

5.8 Wildlife

A rich diversity of wildlife historically inhabited or used the waters of, and terrestrial habitat adjacent to, the Columbia River. Although development along the river has altered the natural environment, many wildlife species occur or depend on habitats found in the study area. Wildlife includes terrestrial and marine mammals, birds, reptiles, amphibians, and invertebrates, including species that are currently protected or proposed for protection under the federal Endangered Species Act (ESA) or other federal and state regulations. Fish species are discussed in Section 5.7, *Fish*.

This section describes wildlife in the study area. It then describes impacts on wildlife potentially resulting from construction and operation of the proposed terminal.

5.8.1 Regulatory Setting

Laws and regulations relevant to wildlife are summarized in Table 5.8-1.

Table 5.8-1. Regulations, Statutes, and Guidelines for Wildlife

Regulation, Statute, Guideline	Description
Federal	
Endangered Species Act of 1973, as amended (16 USC 1531 <i>et seq.</i>)	The federal ESA provides for the conservation of threatened and endangered species and the habitat upon which they depend. ESA Section 7 requires federal agencies to initiate consultation with the USFWS and/or NMFS to ensure federal actions would not jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of designated critical habitat.
Migratory Bird Treaty Act of 1918, as amended (16 USC 703–713)	Makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. Under the regulatory authority of USFWS.
Bald and Golden Eagle Protection Act of 1940, as amended (16 USC 668–668c)	Prohibits the taking of bald eagles, including their parts, nests, or eggs without a permit issued by USFWS, and provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle... [or any golden eagle], alive or dead, or any part, nest, or egg thereof."

Regulation, Statute, Guideline	Description
Marine Mammal Protection Act of 1972, as amended (50 CFR 216)	Protects marine mammals from “take” without appropriate authorization, which may only be granted under certain circumstances. NMFS and USFWS enforce the act. Animals under the jurisdiction of NMFS may be present in the study area. An incidental harassment authorization or letter of authorization (specific authorization to be determined) may be required pursuant to the act.
State	
Washington State Environmental Policy Act (197-11 WAC, RCW 43.21C)	Requires state and local agencies in Washington to identify potential environmental impacts that could result from governmental decisions.
Washington State Growth Management Act (RCW 36.70A)	Defines a variety of critical areas, which are designated and regulated at the local level under city and county critical areas ordinances. These critical areas may include portions of wildlife habitat.
Washington State Shoreline Management Act (RCW 90.58)	Requires cities and counties (through their Shoreline Master Programs) to protect shoreline natural resources.
Washington State Hydraulic Code (RCW 77.55)	WDFW administers the hydraulic project approval program under the state hydraulic code in or near state waters.
WAC 220-660-160 –Marinas and Terminals in Freshwater Areas	Applies to constructing, maintaining, and repairing marinas and terminals in freshwater areas and addresses fish life concerns.
Local	
Cowlitz County SEPA Regulations (CCC 19.11)	Provide for the implementation of SEPA in Cowlitz County.
Cowlitz County Critical Areas Ordinance (CCC 19.15)	Requires the County to designate critical areas such as wildlife habitat conservation areas.
Cowlitz County Shoreline Master Program (CCC 19.20)	Regulates development in the shoreline zone, including the shoreline of the Columbia River, a Shoreline of Statewide Significance.
City of Longview Shoreline Master Program (LMC 17.60) (Off-Site Alternative only)	The City’s SMP consists of environmental designations for the shoreline segments and goals, policies, and regulations applicable to uses and modifications within the Shoreline Management Zone.
City of Longview Critical Areas Ordinance (LMC 17.10.140) (Off-Site Alternative only)	Regulates activities within and adjacent to critical areas and in so doing regulates fish and wildlife habitat conservation areas.
Notes:	
USC = United States Code; NEPA = National Environmental Policy Act; USFWS = U.S. Fish and Wildlife Service; NMFS = National Marine Fisheries Service; ESA = Endangered Species Act; CFR = Code of Federal Regulations; RCW = Revised Code of Washington; WAC = Washington Administrative Code; CCC = Cowlitz County Code; SEPA = State Environmental Policy Act; LMC = Longview Municipal Code	

5.8.2 Study Area

The study areas for the On-Site Alternative and Off-Site Alternative are described below. These study areas are based on the Corps' NEPA scope of analysis MFR, dated February 14, 2014, adjusted as appropriate to reflect habitat characteristics in and near the proposed terminal site.

5.8.2.1 On-Site Alternative

Three study areas have been identified for the wildlife analysis for the Off-Site Alternative.

Terrestrial Species and Habitats Study Area for Direct Impacts

The study area for terrestrial species consists of the project area plus the area extending up to 0.5 mile beyond the project area (Figure 5.8-1). This distance accommodates noise and visual disturbance thresholds set by the U.S. Fish and Wildlife Service (USFWS) for some sensitive species (U.S. Fish and Wildlife Service 2006).

Aquatic Species and Habitats Study Area for Direct Impacts

The study area for direct impacts on aquatic wildlife species and habitats includes the main channel of the Columbia River and extends approximately 5.1 miles upriver and 2.1 miles downriver from the upriver and downriver ends of the proposed Docks 2 and 3 (Docks 2 and 3), respectively (Figure 5.8-1). The aquatic study area is based on the distances where underwater noise generated by construction or operation of the proposed terminal is estimated to reach harassment levels (Section 5.8.3.2, *Impact Analysis*). These distances represent the in-water "line of site" distances from the ends of the dock with respect to underwater noise.

Terrestrial and Aquatic Species and Habitats Study Area for Indirect Impacts

The study area for indirect impacts includes the project area and lands in the vicinity where project-related disturbance to wildlife and habitat could occur. The indirect study area extends to the mouth of the Columbia River (Figure 5.8-2) to address potential impacts of increased vessel traffic on aquatic species and habitat in the lower Columbia River.

5.8.2.2 Off-Site Alternative

Three study areas have been identified for the wildlife analysis for the Off-Site Alternative.

Terrestrial Species and Habitats Study Area for Direct Impacts

The terrestrial study area for direct impacts associated with the Off-Site Alternative extends the same distances as identified for the on-site alternative (Figure 5.8-3).

Aquatic Species and Habitats Study Area for Direct Impacts

The study for the Off-Site Alternative extends a distance of approximately 7.1 miles upriver and 6.8 miles downriver in the Columbia River (measured respectively, from the upriver and downriver ends of the proposed docks at the project area) (Figure 5.8-3). The aquatic study area is based on the same criteria of harassment levels mentioned above in the On-Site Alternative.

Figure 5.8-1. Direct Impacts Study Area Boundaries for the On-Site Alternative

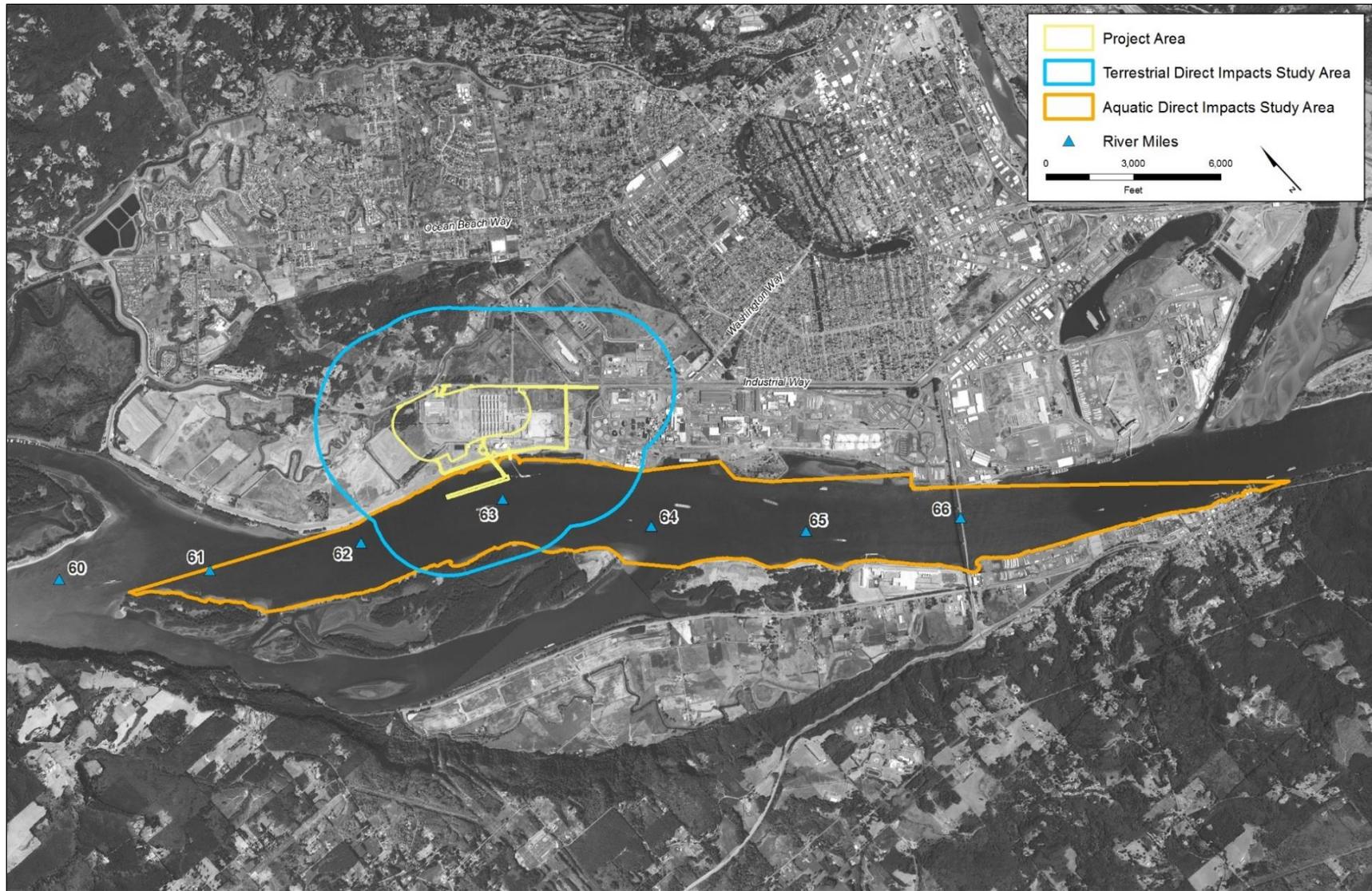


Figure 5.8-2. Indirect Impacts Study Area Boundaries for the On-Site and Off-Site Alternatives

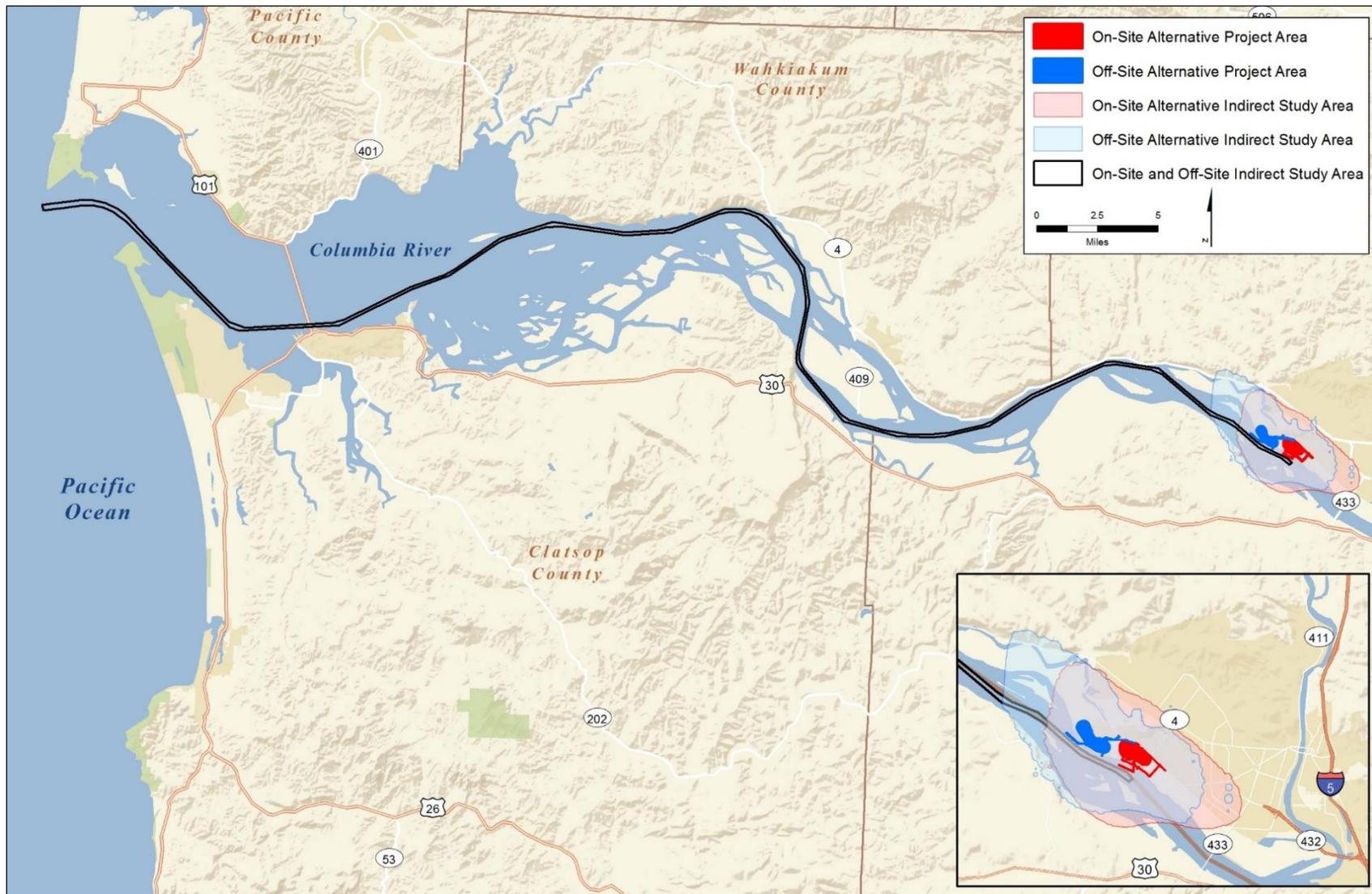
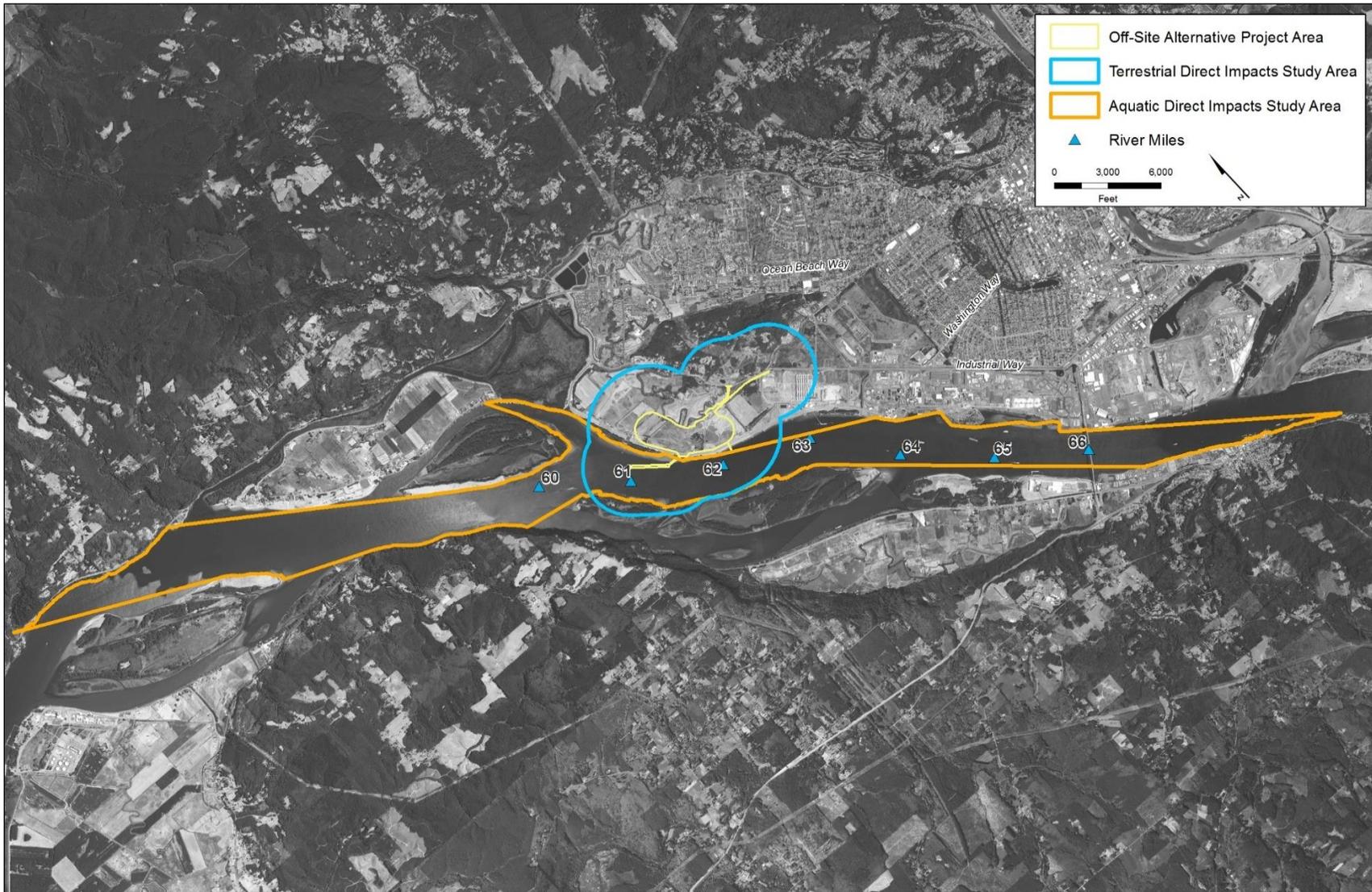


Figure 5.8-3. Study Area Boundaries for the Off-Site Alternative



Terrestrial and Aquatic Species and Habitats Study Area for Indirect Impacts

The study area for indirect impacts associated with the Off-Site Alternative (Figure 5.8-2) is the same as identified above for the On-Site Alternative.

5.8.3 Methods

This section describes the sources of information and methods used to evaluate potential wildlife impacts associated with construction and operation of the proposed export terminal.

5.8.3.1 Information Sources

The following sources of information were used to identify potential impacts. The *NEPA Wildlife Technical Report* (ICF International 2016) provides a detailed list of information sources.

- Site visits conducted by ICF International biologists on April 8, 2014, and December 12, 2014.
- A site visit to the Mount Solo Landfill was conducted by ICF International (ICF) professional biologists on December 12, 2014, to view the project area for the Off-Site Alternative¹ with binoculars from an elevated position. The site was also viewed with binoculars from the project area for the On-Site Alternative and from publicly accessible roads.
- Reports prepared by Grette Associates for the Applicant as part of the permit application materials (Grette Associates 2014a through 2014p).
- National Marine Fisheries Service (NMFS) (2015) west coast region species list.
- USFWS (2015) Information, Planning, and Conservation system online database.

5.8.3.2 Impact Analysis

The following methods were used to identify the potential impacts of the On-Site Alternative, Off-Site Alternative, and No-Action Alternative on wildlife in the study areas. For more information on these methods, see the *NEPA Wildlife Technical Report*. For direct impacts, the analysis assumes best management practices were incorporated into the design, construction, and operation of the export terminal. More information about best management practices can be found in Chapter 8, *Mitigation*, and Appendix H, *Export Terminal Design Features*.

Identifying Resources in the Terrestrial and Aquatic Study Areas

The following species and habitat characteristics were identified and quantified, where possible.

- Documented species occurrences
- Species likely to occur in the terrestrial and aquatic study areas
- Suitable habitat conditions

Wildlife species are mobile and their presence and abundance in the terrestrial and aquatic study areas cannot always be reliably predicted. Wildlife species identified in the Washington Department of Fish and Wildlife (WDFW) Priority Habitat Species (PHS) database were used to document occurrence. Geospatial PHS data containing mapped locations of priority species occurrences and

¹ Permission was not granted to visit the project area for the Off-Site Alternative directly.

priority habitats were obtained from WDFW (Washington Department of Fish and Wildlife 2014) and overlaid with the study area to determine presence of documented priority species and habitat occurrences.

- A list of special-status wildlife species was compiled for the study area, consisting of those species federally listed as threatened, endangered, proposed, or candidate species; wildlife species listed in the WDFW PHS database; and marine mammals.
- A list of federally listed wildlife species for Cowlitz County was generated from the USFWS Information for Planning and Conservation (iPAC) online planning tool (U.S. Fish and Wildlife Service 2015).
- A list of state priority species that occur in Cowlitz County was obtained from the WDFW PHS program website (Washington Department of Fish and Wildlife 2013).
- A list of federally protected marine mammals that could occur in the study area was compiled from the NMFS (2015) West Coast Region website.

Assessing Noise Impacts

An animal's response to sound depends on various factors, including noise level and frequency, distance and event duration, equipment type and conditions, frequency of noisy events over time, slope, topography, weather conditions, previous exposure to similar noises, hearing sensitivity, reproductive status, time of day, behavior during the noise event, and an animal's location relative to the noise source (Delaney and Grubb 2003 in Washington State Department of Transportation 2015). However, USFWS has established some noise and visual distance thresholds for some sensitive species that occur in Washington, including the bald eagle (*Haliaeetus leucocephalus*), marbled murrelet (*Brachyramphus marmoratus*), Northern spotted owl (*Strix occidentalis caurina*), and Columbia white-tailed deer (*Odocoileus virginianus leucurus*) (U.S. Fish and Wildlife Service 2006) (Table 5.8-2). The bald eagle has the lowest threshold for disturbance and, therefore, the greatest protective distance (0.5) mile. This distance is a conservative proxy for assessing potential impacts on other terrestrial wildlife species as well. The 0.5-mile distance used to delineate the terrestrial study area for direct effects was based on this disturbance threshold.

Table 5.8-2. Harassment Distances for Federally Listed Species in Washington State

Species	Scientific Name	Activity and Harassment Distance
Bald eagle	<i>Haliaeetus leucocephalus</i>	Noise: 0.25 mile ^a Visual: 0.5 mile ^b
Marbled murrelet	<i>Brachyramphus marmoratus</i>	Pile-driving: 180 feet ^c Visual: 300 feet
Northern spotted owl	<i>Strix occidentalis caurina</i>	Pile-driving: 180 feet
Columbia white tailed deer	<i>Odocoileus virginianus leucurus</i>	Noise: 0.25 mile

Notes:

^a Noise level disturbance varies on bald eagles. It has been found that visual disturbance is more likely to provoke escape behavior than noise disturbance (U.S. Department of Transportation 2004).

^b Visual disturbance can be caused by close visual proximity of human activities at sensitive locations (i.e., nest trees), and could result in significant disruption of normal behavior patterns.

^c Injury would occur at 202 decibels at this distance (Washington State Department of Transportation 2015).
Source: U.S. Fish and Wildlife Service 2006.

NMFS has established standard underwater marine mammal noise thresholds under the Marine Mammals Protection Act. NMFS has established Levels A and B harassment thresholds for pinnipeds (i.e., seals and sea lions) from impact and vibratory pile-driving (Grette Associates 2014a) (Table 5.8-3).

Table 5.8-3. NMFS Underwater Sound Level Effect Thresholds for Marine Mammals

Effect Type	Effect Threshold (dB_{RMS})
Impulse Sound (Impact Driver Operation)	
Level A harassment	190
Level B harassment	160
Continuous Sound (Vibratory Driver Operation)	
Level B harassment	120
Notes:	
Source: Grette Associates 2014a.	
dB _{RMS} = decibel root mean square	

Pinniped harassment can occur between approximately 178 feet and the extent of the aquatic study area for direct impacts, from the noise source without attenuation, depending on the method of pile-driving. Use of a bubble curtain during impact pile-driving decreases the distance pinniped harassment can occur to between 45 feet and 4,459 feet. Harassment can include hearing-related injuries and behavior changes. These criteria were used to establish pinniped impact thresholds in the aquatic wildlife study area.

For diving birds, USFWS has established impact thresholds for the federally listed marbled murrelet (Table 5.8-2), which can provide some guidance on underwater noise thresholds for other diving birds in the aquatic study area. The USFWS recognizes a behavioral guideline of 150 decibels root mean square (dB_{RMS}), an injurious auditory threshold of 202 sound exposure level (dB_{SEL}) (i.e., permanent threshold shift in hearing due to permanent loss of cochlear hair cells), and a non-auditory injury threshold of 208 dB_{SEL}; underwater noise below 150 dB_{SEL} does not cause injury (Washington State Department of Transportation 2015). These criteria were used to establish impact thresholds for diving birds in the aquatic study area.

5.8.4 Affected Environment

This section describes the environment in the study areas related to wildlife potentially affected by construction and operation of the proposed export terminal.

5.8.4.1 On-Site Alternative

Study Area

This section describes the existing environmental conditions in the terrestrial and aquatic study areas related to wildlife that could be affected by construction and operation of the proposed terminal.

Extensive modifications of the lower Columbia River (flood control, industrial development, deep-draft vessel traffic) have altered the habitat conditions in the study area available to wildlife species. Floodplain habitats have been disconnected from the riverine environment, and in some cases

eliminated. The shoreline and riparian environment has been substantially altered (e.g., armoring and shoreline protection, overwater structures, and development), affecting habitat in adjacent upland and riparian zones. Industrial and transportation development inland have further altered habitat conditions, changing the biological communities associated with these habitats.

Terrestrial Habitat

The On-Site Alternative is located on a disturbed industrial site developed with roads and industrial buildings. Many of the surrounding areas are also highly disturbed. In general, suitable wildlife habitat on the project area is degraded because of past industrial uses on the property. The patches of suitable habitat that are present support foraging and cover for small to large mammals; foraging and nesting for birds, including waterfowl, raptors, and passerine birds; and foraging, breeding, and nesting for amphibians (Grette Associates 2014c, 2014d, 2014e, and 2014h). Of the undeveloped areas on the project area, many are small and fragmented, and separated from similar habitat patches. These areas are limited in their habitat value due to their relatively small size and fragmented condition. The largest contiguous areas of habitat are located on the west side of the project area and include an herbaceous and forested area (associated with wetland). The highest quality habitat on the project area is a small forested area surrounding parallel drainage ditches located in the southwest portion of the site. Upriver of the project area, the heavily developed shoreline lacks suitable habitat and wildlife species are not present. Downriver of the project area are upland, wetland, and riparian habitats as well as disturbed areas. Habitat conditions for wildlife in these areas are similar to those of the project area: disconnected patches of suitable habitat.

Adjacent to the project area is a triangular area bounded by Industrial Way to the south and Consolidated Diking Improvement District (CDID) #1 ditches to the east and west. This area primarily contains herbaceous wetland habitat dominated by reed canarygrass. Other habitats, including forested and scrub-shrub wetlands and uplands (forested, scrub-shrub, and herbaceous), are small and isolated from other similar habitat types. A small portion of the site is disturbed. The habitat likely supports foraging and cover for small to large mammals; foraging and nesting for waterfowl, raptors, and passerine birds; and foraging, breeding, and refuge for amphibians and reptiles. Land to the east is largely disturbed by the Mint Farm Industrial Park, which supports a few small areas of herbaceous or scrub-shrub habitat. South of the project area, the terrestrial study area consists of a levee with managed herbaceous vegetation and riparian area bordering the Columbia River. The riparian area is primarily forested and scrub-shrub habitat and likely provides foraging and cover for small and large mammals; foraging and nesting for passerine, waterfowl and raptor bird species; and foraging, breeding, and refuge for amphibians (Grette Associates 2014d).

A small portion of Lord Island is located in the terrestrial study area. The island was previously used for dredged material disposal and consists of forested habitat in the study area. With the exception of several transmission towers, the island is undeveloped. More detail on Lord Island wildlife species and habitat is provided in the *NEPA Wildlife Technical Report*. Additional information on vegetation cover classes in the study area is found in Section 5.6, *Vegetation*.

Aquatic Habitat

The aquatic study area includes wetlands (refer to Section 5.3, *Wetlands*, for more information), the Columbia River, and smaller areas of open water within the study area, including various ditches and a pond that provide aquatic habitat. Ditches in the aquatic study area include those maintained by CDID #1 and privately owned stormwater ditches. The Columbia River supports marine mammals, fish, birds, and a variety of invertebrates (which serve as forage to support wildlife higher

on the food chain). Fish are discussed in Section 5.7, *Fish*. Ponds and ditches in the aquatic study area could support common species of invertebrates and amphibians as well as small mammals and birds.

Habitat types in the Columbia River include a deepwater zone, shallow water zone, and the active channel margin (Figure 5.8-4) (Grette Associates 2014i); all of these habitats are below the river's ordinary high water mark (OHWM). The active channel margin includes the shoreline and nearshore edge habitat extending toward the water from the OHWM out to a depth of 11.1 feet, Columbia River datum (CRD).² In general, the shoreline adjacent to the aquatic study area is highly modified by extensive levees and riprap armoring with scattered large woody debris.

The conditions in the shallow water zone are relatively narrow and more steeply sloped making it unlikely to support aquatic vegetation (Grette Associates 2014j). The benthic (i.e., river bottom) habitats of the Columbia River are subjected to strong currents and reduced light penetration with depth and, therefore, support little to no aquatic vegetation.

Wildlife Species

Wildlife likely to be found in the terrestrial study area include common species of birds, rodents, amphibians, reptiles, and invertebrates. Larger and more mobile species of mammals could also be present.

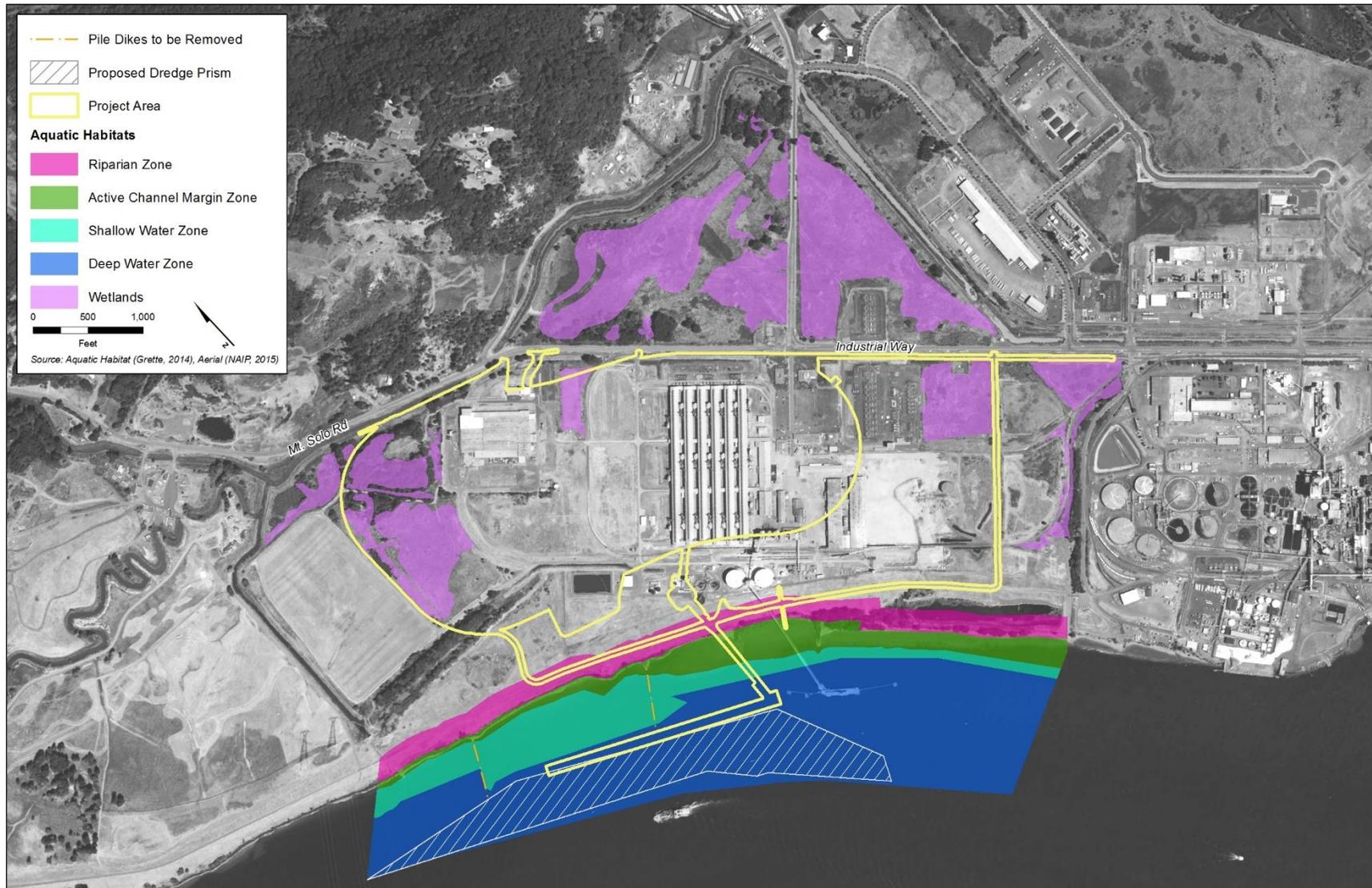
Wildlife likely to be found in both the terrestrial and aquatic study areas include common species of birds (waterfowl, raptors, shorebirds, marine birds, and passerine birds), rodents, frogs, salamanders, snakes, lizards, and invertebrates. Larger and highly mobile species of mammals that are habituated to disturbed environments may also be present in the study area, including coyote (*Canis latrans*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and deer (*Odocoileus* sp.).

During the December site visit, two Columbian black-tailed deer (*Odocoileus hemionus columbianus*) were observed in the forested wetland area (Wetland A) at the northwest portion of project area, and two nutrias (*Myocastor coypus*) were observed on the sloped bank of the CDID Ditch 10, on the north side of Industrial Way. Other signs of mammal presence were observed, including several unidentified small mammal scats, a coyote scat along the dike road, a beaver (*Castor canadensis*)-chewed tree in the riparian habitat along the Columbia River, and an unidentified species of sea lion heard barking from the Columbia River.

Several common bird species were recorded in the terrestrial study area during the site visits, including red-winged blackbird (*Agelaius phoeniceus*), sparrows (*sp.*), robins (*Turdus migratorius*) and other songbirds, American coot (*Fulica Americana*), bufflehead (*Bucephala albeola*), mallards (*Anas platyrhynchos*) and other unidentified ducks, Canada geese (*Branta Canadensis*), cormorants (*sp.*), scaup (*sp.*), gulls (*sp.*), and great blue heron (*Ardea herodias*). A turkey vulture (*Cathartes aura*), red-tailed hawk, kestrel (*Falco sparverius*), and bald eagle (*Haliaeetus leucocephalus*) were observed flying overhead. A small flock of Canada geese were also observed grazing on wetland grasses at the project area, and several unoccupied raptor nests were observed in the forested habitat adjacent to the stormwater ditches on the southwest side of the project area and on an electrical tower near the west side of the dike road.

² Columbia River Datum (CRD) is a vertical datum that is the adopted fixed low water reference plane for the lower Columbia River. It is the plane of reference from which river stage is measured on the Columbia River from the lower Columbia River up to Bonneville Dam, and on the Willamette River up to Willamette Falls.

Figure 5.8-4. Aquatic Habitats for the On-Site Alternative



Grette Associates biologists conducted surveys for the federally threatened and state endangered streaked horned lark in the project area during the 2013 and 2014 breeding seasons. No streaked horned larks were detected; however, 33 other bird species were recorded. A list of these species is included in the *NEPA Wildlife Technical Report*. A few of these bird species are special-status species, which are addressed in Section 5.8.4.1, *On-Site Alternative, Special-Status Wildlife Species*.

Wildlife likely to be found only in aquatic habitats include three species of pinnipeds, which may be present in the aquatic study area within the Columbia River: harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), and Steller sea lion (*Eumetopias jubatus*) (Jeffries et al. 2000). Because these marine mammals are all protected under the Marine Mammal Protection Act, they are described in more detail in Section 5.8.4.1, *On-Site Alternative, Special-Status Wildlife Species*. Various bird species, including waterfowl, raptors, and shorebirds are supported by the Columbia River's aquatic habitats in the aquatic study area, as well as numerous fish species. Freshwater insects and other invertebrate species (e.g., mollusks, crayfish) inhabit the upper layers of the benthos and provide forage for many species of fish and birds. Fish and their habitats are discussed in Section 5.7, *Fish*.

Special-Status Wildlife Species

Special-status wildlife species are those listed as threatened, endangered, proposed for listing, or listed as candidate species under the ESA or are listed as a priority species by WDFW. Table 5.8-4 lists the special-status wildlife species likely to occur in the terrestrial and aquatic study areas. Further descriptions of each species are provided in the *NEPA Wildlife Technical Report*. Some of the PHS listings are not for individuals of a species (PHS Criteria 1) but for vulnerable aggregations (PHS Criteria 2) of individuals, such as western Washington nonbreeding concentrations.

Columbian White-tailed Deer (*Odocoileus virginianus leucurus*)

The Columbia River population of the Columbian white-tailed deer is a federally and state-listed endangered species. The Columbia River population is one of only two extant populations in the United States: the lower Columbia River population and the Douglas County population. The lower Columbia River population occurs in Wahkiakum and Cowlitz Counties, Washington, and Clatsop and Columbia Counties, Oregon. The Douglas County population, which occurs in Umpqua River Basin, Douglas County, Oregon, was delisted in 2003. The Columbia River population inhabits the lower Columbia River floodplain and islands within the river channel. The current range of the Columbian white-tailed deer overlaps with the study area, including Barlow Point and Fisher, Walker, and Lord Islands (Washington Department of Fish and Wildlife 2013).

WDFW has identified specific locations along the Columbia River for recovery (Washington Department of Fish and Wildlife 2013). The nearest recovery location to the study area is downriver of Longview, which includes Fisher, Hump, Lord, and Walker Islands (Washington Department of Fish and Wildlife 2013). The presence of white-tailed deer in the study area has been documented.

Columbian Black-tailed Deer (*Odocoileus hemionus columbianus*)

Black-tailed deer use upland slopes and closed-canopy coniferous forests as they require a mix of forest and openings for cover and forage (Washington Department of Fish and Wildlife 2014). Columbian black-tailed deer have been observed in the project area.

Table 5.8-4. Special-Status Wildlife Species that Could Occur in the Terrestrial Study Area—On-Site Alternative

Wildlife Species	Potential for Occurrence ^a	Potential Habitat	State Priority Species Criteria ^b	Federal Status ^c	State Status ^d
Mammals					
Columbian black-tailed deer (<i>Odocoileus hemionus columbianus</i>)	Yes	Species documented on project area. Limited habitat on project area. May use forested portions of terrestrial study area.	3	N/A	N/A
Columbian white-tailed deer (<i>Odocoileus virginianus leucurus</i>)	Yes	Species documented on project area. ^e Limited forage and cover on project area. Suitable habitat available on Lord Island.	1	E	E
Harbor seal (<i>Phoca vitulina</i>)	Yes	Present in Columbia River	2	N/A	N/A
California sea lion (<i>Zalophus californianus</i>)	Yes	Present in Columbia River	2	N/A	N/A
Stellar Sea lion (<i>Eumetopias jubatus</i>)	Yes	Present in Columbia River	1, 2	SC	T
Birds					
Streaked horned lark (<i>Eremophila alpestris strigata</i>)	Possibly	Not documented during surveys on project area. Potential suitable habitat on Lord Island.	1	T	E
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Yes	Forested wetlands could provide roosting habitat. Suitable habitat on Lord Island.	1	SC	S
Peregrine falcon (<i>Falco peregrinus</i>)	Possibly	Potential foraging habitat	1	SC	S
Barrows goldeneye (<i>Bucephala islandica</i>)	Possibly (nonbreeding concentrations unlikely)	Open water	2, 3	N/A	N/A
Common goldeneye (<i>Bucephala clangula</i>)	Possibly (nonbreeding concentrations unlikely ^f)	Open water	2, 3	N/A	N/A

Wildlife Species	Potential for Occurrence ^a	Potential Habitat	State Priority Species Criteria ^b	Federal Status ^c	State Status ^d
Bufflehead (<i>Bucephala albeola</i>)	Yes (nonbreeding concentrations unlikely ^f)	Open water	2, 3	N/A	N/A
Waterfowl concentrations	Yes	Suitable habitat documented in terrestrial and aquatic study areas	2, 3	N/A	N/A
Vaux's swift (<i>Chaetura vauxi</i>)	Possibly	No large snags for nesting or roosting identified on project area but possible in terrestrial study area.	1	N/A	C
Pileated woodpecker (<i>Dryocopus pileatus</i>)	Possibly	Possible in forested habitat.	1	N/A	C
Purple martin (<i>Progne subis</i>)	Yes	Species documented in terrestrial study area, possible foraging.	1	N/A	C

Notes:

- ^a The likelihood of each species or vulnerable aggregations occurring in the terrestrial and aquatic study areas is listed as follows (Washington Department of Fish and Wildlife 2013).
 - Yes (known to occur)
 - Possibly (likely to occur due to presence of suitable habitat, but not documented)
 - Unlikely (individuals may occur in the terrestrial or aquatic study areas but vulnerable aggregations are not documented in the PHS database)
- ^b State PHS Species Criteria: 1 – State-listed or candidate species; 2 – Vulnerable aggregation; 3 – commercial, recreational, or tribal importance
- ^c Federal Status under the U.S. Endangered Species Act: E = Endangered; T = Threatened; SC = Species of Concern
- ^d State Status: E = Endangered; T = Threatened; C = Candidate; S = Sensitive
- ^e Source: Grette Associates 2014j
- ^f Western Washington Nonbreeding Concentrations
- ^g Source: Willapa Hills Audubon Society 2014

Streaked Horned Lark (*Eremophila alpestris strigata*)

The streaked horned lark is a federally threatened and state endangered species. Streaked horned larks prefer wide open spaces characterized by flat, treeless landscapes of 300 acres or more, sparse grass/forb vegetation, and few or no shrubs. In the lower Columbia River, they were historically known to nest on sandy beaches and spits. Now, they can be found nesting on dredge spoil depositions. At the project area and within the study area, there are a few small areas containing potentially suitable habitat (low vegetative cover and no woody vegetation) located adjacent to the Columbia River near the former Reynolds Metal Company landfill and along the edges of roadbeds. No streaked horned larks were observed during the surveys in the project area during the 2013 and 2014 breeding seasons (Grette Associates 2014j, 2014k).

Critical habitat has been designated for the streaked horn lark, but none of these designated areas occur in the terrestrial study area. The closest designated critical habitat is on Crims Island, approximately 5 miles downriver of the project area.

Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles nest and forage for fish along the lower Columbia River. There are no documented bald eagle nests in the study area and no suitable nesting habitat in the project area. The nearest documented nest sites are located approximately 2 miles downriver and 4 miles upriver of the study area (Washington Department of Fish and Wildlife 2014). The study area provides foraging habitat for this species. Lord Island also provides suitable habitat for bald eagles (Pacific Coast Joint Venture 1994). Bald eagles were observed soaring over the study area during the April 8, 2014 site visit. Bald eagles were also observed in the study area during the July 12, 2013 streaked horned lark surveys (Grette Associates 2014j).

Peregrine Falcon (*Falco peregrinus*)

Peregrine falcons nest on cliff ledges but also use tall manmade structures such as bridges, overpasses, buildings, and power plants (Oregon Department of Transportation undated). The nearest documented nest location is approximately 3 miles south of the study area (Washington Department of Fish and Wildlife 2014). Peregrine falcons nesting within a few miles of the study area could potentially use the study area for foraging.

Waterfowl

Nonbreeding concentrations of Barrow's goldeneye (*Bucephala islandica*), common goldeneye (*B. clangula*), and bufflehead (*B. albeola*) are considered priority species (vulnerable aggregation) by WDFW. A few individual bufflehead were observed resting on open water (both in wetlands and on the Columbia River) in the study area during the April 8, 2013 site visit. However, within the study area there are no vulnerable concentrations of waterfowl documented in the WDFW PHS database (Washington Department of Fish and Wildlife 2014). The nearest documented vulnerable concentration is located approximately 0.25 mile northwest of the study area, east of Willow Grove Island. Lord Island and adjoining Walker Island support waterfowl and suitable habitat is located just outside of the study area in the tidal marsh area between the islands south of the sand spit (Pacific Coast Joint Venture 1994).

Purple Martin (*Progne subis*)

The purple martin is a state-listed species of concern. Purple martins were observed in the project area during the streaked horned lark surveys in July 2013 (Grette Associates 2014j). Several nest sites are documented in the Coal Creek Slough, approximately 3 to 4 miles downriver of the study area (Washington Department of Fish and Wildlife 2014).

Vaux's Swift (*Chaetura vauxi*)

The Vaux's swift is a state candidate species. They are summer (June to mid-August) residents in Washington, migrating north to Washington during the spring (April to late May) and south during the fall (mid-August to late September). There is no suitable nesting or roosting habitat in the project area; however, there are other forested areas in the study area that may contain suitable habitat. Vaux's swifts may fly through the study area during migrations or while foraging. They are commonly observed at the Mint Farm (Willapa Hills Audubon Society 2014) east of the study area.

Pileated Woodpecker (*Dryocopus pileatus*)

Pileated woodpeckers inhabit mature deciduous or mixed deciduous-coniferous forests. There is no suitable nesting habitat in the project area. Limited foraging habitat may be available in the forested areas on site. Forested portions of the study area may contain suitable habitat for nesting and foraging.

Pinnipeds

Three species of pinniped are found in the lower Columbia River in the study area: California sea lions (*Zalophus californianus*), Steller sea lions (*Eumetopias jubatus*), and harbor seals (*Phoca vitulina*). Sea lions use the lower Columbia River for foraging on fish and resting at haulout sites. Breeding areas (both mating rookeries and pupping sites) for California sea lions are located in California and Mexico. Steller sea lions are primarily present during the nonbreeding season.

Surveys conducted in the 1990s identified four haulout sites used by sea lions between the mouth of the Columbia River and its confluence with the Cowlitz River (Jeffries et al. 2000), which is approximately 4.5 miles upriver of the project area. There are no documented sea lion haulout sites in the study area, but individuals likely swim through the study area as they migrate up and down the Columbia River. Harbor seals are the most numerous of the pinnipeds found in Washington waters. Like sea lions, they forage and rest along the lower Columbia River, with dozens of haulout sites identified between the mouth of the river and the study area. There are no documented seal haulout sites in the study area, but individuals swim through the study area as they migrate up and down the Columbia River.

5.8.4.2 Off-Site Alternative

Study Area

The Off-Site Alternative is located on previously disturbed lands adjacent to upriver industrial developments. Prior to 2000, the project area was used primarily for agriculture and grazing and a small portion of the area continues to be used for agricultural activities. This area is currently undeveloped and vegetation on the property is mostly overgrown, consisting of dense shrub vegetation and grassy areas that extend to the shoreline. The majority of the area consists of herbaceous habitat.

The direct impacts study area includes lands within 0.5 miles from the project area as is illustrated in Figure 5.8-3. Approximately one-half of the Off-Site Alternative study area overlaps the study area for the On-Site Alternative. In addition to the previously described habitats is the Mount Solo landfill, located adjacent to the project area. The landfill habitat is classified as disturbed but likely to provide some wildlife habitat, including foraging and cover for small to large mammals, and foraging for bird species.

Terrestrial Habitat

Terrestrial habitat types found in the study area are characterized as developed (disturbed), upland (forested, scrub-shrub, herbaceous, and managed herbaceous), wetland (forested, scrub-shrub, herbaceous, managed herbaceous, and disturbed), and riparian (forested and scrub-shrub) and detailed in the Section 5.6, *Vegetation*. Habitat types present in the study area are generally similar to those in the On-Site Alternative study area. Habitat at the northern end of the project area is mostly herbaceous uplands with smaller herbaceous seasonal wetlands. This habitat has been documented in the PHS database as supporting regular concentrations of wintering waterfowl (Washington Department of Fish and Wildlife 2014). Other wildlife that may be supported by herbaceous habitat in the area include foraging and cover habitat for small to large mammals and foraging habitat for raptors. Close to the Columbia River is a small disturbed area with houses and other small buildings associated with the residences and agricultural fields. A levee with managed herbaceous vegetation spans the study area upland from the Columbia River riparian area. The riparian area in the downriver portion of the study area is dominated by densely forested trees and shrubs that likely provide high-quality habitat for wildlife. Upriver, the riparian area transitions to scrub-shrub habitat and is more sparsely vegetated. Support for wildlife in the riparian area includes foraging and cover for small and large mammals, foraging and nesting for a variety of birds, and foraging, breeding and nesting for amphibians. Downriver habitats are similar to those at the downriver end of the project area, consisting of herbaceous agricultural fields which support regular concentrations of wintering waterfowl (Washington Department of Fish and Wildlife 2014), foraging and cover for small to large mammals, and foraging for raptors. Upriver habitats are similar to what is described in Section 5.8.4.1, *On-Site Alternative, Terrestrial Habitat*.

Walker Island is offshore from the project area in the Columbia River (Figure 5.8-3). The island contains high-quality habitat for wildlife. Walker Island is predominantly forested and connects to Lord Island, upriver, by a narrow sand bar. Between the two islands lies a tidal marsh and shallows. This area provides foraging and resting habitat for waterfowl and supports wintering ducks and geese (Pacific Coast Joint Venture 1994). Suitable habitat is present in this area to support wildlife species including mammals, various birds, amphibians, and reptiles.

Aquatic Habitat

Aquatic habitats include wetlands (refer to Section 5.3, *Wetlands*, for more information), the Columbia River, and smaller open-water areas, such as ponds and drainage ditches, throughout the study area. Habitat types in the Columbia River are similar to those described in Section 5.8.4.1, *On-Site Alternative, Aquatic Habitat*, and are also shown in Figure 5.8-5. The majority of wetland habitats in the project area are in the southern portion of the project area, and include both forested and herbaceous wetland areas. Wetlands in the project area likely support foraging and cover for small to large mammals, foraging and nesting for a variety of birds, and foraging, breeding, and nesting for amphibians (Grette Associates 2014i, and 2014l).

Figure 5.8-5. Aquatic Habitats for the Off-Site Alternative



Wildlife

The study area for the Off-Site Alternative is adjacent to and overlaps with the On-Site Alternative study area. Due to this proximity and similar habitat types and characteristics, wildlife species that may occur in the study area for the Off-Site Alternative are expected to be similar to those described for the On-Site Alternative.

During the December 12, 2014 site visit to the adjacent Mount Solo landfill, bird species observed at the project area included red-tailed hawk, great blue heron, and mallard. Additionally, an unoccupied raptor's nest was observed. Columbian white-tailed deer have been documented in the project area (Washington Department of Fish and Wildlife 2014) but were not observed during the site visit.

Special-Status Wildlife Species

Descriptions of special-status wildlife species that could occur in the study area are the same as those described for the On-Site Alternative. Table 5.8-5 lists special-status wildlife species likely to occur in the study area. The potential for occurrence in the study area follows the same definitions as for the On-Site Alternative.

Table 5.8-5. Special-Status Animal Species that Could Occur in the Study Area—Off-Site Alternative

Common Name	Potential for Occurrence in Study Area ^a	Potential Habitat in the Study Area	State Priority Species Criteria ^b	Federal Status ^c	State Status ^d
Mammals					
Columbian black-tailed deer (<i>Odocoileus hemionus columbianus</i>)	Yes	Documented in study area	3	N/A	N/A
Columbian white-tailed deer (<i>Odocoileus virginianus leucurus</i>)	Yes	Documented on project area (PHS)	1	E	E
Harbor seal (<i>Phoca vitulina</i>)	Yes	Present in Columbia River	2	N/A	N/A
California sea lion (<i>Zalophus californianus</i>)	Yes	Present in Columbia River	2	N/A	N/A
Stellar Sea lion (<i>Eumetopias jubatus</i>)	Yes	Present in Columbia River	1, 2	SC	T

Common Name	Potential for Occurrence in Study Area ^a	Potential Habitat in the Study Area	State Priority Species Criteria ^b	Federal Status ^c	State Status ^d
Birds					
Streaked horned lark (<i>Eremophila alpestris strigata</i>)	Possibly	Not documented in study area. Few areas of potential suitable habitat on site.	1	T	E
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Yes	Forested wetlands could provide roosting habitat	1	SC	S
Peregrine falcon (<i>Falco peregrinus</i>)	Possibly	Potential foraging habitat	1	SC	S
Barrows Goldeneye (<i>Bucephala islandica</i>)	Possibly ^e (Nonbreeding Concentrations Unlikely ^e)	Open water	2, 3	N/A	N/A
Common Goldeneye (<i>Bucephala clangula</i>)	Possibly (Nonbreeding Concentrations Unlikely ^e)	Open water	2, 3	N/A	N/A
Bufflehead (<i>Bucephala albeola</i>)	Possibly (Nonbreeding Concentrations Unlikely ^e)	Open water	2, 3	N/A	N/A
Waterfowl concentrations ^e	Yes	Suitable habitat documented at project area	2, 3	N/A	N/A
Vaux's swift (<i>Chaetura vauxi</i>)	Possibly	Deciduous forest with snags documented on project area	1	N/A	C
Pileated woodpecker (<i>Dryocopus pileatus</i>)	Possibly	Possible in forested areas	1	N/A	C
Purple martin (<i>Progne subis</i>)	Possibly	Species presence documented in vicinity of study area, possible foraging	1	N/A	C

Notes:

- ^a Potential for individuals to occur based on multiple sources, including PHS data, scientific literature, and agency documents; potential for vulnerable aggregations based on PHS data only.
- ^b State PHS Species Criteria: 1 = State-listed or candidate species; 2 = Vulnerable aggregation; 3 = commercial, recreational, or tribal importance
- ^c Federal Status under the U.S. Endangered Species Act: E = Endangered; T = Threatened; SC = Species of Concern
- ^d State Status: E = Endangered; T = Threatened; C = Candidate; S = Sensitive
- ^e Western Washington Nonbreeding Concentrations

5.8.5 Impacts

This section describes the direct and indirect impacts to wildlife potentially resulting from construction and operation of the proposed export terminal.³

5.8.5.1 On-Site Alternative

This section describes the potential impacts on wildlife as a result of construction and operation of the proposed export terminal at the On-Site Alternative location.

Construction activities that could affect wildlife include the following:

- Permanent removal of habitat and wildlife displacement and mortality in terrestrial and aquatic habitats associated with clearing and construction of the proposed terminal.
- Noise and visual impacts on wildlife associated with operation of construction equipment, general construction-related noise, and pile-driving.
- Spills and leaks associated with the use of construction equipment and materials.

Operation activities that could affect wildlife include the following.

- Noise impacts on wildlife associated with operations such as train movement, managing the coal stockpile, transfer of coal to vessels, and general industrial operations.
- Spills and leaks from trains, vehicles, or equipment.
- Vessel strikes of marine mammals.
- Underwater vessel noise impacts on pinnipeds and diving birds.
- Removal of benthic habitat during maintenance dredging affecting wildlife and habitat.
- Coal dust deposition impacting terrestrial, wetland, and aquatic habitats and wildlife.

Construction—Direct Impacts

Construction activities associated with the On-Site Alternative could result in direct impacts as described below. As explained in Chapter 3, *Alternatives*, construction-related activities include demolishing existing structures and preparing the site, constructing the rail loop and docks, and constructing supporting infrastructure (e.g., conveyors and transfer towers).

Alter or Permanently Remove Terrestrial Habitat

Construction of the On-Site Alternative would result in the permanent removal of wildlife habitat within the limits of the project area.

A total of 201.5 acres of terrestrial habitat would be permanently removed during construction (Table 5.8-6). The majority of these impacts (151.14 acres) would occur in previously developed lands in which industrial buildings, pavement, and infrastructure currently exist with scattered areas of vegetation surrounding the developed areas, or sparsely vegetated areas that previously served as material storage or disposal sites associated with past industrial uses of the

³ Acreages presented in the impacts analysis were calculated using geographic information system (GIS), thus, specific acreage of impacts are an estimate of area based on the best available information.

property. In general, these developed lands provide degraded wildlife habitat conditions that do not provide suitable habitat for many species of wildlife, but may support bats, birds, rodents and insects.

Table 5.8-6. Permanent Terrestrial Habitat Loss by Type in the Study Area

Habitat Type	Direct Impact Area (acres)
Developed	151.14
Upland	26.26 ^a
Wetland	24.10
Total	201.5

^a Includes 0.05 acre of upland riparian forest.

Construction of the On-Site Alternative would result in the permanent loss of 26.26 acres of upland and 24.10 acres of wetland habitats containing forested, herbaceous, managed herbaceous, and scrub-shrub vegetation, and a small area (0.05 acre) of forested riparian habitat (Table 5.8-6). Animals inhabiting these areas could be displaced to other habitats outside of the project area and mortality of some less mobile individual species could occur.

Wildlife Displacement or Mortality

Wildlife present in the study area during construction could be displaced, injured or killed by construction vehicles or equipment, placement of construction materials on the ground, or ground disturbance such as land clearing and preloading activities. Approximately 151 acres (71%) of the project area are currently developed and many species of wildlife would likely not be present in these areas due to the lack of suitable habitat. Most wildlife species are mobile, and construction activities on approximately 50 acres of suitable wildlife habitat would result in the displacement and possibly the mortality of wildlife in the project area, particularly less mobile species such as burrowing mammals, reptiles, amphibians, and insects. Overall, the project would result in the loss of approximately 50 acres of suitable wildlife habitat and approximately 151 acres of developed lands that do not provide suitable habitat conditions for many species of wildlife. Wildlife that occur in these habitats would be displaced, injured, or killed as a result of construction of the proposed terminal.

Physical or Behavioral Responses to Construction

Construction of the terminal under the On-Site Alternative could affect both terrestrial and aquatic wildlife because of increased human presence, elevated noise levels, and/or ground-disturbing activities. While wildlife in and around the terrestrial and aquatic study areas is likely habituated to human activity and noise associated with existing industrial activities, noise levels at the project area would increase above ambient levels during construction, especially during impact pile-driving for dock and trestle construction.

Wildlife species exhibit different hearing ranges and not all wildlife responds the same way to sound. Wildlife response to sound depends on numerous factors, including noise level, frequency, distance and event duration, equipment type and conditions, frequency of noise events over time, slope, topography, weather conditions, previous exposure to similar noises, hearing sensitivity, reproductive status, time of day, behavior during the noise event, and the animal's location relative to the noise source (Delaney and Grubb 2003 in Washington State

Department of Transportation 2015). Therefore, an animal's reaction to elevated noise levels could range from mild disturbance with little or no reaction to escape behavior, which would displace individuals by forcing them to abandon the area of elevated noise levels, potentially resulting in significant impairment or disruption of normal behavioral patterns. Such displacement and disruption of behavior could reduce productivity and survival of individuals as the individual would likely expend more energy relocating to new suitable habitat, and would be less familiar with new habitat areas and at an increased risk of predation, potentially limiting survival of individual adults or offspring (e.g., abandoning young). These impacts would be exacerbated where there is no adjacent or nearby suitable habitat that is easily accessible. In addition, visible construction equipment, materials, and an increase in infrastructure could cause displacement because some species would avoid areas within the line-of-sight of construction equipment.

Dredging could affect birds, including streaked horned larks. No studies specifically identify noise sensitivities of the streaked horned lark but the marbled murrelet is very sensitive to underwater noise such as pile-driving and to noise that lasts longer than 10 to 15 minutes (Mountain Loop Conservancy 2010). Shorebird sensitivities are more similar to those of sea lions because they spend most of their time above water and generally stay in the shallow water while hunting (Science Applications International Corporation 2011). Dredging activities have been shown to generate in-air noise levels of 72 decibels in commercial or industrial areas (Epsilon Associates, Inc. 2006). Noise levels in this range could disturb birds, but would not likely result in injury.

Construction would be temporary, occurring over the estimated 6-year construction period. A lower density of development northwest of the terrestrial study area could connect to potentially suitable wildlife habitat where wildlife could relocate during and after construction. Because wildlife in the study area is likely habituated to noise associated with industrial activities and are generally mobile, construction noise could affect individuals of a species, but would not likely affect the local population.

Alter or Permanently Remove Aquatic Habitat

Construction would result in the alteration or permanent loss of approximately 83 acres of aquatic habitat. Dredging to provide vessel access to Docks 2 and 3 would alter approximately 48 acres of benthic habitat and construction would result in the permanent loss of approximately 11 acres of aquatic habitat (ditches and ponds) throughout the project area. Additionally, the project would result in the permanent loss of approximately 24 acres of wetland habitat (refer to Section 5.3, *Wetlands*, for further information).

These open areas of freshwater and wetlands support amphibians, small mammals, and birds. The project would permanently remove approximately 11 acres of aquatic habitat and 24 acres of wetlands, which would reduce suitable habitat available to these species.

The placement of 610 piles would permanently remove approximately 0.10 acre (4,312 square feet) of river bottom habitat (7.07 square feet per pile). Construction of docks and trestle would also create 5.13 acres of new overwater surface area that would limit light penetration into the aquatic environment. Benthic organisms within the pile footprint at the time of pile-driving would likely perish.

Approximately 225 feet of two existing pile dikes would be removed using vibratory extraction or direct-pull methods (Grette Associates 2014n). Pile dikes were installed throughout the lower Columbia River between 1889 and 1969. The specific year the pile dikes to be partially removed as part of the proposed project were installed is unknown, but their degraded condition indicates that they've been in the river for considerable time. Removing creosote-treated piles from the Columbia River would improve water quality over the long term; however, removing the piles could cause temporary, short-term increases in suspended sediments, short-term water contamination, and long-term sediment contamination from creosote released during extraction or long-term exposure to the water column. Those portions of the creosote-treated piles that have been exposed to water and air have little creosote remaining. Those portions of the treated piles below the mud line likely have more creosote remaining, which would become exposed during extraction. Backfilling the holes left after extracting the piles with clean-sand would avoid and minimize exposure to the water column of the creosote that may be present in the surrounding soils.

Creosote and associated chemicals, particularly those that are water soluble and that persist in the water column are known to bioconcentrate in many aquatic invertebrates (Eisler 1987; Brooks 1997). Creosote contains a mixture 200 to 250 compounds, with primary components composed of polycyclic aromatic hydrocarbons (PAHs) (National Marine Fisheries Service 2009). PAHs are known to be toxic to aquatic organisms including invertebrates and fish and can cause sublethal and lethal effects (Eisler 1987; Brooks 1997). Most of the components of creosote are heavier than water and sink in the water column. PAHs from creosote accumulate in sediments and are likely to persist at the site of pile removal or wherever they settle after suspension until they degrade (National Marine Fisheries Service 2009). However, PAHs from sediment are less bioavailable to aquatic species and, thus, these organisms are not likely to bioaccumulate PAHs from sediments (Brooks 1997). Over the long term, the source of creosote would be removed or capped by the sediment falling into the hole left by the extracted pile. Water quality would improve, the concentration of creosote in the sediment would be expected to decrease, and the potential pathway of exposure for wildlife through contamination of prey would be reduced.

Dredging would permanently alter a 48-acre area of deepwater habitat by removing approximately 500,000 cubic yards of benthic sediment. Within the proposed dredged area, the amount of deepening would depend on existing depths, varying from no removal up to 16 feet of removal. Most benthic organisms are stationary or slow moving and would likely perish during dredging. Benthic organisms typically recolonize disturbed areas within 30 to 45 days.

Physical or Behavioral Responses to Dredging and Underwater Construction Noise— Pinnipeds

Dredging activities could affect pinnipeds through collisions with vessels and dredging-related turbidity. Collisions with vessels and dredging equipment are possible but unlikely given the slow speeds of dredging vessels. Information on turbidity is limited; however, existing research indicates that dredging-related turbidity is unlikely to cause substantial impacts on pinnipeds since they often inhabit naturally turbid or dark environments and are likely to use senses in addition to their vision (Todd et al. 2014). Noise generated by dredging could cause masking and behavioral changes but is unlikely to cause auditory damage to pinnipeds (Todd et al. 2014). Increases in turbidity and underwater noise associated with dredging would be short-term and localized. Dredging would not likely cause long-term negative impacts on pinnipeds.

Installation of steel piles to support Docks 2 and 3 would generate underwater noise during pile-driving (Grette Associates 2014b) that could exceed the harassment thresholds described in Section 5.8.3.2, *Impact Analysis, Assessing Noise Impacts*. Pile installation would likely occur over two in-water work window construction periods due to the large number of piles involved.

Impact Pile-Driving

Level A harassment could occur up to a radius distance of 178 feet from active impact pile-driving without any sound attenuation in place. With implementation of a bubble curtain to attenuate noise levels during impact pile-driving, there would be a reduction of at least 9 decibels at the source, which would decrease the Level A harassment area to a 45-foot radius around each pile as it is driven. Because the Columbia River is approximately 3,000 feet wide at the point where pile-driving would occur, there would be a wide area of the river that pinnipeds could utilize and avoid exposure to the small area where underwater noise reaching Level A harassment would be generated. Based on the seasonal use patterns for California sea lion, Steller sea lion, and harbor seals in the study area, presence of individual pinnipeds during impact pile-driving would be unlikely.

It is estimated that Level B harassment could occur up to a radius distance of 3.36 miles from active impact pile-driving without any sound attenuation in place. With implementation of a bubble curtain to attenuate sounds, it is estimated that there would be a reduction of at least 9 decibels at the source, which would decrease the Level B harassment area to a 0.84-mile radius (4,459 feet) around each pile as it is driven. In the event these pinnipeds pass through the study area during impact pile-driving, they would be exposed to sound in excess of the Level B harassment threshold.

Vibratory Pile-Driving

Vibratory pile-driving may occur during much or all of each working day during the proposed in-water work window. Vibratory pile-driving would be used to drive the pile to the greatest extent possible. Final driving and/or proofing would require an impact pile-driver. Given the likely use of multiple pile-driving rigs and variable subsurface conditions, vibratory pile-driving might not occur throughout the working day. California sea lions, Steller sea lions, and harbor seals are considered unlikely to be present during much of the vibratory pile-driving period, based on their seasonal occurrence and the in-water pile-driving construction timing. This would minimize the likelihood that individual pinnipeds would experience sound in excess of the 120 dB_{RMS} Level B harassment threshold for continuous pile-driving sound. Individuals that occur within approximately 5.1 miles (26,928 feet) of vibratory pile-driving would experience elevated sound levels. If an individual were to initially avoid the area of elevated sound it would be expected to eventually move through the study area, either once acclimated to the sound or once pile-driving has ceased.

Physical or Behavioral Responses to Underwater Construction Noise—Diving Birds

Installation of piles could result in underwater noise impacts on diving birds. Given USFWS thresholds for marbled murrelet (Section 5.8.3.2, *Impact Analysis, Assessing Noise Impacts*), the small area where these noise levels would be reached, and the presence of construction equipment, vessels, and humans during pile-driving, it is likely a diving bird would avoid the area and not be exposed to injurious noise levels.

The reaction of a diving bird exposed to underwater noise levels above 150 dB_{RMS} (but below 202 dB_{SEL}) could range from mild disturbance to escape behavior, which would displace individuals. Displacement and disruption of behavior could interrupt feeding and diving, and reduce productivity and survival of individuals as the individual would likely expend more energy relocating to a new area. However, impact pile-driving noise impacts would be temporary, occurring over two in-water work windows. It is not anticipated underwater impact pile-driving noise would affect the overall fitness of diving bird populations.

Temporary Spills and Leaks

Construction activities could result in temporary water quality impacts from the release of hazardous materials such as fuels, lubricants, hydraulic fluids, or other construction-related hazardous materials. Spills could affect aquatic and terrestrial wildlife, particularly in terms of respiration, growth, and reproduction. The risk of a spill or release of hazardous materials is low because of the requirements associated with the handling, transfer, use, and storage of most construction-related hazardous materials. The potential risks and impacts related to impacts on water quality are addressed in Section 5.5, *Water Quality*. The potential for these types of impacts would be minimized by implementing construction best management practices, avoidance and minimization measures, in-water work windows, and compliance with regulatory and permit requirements.

Construction—Indirect Impacts

Construction under the On-Site Alternative would not result in indirect impacts on wildlife or wildlife habitat because construction would be limited to the project area.

Operations—Direct Impacts

Operation of the proposed terminal at the On-Site Alternative location would result in the following direct impacts.

Spills or Leaks

Routine operations at the project area could result in spills or leaks of hazardous materials from vehicles, trains, or equipment. Contaminants could degrade aquatic habitat in the Columbia River and drainage ditches in the project area. Training, oil discharge prevention briefings, and regulatory compliance would reduce the likelihood of accidental spills impacts. Additional measures are outlined Section 5.5, *Water Quality*, and Chapter 4, Section 4.6, *Hazardous Materials*.

Physical or Behavioral Responses to Noise

Operations could result in increased noise, which could affect wildlife by causing disturbance or avoidance behavior. Wildlife present in the area is likely habituated to the elevated noise levels associated with industrial, commercial, and residential uses. Wildlife is generally mobile and avoids disturbing noise levels and human activities beyond those to which it is habituated. Noise generated by terminal operations would be similar to noise generated by existing activities along the industrial waterfront and should have no measurable impact on wildlife in the terrestrial study area.

Spill Coal during Operations

Direct impacts resulting from a spill during coal handling at the proposed terminal would likely be minor because the amount of coal that could be spilled would be relatively small. Also, there would be no impacts to wildlife or wildlife habitat in the project area due to the absence of terrestrial and aquatic environments in the project area and the contained nature and features of the proposed terminal (e.g., fully enclosed belt conveyors, transfer towers, and shiploaders). Potential physical and chemical effects of a coal release on the aquatic and terrestrial environments that occur adjacent to the proposed terminal are described below.

Coal spilled into the Columbia River would have physical effects on aquatic wildlife and habitats, including abrasion, smothering, diminished photosynthesis, alteration of sediment texture and stability, reduced availability of light, temporary loss of habitat, and diminished respiration and feeding for aquatic organisms. The magnitude of these potential impacts would depend on the amount and size of coal particles suspended in the water, duration of coal exposure, and existing water clarity (Ahrens and Morrisey 2005). Therefore, the circumstances of a coal spill, the existing conditions of a particular aquatic environment (e.g., pond, stream, wetland), and the physical effects on aquatic organisms and habitat from a coal spill would vary. Cleanup of coal released into the aquatic environment could also result in temporary impacts on habitat, such as smothering, altering sediment composition, temporary loss of habitat, and diminished respiration and feeding for aquatic organisms.

The recovery time required for aquatic resources would depend on the amount of coal spilled and the extent and duration of cleanup efforts, as well as the environment in which the incident occurred. It is unlikely that coal handling in the upland portions of the export terminal would result in a spill of coal that would affect the Columbia River because the rail loop and stockpile areas would be contained, and other areas adjacent to the export terminal are separated from the Columbia River by an existing levee. Coal could be spilled during shiploading operations as a result of human error or equipment malfunction. However, such a spill would likely result in a limited release of coal into the environment due to safeguards to prevent such operational errors, such as start-up alarms, dock containment measures (i.e., containment “gutters” placed beneath the docks to capture water and other materials that may fall onto and through the dock surface) to contain spillage/rainfall/runoff, and enclosed shiploaders.

The chemical effects on aquatic organisms and habitats would depend on the circumstances of a coal spill and the existing conditions of a particular aquatic environment (e.g., stream, lake, wetland). Some research suggests that physical effects are likely to be more harmful than the chemical effects (Ahrens and Morrisey 2005).

A coal train derailment and coal spill in Burnaby, British Columbia, in 2014, and subsequent cleanup and monitoring efforts provide some insight into the potential impacts of coal spilled in the aquatic environment. Findings from spill response and cleanup found there were potentially minor impacts in the coal spill study area, and that these impacts were restricted to a localized area (Borealis Environmental Consulting 2015).

Operations—Indirect Impacts

Operation of the terminal would result in the following indirect impacts.

Injury or Mortality from a Vessel Strike—Pinnipeds

Operation of the terminal would increase vessel traffic in the Columbia River (Chapter 6, Section 6.4, *Vessel Transportation*) by 1,680 vessel transits per year. Increased vessel traffic would increase the risk of vessel collisions with pinnipeds in the lower Columbia River. Most research and literature on marine mammal vessel strikes is associated with vessel-whale collisions at sea. Compared to pinnipeds, whales are typically much larger, slower-moving, and, therefore, are assumed to be more vulnerable to vessel strikes. Vessel strikes on marine mammals are usually described as massive blunt-force trauma (Geraci and Lounsbury 1993 in Horning and Mellish 2009), but are considered extremely rare for pinnipeds (Andersen et al. 2007 in Horning and Mellish 2009).

The potential for a pinniped strike with a vessel depends on many factors, including time of year, vessel type, vessel size, pinniped species, vessel location, vessel speed, and location of animal relative to vessel. The behavior of a pinniped in the path of an approaching vessel in the study area is uncertain, but it is likely that an individual would have the ability to swim away from an approaching vessel. In addition, pinnipeds in the Columbia River are likely habituated to existing Columbia River vessel traffic, and vessel speed would be less than 14 knots. Therefore, the potential risk for a vessel collision with a pinniped would be low.

Physical or Behavioral Responses to Vessel Noise and Maintenance Dredging—Pinnipeds

Operation of the proposed terminal would increase vessel traffic and underwater noise in the lower Columbia River (Chapter 6, Section 6.4, *Vessel Transportation*). Studies in the Salish Sea have shown that the greater the ship size, the greater the underwater noise due to propeller cavitation,⁴ with the exception of tug vessels, which have greater underwater noise levels while performing such activities as berthing or accelerating a ship (Hemmera Envirochem et al. 2014). Vessel noise levels are likely to be similar in the Columbia River.

The peak hearing sensitivity frequencies of the Steller sea lion, California sea lion, and harbor seal are generally outside the noise frequencies generated by vessels (generally between 10 and 1,000 hertz (Wright 2008) and these species are habituated to existing Columbia River vessel noise levels. In response to vessel noise, marine mammals may modify or cease producing sounds they use to communicate, forage, or gain awareness of their environment (Wright 2008). Vessel noise may influence marine mammal behavior, but would not be great enough to cause physiological damage.

Impacts from noise generated during dredging would be similar to those described under construction-related direct impacts.

⁴ As propellers move through water, low-pressure areas are formed as the water accelerates around and moves past the propellers. The faster the propeller moves, the lower the pressure around it can become. As it reaches vapor pressure, the water vaporizes and forms small bubbles. This is cavitation. When the bubbles collapse, they typically cause very strong local shock waves in the water, which may be audible and even damage propellers.

Remove or Alter Habitat during Maintenance Dredging

Maintenance dredging is anticipated to occur every few years, but could occur as frequently as every year. Other neighboring berths typically maintenance dredge on an annual basis. Maintenance dredging impacts on pinnipeds and benthic organisms would be similar to those described for initial construction, but maintenance dredging would likely remove a smaller amount of material over a shorter period of time. Maintenance dredging would still result in mortality of invertebrate organisms and temporary disruption of benthic productivity, but benthic organisms typically recolonize an area 30 to 45 days following disturbance. In general, baseline benthic productivity is expected to be low in this deepwater habitat (McCabe et al. 1997), given the depth of water and amount of ambient light penetration to the river bottom.

Generate and Disperse Coal Dust

Coal particles would be generated during operation of the terminal as coal is unloaded from trains, stockpiled, and loaded into vessels.

The potential extent and deposition rate of coal dust particles less than 75 microns in diameter was modeled as part of the air quality analysis. Based on this modeling, the highest rate of coal dust deposition would be expected in the immediate area surrounding the export terminal, but smaller particles would also be expected to deposit in a zone extending around and downwind of the terminal. Deposition rates could range from 1.45 grams per square meter per year ($\text{g}/\text{m}^2/\text{year}$) adjacent to the project area, gradually declining to $0.01 \text{ g}/\text{m}^2/\text{year}$ approximately 2.41 miles from the project area. Based on the modeling results, the zone of deposition would extend primarily northwest of the project area and over the Columbia River. Deposition rates of less than $0.1 \text{ g}/\text{m}^2/\text{year}$ are projected to occur over the forested habitats of Lord Island within the study area, with declining concentrations across the island and to the south and west toward Walker Island. Thresholds for possible effects of coal dust on wildlife have not been established. However, as described in Chapter 6, Section 6.7, *Coal Dust*, the benchmark used for the analysis of potential negative impacts on people was $2.0 \text{ g}/\text{m}^2/\text{month}$. Coal dust deposition in the indirect study area would be below this benchmark. See Section 6.7, *Coal Dust*, for more information.

Although concerns regarding coal dust are commonly expressed relative to air quality and human health concerns, scientific literature examining the potential impacts of coal dust on wildlife, in particular, on terrestrial wildlife is scarce. More research has been conducted on potential effects of coal dust on aquatic organisms. Potential physical effects of coal dust have been well documented but the potential toxic effects of coal dust on aquatic organisms is not well known.

Coal particles could affect aquatic wildlife in a manner comparable to any form of suspended particulate, such as tissue abrasion, smothering, obstruction or damage to feeding or respiratory organs, and effects resulting from reduced light. Another potential manner in which coal could affect aquatic wildlife is through coal leachates. Unburnt coal can be a source of acidity, salinity, trace metals, hydrocarbons, chemical oxygen demand, and potentially macronutrients if they leach from the coal matrix into aquatic habitats. Toxic constituents of coal include PAHs and trace metals, which are present in coal in variable amounts and combinations dependent on the type of coal. Some PAHs are known to be toxic to aquatic animals and humans. Metals and PAHs could also potentially leach from coal to the pore water of sediments and be ingested by benthic-feeding organisms, providing a mechanism for subsequent ingestion by other organisms

throughout the food chain. However, the low aqueous extractability and bioavailability of the contaminants likely minimizes potential toxic effects.

5.8.5.2 Off-Site Alternative

This section describes the potential impacts on wildlife that could occur as a result of the construction and operation of the proposed export terminal at the Off-Site Alternative location. Construction and operation impacts at the Off-Site Alternative location are the same as those at the On-Site Alternative, with the exception of the following notable differences.

Construction—Direct Impacts

Alter or Permanently Remove Terrestrial Habitat

Construction of the terminal would destroy all wildlife habitat within the limits of construction. A total of 216.36 acres of terrestrial habitat would be permanently removed during construction by grading and clearing (Table 5.8-7). Although the majority of the habitats at the project area are vegetated, these habitats have been altered and degraded by past agriculture and recreational activities.

Table 5.8-7. Permanent Direct Impacts by Terrestrial Habitat Type in the Project Area—Off-Site Alternative

Habitat Type	Direct Impact Area (acres)
Developed	9.62
Upland	155.46 ^a
Wetland	51.28
Total	216.36

^a Includes 0.01 acre of upland riparian scrub-shrub

Alter or Permanently Remove Aquatic Habitat

A total of 597 36-inch-diameter steel piles would be installed in the river to construct the trestle and docks, removing an area equivalent to 0.10 acre of benthic habitat. Approximately 94% of this habitat (3,980 square feet) is located in deep water (Grette Associates 2014o). Bottom-dwelling organisms within the pile footprint at the time of pile-driving would likely perish.

Dredging would permanently alter a 15-acre area of deep water habitat by removing approximately 50,000 cubic yards of benthic sediment (Grette Associates 2014o). As with the On-Site Alternative, the Applicant has proposed disposing of dredged materials within the flow lane, adjacent to or within the navigation channel, to support the downriver sediment transport system (Grette Associates 2014i, 2014m, 2014o). The flow lane disposal area may be located between river miles 61 and 64, similar to other nearby projects. These river miles are illustrated on Figures 5.8-1 and 5.8-3.

Potential impacts on wildlife and wildlife habitat from dredging activities would be similar to those described for the On-Site Alternative, although the magnitude would be much less for the Off-Site Alternative. The On-Site Alternative would involve approximately 48 acres and 500,000 cubic yards of material while the Off-Site Alternative would involve approximately 15 acres and 50,000 cubic yards of material (approximately 10% of the volume of the On-Site Alternative).

The majority of bottom-dwelling organisms are stationary or slow-moving and occur relatively close to the substrate surface, and they would likely perish during dredging. Because benthic organisms generally occur near the interface between the water and substrate, the area of impact best represents the magnitude of the potential impact to benthic organisms, which for the Off-Site Alternative would be approximately 30% of the potential magnitude of impact associated with the On-Site Alternative. These organisms serve as prey for larger species. The proposed dredge area is deep water, where productivity is low relative to shallower areas. Dredging activities are not typically associated with long-term reductions in the availability of prey, and impacts on productivity are expected to be temporary. Dredging activities could potentially affect pinnipeds as described for the On-Site Alternative.

Beyond the Columbia River, construction would result in the loss of approximately 8.61 acres of other aquatic habitats (primarily ditches) that meander through the Off-Site Alternative project area. These open waters support amphibians and are used by small mammals and birds, which are highly mobile species that can leave the area during construction. Some mortality of amphibians and other less mobile species would likely occur.

Operations—Indirect Impacts

Generate and Disperse Coal Dust

Deposition rates could range from 1.83 grams per square meter per year ($\text{g}/\text{m}^2/\text{year}$) adjacent to the project area, gradually declining to $0.01 \text{ g}/\text{m}^2/\text{year}$ approximately 2.98 miles from the project area. Based on the models, the zone of deposition would extend primarily northwest of the project area and over the Columbia River. Deposition rates of less than $0.1 \text{ g}/\text{m}^2/\text{year}$ are projected to occur over the forested habitats of Lord Island within the study area, with declining concentrations across the island and to the south and west toward Walker Island.

5.8.5.3 No-Action Alternative

Under the No-Action Alternative the Corps would not issue a Department of Army permit authorizing construction and operation of the proposed export terminal. As a result, impacts resulting from constructing and operating the export terminal would not occur. In addition, not constructing the export terminal would likely lead to expansion of the adjacent bulk product business onto the export terminal project area. The following discussion assesses the likely consequences of the No-Action Alternative regarding wildlife.

Under the No-Action Alternative, ongoing operations in the On-Site Alternative project area would continue. Additional storage and transfer activities might occur using existing buildings and structures. The Applicant would continue with current and future increased operations and the project area could be developed for other industrial uses including an expanded bulk product terminal or other industrial uses. New construction, demolition, or related activities to develop the project area into an expanded bulk terminal could occur on previously developed and undeveloped lands. This could affect areas that provide suitable terrestrial and aquatic wildlife habitat. Cleanup activities, relative to past industrial uses, would continue to occur. These could affect developed areas and associated disturbed habitats. Vessel traffic would continue and any aquatic wildlife disturbance or injury associated with vessel movements would continue. Thus, potential impacts on wildlife could occur under the No-Action Alternative similar to what is described for the On-Site Alternative, but the extent of the impact would depend on the proposed action.

5.8.6 Required Permits

The following required permits are expected to reduce impacts on wildlife.

5.8.6.1 On-Site Alternative

The On-Site Alternative would require the following permits for wildlife.

- **Endangered Species Act Consultation—U.S. Fish and Wildlife Service and National Marine Fisheries Service.** Constructing and operating the proposed terminal at the On-Site Alternative location would affect species listed (or eligible for listing) under the ESA or designated critical habitat. In accordance with Section 7(a)(2) of the ESA, as amended, any action that requires federal authorization or funding, or is carried out by a federal agency, must undergo consultation with the USFWS and/or NMFS to ensure the action is not likely to jeopardize the continued existence of any listed threatened or endangered animal species or result in the destruction or adverse modification of designated critical habitat.
- **Clean Water Act Authorization, Section 404—U.S. Army Corps of Engineers.** Construction and operation of the terminal would result in discharges of dredged and fill material into waters of the United States, including wetlands. Department of the Army authorization from the U.S. Army Corps of Engineers would be required.
- **Rivers and Harbors Act, Section 10—U.S. Army Corps of Engineers.** Construction and operation of the proposed export terminal would affect navigable waters of the United States (i.e., the Columbia River). The Rivers and Harbors Act authorizes the Corps to protect commerce in navigable streams and waterways of the United States by regulating certain activities in such waters. Section 10 of the RHA (33 USC 403) specifically regulates construction, excavation, or deposition of materials into, over, or under navigable waters, or any work that would affect the course, location, condition, or capacity of those waters.
- **Marine Mammal Protection Act—National Marine Fisheries Service.** Construction of the proposed terminal would involve pile-driving, which could result in harassment, or “take,” of marine mammals protected under the Marine Mammal Protection Act (MMPA) of 1972, as amended. Under the MMPA, the NMFS would have to issue authorization for incidental “take” of marine mammals. Take is defined under the MMPA as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.”
- **Local Critical Areas and Construction Permits—Cowlitz County.** The On-Site Alternative would require local permits for clearing and grading of the project area and for impacts on regulated critical areas. Cowlitz County would issue a fill and grade permit, and would review the On-Site Alternative for consistency with the County’s critical areas ordinance.
- **Shoreline Substantial Development and Conditional Use Permits—Cowlitz County.** Cowlitz County administers the Shoreline Management Act through its Shoreline Management Master Program. The project area would have elements and impacts within jurisdiction of the Act (Cowlitz County Code (CCC 19.20) and would thus require a Shoreline Substantial Development and Conditional Use Permit from Cowlitz County and Ecology.
- **Hydraulic Project Approval—Washington Department of Fish and Wildlife.** The On-Site Alternative would require a hydraulic project approval from WDFW because it will change the natural flow or bed of the Columbia River.

- **Clean Water Act, Section 401 Water Quality Certification—Washington State Department of Ecology.** Because the export terminal authorization under Section 404 of the Clean Water Act, the regulated discharges would require a Clean Water Act, Section 401 water quality certification. This certification is administered by Ecology. The dredged materials management plan requires site-specific sediment sampling to characterize sediments and determination of suitability of dredged material for disposal.

5.8.6.2 Off-Site Alternative

The Off -Site Alternative would require the same permits related to wildlife as described for the On-Site Alternative.

- Endangered Species Act Consultation
- Clean Water Act Authorization, Section 404
- Rivers and Harbors Act, Section 10
- Marine Mammal Protection Act
- Hydraulic Project Approval
- Clean Water Act, Section 401 Water Quality Certification
- **Local Critical Areas and Construction Permits—City of Longview.** In addition to the Cowlitz County permits, the Off-Site Alternative would require permits from the City of Longview. Chapter 17.10 of the City of Longview Municipal Code regulates activities within and adjacent to critical areas such as wetlands and their buffers, fish and wildlife habitat conservation areas (including streams and their buffers), frequently flooded areas, and geological hazard areas. The City of Longview would require Critical Areas and Floodplain permits, as well as a Building Permit for clearing, grading, and construction.
- **Shoreline Substantial Development—City of Longview.** A Shoreline Substantial Development permit from the City of Longview would also be required. The City of Longview administers the Shoreline Management Act through its Shoreline Management Master Program. The project area would have elements and impacts within jurisdiction of the act and would thus require a Shoreline Substantial Development permit from the City of Longview. The Off-Site Alternative would not require a Shoreline Substantial Development Permit or Conditional Use Permit from Cowlitz County.