. The proposed facilities will provide both water quality and water quantity treatment and will be designed to handle the 6-month, 24-hour event as estimated using Ecology's Western Washington Continuous Simulation Hydrology Model (Ecology's hydrology model).

The operation of the Facility also has the potential to increase the risk of catastrophic accidents, such as an inadvertent release of crude oil to the environment. While the likelihood of such an event is exceedingly low, the possibility must be addressed. According to projected volumes, the

proposed project will result in approximately 140 shipping trips annually in 2016 (first full year of operations) up to 365 shipping trips per year at full capacity buildout. Spills could occur at the project site or while docking or filling, or in transit downstream on the Columbia River or in marine waters.

The project site and vicinity provide documented habitat for the adult and juvenile forms of several special status populations of salmon, steelhead, and bull trout as well as for Pacific eulachon, green sturgeon, Pacific and river lamprey, and leopard dace. While run timing differs by species and population, these populations may be present within the project site and/or vicinity at various times during the year. Since operational impacts will not be restricted to an in-water work window, each species and its habitat have the potential to be affected by water quality impacts associated with the operation of the Facility.

Habitat suitability for native fish (including special status species) is limited at the site. The project site and vicinity primarily provide habitat as a migratory corridor. For this reason, fish are expected to move rapidly through the vicinity.

Accidental leaks or spills of fuel or other chemicals into surface- or groundwater at the project site have the potential to reduce fish habitat suitability, which also could affect special status fish species. However, the project has implemented several impact minimization measures and BMPs to reduce the potential for any spills or release of materials to occur, and to minimize the extent of any impacts resulting from any accidental spill or release.

Proposed stormwater treatment for new impervious surface at the site will minimize the potential for any adverse effects associated with stormwater. The proposed stormwater treatment will result in an improved water quality condition within the project site in the long term, and will not result in any adverse effects to fish habitat or to special status fish species.

Accidental release of crude oil to surface water has the potential to result in significant adverse effects to fish habitat and for special status fish species and their designated or proposed critical habitats. Fish that were exposed to high concentrations of spilled crude oil or other fuels could experience a range of effects up to and including direct mortality. A spill of crude oil to the aquatic environment within the project shipping prism could potentially result in long-term adverse effects to habitat suitability for a significant distance downstream of the spill. Impacts to fish and fish habitat would be significant. However, the likelihood of a spill is extremely low, and the proposed BMPs and safety and security measures (see sections 2.10, 2.11, 2.19, and Appendix B.2) will manage the risk of impacts to fish species and habitats effectively.

Impacts to fish habitat and to special status fish species and their designated or proposed critical habitats from water quality impacts associated with operation of the Facility are expected to be minor.

Shipping – The operation of the Facility will result in ships transiting the Columbia River within the project site, vicinity, and shipping prism. It is estimated that the proposed Facility will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full capacity buildout. Marine traffic on the Columbia River has the potential to result in impacts to biological resources through increases in the potential for fish stranding and shoreline erosion associated with propeller wash, and through the introduction of exotic species.

- *Wake Stranding* – Recent studies conducted on the Lower Columbia River suggest that, under certain conditions, deep-draft vessels can produce wakes that can strand juvenile fish (Pearson et al. 2006, Entrix 2008, FERC 2008). Stranding can occur when a fish becomes caught in a vessel’s wake and is deposited on shore by the wave the wake generates. Stranding typically results in mortality unless another wave carries the fish back into the water. The most recent and comprehensive study on wake strandings on the Lower Columbia River (Pearson et al. 2006) suggests that the specific mechanisms of stranding are still not completely understood. Fish stranding is thought to depend on interlinked factors that include river surface elevation, beach slope, wake characteristics, and species-specific biological factors (FERC 2008). Given these factors, it is not possible to predict accurately the extent to which increased shipping traffic may increase the potential for fish stranding. However, it is safe to assume that the proposed project, over the course of its design life, will likely result in the stranding of some fish, including special status fish species. Juvenile fish, and species that are not strong swimmers, will be most susceptible to increased stranding.
- *Bank Erosion* – Propeller wash from ships in transit, as well as wakes breaking on shore, could cause increased erosion along unarmored sections of the shoreline. Erosion can re-suspend eroded material within the water column, increasing turbidity, which can affect habitat suitability for fish and other aquatic organisms. This could result in degradation of habitat suitability for fish habitat and special status fish species.
- *Exotic Species* – Ships in transit could import exotic and/or invasive species on their hulls and exterior equipment and/or in ballast water. Introduced species can often out-compete native species, and have the potential to alter natural habitats significantly. Once an aggressive exotic species is introduced, it may be nearly impossible to eradicate it. However, the BMPs that will be in place for the proposed operation of the terminal including hull maintenance and ballast water practices (section 3.4.4.32.24.3.3) will greatly minimize the potential for any transport of these species. For these reasons, the proposed project is unlikely to result in a significant risk of the increased transport of exotic and/or invasive species.

3.4.3.3 Mitigation Measures

The project will implement several impact minimization measures and BMPs to minimize the potential for impacts to fish and fish habitat. These are described below. Additional measures are also listed in Appendix H.1.

Direct Habitat Modification

The project will result in no net new direct, permanent impacts to fish habitat. The dock configuration has been designed to require the minimum amount of new piling and no new permanent piling below the OHWM, and no net increase in overwater structure necessary, and has reduced the quantity of direct permanent habitat impacts to the amount practicable. The proposed removal of piles and existing overwater coverage has further minimized the extent of impacts. The no net increase in direct, permanent impacts to fish habitat at the project site is expected to result in no significant effects on the quality or function of fish habitat within the project site, project vicinity, or project shipping prism.

The impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project.

Temporary Water Quality Impacts

The project has the potential to result in temporary water quality impacts during construction including increased potential for spills, and a potential for temporarily elevated levels of turbidity during construction. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Natural currents and flow patterns in the Lower Columbia River routinely disturb sediments. Flow volumes and currents are affected by precipitation as well as upstream water management at dams. High volume flow events can result in hydraulic forces that re-suspend benthic sediments, temporarily elevating turbidity locally. Any temporary increase in turbidity as a result of the proposed project is not anticipated to measurably exceed levels caused by these normal periodic increases. Additionally, the volume of flow will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

In addition, all in-water temporary pile installation and installation-removal will be conducted within the published approved in-water work period for the project (anticipated to be NovemberOctober 1 to February 28). This work window has been established to minimize potential impacts to native fish species, particularly to ESA-listed salmonids and Pacific eulachon. While there is no time when ESA-listed fish are absent from the project vicinity, the window between NovemberOctober 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

These impact minimization measures and BMPs fully mitigate for the temporary water quality impacts associated with the project.

Temporary Construction Noise

~~The proposed project has the potential to result in elevated underwater noise during construction which can temporarily affect fish and fish habitat quality. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise during pile installation activities. The project will implement a bubble curtain or similarly effective noise attenuation device during all impact pile installation. These devices, when installed and operated properly, typically provide at least 5 dB of noise attenuation (Caltrans 2009). This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to fish. The proposed project has the potential to result in elevated underwater noise during construction which can temporarily affect fish and fish habitat quality. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise by using vibratory methods. The dock modifications have been designed so as to require no impact pile driving, which will greatly reduce the extent of terrestrial and underwater noise generated during construction. This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to fish.~~

In addition, all pile installation-in-water work below the OHWM will be conducted within the published approved in-water work period for the project (anticipated to be NovemberOctober 1 to February 28). This work window has been established to minimize potential impacts to native fish species, particularly to ESA-listed salmonids and Pacific eulachon. While there is no time when ESA-listed fish are absent from the project vicinity, the window between

November, October 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

These impact minimization measures and BMPs fully mitigate for the temporary construction noise impacts associated with the project.

Operational Water Quality Impacts

The proposed project has the potential to result in indirect effects to fish and fish habitat through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters. The Facility will discharge to existing Columbia River outfalls through existing manmade conveyance pipelines, and is categorically exempt from the flow control provisions of the Ecology stormwater manual. According to Appendix I-E of the manual, the Columbia River is listed as a flow control-exempt water body.

As described in section 2.11 of this application, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. Stormwater from the storage area will be treated to enhanced water quality standards and discharged to the existing Terminal 4 stormwater system. Stormwater from Areas 200, 500, and 600 and the rail improvements will be treated to basic levels and discharged to the existing Terminal 5 stormwater system. Stormwater from Area 400 will be treated to an enhanced treatment level and conveyed to existing infiltration swales located immediately north of the site. Stormwater treatment facilities will be sized to accommodate the 6-month, 24-hour event as estimated using Ecology's hydrology model. The proposed stormwater treatment will provide treatment to a level that is consistent with the discharge permits applicable to the Facility and will ensure that fish and fish habitat are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of cargo in the event of a spill. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic spill is very low, and the proposed BMPs and safety and security measures will minimize the risk of impacts to biological resources.

These impact minimization measures and BMPs fully mitigate for the operational water quality impacts associated with the project.

Shipping

The proposed project will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full capacity buildout. Oceangoing vessel traffic on the Columbia River has the potential to result in impacts to fish and fish habitat through increases in the potential for fish stranding, increased potential for shoreline erosion associated with propeller wash, and through the introduction of exotic species.

The risk of adverse effects to fish and fish habitat from increased bank erosion is low. Streambanks at the site are well armored, and not particularly sensitive to erosion, so these habitats likely will not be affected. Elsewhere in the project vicinity and shipping prism, there are unarmored banks, which could potentially be susceptible to increased erosion from prop wash. Effects associated with bank erosion would be temporary and localized, and would result in only minor negative impacts to fish and fish habitat.

Operators of commercial vessels have a significant economic interest in maintaining underwater body hull platings in a clean condition. Fouled bottom platings result in increased fuel costs and can reduce the vessel's maximum transit speed. To prevent fouling and higher costs, operators preserve and maintain the hulls of their ships aggressively (FERC 2008), greatly reducing the risk of the transport of exotic species. Additionally, the USCG has developed mandatory practices for all vessels with ballast tanks in all waters of the United States. Washington has developed similar guidelines. These practices include requirements for ballast water exchange, to rinse anchors and anchor chains during retrieval to remove organisms and sediments at their place of origin, to regularly remove fouling organisms from the hull, piping, and tanks, and to dispose of any removed substances in accordance with local, state, and federal regulations.

These impact minimization measures and BMPs mitigate for the increased shipping-related impacts associated with the project.

Cumulative Impacts

The impact minimization measures that have been incorporated into the design of the project are the same measures that will reduce the potential for cumulative impacts. The project has been designed to minimize the extent of impacts to fish and fish habitat resources to the extent practicable, and this will reduce the potential for cumulative effects to these resources as well. The project itself will not result in any cumulative impacts to fish or fish habitat resources.

3.4.4 Wildlife

3.4.4.1 Existing Conditions

The general suitability of wildlife habitat within the project site and vicinity was examined based on the vegetation and habitat assessment described in section 3.4.2 because habitat suitability for wildlife species typically is closely associated with vegetation and species composition. This information is presented in section 3.4.2, as well as in the biological resources report prepared for this project (Appendix H.1).

Special Status Wildlife Species

This section evaluates the potential for special status wildlife species to occur within the project study area. Information regarding the potential presence of special status wildlife species was obtained from the USFWS web site (USFWS 2013) and the NMFS web site (NMFS 2013) on June 27, 2013. Additional information came from data from WDFW's two on-line databases, Priority Habitat and Species (PHS) on the Web (WDFW 2013a) and Salmonscape (WDFW 2013b), as well as from the 2008 PHS list (WDFW 2008). WDFW PHS Management Recommendations (available at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations) have been reviewed, including recommended protection buffers. In general, the management recommendations focus on protecting nesting area and other important wildlife habitats.

The biological resources report prepared for this project (Appendix H.1) lists the special status wildlife species known to, or with the potential to, occur at the project site or within the vicinity. The report also discusses each species' life history, listing status, and potential to occur within the project site or vicinity based on an evaluation of the presence or absence of appropriate habitat for each species at the project site and vicinity scales. This information is summarized in Table 3.4-3.

No special status wildlife species have been documented at the project site and it provides only low to moderate habitat suitability for special status wildlife species. Based on the presence of potentially suitable habitat, several special status wildlife species have been documented or have the potential to occur in the project vicinity. As described in section 3.4.2, the project vicinity provides several relatively high quality wetland, riparian, and aquatic habitats, several of which are documented as habitat for one or more species of special status wildlife species.

Table 3.4-3. Special Status Wildlife Species and Their Potential to Occur within the Project Site or Vicinity

Species	ESU/ DPS ¹	Federal			State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site	Project Vicinity	Shipping Prism	
Birds										
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	N/A	None	N/A	SS	1	Y	Moderate – low quality foraging habitat in riparian zone.	High – Documented nesting occurrences in Columbia River riparian forested habitats.	High – Foraging habitat throughout Lower Columbia River.	
Aleutian Canada Goose (<i>Branta canadensis leucopareia</i>)	N/A	FSC	N/A	None	None	N	Low – No suitable habitat on-site.	Moderate – Potentially suitable migratory habitat in wetlands adjacent to Vancouver Lake and agricultural lands on Parcel 3.	Moderate – potentially suitable habitat throughout Lower Columbia River	
Cavity Nesting Ducks (several species)	N/A	None	N/A	None	3	N	Low – No suitable habitat on-site.	High – Documented breeding areas and suitable habitat for breeding for several species in vicinity of Buckmire Slough.	Moderate – potentially suitable habitat throughout Lower Columbia River	
Common Loon (<i>Gavia immer</i>)	N/A	None	N/A	SS	1, 2	Y	Low – No suitable habitat on-site.	Moderate – One or more documented occurrences and potentially suitable habitat at Vancouver Lake.	Low – Not in Columbia River mainstem or marine waters.	
Great Blue Heron (<i>Ardea herodias</i>)	N/A	None	N/A	None	2	Y	Low – No suitable habitat on-site.	High – Documented breeding occurrences and rookeries near Vancouver Lake and Buckmire Slough.	Moderate – potentially suitable habitat throughout Lower Columbia River	
Lewis' Woodpecker (<i>Melanerpes lewis</i>)	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	Low – Potentially suitable habitat throughout lowlands, but not documented extensively in Clark County.	Low – Not in Columbia River mainstem or marine waters.	

Species	ESU/ DPS ¹	Federal			State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site	Project Vicinity	Shipping Prism	
Olive-Sided Flycatcher (<i>Contopus cooperi</i>)	N/A	FSC	N/A	None	N/A	N	Low – No suitable habitat on-site.	Low – There is no mature coniferous forest habitat present within the project vicinity	Low – Not in Columbia River mainstem or marine waters.	
Pileated Woodpecker (<i>Dryocopus pileatus</i>)	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	Moderate – Riparian cottonwood forests provide potentially suitable foraging habitat.	Low – Not in Columbia River mainstem or marine waters.	
Peregrine Falcon (<i>Falco peregrinus</i>)	N/A	FSC	N/A	SS	1	Y	Moderate – low quality foraging habitat present.	Moderate – One or more historic documented nesting occurrences in vicinity.	Low – Not in Columbia River mainstem or marine waters.	
Purple Martin (<i>Progne subis</i>)	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	High – Documented nesting habitat and regular concentrations near Vancouver Lake.	Low – Not in Columbia River mainstem or marine waters.	
Sandhill Crane (<i>Grus canadensis</i>)	N/A	None	N/A	SE	1	Y	Low – No suitable habitat on-site.	High – Documented regular concentrations throughout Vancouver Lake Lowlands, particularly on agricultural lands at Parcel 3.	Low – Not in Columbia River mainstem or marine waters.	
Shorebird Concentrations (Several species)	N/A	None	N/A	None	2	N	Moderate – riparian and aquatic zone provides opportunities for foraging.	High – Regular concentrations of shorebirds documented on Vancouver Lake	High – potentially suitable habitat throughout Lower Columbia River and marine waters	
Slender-Billed White-Breasted Nuthatch (<i>Sitta carolinensis aculeata</i>)	N/A	FSC	N/A	SC	1	Y	Low – No suitable habitat on-site.	Moderate – One or more documented occurrences near Vancouver Lake.	Low – Not in Columbia River mainstem or marine waters.	

Species	ESU/DPS ¹	Federal			State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site	Project Vicinity	Shipping Prism	
Streaked Horned Lark (<i>Eremophila alpestris strigata</i>)	N/A	FP	Not designated	SE	1	Y	Low – No suitable habitat on-site.	Moderate – Documented presence on dredge material placement sites and barren lands throughout Lower Columbia River.	Documented presence on dredge material placement sites and barren lands throughout Lower Columbia River.	
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	N/A	FT	Designated	ST	1, 2	Y	Low – No suitable habitat.	Low – No suitable habitat.	High – Marine habitats represent foraging habitat	
Short-Tailed Albatross (<i>Phoebastria albatrus</i>)	N/A	FE	Not Designated	SC	1	Y	Low – No suitable habitat.	Low – No suitable habitat.	Moderate – Marine waters represent foraging habitat, but species is rare	
Western Snowy Plover (<i>Charadrius nivosus nivosus</i>)	N/A	FT	Designated	SE	1	Y	Low – No suitable habitat.	Low – No suitable habitat.	Moderate – Marine waters and intertidal and estuarine areas are documented habitat	
Vaux's Swift (<i>Chaetura vauxi</i>)	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	Low – Limited presence of large snags for nesting in vicinity	Low – Not in Columbia River mainstem or marine waters.	
Waterfowl Concentrations (several species)	N/A	None	N/A	None	3	N	Moderate – riparian and aquatic zone provides opportunities for foraging.	High – Documented concentrations throughout Vancouver Lake Lowlands .	High – potentially suitable habitat throughout Lower Columbia River and marine waters	
Mammals										
Steller Sea Lion (<i>Eumatopius jubatus</i>)	Easter n DPS	FT	Designate d	ST	1, 2	Y	Moderate – Aquatic portion of site is within migratory/foraging corridor	High – Columbia River is a documented migratory/foraging corridor.	High – Columbia River and adjacent marine habitats are documented habitat.	

Species	ESU/DPS ¹	Federal			State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site	Project Vicinity	Shipping Prism	
Whales (Several species)	Varies	Varies	Varies	Varies	Varies	Varies	Varies	Low – No habitat	Low – No habitat	High – Marine waters off coast provide documented habitat
Non-ESA-Listed Marine Mammals	N/A	None	N/A	Varies	Varies	Varies	Varies	Moderate – Aquatic portion of site is within migratory/foraging corridor	High – Columbia River is a documented migratory/foraging corridor.	High – Columbia River and adjacent marine habitats are documented habitat.
Columbian White-Tailed Deer (<i>Odocoileus virginianus leucurus</i>)	N/A	FE	Not Designated	SE	1	Y	1	Low – No habitat	Low – No habitat	Moderate – Islands in the Lower Columbia River represent suitable habitat.
Gray-Tailed Vole (<i>Microtus canicaudus</i>)	N/A	None	N/A	SC	1, 2	Y	1, 2	Moderate – Ruderal grass/forb habitat may provide limited habitat.	Moderate – Agricultural lands, pastures, and fields provide suitable habitat.	Low – Not in Columbia River mainstem or marine waters.
Pacific Townsend's Big-Eared Bat (<i>Corynorhinus townsendii townsendii</i>)	N/A	FSC	N/A	SC	1, 2	Y	1, 2	Low – No suitable habitat on-site.	Moderate – potentially suitable foraging habitat throughout Vancouver lowlands, but limiting roosting habitat.	Low – Not in Columbia River mainstem or marine waters.
Myotis Bats (<i>Myotis evotis</i> and <i>Myotis volans</i>)	N/A	FSC	N/A	None	N/A	N	N/A	Low – No suitable habitat on-site	Moderate – potentially suitable foraging habitat throughout Vancouver lowlands, but limiting roosting habitat.	Low – Not in Columbia River mainstem or marine waters.
Invertebrates										
California Floater (<i>Anodonta californiensis</i>)	N/A	FSC	N/A	SC	1, 2	Y	1, 2	Low – No suitable habitat on-site.	Moderate – One or more documented occurrences and potentially suitable habitat in Vancouver Lake.	

Species	ESU/ DPS ¹	Federal			State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status ³	PHS Listing Criterion ⁴	SGCN (Y/N) ⁵	Project Site	Project Vicinity	Shipping Prism	
Amphibians										
Oregon Spotted Frog (<i>Rana pretiosa</i>)	N/A	FC	N/A	SE	1	Y	Low – No suitable habitat on-site.	Moderate – Suitable aquatic habitat in vicinity of Vancouver Lake and adjacent wetlands, but no documented occurrences.	Low – Not in Columbia River mainstem or marine waters.	
Western Toad (<i>Bufo boreas</i>)	N/A	FSC	N/A	SC	1	Y	Low – No suitable habitat on-site.	Moderate – Potentially suitable habitat throughout Vancouver lowlands, but no recently documented occurrences.	Low – Not in Columbia River mainstem or marine waters.	
Reptiles										
Pacific Pond Turtle (<i>Actinemys marmorata</i>)	N/A	FSC	N/A	SE	1	Y	Low – No suitable habitat on-site.	Moderate – Suitable habitat throughout Vancouver Lake Lowlands, but no documented occurrences.	Low – Not in Columbia River mainstem or marine waters.	
Sea Turtles (Various species)	Varies	Varies	Varies	Varies	Varies	Varies	Low – No suitable habitat on-site.	Low – No suitable habitat on-site.	High – Marine waters represent documented habitat.	

¹ ESU = evolutionarily significant unit; DPS = distinct population segment

² ESA Classifications: FE = federal endangered; FT = federal threatened; FSC = species of concern; FP = federal proposed; FC = federal candidate.

³ Washington State Species of Concern Classifications: SE = state endangered; ST = state threatened; SS = state sensitive; SC = state candidate.

⁴ WDFW PHS Listing Criteria: Criterion 1 = state-listed and candidate species; Criterion 2 = vulnerable aggregations; Criterion 3 = species of recreational, commercial, or tribal importance.

⁵ SGCN – As defined in WDFW's Comprehensive Wildlife Conservation Strategy (CWCS) (WDFW 2005).

3.4.4.2 Impacts

This section describes the direct and indirect impacts that could occur to wildlife or wildlife habitat associated with the proposed project. Due to the nature of the resource and the varying degree of use of the habitat by each species, it is not possible to meaningfully estimate the numbers of individuals that could potentially be affected. Instead, the extent of impacts to individuals of each species are established based on an interpretation of the extent of impact to suitable or potentially suitable habitat. WDFW PHS Management Recommendations (available at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations) have been reviewed. Proposed project activities occur outside all recommended protection buffers for the species addressed in this Application.

Construction

As discussed in sections 3.4.2.2 and 3.4.3.2, construction of the proposed project will have only minor effects to terrestrial habitat and vegetation at the project site. The only construction-related impacts will be any direct impacts to habitat and vegetation associated with the terrestrial components of the project. Vegetation and habitat within these portions of the project site will be permanently removed.

Direct Habitat Modification – Impacts associated with direct habitat modification are described in sections 3.4.2.2 and 3.4.3.2.

The project site provides potentially suitable, relatively low quality, foraging habitat for raptors such as bald eagles and peregrine falcons. Bald eagles have been documented extensively in the project vicinity, and it is likely that they use riparian habitats throughout the project vicinity as foraging habitats. Peregrine falcons have not been documented foraging at the project site, but they may occur in the vicinity. If present, peregrine falcons could forage in upland and riparian habitats at the site. The ruderal grass/forb habitats at the site provide potentially suitable, relatively low quality habitat for gray-tailed vole. The limited quality and quantity of available terrestrial habitat for these species, and the highly industrial nature of the surroundings, likely greatly limit the extent of habitat function. As described in section 3.4.2.2 above, direct impacts consisting of removal of approximately 46,250 square feet of ruderal grass-forb and approximately 6,300 square feet of upland cottonwood stands are expected to result in only minor potential impacts to bald eagle, peregrine falcon, and gray-tailed vole.

The aquatic portion of the site represents suitable foraging and resting habitat for shorebirds and wintering waterfowl, which are WDFW priority species. As stated in section 3.4.3.2, the project will not result in any net increase in permanent impacts to the aquatic portion of the project, and is therefore not expected to result in any measurable or significant impact to shorebird or waterfowl habitat suitability.

The aquatic portion of the project site also represents potentially suitable habitat for ~~Steller sea lion~~ marine mammals. If present, they are expected to be passing through in deep water habitats outside the immediate project site. They are not known or expected to use habitats near the existing dock, and are therefore unlikely to be affected by the relatively small amount of direct habitat impacts associated with ~~new pile footprints or new overwater coverage~~ the proposed dock modification.

Temporary Water Quality Impacts – As with any construction project, there is a potential for leaks and/or spills from construction equipment. The proposed overwater work creates the

potential for construction debris to enter the waterway. Equipment and storage containers associated with the proposed project also create the potential for leaks and spills of fuel, hydraulic fluids, lubricants, and other chemicals.

The proposed project also has the potential to disturb sediments and increase turbidity temporarily at the project site during pile ~~installation and~~ installation and removal activities. These impacts would not affect terrestrial wildlife species or habitats at the site, but could affect wildlife species that use aquatic habitats. Increased levels of turbidity could have temporary negative impacts on aquatic habitats and, if any wildlife species are present in the project vicinity during construction, could affect them directly.

The aquatic portion of the project site represents suitable foraging and nesting habitat for shorebirds and wintering waterfowl. The aquatic portion of the project site also represents potentially suitable foraging habitat for ~~Steller sea lion~~ marine mammals.

The accidental release of construction debris or leaks or spills of fuel or other chemicals into the waters of the project site has the potential to reduce habitat suitability for shorebirds and waterfowl as well as for ~~Steller sea lion~~ marine mammals.

Similarly, temporarily elevated levels of turbidity that could result during pile ~~driving and~~ installation and removal activities also have the potential to reduce habitat suitability for these species by reducing visibility and habitat suitability for prey species. However, any temporary elevation of turbidity is expected to be short term, and to not exceed the turbidity levels generated by natural events such as high volume flow events.

Impacts to special status wildlife species from temporary water quality impacts are expected to be minor.

Temporary Construction Noise – The proposed project has the potential to result in temporarily elevated terrestrial and underwater noise levels during pile ~~driving~~ installation and removal activities. Pile installation and removal includes both in-water temporary piles that would be installed and removed with vibratory methods. Upland pile installation for shore-based mooring points and building foundation/support would be completed with impact hammers.

Terrestrial construction noise and noise from other human activity can result in a variety of effects to wildlife species, including displacement from occupied habitats, interference with hearing ability in songbirds and mating and alarm calls in amphibians and ground squirrels, and disruption of raptor foraging activities (Madsen 1985; Van der Zande et al. 1980; Fyfe and Olendorff 1976). Noise generating activities are expected to occur during all phases of construction between October and July.

Terrestrial noise levels will ~~be elevated~~ peak within the vicinity of the project site during impact pile ~~driving~~ installation and removal, but these sound levels will be expected to decrease to ambient conditions within a ~~relatively short distance~~ approximately 5,000 feet from the immediate project site.

Peak terrestrial noise generated during impact pile installation has been estimated at a maximum of approximately 110 A-weighted decibels (dBA), measured at 50 feet (FTA 2006). Baseline and construction-related noise levels were inferred using an industry-standard technique recommended by WSDOT (WSDOT 2013). This guidance includes information regarding noise levels associated with typical construction procedures from the City of Boston's noise

assessment methodology (Thalheimer 2000) and noise attenuation data from the Federal Transit Administration's construction noise methodology (FTA 2006).

~~Peak terrestrial noise generated during impact pile installation has been estimated to be approximately 110 decibels (dBA), measured at 50 feet (FTA 2006). As stated above, the baseline noise levels associated with the action area project site and vicinity are relatively high, and this terrestrial noise attenuation analysis assumes baseline noise levels similar to those associated with a high density urban area (78 70 dBA measured at 50 feet). Hard site conditions were assumed for noise attenuation purposes because the surrounding landscape is largely unvegetated, so the linear attenuation rate was estimated to be approximately -6 dBA per doubling of distance. At this rate, terrestrial noise from impact vibratory pile driving is expected to attenuate to ambient conditions between approximately 1,600 and 3,200 feet within approximately 5,000 feet from the location of project activities.~~

Most of the terrestrial habitat within approximately ~~5,000~~ 3,200 feet of the dock is not suitable for wildlife species, and terrestrial wildlife habitats at the immediate project site are of limited quality and quantity. Species that utilize these industrialized habitats are generally well adjusted to nearly continuous human presence and activity. Terrestrial habitats at the project site represent low-quality foraging habitat for bald eagle, peregrine falcon, and other raptor species. These species may avoid habitats near the pile driving activity temporarily, but the foraging habitat in the vicinity is sufficient so that a significant adverse effect to any species is not anticipated.

Temporarily elevated terrestrial noise levels could extend beyond the project site onto portions of the CRWMB and associated wetlands and forested habitats on the Shillapoo NWR ~~south of~~ Vancouver Lake Unit. Modeled noise levels in the vicinity of the CRWMB and Shillapoo Vancouver Lake Unit would range between 65 dB at the north end and 75 dB at the south end during impact pile driving. In addition to being used extensively by a variety of waterfowl, raptors, migratory birds, small mammals, amphibians, and reptiles, these habitats provide potentially suitable habitat for a number of special status wildlife species. There is potential for these species to be present in these habitats during construction and they could be exposed to periods of elevated terrestrial noise levels. Terrestrial noise from impact pile driving will have attenuated significantly by the time it reaches these habitats. These habitats also receive noise from other temporary sources not accounted for in the noise model, including adjacent port activities at other terminals, SR 501 road noise, and seasonal hunting noise (firearms).

The modeled noise levels may potentially be of sufficient intensity to generate a behavioral responses, such as changes in alertness, but will not be expected to elicit avoidance or other behaviors that could result in adverse effects to any wildlife species such as missed feeding opportunities, nest abandonment, or increased susceptibility to predation that could result in adverse effects to any special status wildlife species.

Direct impacts to special status species have been minimized by locating all project activities within an existing industrial site. According to WDFW Priority Habitats and Species (PHS) data, there are no occurrences of special status species within the project site. Within the project vicinity, there are several occurrences of PHS points, including bald eagle nests (approximately 1.2 miles to the west), bald eagle concentration areas (approximately 1.2 miles northwest), sandhill crane concentrations (approximately 3,000 feet west), and great blue heron breeding (approximately 4,000 feet northeast). Waterfowl concentrations are also known to occur on Vancouver Lake, approximately 1 mile north of the project.

Temporary construction noise has been minimized to the extent practical through equipment selection and construction timing to reduce impacts to special status species using habitats (e.g., foraging and resting) within the project vicinity. Peak construction noise would be generated by impact pile driving for the shore-based mooring points and rail unloading facility and is located outside of WDFW- and USFWS-recommended management buffers for bald eagle nest (660 feet and 0.5 mile, respectively) and great blue heron rookeries (656 feet). Foraging or resting species may be temporarily displaced from habitats within the project vicinity during periods of construction noise. These impacts have been minimized during construction sequencing to complete the noise generating aspects of construction as efficiently as possible.

In addition, the aquatic portion of the action area is suitable foraging and resting habitat for several species of shorebirds and waterfowl and foraging habitat for ~~Steller sea lion~~ marine mammals. Shorebirds and waterfowl will avoid the area in the immediate vicinity of pile driving installation and removal activity temporarily, but the foraging and resting habitat in the vicinity is sufficient, and this is not expected to represent a significant adverse effect.

~~Elevated underwater noise can also affect aquatic wildlife species, particularly marine mammals. The range of effects can range from mild disturbance to severe auditory damage. Direct mortality in marine mammals has not been observed as a result of elevated underwater noise levels. The project's marine mammal monitoring plan will reduce the potential for significant impacts to marine mammals, which in any event are not expected to occur within the action area during the in-water work period.~~ Elevated underwater noise can also affect aquatic wildlife species, particularly marine mammals. WSDOT recently published a memorandum reporting average root mean square (rms) values associated with vibratory installation of 30-inch steel piles as ranging from 164 to 176 dBRMS with an overall average rms value of 171 dBRMS (Laughlin 2010). WSDOT also published data in 2011 documenting average underwater sound pressure levels of 150 dBRMS at a distance of 10 meters from the pile, during vibratory removal of timber piles (WSDOT 2011). For purposes of this analysis, therefore, it has been assumed that underwater noise associated with vibratory pile installation and removal will not exceed 176 dBRMS.

Vibratory pile installation and removal is not expected to generate levels of underwater noise that will result in significant adverse effects to marine mammals. NMFS has established a disturbance threshold of 120 dBRMS for pinnipeds. Vibratory pile installation and removal may result in underwater sound levels that meet or exceed this threshold throughout the project vicinity. Additionally, proposed upland impact pile driving for shore-based mooring points would also generate underwater noise levels that exceed the disturbance threshold for pinnipeds. Any marine mammals that are present within the project vicinity could be temporarily disturbed. The extent of effects associated with vibratory pile installation and removal and upland impact driving would not be expected to exceed mild disturbance. Marine mammals are also not expected to occur in great numbers within the portion of the project site and vicinity that could potentially receive elevated underwater noise levels during the in-water work period. For these reasons, marine mammals are not expected to be significantly affected by underwater construction noise.

Operation

The operation of the proposed project could affect wildlife habitat and special status wildlife species through operational water quality impacts, including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery and a potential for catastrophic accidents such as a spill to surface

water. Lighting associated with the project could lead to direct and/or indirect impacts to wildlife species because it may affect the nocturnal behavior of animals within the project vicinity, including bird and bat species. Increased shipping traffic also could result in effects associated with the operation of the Facility.

Operational Water Quality Impacts – Operational water quality impacts that could be associated with the proposed project include an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery and a potential for accidental spills to surface waters during transportation of product by rail or vessel.

As discussed in section 2.11, the project has the potential to increase stormwater runoff at the site, which could affect water quality and quantity. The project will provide both water quality and water quantity treatment.

Terrestrial habitats could be affected by an increased potential for spills or leaks. Accidental leaks or spills of fuel or other chemicals into surface- or groundwater at the project site have the potential to reduce habitat suitability for shorebirds and waterfowl as well as marine mammals.

Spills occurring at time of vessel loading will have the potential to affect wildlife species adversely as well as shorebirds, waterfowl, and marine mammals, as these species occupy aquatic habitats at the project site and within the vicinity. A spill while in transit in the project's shipping prism also has the potential to affect a number of special status species, depending on the location of the spill.

Impacts to special status wildlife species from water quality impacts related to normal operation of the Facility are expected to be minor.

Shipping – The operation of the Facility will result in ships transiting the Columbia River within the project site, vicinity, and shipping prism. It is estimated that the proposed Facility will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full capacity build-out. Marine traffic on the Columbia River has the potential to result in impacts to wildlife through increases in the potential for shoreline erosion associated with propeller wash, through the introduction of exotic species, and (for certain species) through increased potential for direct mortality through ship strikes.

- *Bank Erosion* – Propeller wash from ships in transit, as well as wakes breaking on shore, could cause increased erosion along unarmored sections of shoreline. Erosion can re-suspend eroded material within the water column, increasing turbidity, which can affect habitat suitability for fish and other aquatic organisms. While most of the streambanks in the project vicinity are armored, and thus less susceptible to erosion, unarmored beaches could be susceptible to erosion from prop wash.

Wildlife habitat and special status wildlife species within the project site, vicinity, and shipping prism may be affected by an increased potential for bank erosion that will result from increased ship traffic. Streambanks at the project site are well armored and not particularly sensitive to erosion, so these habitats will not likely be affected. Elsewhere in the project vicinity and shipping prism there are unarmored banks that could potentially be susceptible to increased erosion from prop wash. This could result in temporary degradation of wildlife habitat suitability and could affect special status wildlife species.

- *Exotic Species* – Ships in transit could potentially import exotic and/or invasive species on their hulls and exterior equipment and/or in ballast water. Introduced species often can out-compete native species and have the potential to alter natural habitats by competing with native species.
- *Ship Strikes* – The 140 vessel transits per year in 2016 up to 365 ship transits per year at full capacity buildout on the Lower Columbia River, as well as in marine waters during transit, has the potential to result in collisions of ships with species that include sea turtles, marine mammals, and cetaceans. Although sea turtles and cetaceans will not occur in the immediate vicinity of the project site or its vicinity, they could be affected in marine waters by vessels transiting to/from the Columbia River. The potential for vessel strikes to affect sea turtles, marine mammals, and/or cetaceans is relatively low. While sea turtles, marine mammals, and cetaceans all may be at risk for propeller or collision injuries, these injuries are most frequently caused by small, fast-moving vessels (FERC 2008). In contrast, because of their design and large displacement tonnage, the ships that will dock at the Facility produce a bow wave. This wave pushes in-water objects away from the vessel.

3.4.4.3 Mitigation Measures

The project will implement an array of impact minimization measures and BMPs to minimize the potential for construction and operational impacts to wildlife species.

Direct Habitat Modification

The upland facilities associated with the project have been located on developed portions of an existing industrial site, which in its current state provides very little habitat function and very little native vegetation. By siting the project in a developed location, impacts to native terrestrial habitats and native species of vegetation, including special status species, have been avoided. Ground disturbance and vegetation removal will be limited to the minimum amount necessary to construct the project, and construction fencing will be used to protect existing vegetation to be retained.

These impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project.

Temporary Water Quality Impacts

The project has the potential to result in temporary water quality impacts during construction including increased potential for spills, and a potential for temporarily elevated levels of turbidity during construction. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Natural currents and flow patterns in the Lower Columbia River routinely disturb sediments. Flow volumes and currents are affected by precipitation as well as upstream water management at dams. High volume flow events can result in hydraulic forces that re-suspend benthic sediments, temporarily elevating turbidity locally. Any temporary increase in turbidity as a result of the proposed project is not anticipated to measurably exceed levels caused by these normal

periodic increases. Additionally, the volume of flow will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

In addition, all ~~pile installation work~~ below the OHWM will be conducted within the ~~published~~ approved in-water work period for the project (~~anticipated to be November~~ October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, but also avoids the peak migration timing for marine mammals in the Lower Columbia River.

These impact minimization measures and BMPs fully mitigate for the temporary water quality impacts associated with the project.

Temporary Construction Noise

Terrestrial noise levels will ~~be elevated~~ peak within the vicinity of the project site during impact pile driving of the shore-based mooring points and rail unloading facility, but these sound levels will be expected to decrease to ambient conditions within a ~~relatively short distance~~ distance maximum of approximately 5,000 feet from the immediate project site. Most of the terrestrial habitat within approximately ~~3,200~~ 5,000 feet of the dock is not suitable for wildlife species, and terrestrial wildlife habitats at the immediate project site are of limited quality and quantity. Species that utilize these industrialized habitats are generally well adjusted to nearly continuous human presence and activity.

~~The proposed project has the potential to result in elevated underwater noise during construction which can temporarily affect marine mammals and the quality of their habitat. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise during pile installation activities. The project will implement a bubble curtain or similarly effective noise attenuation device during all impact pile installation. These devices, when installed and operated properly, typically provide at least 5 dB of noise attenuation (Caltrans 2009). This will result the intensity of underwater noise, and will limit the potential for adverse effects to marine mammals. The proposed project has the potential to result in temporarily elevated terrestrial and underwater noise levels at the project site and with the project vicinity during in-water pile installation and removal activities, and during impact pile driving of upland piles. These activities have the potential to temporarily affect marine mammals and the quality of their habitat within the project vicinity during construction. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise during in-water pile installation and removal activities by using vibratory methods. The dock modifications have been designed so as to require no in-water impact pile driving, which will greatly reduce the extent of underwater noise generated during construction. This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to marine mammals.~~

In addition, all ~~pile installation~~ in-water work below the OHWM will be conducted within the ~~published~~ approved in-water work period for the project (~~anticipated to be November~~ October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, but also avoids the peak migration timing for marine mammals in the Lower Columbia River. Marine mammals are not expected to occur within the action area during the in-water work period.

These impact minimization measures and BMPs fully mitigate for the temporary construction noise impacts associated with the project.

Shipping

The proposed project will result in approximately 140 to 365 ship transits per year through the project shipping prism. Increased marine traffic on the Columbia River has the potential to result in impacts to wildlife and wildlife habitat through increased potential for shoreline erosion associated with propeller wash, through the introduction of exotic species, and through increased potential for ship strikes.

The risk of adverse effects to wildlife from increased bank erosion is low. Streambanks at the site are well armored, and not particularly sensitive to erosion, so these habitats likely will not be affected. Elsewhere in the project vicinity and shipping prism, there are unarmored banks, which could potentially be susceptible to increased erosion from prop wash. Effects associated with bank erosion would be temporary and localized, and would result in only minor negative impacts to marine mammal habitat.

Operators of commercial vessels have a significant economic interest in maintaining underwater body hull platings in a clean condition. Fouled bottom platings result in increased fuel costs and can reduce the vessel's maximum transit speed. To prevent fouling and higher costs, operators preserve and maintain the hulls of their ships aggressively (FERC 2008), greatly reducing the risk of the transport of exotic species. Additionally, the USCG has developed mandatory practices for all vessels with ballast tanks in all waters of the United States. Washington has developed similar requirements. These practices include requirements to rinse anchors and anchor chains during retrieval to remove organisms and sediments at their place of origin, to regularly remove fouling organisms from the hull, piping, and tanks, and to dispose of any removed substances in accordance with local, state, and federal regulations.

These impact minimization measures and BMPs fully mitigate for the increased shipping-related impacts associated with the project.

Cumulative Impacts

The impact minimization measures that have been incorporated into the design of the project are the same measures that will reduce the potential for cumulative impacts. The project has been designed to minimize the extent of impacts to wildlife and wildlife habitat resources to the extent practicable, and this will reduce the potential for cumulative effects to these resources as well. The project itself will not result in any cumulative impacts to wildlife and wildlife habitat resources.

Operational Water Quality Impacts

The proposed project has the potential to result in indirect effects to wildlife through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters. However, the terrestrial habitats at the site provide very little functional habitat, and the impact minimization measures and BMPs that will be implemented will effectively reduce the potential for any adverse effects to the quantity or quality of terrestrial habitats as a result of operation.

As described in section 2.11, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. The proposed stormwater treatment will provide treatment to a level that is consistent with existing treatment at the site, which will ensure that aquatic wildlife are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of crude oil should an accident occur. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic release of crude oil is very low, and the proposed BMPs and safety and security measures will manage the risk of impacts to biological resources effectively.

These impact minimization measures and BMPs fully mitigate for the operational water quality impacts associated with the project.

3.4.5 Federal Approvals

Federal approvals anticipated for the project are identified in section 2.23. As noted a permit or authorization under Section 10 of the Rivers and Harbors Act will be required for proposed work below the OHWM of the Columbia River. Issuance of Section 10 permit or authorization will require compliance with the ESA, NEPA and NHPA. A permit or review under the MMPA may also be required. Submittal of the required application materials to the USACE had not occurred at the time of submittal of the Application for Site Certification but is anticipated to occur shortly thereafter. Contacts with federal agencies are identified in section 1.6.