Vancouver Energy
Construction Wildlife Monitoring Plan

Plan No. C.05 | Revision 00

Approved by:

Name, Title: Kelly Flint, Senior Vice President and Corporate Counsel, Savage Companies
Designated Agent for EFSEC Application No. 2013-01
Date: 12 June 2015

This page left blank intentionally.

Vancouver Energy
Construction Wildlife Monitoring Plan

EFSEC Application for Site Certification No. 2013-01
Docket No. EF131590
12 June 2015

Prepared for

Tesoro Savage Petroleum Terminal LLC
5501 NW Old Lower River Road
Vancouver, Washington

Prepared by

BergerABAM
210 East 13th Street, Suite 300
Vancouver, Washington 98660

Job No. A13.0267.02

Revision Summary

No.	Date	Edits/Comments
00	12 June 2015	Submittal for Application Review

Vancouver Energy
Construction Wildlife Monitoring Plan

Table of Contents

Section

1. Introduction 3
1.1 Purpose of Plan 3
1.2 Proposed Construction Activities 6
1.3 Related Plans and Documents 6
2. Monitoring Framework 7
2.1 Management Recommendations 7
2.2 Monitoring Approach 8
2.3 Noise Analysis 10
3. Monitoring Protocols 11
3.1 Monitoring Zones 11
3.2 Monitoring Period 11
3.3 Noise monitoring 11
3.3.1 Adaptive Management 13
4. Reporting 13
5. References 13
6. List of Acronyms and Abbreviations 15

List of Tables

Table 1. Summary of Noise Level Impacts to Wildlife from Literature Reviews 9
Table 2. Summary of Noise Impact Thresholds for ESA Consultation and Effect Determination 9
Table 3. Project-Related Terrestrial Noise Attenuation 10

List of Figures

Figure 1. Vicinity Map 4
Figure 2. Project Site Plan 5
Figure 3. Monitoring Zone 12

List of Appendices

Appendix A. Wildlife Species of Concern
Appendix B. Sample Monitoring Report Template

This page left blank intentionally.

1. Introduction

Vancouver Energy (Facility) provides transloading services for pipeline quality crude oil from railcars to marine vessels. The Facility is located at 5501 NW Old Lower River Road, Vancouver, Washington; it is situated at the Port of Vancouver USA (Port) on the north bank of the Columbia River at approximately River Mile 103.5. The Facility site is approximately 47.4 acres in size and comprises elements within the following "area" groupings, as illustrated in Figures 1 and 2.

- Area 200 – Rail Unloading – located at Terminal 5 of the Port
- Area 300 – Storage – located at Parcel 1A of the Port
- Area 400 – Marine Terminal – located at berths 13 and 14 at the Port
- Area 500 – Transfer Pipelines – located in locations between areas 200, 300, and 400
- Rail Infrastructure – located at Terminal 5 of the Port

The Facility receives an average of four unit trains per day and unloads an average of 360,000 barrels (bbl) of crude oil per day. Six nominal capacity 400,000 bbl tanks are used to store crude oil on site. A transfer pipeline system is used to convey crude oil from Area 200 to Area 300 for storage, and from Area 300 to Area 400 for vessel loading. The transfer pipeline system can also be operated to move crude oil from Area 200 directly to Area 400. The Facility will operate 24 hours per day, 7 days per week.

1.1 Purpose of Plan

The purpose of the construction wildlife monitoring plan (CWMP) is to describe the protocols that will be used to verify the modeled construction noise and subsequent impacts to wildlife during certain construction activities of the Facility. Consistent with WAC 463-62-040, the proposed project will result in "no net loss of habitat functions and values by maintaining the functions and values of fish and wildlife habitat in the areas impacted by energy development." As described in Application for Site Certification (ASC), direct impacts to habitat resulting from the construction of the Facility have been mitigated on site. Temporary construction impacts, such as noise and water quality, may still affect wildlife and would, therefore, require construction monitoring. The Washington Department of Fish and Wildlife (WDFW), acting as a reviewing agency during the ASC review by the Energy Facility Site Evaluation Council (EFSEC), acknowledged that upland and in-water construction activities could result in temporary impacts to Priority Habitats and Species (PHS) species and requested that a monitoring plan be developed to "determine the extent of temporary disturbance from construction and attempt to validate through best professional judgment the assumption that temporary impacts will not be significant" (EFSEC 2014). The CWMP adopts WDFW's recommendations and has developed protocols to monitor certain construction noise to confirm the level of impacts on wildlife. This CWMP was developed to support the ASC.

The primary goal of this CWMP is to verify that the effects described in the Application for Site ASC Supplement (February 2014, pages 3-317 to 3-319) are not exceeded. The effect of Facility construction on wildlife is the temporary increase in terrestrial noise levels[1] associated with construction activities, in particular impact pile driving. The potential adverse disturbance effects to wildlife within this area were determined to be non-significant based on the short duration of the pile driving, existing noise levels associated with industrial development in the vicinity, and distance to known PHS points.

[1] *Noise impacts related to aquatic species resulting from in-water pile driving are addressed through the Marine Mammal Protection Plan and best management measures for in-water work presented in the JARPA, Appendix H.2 to the ASC.*

Figure 1 - Vicinity Map

LEGEND

- Project Boundary
- Vancouver, WA
- Portland, Oregon

VANCOUVER ENERGY

Tesoro Savage Petroleum Terminal LLC

Date: April 2015

Map Notes: Aerial photo dated July 2010, courtesy of ESRI World Imagery service

N

EX-0001-005964-PCE

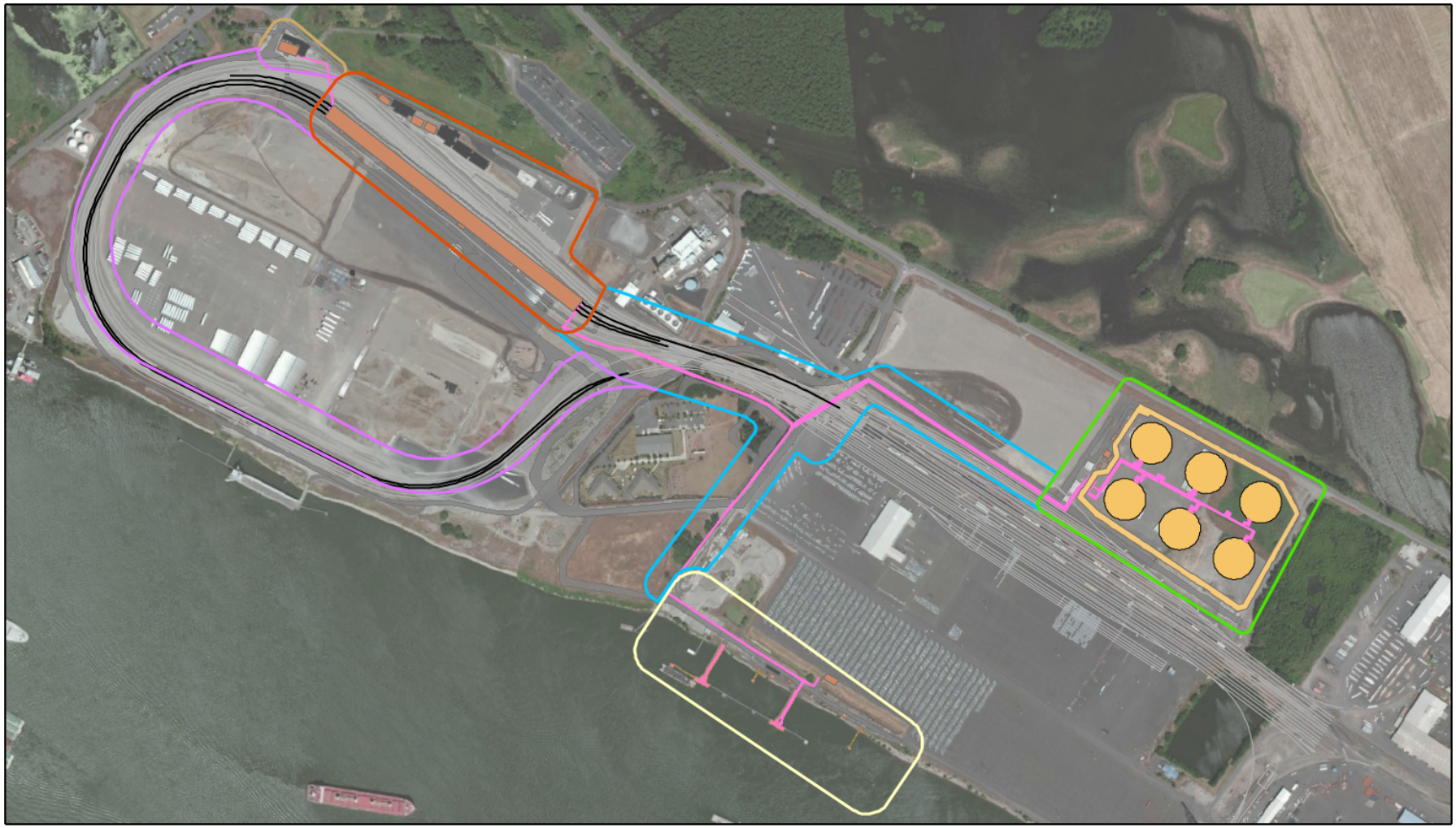

Figure 2 - Site Plan

Proposed Project Facilities

- Containment Berm
- Rail
- Parking
- Building
- Transfer Pipeline
- Storage Tank
- Roads
- Marine Terminal

TSPT Improvement Areas

- 200 - Unloading and Office
- 300 - Storage
- 400 - Marine Terminal
- 500 - Transfer Pipelines
- 600 - West Boiler
- Rail Infrastructure

0 250 500 1,000
Feet

N

VANCOUVER ENERGY

Tesoro Savage Petroleum Terminal LLC

Date: February 2015

Map Notes: Aerial photo dated July 2010, courtesy of ESRI World Imagery service

The purpose of the monitoring is to validate that construction noise emissions attenuate to a level of non-disturbance to PHS species potentially present in the vicinity of the construction site during upland pile-driving activities.

The CWMP will describe the means and methods to monitor noise levels during project pile-driving activities in order to demonstrate that noise levels attenuate to a level of non-disturbance.

1.2 Proposed Construction Activities

The ASC describes the construction activities and potential impacts to wildlife. The Facility is located entirely within a previously developed industrial area. Existing wildlife habitat is lacking and generally of poor quality. As stated, the loss of wildlife habitat has been mitigated on site. Certain construction activities have the potential to generate higher levels of noise that may temporarily affect wildlife within approximately 1 mile of the Facility. Loud construction noises may temporarily affect wildlife but were determined not likely to adversely affect wildlife species. These construction activities include the following.

- Impact pile driving for Area 200 rail unloading facility foundation support.
- Impact pile driving for Area 400 upland mooring points.
- Vibratory pile installation and removal for Area 400 marine terminal modifications.

The analysis of these activities in the ASC discloses temporary construction noise impacts that could affect wildlife. These impacts can include temporary displacement from the area during construction, interference with hearing abilities and species-specific communication, and disruptions of foraging opportunities. As stated previously (Section 1.1), WDFW requested construction monitoring of wildlife species to verify the conclusions of the ASC. Specifically, WDFW requested the following.

- Bald eagle monitoring during pile-driving activities;
- Sandhill crane monitoring at portions of Parcel 3 and Columbia River Wetland Mitigation Bank (CRWMB) during construction activities;
- Monitoring to validate the assumption that temporary impacts to the great blue heron rookery in the stand of black cottonwood north of the CRWMB would not be significant; and
- Development of a plan for the Oregon spotted frog as part of the Construction Environmental Compliance Program established by the Site Certification Agreement.

1.3 Related Plans and Documents

Other plans prepared for the Facility that address components related to wildlife monitoring include the following.

- Water Quality Protection and Monitoring Plan (WQPMP) – This plan includes visual monitoring of surface water quality conditions; these monitoring activities can serve to identify fish kills, if any, associated with Facility construction-related in-water work activities. Therefore, fish monitoring is not covered under this CWMP.
- Marine Mammal Monitoring Plan (MMMP) – This plan describes monitoring protocols for marine mammals during Facility construction. This plan specifically addresses the WDFW comments related to recommendation, which is as follows:

  > *""WDFW recommends the ASC support the development of a construction monitoring plan for a variety of aquatic species. (Justin Allegro)".*

  Therefore, marine mammal monitoring is not covered under this CWMP.

2. Monitoring Framework

The ASC describes the species of concern that are known to occur, or have the potential to occur, at the proposed Facility location and within a 1-mile vicinity. Species of concern include all federal- and state-listed threatened and endangered species, as well as WDFW PHS-listed wildlife. Information regarding the potential presence of species of concern was obtained from the following.

- U.S. Fish and Wildlife Service (USFWS) website (USFWS 2013)
- National Marine Fisheries Service (NMFS) website (NMFS 2013)
- 2008 PHS List (WDFW 2008)

Appendix A discusses each species' life history, listing status, and potential to occur within the proposed Facility location or vicinity. The occurrence of the species is based on an evaluation of the presence or absence of suitable habitat for each species at the proposed Facility location and 1-mile vicinity.

As described in the ASC, the developed and industrial nature of the Facility site provides limited habitat with only low to moderately suitable habitat for a limited number of special status wildlife species (Figure 3). Most species of concern are not likely to be observed in the immediate Facility area due to the limited habitat and high level of industrial activity. Occurrences may be noted, such as avian species flying overheard, or aquatic species passing through the Columbia River, but are expected to be transitory in nature for migration and daily foraging patterns.

Based on the potential for occurrence in the project area, known locations of species occurrences based on WDFW PHS mapping, and WDFW comments on the ASC, the following species have been carried forward for construction monitoring.

- Bald Eagle
- Sandhill Crane
- Great Blue Heron
- Oregon Spotted Frog

2.1 Management Recommendations

Determination of appropriate monitoring protocols includes existing published guidance or regulations. The following sections summarize the existing guidance for each species included in this CWMP.

Bald Eagle

The bald eagle is managed under the federal Bald and Golden Eagle Protection Act. WDFW has not maintained PHS management recommendations for bald eagle since 2011, following the federal delisting of the species. Federal guidelines on construction activities within 1 mile of an active nest include protection buffers (up to 660 feet) and timing restrictions for loud construction activities. The Facility is located greater than 1 mile from a known bald eagle nest on Port Parcel 3. While the project is not subject to the federal guidance, WDFW has indicated that impact pile-driving activities are a concern during construction.

Sandhill Crane

WDFW PHS management recommendation for Sandhill Crane include restrictions on construction activities within specific distances of known night roosts and breeding locations. There are two WDFW recommendations that could apply to the Facility.

1. New construction or traffic increases within 800 meters (2,625 feet) of feeding areas should be avoided.
2. Construction of roads and buildings within 500 meters (1,640 feet) of known night roost locations should be avoided.

The Facility is not located near any known night roost as mapped by WDFW. Sandhill crane have been documented on Parcel 3, within 800 meters of the Facility. Foraging may occur on Parcel 3 and could be disturbed by construction activities.

Great Blue Heron

WDFW PHS management recommendations establish heron management areas around known breeding colonies. Heron colonies have year-round (656 feet) and seasonal (1,320 feet for blasting) protection buffers to protect nesting birds. WDFW PHS mapping identifies a great blue heron breeding area, or rookery, approximately 2,800 feet north of the Facility in the CRWMB. Port staff have indicated the heron rookery in the CRWMB has been abandoned and is no longer active. The Facility is located outside of the protection buffers if the rookery is recolonized at some point in the future during construction activities.

Oregon Spotted Frog

WDFW has developed PHS management recommendations for Oregon spotted frog, but they do not include protection buffers similar to avian species. Recommendations applicable to the Facility include collecting stormwater runoff and not directing it to known habitat, maintaining riparian habitat, and maintaining local hydrology. There is no suitable habitat present at the Facility, i.e., wetlands associated with slow-moving waters or with permanent water, and construction is unlikely to impact Oregon spotted frog.

2.2 Monitoring Approach

As stated previously, certain construction activities have the potential to generate louder noise levels, potentially affecting sensitive species further from the Facility. Impact pile driving will generate the loudest construction noise source for construction of the Facility. Terrestrial construction noise can cause a variety of impacts to wildlife species, including displacement from occupied habitats, interference with hearing ability in songbirds, mating and alarm calls in amphibians and ground squirrels, and disruption of raptor foraging activities (Fyfe and Olendorff 1976, Madsen 1985, Van der Zande et al. 1980). Noise-generating activities are expected to occur during all phases of construction. Facility construction noise will temporarily increase terrestrial noise levels above ambient levels but will decrease to ambient noise levels through a distance attenuation. Other terrestrial noise sources that can affect wildlife include construction equipment, vehicle noise, and Facility assembly, among others. However, these noises are lower in intensity as compared to impact pile driving and are not expected to have measureable impacts on wildlife.

The level of terrestrial noise at which disturbance to the target species occurs is not well understood or documented in the available scientific literature. Most of the reviewed literature on terrestrial noise focuses on airport and aircraft operations, military applications (artillery fire), and traffic noise. Table 1 summarizes available information of noise studies conducted to evaluate the impact on wildlife. There are studies associated with aircraft that measured noise levels on heron rookeries, but did not note any impacts with passing aircraft (Grubb 1979). Furthermore, aircraft noise on take-off and landing approaches is a linear noise source and may not serve as the best comparison for point sources, such as impact pile driving. Noise studies conducted at military installations for artillery fire, a point source, have not been able to identify specific noise levels that cause harm to wildlife (Delaney 2011). Research conducted around the effects of sonic booms on wildlife have shown startle response across species groups, but tend to vary with the distance from the source (USFWS 1988). Delaney (2011) did note that the combination of noise level and distance did suggest that certain species may be more likely to elicit a response to the noise.

Responses can range from changes in alertness to startle and flushing from habitat. Alertness changes may not result in observable or measurable impacts to wildlife. Startle and flushing responses may impact wildlife where it results in missed foraging opportunities, or displacement from nesting and roosting areas.

It should be noted that response varies greatly by species, noise level, noise source, and distance from the source. Furthermore, repeated exposure to noise can result in wildlife habituation and result in higher thresholds to elicit a similar response (Pater et. al. 2009).

Table 1. Summary of Noise Level Impacts to Wildlife from Literature Reviews

Species/Group	Noise Level	Noise Source	Response/Effect	Sources
Marbled Murrelet/Northern Spotted Owl	90 dBA	Pile-driving (steel H piles, pipe piles) Rock Crushing and Screening Equipment	Harassment	USFWS 2006
Mammals	90 dBA	Intermittent Loud Noise	Startle	USFWS 1988
Domestic Chickens	100-118 dBA	Intermittent Loud Noise	Startle	USFWS 1988
Seabirds	72-89 dBA	Sonic Boom	Startle	USFWS 1988
Seabirds	>115 dBA	Sonic Boom	Startle	USFWS 1988
Raptors	82-144 dBA	Sonic Boom	Startle	USFWS 1988
Lab Animals	80 dBA	Intermittent Loud Noise	Startle	Bowles 1995
Mexican Spotted Owl/Northern Spotted Owl	92 dBA	Helicopter flights	Startle	Delaney 1999, Delaney 2002
Great blue heron, Great Egret, Night Heron	92 dBA	Aircraft overflight	No Response	Grubb 1979
Northern Goshawk	67 dBA @78m	Logging truck traffic	Change in Alertness	Grubb 2013
Red Cockaded Woodpeckers	76-96 dBA @200m	Small arms fire (M16)	No Response	Delaney 2011
Red Cockaded Woodpeckers	98-108 dBA @500m	Large caliber arms	Startle	Delaney 2011
Red Cockaded Woodpeckers	92-95 dBA @ 100m	Artillery blast	Startle	Delaney 2011
Red Cockaded Woodpeckers	80/98 dBA	Artillery simulator	Startle	Delaney 2011

Recent guidance (Table 2) from the USFWS regarding the effect of construction noise on northern spotted owl and marbled murrelet identified threshold distances for purposes of an Endangered Species Act (ESA) effect determination (USFWS 2013b). The effect determination is based the ESA definitions of harm and harassment.

Table 2. Summary of Noise Impact Thresholds for ESA Consultation and Effect Determination

Project Activity	No Effect (March 1 – Sept 30)	NLAA "may affect" disturbance distance (March 1 – Sep 30)	LAA-Harass Early nesting season disruption distance (March 1 – July 15)	LAA-Harass Late nesting season disruption distance (July 16 – Sep 30)	LAA-Harm Direct injury and/or mortality (March 1 – Sep 30)
Pile-driving (steel H piles, pipe piles) Rock Crushing and Screening Equipment	>0.25 mile	120 yards to 0.25 mile	≤120 yards	NA	≤5 yards (injury)

NLAA- Not likely to adversely affect

LAA – Likely to adversely affect

Impact pile driving can generate noise levels of 115 dB at 50 feet (worst-case scenario). Corresponding noise levels at 0.25 mile would be approximately 87 dB. This suggest that noise levels less than 87 dB would have no effect on wildlife species according to ESA definitions. This level generally correlates to

the data presented in Table 1 for noise levels that elicit a startle response for avian species. Assuming that startle responses are more likely to temporarily affect wildlife, noise levels that exceed a certain threshold are more likely to result in an impact. As described in the ASC, these impacts can include 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. The description of impacts disclosed in the ASC correlate with effect determinations between no effect and not likely to adversely affect as temporary disturbance is conservatively assumed to occur during construction. Therefore, this CWMP establishes a disturbance threshold of 90 dB that has been inferred from noise levels used in ESA consultation and a review of the scientific literature. Noise levels less than 90 dB are not expected to result in impacts to wildlife species.

2.3 Noise Analysis

Noise modeling was conducting to determine the distance that construction noise would attenuate to permitted industrial noise levels of 70 dB. As described in the ASC, construction noise would attenuate to 70 dB within 5,000 feet of upland impact pile driving and installation of ground improvements. This analysis is consistent with the biological evaluation that was used to determine potential impacts to ESA-listed species (BergerABAM 2014) and the approach to terrestrial noise analysis specified by WSDOT (WSDOT 2013). However, 70 dB does not correlate well with the scientific literature for determining disturbance thresholds to use in assessing impacts of construction noise to wildlife. For purposes of this monitoring plan, a noise level of 90 dB has been conservatively established as a disturbance threshold level. As stated, the objective of this monitoring plan is to validate the analysis of noise impacts to wildlife disclosed in the ASC.

Impact pile driving at Area 200 for the rail unloading facility and Area 400 represent the loudest source of construction noise. Additionally, ground improvements at areas 300 and 400 are also expected to generate louder construction noise levels (although not as loud as impact pile driving) because of the required equipment. Although noise emissions from installation of ground improvements are expected to be less than those associated with impact pile driving, because of their relative proximity to habitat at Area 300, they will be included as a monitored activity.

Peak terrestrial noise (L_{max}) generated during impact installation of upland piles has been estimated to be approximately 115 decibels (dBA), measured at 50 feet (WSDOT 2013). In-air noise attenuation calculations, generally show a 6 dBA loss for a doubling of distance from the source as shown in Table 3. A threshold level of 90 dB has been used to conduct the noise analysis for establishing the monitoring area.

Table 3. Project-Related Terrestrial Noise Attenuation

Distance from Source (ft)	Construction Noise in dBA (Point Source, Hard Site) (-6 dBA reduction per doubling of distance)
50	115
100	109
200	103
400	97
800	91
1,600	85

Based on the noise attenuation assumptions listed in the table above, terrestrial noise from impact pile driving is expected to attenuate below the 90 dBA disturbance threshold between 800 and 1,600 feet from the location of project activities. The following equation was used to determine the distance at which terrestrial noise will attenuate below the 90 dBA threshold:

$$TL = 20 * Log\left(\frac{R1}{R2}\right)$$

Where TL is the transmission loss, represented as the difference between measured sound level and the threshold level, R1 is the distance where sound attenuates to the threshold level, and R2 is the distance of the measured sound level. Solving the equation for R1 results in the following:

$$R1 = R2 * 10^{\left(\frac{Measured\ Sound - Threshold\ Level}{20}\right)}$$

This indicates that terrestrial noise associated with impact pile driving will attenuate below disturbance threshold noise levels within approximately 900 feet. The monitoring zone has been established for areas within 900 feet of the rail unloading facility at Area 200, ground improvements at areas 300 and 400, and upland piles at Area 400 (Figure 3).

3. Monitoring Protocols

3.1 Monitoring Zones

A monitoring zone of 900 feet has been established based on the disturbance threshold of 90 dBA (Figure 3). Within the monitoring zone, there is very little suitable habitat to support the presence of wildlife. As described previously, the Facility location does not provide suitable wildlife habitat because of the developed industrial nature of the site. Further, wildlife are not expected to use this area during construction activities as the construction and presence of human activity is expected to discourage presence. Therefore, this zone is excluded from wildlife monitoring during construction (Figure 3). Potentially suitable habitat for wildlife located in the general vicinity is present within the Vancouver Lake lowland wetlands (Parcel 2) and agricultural fields (Parcel 3) that could be affected by impacting pile driving at Area 200. Potentially suitable habitat is present in the Parcel 1a mitigation site and the CRWMB could be affected by ground improvements. Therefore, monitoring will only occur in areas of potentially suitable habitat (Figure 3).

3.2 Monitoring Period

Monitoring will occur during impact pile driving at areas 200 and 400, and during ground improvements installation at Area 300 in accordance with the construction schedule. Wildlife monitoring will not occur outside these construction activities.

3.3 Noise monitoring

Monitoring protocols have been developed to monitor construction noise levels within the established monitoring area. As stated previously, this area has been modeled where sound levels are expected to exceed a disturbance threshold of 90 dBA. Wildlife within the area could be potentially impacted by construction noise. Because the objective of this plan is to validate the ASC analysis of impacts, construction noise monitoring will be conducted to determine what actual noise levels are observed in this area.

Figure 3 - Construction Wildlife Monitoring Area

LEGEND

- Site Boundary
- Noise Monitoring Area
- Noise Disturbance Threshold (90 dBA)

VANCOUVER ENERGY

Tesoro Savage Petroleum Terminal LLC

Date: May 2015

Map Notes: Aerail photo dated July 2010, courtesy of ESRI World Imagery service

0 250 500 1,000

Feet

N

EX-0001-005972-PCE

Noise level monitoring will be conducted using Type 1 noise level meters (Bruel & Kjaer 2250 meter or equivalent). Monitoring events will coincide with the first day of construction activity, either impact pile driving or ground improvements and be completed by a team of two qualified scientists. If construction activities occur simultaneously, two field crews would be required, with a minimum of one qualified scientist on each team. The noise level meter would be placed at the furthest extent (900 feet) from the construction activity within the monitoring zone. The meter will be deployed to capture 1-second interval data during the installation of a minimum of two piles. Pile driving has a fairly distinctive time stamp, so it is likely that extraneous noises can be identified in post processing and removed from the analysis. For ground improvements, noise level monitoring will be conducted for the duration of two stone columns.

If monitoring results in measured noise levels at or below 90 dBA, the analysis of impacts presented in the ASC will be considered validated and no further monitoring will be required. If measured noise levels exceed 90 dBA, adaptive management measures will be implemented by construction crews to reduce noise levels.

3.3.1 Adaptive Management

If noise levels exceed 90 dBA at 900 feet, noise monitoring will be conducted at the location of the nearest sensitive resource, assumed to be the bald eagle nest located on Parcel 3 near the dredge disposal area. Noise monitoring will be conducted at the nest for the duration of two piles or stone columns to determine actual noise levels. If monitoring indicates an exceedance of 90 dBA at that location, the following adaptive management strategies may be activated after seeking input from WDFW.

1. Construction crews may implement noise dampening strategies for impact pile driving. This can include the use of nylon or wood blocks placed between the pile and hammer. Because of the height of the mast and hammer, the use of sound walls may not be feasible.
2. Temporary sound barriers, such as containers, earthen berms, or stockpiled materials, may be placed around the ground improvement area to minimize noise impacts.

Noise monitoring would be conducted again for the duration of two piles or stone columns to verify the effect of the adaptive management strategies. If measured noise levels are at or below 90 dBA with adaptive management, no further monitoring is necessary.

4. Reporting

A CWMP report will be prepared following the completion of all noise monitoring. Appendix B contains an example sample report template. In general, the monitoring report will summarize results of monitoring activities.

5. References

BergerABAM. 2014. Biological Evaluation for the Tesoro Savage Vancouver Energy Distribution Terminal. Vancouver, WA.

Bowles, A.E. 1995. Responses of Wildlife to Noise in *Wildlife and Recreationists Coexistence through Management and Research*. Eds Knight, R.L. and Gutzwiller, K.J. 1995. Washington, DC.

California Department of Transportation (Caltrans). 2012. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Updated October 2012.

Delaney, D.K., L.L. Pater, L.D. Carlile, E.W. Spadgenske, T.A. Beatty, and R.H. Melton. 2011. Response of red-cockaded woodpeckers to military training operations. Wildlife Monographs 177:1–38.

Delaney, D.K. 2002. Prioritization of Threatened and Endangered Species Sound Research on Army Installations ERDC/CERL TR-02-30. U.S. Army Corps of Engineers Construction Engineering Research Laboratory. Champaign, IL.

Delaney, D.K., T.G. Grubb, P. Beier, L.L. Pater, and M.H. Reiser. 1999. “Effects of helicopter noise on Mexican Spotted Owls.” Journal of Wildlife Management 63:60-76.

Energy Facility Site Evaluation Council (EFSEC). 2014. EFSEC Review Comments on the ASC for the Tesoro Savage Vancouver Energy Distribution Terminal Project: Application No. 2013-0; Docket:EF-131590. Letter dated October 29, 2014. Olympia, WA.

Federal Transit Administration (FTA). 2006. Construction Noise Methodology.

Fyfe, R.W., and R.R. Olendorff. 1976. Minimizing the dangers of nesting studies to raptors and other sensitive species. Catalogue No. CW69-1/23. Canadian Wildlife Service, Information Canada, Ottawa, Canada.

Grubb, M.M. 1979. Effects of Increased Noise Levels on Nesting Herons and Egrets. Proceedings of the Colonial Waterbird Group, Vol. 2 (1979), pp. 49-54. Bedford, NH.

Grubb, T.G., L.L. Pater, A.E. Gatto, and D.K. Delaney. 2013. Response of nesting northern goshawk to logging truck noise in northern Arizona. Journal of Wildlife Management 77(8): 1618-1625.

Madsen, J. 1985. Impact of disturbance on field utilization of pink-footed geese in West Jutland, Denmark. Biological Conservation 33:53–64.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1993. Amphibians of Washington and Oregon. Seattle Audubon Society. Seattle, WA.

NMFS (National Marine Fisheries Service). 2013. ESA salmon listings. Available at: http://www.nwr.noaa.gov/publications/protected_species/salmon_steelhead/status_of_esa_salmon_listings_and_ch_designations_map.pdf, accessed June 26, 2013.

National Oceanic and Atmospheric Administration (NOAA). 2015. Interim Sound Threshold Guidance. http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/threshold_guidance.html. Last accessed 2 March 2015.

Pater, L.L., Grubb, T.G., and D.K. Delaney. 2009. Recommendations for Improved Assessment of Noise Impacts on Wildlife. The Journal of Wildlife Management 73(5): 788-795.

Thoms, C., C.C. Corkran, and D.H. Olson. 1997. Basic amphibian survey for inventory and monitoring in lentic habitats. pp.35-46. In D.H. Olson, W.P. Leonard, and R.B. Bury, eds. Sampling Amphibians in Lentic Habitats: Methods and Approaches for the Pacific Northwest. Northwest Fauna No.4. Society for Northwestern Vertebrate Biology. Olympia, WA.

USFWS (U.S. Fish and Wildlife Service). 2014. Endangered and Threatened Wildlife and Plants; Threatened Status for Oregon Spotted Frog; Final Rule. 50 CFR 17 Vol. 79 No. 168.

USFWS 2013a. Listed and proposed endangered and threatened species and critical habitat; candidate species; and species of concern in Clark County. Available at: http://www.fws.gov/wafwo/speciesmap/ClarkCounty121112.pdf, accessed June 26, 2013. U.S. Fish and Wildlife Service, Western Washington Fish and Wildlife Office, Clark County. Revised December 11, 2012.

USFWS. 2013b. Biological Opinion and Letter of Concurrence for Effects to Bald Eagles, Marbled Murrelets, Northern Spotted Owls, Bull Trout, and Designated Critical Habitat for Marbled Murrelets and Northern Spotted Owls from Olympic National Forest Program of Activities for

March 25, 2013, to December 31, 2023. U.S. Department of the Interior Fish and Wildlife Service, Lacey, WA.

USFWS. 2006. Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California.

USFWS. 1988. Effects of Aircraft noise and sonic booms on domestic animals and wildlife: a literature synthesis. ESL-TR-88-14. Fort Collins, CO.

Van der Zande, A.N., W.J. ter Keurs, and W.J. van der Weijden. 1980. The impact of roads on the densities of four bird species in an open field habitat—Evidence of a long distance effect. Biological Conservation 18:299–321.

Washington Department of Fish and Wildlife (WDFW). 2000. Final Report. Monitoring Incidental Harassment of Harbor Seals (Phoca vitulina richardsi) at Gertrude Island during the McNeil Island Corrections Center Still Harbor Dock Renovation Project. 1 December 1998 to 15 August 1999. Dyanna Lambourn and Steven Jeffries. Washington Department of Fish and Wildlife Marine Mammal Investigations. Tacoma, WA. January 10, 2000.

WDFW. 2005. Washington's comprehensive wildlife conservation strategy. Final draft. Submitted September 19, 2005. Olympia, WA. 618 pp. + appendices.

WDFW. 2008. Priority habitat and species list. Washington State Department of Fish and Wildlife, Olympia, WA. 177 pp.

WDFW. 2013. WDFW priority habitats and species (PHS) on the web online database. Available at: http://wdfw.wa.gov/mapping/phs/, accessed June 26, 2013.

Washington State Department of Transportation (WSDOT). 2013. Biological Assessment Preparation – Advanced Training Manual Version 02-2013. February 2013.

6. List of Acronyms and Abbreviations

ASC: Application for Site Certification

bbl: barrel and barrels

BGEPA: Bald and Golden Eagle Protection Act

CRWMB: Columbia River Wetland Mitigation Bank

CWMP: construction wildlife monitoring plan

dBA: decibels

EFSEC: Energy Facility Site Evaluation Council

ESA: Endangered Species Act

Facility: Vancouver Energy

MMMP: marine mammal monitoring plan

NMFS: National Marine Fisheries Service

PHS: Priority Habitat and Species

Port: Port of Vancouver USA

USFWS: U.S. Fish and Wildlife Service

WAC: Washington Administrative Code

WDFW: Washington State Department of Fish and Wildlife

WQPMP: water quality protection and monitoring plan

WSDOT: Washington State Department of Transportation

Vancouver Energy
Construction Wildlife Monitoring Plan

EFSEC Application for Site Certification No. 2013-01
Docket No. EF131590

Appendix A
Wildlife Species of Concern

Appendix A, Species of Concern

Table of Contents

Section

1. Introduction 3
1.1 Background 3
1.2 Location 3
1.3 Project Area of Potential Effect 3
2. Literature and Reference Material Review 3
3. Special Status Species 3
3.1 Special Status Plant Species 4
3.1.1 Oregon Bolandra (*Bolandra oregana*) 4
3.1.2 Dense Sedge (*Carex densa*) 4
3.1.3 Golden Paintbrush (*Castilleja levisecta*) 7
3.1.4 Tall Bugbane (*Cimicifuga elata*) 7
3.1.5 Few-Flowered Collinsia (*Collinsia sparsiflora* var. *bruceae*) 7
3.1.6 Clackamas Corydalis (*Corydalis aquae-gelidae*) 7
3.1.7 Oregon Coyote-Thistle (*Eryngium petiolatum*) 7
3.1.8 Western Wahoo (*Euonymus occidentalis*) 8
3.1.9 Western Sweetvetch (*Hedysarum occidentale*) 8
3.1.10 Water Howellia (*Howellia aquatilis*) 8
3.1.11 Nuttall's Quillwort (*Isoetes nuttallii*) 8
3.1.12 Smooth Goldfields (*Lasthenia glaberrima*) 8
3.1.13 Torrey's Peavine (*Lathyrus torreyi*) 8
3.1.14 Bradshaw's Lomatium (*Lomatium bradshawii*) 9
3.1.15 Branching Montia (*Montia diffusa*) 9
3.1.16 California Broomrape (*Orobanche californica* ssp. *grayana*) 9
3.1.17 Western Yellow Oxalis (*Oxalis suksdorfii*) 9
3.1.18 Western False Dragonhead (*Physostegia parviflora*) 9
3.1.19 Wheeler's Bluegrass (*Poa nervosa*) 10
3.1.20 Great Polemonium (*Polemonium carneum*) 10
3.1.21 Idaho Gooseberry (*Ribes oxyacanthoides* ssp. *irriguum*) 10
3.1.22 Soft-Leaved Willow (*Salix sessilifolia*) 10
3.1.23 Hairy-Stemmed Checkermallow (*Sidalcea hirtipes*) 10
3.1.24 Western Ladies Tresses (*Spiranthes porrifolia*) 11
3.1.25 Hall's Aster (*Symphyotrichum hallii*) 11
3.1.26 Small-Flowered Trillium (*Trillium parviflorum*) 11
3.1.27 California Compassplant (*Wyethia angustifolia*) 11
3.2 Special Status Wildlife Species 11
3.2.1 Birds 12
3.2.2 Mammals 24
3.2.3 Invertebrates 27

3.3 Amphibians 27
3.3.1 Oregon Spotted Frog (*Rana pretiosa*) 27
3.3.2 Western Toad (*Bufo boreas*) 28
3.3.3 Reptiles 29
3.4 Special Status Fish Species 31
3.4.1 Salmon and Trout 31
3.4.2 Sturgeon 38
3.4.3 Lamprey 39
3.4.4 Eulachon 40
4. References 41

1. Introduction

1.1 Background

Vancouver Energy (Facility) provides transloading services for pipeline quality crude oil from railcars to marine vessels. The Facility is located at 5501 NW Old Lower River Road, Vancouver, Washington; it is situated at the Port of Vancouver USA (Port) on the north bank of the Columbia River at approximately River Mile 103.5 (RM 103.5). The Facility receives an average of four unit trains per day and unloads an average of 360,000 barrels (bbl) of crude per day. Six nominal capacity 380,000 bbl tanks are used to store crude oil on site. A transfer pipeline system is used to convey crude oil from Area 200 to Area 300 for storage, and from Area 300 to Area 400 for vessel loading. The transfer pipeline system can also be operated to move oil from Area 200 directly to Area 400. The Facility will operate 24 hours a day, 7 days a week.

1.2 Location

The proposed Facility is located within the Port of Vancouver (Port). The site is located on the north (Washington) shore of the Columbia River. State Route (SR) 501 (Lower River Road) is located immediately to the north of the site. Interstate 5 (I-5) is located approximately 2.5 miles east. Rail access to the site is available from the east. The site is located in the SE 1/4 of Section 18, NW 1/4 of Section 19, and the NW and NE 1/4 of Section 20, Township 2 North, Range 1 East WM. Berths 13 and 14 are located at approximately Columbia RM 103.5.

1.3 Project Area of Potential Effect

This study included all of the areas that could be affected directly or indirectly by the construction, operation, decommissioning, or abandonment of the proposed project. The analysis was conducted at three scales: the project site, the project vicinity, and the project shipping corridor.

The project site encompasses approximately 47.4 acres at the Port. The project vicinity includes lands adjacent to the proposed project site as well as biologically important features within approximately 1 mile.

2. Literature and Reference Material Review

Information regarding the potential presence of special status plant species was obtained from the U.S. Fish and Wildlife Service (USFWS) web site (USFWS 2013), and from a review of the Washington Natural Heritage Program (WNHP) database (WNHP 2011). 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 National Marine Fisheries Service (NMFS) web site (NMFS 2013) on June 26, 2013. Additional information came from data from the Washington Department of Fish and Wildlife (WDFW) two on-line databases, Priority Habitat and Species (PHS) on the Web (WDFW 2013a) and Salmonscape (WDFW 2013), as well as from the 2008 PHS list (WDFW 2008).

3. Special Status Species

The following sections document those Special Status Species that are known, suspected, or that have the potential 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 either (1) listed, proposed for

listing, or identified as a candidate species or species of concern under the federal Endangered Species Act of 1973 (ESA), or (2) are plant species identified as endangered, threatened or sensitive by the Washington Natural Heritage Program (WNHP), or (3) are identified as PHS, species of concern (SOC), or species of greatest conservation need (SGCN) by WDFW.

3.1 Special Status Plant Species

This section evaluates the potential for special status plant species to occur within the project area. 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 2011). The potential for these species to occur at the project site was evaluated based on the presence or absence of appropriate habitat for each species. Table 1 lists the special status plant species known to occur within Clark County, and which could potentially occur within the project site or vicinity (WNHP 2012).

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. The WNHP also places a management priority on the preservation of high-quality native plant communities; however, no high-quality native plant communities exist on the property. 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 its population decline, or habitat degradation or loss, continue. Plants listed as federally threatened or endangered are protected under the ESA, which is regulated by the USFWS.

Summaries of the habitat requirements for each species and its likelihood of occurrence within the project site or vicinity are presented below.

3.1.1 Oregon Bolandra (*Bolandra oregana*)

This species occurs along the Columbia River drainage mostly at low elevations; it is usually found near streams and moist, rocky places in deep shade. Associated species include shooting star (*Dodecatheon dentatum*), western saxifrage (*Saxifraga occidentalis*), streambank spring beauty (*Montia parviflora*), and clasping arnica (*Arnica amplexicaulis*). This species grows in a variety of habitats. Although it usually is found in moist, shady, wooded areas on cliffs near waterfalls, it has also been found in open, rocky areas and on steep, grassy, semi-open slopes (WNHP 2013). Documented sightings in the region are limited to East Clark County, near the entrance to the Columbia River Gorge.

This species is not documented or expected to occur at the project site or within the vicinity.

3.1.2 Dense Sedge (*Carex densa*)

This is a peripheral species in Washington, known from only a few documented sightings. The primary habitat in Washington is eroding hummocks in intertidal marshland (WNHP 2013). The species has been reported from small cutbanks along rivers and shaded springs at high elevations (WNHP 2013). Associated species include coyote willow (*Salix exigua*), riverbank wormwood (*Artemisia lindleyana*), Columbia coreopsis (*Coreopsis atkinsoniana*), sneezeweed (*Helenium autumnale*), awned flatsedge (*Cyperus aristatus*), and conyza (*Conyza* sp.).

This species is not documented or expected to occur at the project site or within the vicinity.

Table 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[a]	State Listing Status[b]	Project Site	Project Vicinity
Oregon Bolandra (*Bolandra oregana*)	None	SC	Low – no suitable habitat on site	Low – riparian species requiring deep shade
Dense Sedge (*Carex densa*)	None	ST	Low – no suitable habitat on site	Low – peripheral species of intertidal marshlands
Golden Paintbrush (*Castilleja levisecta*)	FT	SE	Low – no suitable habitat on site	Low – rare species of open grasslands in Puget trough on glacial outwash
Tall Bugbane (*Cimicifuga elata*)	FSC	SS	Low – no suitable habitat on site	Low – understory species of lowland forests
Few-Flowered Collinsia (*Collinsia sparsiflora* var. *brucea*)	None	SS	Low – no suitable habitat on site	Low - thin soils over basalt on a variety of slopes in Columbia Gorge.
Clackamas Corydalis (*Corydalis aquae-gelidae*)	FSC	SS	Low – no suitable habitat on site	Low – mid-elevation riparian species of hemlock and fir forests
Oregon Coyote-Thistle (*Eryngium petiolatum*)	None	ST	Low – no suitable habitat on site	Moderate – rare species of wet prairies and low ground
Western Wahoo (*Euonymus occidentalis*)	None	ST	Low – no suitable habitat on site	Low – shaded forest understory species
Western Sweetvetch (*Hedysarum occidentale*)	None	ST	Low – no suitable habitat on site	Low – high elevation species
Water Howellia (*Howellia aquatilis*)	FT	ST	Low – no suitable habitat on site	Moderate – aquatic species of small vernal ponds
Nuttall's Quillwort (*Isoetes nuttallii*)	None	SS	Low – no suitable habitat on site	Low – terrestrial species of wet ground, seeps, and in mud near vernal pools
Smooth Goldfields (*Lasthenia glaberrima*)	None	SE	Low – no suitable habitat on site	Moderate – rare species of wet streambanks and vernal pools.
Torrey's Peavine (*Lathyrus torreyi*)	FSC	FT	Low – no suitable habitat on site	Low – open areas within Douglas fir-dominated sites
Bradshaw's Lomatium (*Lomatium bradshawii*)	FE	SE	Low – no suitable habitat on site	Moderate – wet, seasonally flooded prairies and grasslands near creeks and small rivers.
Branching Montia (*Montia diffusa*)	None	SS	Low – no suitable habitat on site	Low – moist Douglas fir forests
California Broomrape (*Orobanche californica* ssp. *grayana*)	None	X	Low – no suitable habitat on site	Low – thought to be extirpated from WA
Western Yellow Oxalis (*Oxalis suksdorfii*)	None	ST	Low – no suitable habitat on site	Low - meadows and moist woods, rare in Clark County
Western False Dragonhead (*Physostegia parviflora*)	None	SS	Low – no suitable habitat on site	Low – wet to mesic prairies, damp thickets, and banks of streams and ponds
Wheeler's Bluegrass (*Poa nervosa*)	None	SS	Low – no suitable habitat on site	Low - rock outcrops, cliff crevices, and occasionally in talus
Great Polemonium (*Polemonium carneum*)	None	ST	Low – no suitable habitat on site	Low - woody thickets, open and moist forests, prairie edges, roadsides, fence lines

Species	Federal	State	Potential for Occurrence	
	ESA Listing Status[a]	State Listing Status[b]	Project Site	Project Vicinity
Idaho Gooseberry (*Ribes oxyacanthoides* ssp. *irriguum*)	None	ST	Low – no suitable habitat on site	Low – streams and canyons in eastern WA
Soft-leaved willow (*Salix sessilifolia*)	None	SS	Low – no suitable habitat on site	Moderate – variety of lowland riparian habitats
Hairy-Stemmed Checkermallow (*Sidalcea hirtipes*)	None	ST	Low – no suitable habitat on site	Moderate – prairie fragments along fencerows and openings along drainages
Western Ladies Tresses (*Spiranthes porrifolia*)	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 (*Symphyotrichum hallii*)	None	ST	Low – no suitable habitat on site	Moderate – dry to moist prairies in valleys and plains
Small-Flowered Trillium (*Trillium parviflorum*)	None	SS	Low – no suitable habitat on site	Moderate – moist forested habitats dominated by hardwoods
California Compassplant (*Wyethia angustifolia*)	None	SS	Low – no suitable habitat on site	Moderate – grasslands, meadows, and other open habitats

Source: (WNHP 2012)

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

[b] Washington State Status: SE = state endangered; ST = State threatened; SS = State Sensitive; X = possibly extinct or extirpated

3.1.3 Golden Paintbrush (*Castilleja levisecta*)

This species occurs in open grasslands in the Puget Trough. The preferred substrate is generally composed of glacial outwash or depositional material. The species prefers sun and can tolerate partial shade, but will not tolerate a closed canopy. The most common associate is, depending on the site, variously Idaho fescue (*Festuca idahoensis*) or red fescue (*Festuca rubra*). Many weedy species also occur as associated species, as most of these areas have suffered from past disturbances (WNHP 2013). There are no recent documented occurrences of golden paintbrush in Clark County.

The project site and vicinity do not provide suitable habitat for golden paintbrush, and this species is not documented or expected to occur at the project site or within the vicinity.

3.1.4 Tall Bugbane (*Cimicifuga elata*)

This species is a tall understory plant of lowland forests. In Washington, it occurs in the Western Cascades, Puget Trough, Olympic Peninsula, and Southwest Washington physiographic provinces (WNHP 2013). The species grows in or along the margins of mixed, mature or old growth stands of mesic coniferous forest, or mixed coniferous-deciduous forest. Associated species include Douglas fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), vine maple (*Acer circinatum*), oceanspray (*Holodiscus discolor*), hazelnut (*Corylus cornuta*), sword fern (*Polystichum munitum*), and snowberry (*Symphoricarpos albus*).

The project site and vicinity do not provide suitable habitat for this species, and it is not documented or expected to occur at the project site or within the vicinity.

3.1.5 Few-Flowered Collinsia (*Collinsia sparsiflora* var. *bruceae*)

In Washington, this species occurs in thin soils over basalt on a variety of slopes, from almost flat to rather steep, generally south-facing, at elevations ranging from 200 to 1000 feet. The microsites are generally quite open, but may be adjacent to or found within open stands of ponderosa pine (*Pinus ponderosa*) and Oregon white oak (*Quercus garryana*) (WNHP 2013).

This type of habitat does not occur at the project site or within the project vicinity.

3.1.6 Clackamas Corydalis (*Corydalis aquae-gelidae*)

This species is a regional endemic species to Clackamas and Multnomah counties in Oregon, and Clark and Skamania counties in Washington. The species occurs primarily in western hemlock (*Tsuga heterophylla*) and Pacific silver fir (*Abies amabilis*) forest habitats at elevations ranging from 2,500 to 3,800 feet. It is found growing in or near cold flowing water, including seeps and small streams, often occurring within the stream channel itself (WNHP 2013).

These habitats do not occur at the project site or within the project vicinity.

3.1.7 Oregon Coyote-Thistle (*Eryngium petiolatum*)

This species occurs from the Willamette Valley of Oregon to the eastern end of the Columbia Gorge in Washington and Oregon. In Washington, the taxon is restricted to a very small area within western Klickitat and Clark counties. It occurs in wet prairies and low ground, especially in places submerged in the spring and drier in the summer (WNHP 2013).

There is no potentially suitable habitat at the project site. The greater Vancouver Lake Lowlands, particularly the seasonally inundated habitats south of Vancouver Lake and within the CRWMB may provide potentially suitable habitat for Oregon coyote-thistle. However, this species is rare in Washington, and has not been documented in the vicinity.

3.1.8 Western Wahoo (*Euonymus occidentalis*)

This species grows in woods on the west side of the Cascade Mountains. It is often found in shaded, moist draws and ravines. In the Puget Trough area it associated with remnant oak savannah. This species prefers moist, wooded/forested areas but is sometimes found in grassy areas with some trees (WNHP 2013). These habitats do not occur at the project site or within the project vicinity.

3.1.9 Western Sweetvetch (*Hedysarum occidentale*)

This species is found in meadows, shrubfields, bare rock outcrops, boulder-fields, and talus-slopes at elevations between approximately 3150 and 6500 feet in Washington. These habitats are not present at the project site or within the project vicinity.

3.1.10 Water Howellia (*Howellia aquatilis*)

This species is a regional endemic species that occurs in low elevation minerotrophic wetland habitats, particularly small vernal ponds. The species apparently requires exposure to air to germinate and inundation for growth in the spring. This restricts the species to the zone within wetlands that is seasonally inundated, but which dries out in late summer or early fall (WNHP 2013). Documented occurrences in Clark County are located downstream of the project area, in the vicinity of the Ridgefield National Wildlife Refuge.

There is no potentially suitable habitat at the project site. The seasonally inundated habitats south of Vancouver Lake and within the CRWMB may provide potentially suitable habitat for water howellia. However, this species has not been documented in the vicinity of the project.

3.1.11 Nuttall's Quillwort (*Isoetes nuttallii*)

This species is currently known from Cowlitz, San Juan, and Thurston counties in Washington, but its range may extend into Clark County. It is an inconspicuous plant found from low to middle elevations in wet ground or seepages and in mud near vernal pools. It is known from only a few recent sites. However, it can be rather inconspicuous and may be somewhat more widespread than the data currently suggest (WNHP 2013).

There is no potentially suitable habitat at the project site. The seasonally inundated habitats south of Vancouver Lake and within the CRWMB may provide potentially suitable habitat for Nuttall's quillwort. However, this species has not been documented in the vicinity of the project.

3.1.12 Smooth Goldfields (*Lasthenia glaberrima*)

This species is typically found on wet stream banks and in vernal pools. It is a rare species in Washington, known only from one historical occurrence from Clark County and one recent occurrence from Klickitat County. Very little information is known about this species (WNHP 2013). All moist areas, vernal pools, and wetlands in Clark and Klickitat Counties are considered potentially suitable habitat.

There is no potentially suitable habitat at the project site. Wetlands throughout the Vancouver Lake Lowlands represent potentially suitable habitat for smooth goldfields, particularly the seasonally inundated habitats south of Vancouver Lake and within the CRWMB. However, this species has not been documented in the vicinity of the project.

3.1.13 Torrey's Peavine (*Lathyrus torreyi*)

This species is rare in Clark County, known only form one historic occurrence in the County (WNHP 2013). It was thought to have been extirpated from Washington as recently as 1994.The only known

extant occurrences in WA are within somewhat open areas within Douglas fir dominated sites. These habitats are not present at the project site or within the project vicinity.

3.1.14 Bradshaw's Lomatium (*Lomatium bradshawii*)

This species is endemic to the southern portion of western Washington in the Puget Trough physiographic province and to the central and southern portions of the Willamette Valley physiographic province in western Oregon. The species occurs in remnant fragments of the once widespread low elevation grasslands and prairies. The habitat type is described as wet, seasonally flooded prairies and grasslands common around creeks and small rivers. Associated species include tufted hairgrass (*Deschampsia cespitosa*), slender rush (*Juncus tenuis*), sawbeak sedge (*Carex stipata*), and one-sided sedge (*Carex unilateralis*).

There is no potentially suitable habitat at the project site. Wetlands throughout the Vancouver Lake Lowlands represent potentially suitable habitat for smooth goldfields, particularly the seasonally inundated habitats south of Vancouver Lake and within the CRWMB. However, this species has not been documented in the vicinity of the project.

3.1.15 Branching Montia (*Montia diffusa*)

This species occurs in moist forests in the lowland and lower montane zones. It is occasionally located in xeric soil or disturbed sites. Associate species include Douglas fir (*Pseudotsuga menziesii*), ocean-spray (*Holodiscus discolor*) and miner's lettuce (Montia perfoliata) (WNHP 2013). These habitats are not present at the project site or within the project vicinity.

3.1.16 California Broomrape (*Orobanche californica* ssp. *grayana*)

This species is a parasitic plant that is native to coastal moist meadows/stream bank, primarily in California in the San Francisco Bay area, northern Sierra Nevada, and the Modoc Plateau. It is thought to be extirpated from Washington. Suitable habitat does not occur at the project site or within the project vicinity, and this species is unlikely to be present.

3.1.17 Western Yellow Oxalis (*Oxalis suksdorfii*)

This species ranges from the western slopes of the Cascades to the Pacific Coast from southwestern Washington to northwestern California. It is usually found growing in meadows and moist woods and sometimes on dry open slopes (WNHP 2013). There has been only one documented historic occurrence in Clark County.

There is no potentially suitable habitat at the project site. Moist meadow habitat in the adjacent Vancouver Lake Lowlands may provide potentially suitable habitat for western yellow oxalis, but its presence within the project vicinity is unlikely.

3.1.18 Western False Dragonhead (*Physostegia parviflora*)

The WNHP has little information on this species. Its habitat consists of wet to mesic prairies, damp thickets, and banks of streams and ponds. There is no published information about its distribution in Washington, but it appears to be known only from historic records in Washington. It is described in Flora of the Pacific Northwest (Hitchcock and Cronquist 1973), as occurring primarily east of the Cascades. There is no habitat for this species at the project site, and it is unlikely that this species occurs within the project vicinity.

3.1.19 Wheeler's Bluegrass (*Poa nervosa*)

This species is a regional endemic species. In Washington, it has been documented in Clark and Cowlitz counties in the Puget Trough physiographic province. Its habitat consists of rock outcrops, cliff crevices, and occasionally in talus near the base of cliffs or outcrops. It occurs on sparsely and well vegetated outcrops, although it is more abundant in sparsely vegetated site (WNHP 2013). These habitats do not occur at the project site or within the project vicinity, and this species is unlikely to be present.

3.1.20 Great Polemonium (*Polemonium carneum*)

This species occurs on the western side of the Cascade Mountains in northwestern Washington, south to San Francisco Bay, California. It grows in the lowlands of mountain ranges and in prairies, to moderate elevations in the mountains. It has been documented in Lewis, Clallam, Grays Harbor, Clark, Skamania, and Pacific counties in Washington, though it is known only from historic occurrences in Clark County (WNHP 2013). It is commonly found in woody thickets, open and moist forests, prairie edges, roadsides, and has been extensively documented along fence lines (WNHP 2013).

There is no potentially suitable habitat at the project site. Moist meadow habitats, roadsides, and fences in agricultural lands in the adjacent Vancouver Lake Lowlands may provide potentially suitable habitat for great polemonium, but its presence within the project vicinity is unlikely.

3.1.21 Idaho Gooseberry (*Ribes oxyacanthoides* ssp. *irriguum*)

This species occurs in north-central Idaho, western Montana, Oregon, and Washington. In Washington, the taxon is currently known from Asotin, Spokane, and Ferry counties in the Columbia Basin and Okanogan Highlands physiographic provinces. There are historical records of the species from Whitman, Stevens, and Clark counties. The historic Clark County record is considered suspect, given the significant disjunction from all other known locations of the taxon (WNHP 2013). Habitat for this species does not occur at the project site or within the project vicinity, and it is unlikely to be present.

3.1.22 Soft-Leaved Willow (*Salix sessilifolia*)

This species is distributed from British Columbia to Washington, Oregon and northern California. In Washington it has been found in Cowlitz, Klickitat, Wahkiakum, Skagit, and Whatcom counties. It has been found in a number of lowland habitats: a riparian forest, in dredge spoils, and on a silty bank at the upper edge of an intertidal zone. Associated species at one or more sites include: Sitka willow (*Salix sitchensis*), heartleaf willow (*Salix rigida*), black cottonwood (*Populus trichocarpa*), red alder (*Alnus rubra*), big-leaf maple (*Acer macrophyllum*) and red-osier dogwood (*Cornus stolonifera*) (WNHP 2013). It is known from less than 10 occurrences, and has not been documented in Clark County, but Clark County is thought to be within its potential range.

Riparian habitat at the project site and throughout the Vancouver Lake Lowlands may provide potentially suitable habitat for Soft-leaved willow, though its presence is unlikely. Soft-leaved willow has not been documented in Clark County, and riparian habitat within the project vicinity is limited in quantity and quality. The riparian forest habitat on Parcel 3 likely provides the highest quality potential habitat for soft-leaved willow in the vicinity.

3.1.23 Hairy-Stemmed Checkermallow (*Sidalcea hirtipes*)

This species is a regional endemic to Clark, Lewis, and Wahkiakum Counties in Washington, and Clatsop, Lincoln, and Tillamook counties in Oregon. Its habitat includes remnant prairie fragments along fencerows and openings along drainages. Some occurrences are in fairly mesic habitats associated with creeks and streams. Associated species include, large-leaved lupine (*Lupinus polyphyllus*), woolly vetch (*Vicia villosa*), bracken fern (*Pteridium aqualinum*), large-leaved avens (*Geum macrophyllum*), trailing

blackberry (*Rubus armeniacus*), and oxeye daisy (*Chrysanthemum leucanthemum*) (WNHP 2013). There are currently only five known occurrences in Washington, and documented occurrences in Clark County are primarily in the eastern portion of the County (WNHP 2013).

3.1.24 Western Ladies Tresses (*Spiranthes porrifolia*)

This species occurs sporadically from Southern Washington to Southern California. In Washington, it has been documented in Chelan, Kittitas, Klickitat, Lincoln, Okanogan, and Skamania counties. It has not been documented in Clark County, but it is considered to be within its range. Its habitat includes wet meadows, areas adjacent to streams, bogs, and seepage slopes. A variety of associated species have been documented depending upon location (WNHP 2013).

Wet meadow habitat throughout the adjacent Vancouver Lake Lowlands may provide potentially suitable habitat for western ladies-tresses, but its presence within the project vicinity is unlikely due to the fact that it has not been documented within the County. However, western ladies-tresses have been identified previously by the Port at Parcel 3.

3.1.25 Hall's Aster (*Symphyotrichum hallii*)

This species is rarely documented in Washington. It is known from two documented occurrences in Washington. Little is known about this species. Its habitat consists of mostly dry, open places in valleys and plains, but it has also been documented in a wet remnant prairie in a floodplain.

There is no potentially suitable habitat at the project site. Given the potential habitat variability of this species, the remnant meadows and seasonally flooded habitats south of Vancouver Lake may provide potentially suitable habitat for this species.

3.1.26 Small-Flowered Trillium (*Trillium parviflorum*)

The species is a regional endemic, occurring from Pierce and Thurston counties southward into Lewis and Clark counties, Washington and into the Willamette Valley, Oregon. It is an uncommon species of very local distribution with few, widely scattered populations (WNHP 2013). It occurs in association with moist areas dominated by hardwoods, most commonly Oregon ash, but sometimes red alder or even Garry oak.

There is no potentially suitable habitat at the project site. Hardwood-dominated forest habitat within the adjacent Vancouver Lake Lowlands, including forested riparian habitat on Parcel 3, and forested habitats at the Parcel 2 and Parcel 1A wetland mitigation sites may provide potentially suitable habitat for small-flowered trillium.

3.1.27 California Compassplant (*Wyethia angustifolia*)

The WNHP has little information on this species. It is a relatively widely distributed plant in Oregon and California, but it is rarely observed in Washington. Its habitat includes grasslands, meadows, and other open habitats.

There is no potentially suitable habitat at the project site. Most of the open meadow habitat within the adjacent Vancouver Lake Lowlands is likely too wet to provide suitable habitat for California compassplant; however, where dry open habitats occur, these may provide potentially suitable habitat. Given the relative rarity of this species in Washington, its presence is considered unlikely.

3.2 Special Status Wildlife Species

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 26, 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 2013), as well as from the 2008 Priority Habitats and Species List (WDFW 2008). WDFW PHS Management Recommendations (available at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations) have been reviewed and incorporated into this document as applicable. In general, the management recommendations focus on protecting nesting area and other important wildlife habitats. Recommended protection buffers are included where appropriate and are placed around the nest or habitat and not the activity. Proposed project activities occur outside all recommended protection buffers for the species addressed in this application.

No special status wildlife species have been documented at the project site according to PHS data. The developed and industrial nature of the project site provides only low to moderate habitat suitability for special status wildlife species. Several special status wildlife species have the potential to occur within the vicinity of the proposed project. Table 2 lists the special status wildlife species that are known or expected to occur in or near in the project vicinity and specifies their likelihood of occurring within the project area.

3.2.1 Birds

3.2.1.1 Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is listed as a state sensitive species, a priority species, and an SGCN by WDFW (WDFW 2008). The species was removed from the federal endangered species list in 2007(72 FR 37346). However, it remains under the protection of the federal Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act.

Bald eagles are closely associated with lakes and large rivers in open areas, forests, and mountains. Breeding bald eagles need large trees near open water with a relatively low level of human activity. In Washington, nearly all bald eagle nests (99%) are within 1 mile of a lake, river, or marine shoreline (Stinson et al. 2007). Perches from which nesting bald eagles forage are distributed throughout their nest territories along shorelines and prominent viewpoints. Nesting bald eagles are opportunistic foragers but feed most consistently on fish and waterfowl which are usually associated with large, open expanses of water (Stalmaster 1987).

The riparian habitat at the project site may provide low quality foraging habitat for bald eagles, as there are no suitable perching trees nearby, and very little functional habitat in which prey items could be encountered. Bald eagles are relatively common within the greater project vicinity, and bald eagles use habitat throughout the greater Vancouver Lake Lowlands extensively. The WDFW PHS database identifies the area in the vicinity of Vancouver Lake as winter roosting habitat, and identifies two documented breeding occurrences (nests) in the riparian forest on Parcel 3 (WDFW 2013a). The nearest eagle nest site documented in the PHS database is approximately 1 mile west of the westernmost portion of the project site. At the scale of the shipping prism, bald eagles are common throughout the Lower Columbia River and adjacent marine waters.

Table 2. Special Status Wildlife Species and Their Potential to Occur within the Project Site or Vicinity

Species	ESU/ DPS[a]	Federal		State			Potential for Occurrence		
		ESA Listing Status[b]	Critical Habitat	State Listing Status[c]	PHS Listing Criterion[d]	SGCN (Y/N)[e]	Project Site	Project Vicinity	Shipping Prism
Birds									
Bald Eagle (*Haliaeetus leucocephalus*)	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 (*Branta canadensis leucopareia*)	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 (*Gavia immer*)	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 (*Ardea herodias*)	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 (*Melanerpes lewis*)	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.
Olive-Sided Flycatcher (*Contopus cooperi*)	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 (*Dryocopus pileatus*)	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.

Species	ESU/ DPS[a]	Federal		State			Potential for Occurrence		
		ESA Listing Status[b]	Critical Habitat	State Listing Status[c]	PHS Listing Criterion[d]	SGCN (Y/N)[e]	Project Site	Project Vicinity	Shipping Prism
Peregrine Falcon (*Falco peregrinus*)	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 (*Progne subis*)	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 (*Grus canadensis*)	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 (*Sitta carolinensis aculeata*)	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.
Streaked Horned Lark (*Eremophila alpestris strigata*)	N/A	FT	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 including Port of Vancouver Parcel 3 location.	Documented presence on dredge material placement sites and barren lands throughout Lower Columbia River.
Marbled Murrelet (*Brachyramphus marmoratus*)	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 (*Phoebastria albatrus*)	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 (*Charadrius nivosus nivosus*)	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

Species	ESU/ DPS[a]	Federal		State			Potential for Occurrence		
		ESA Listing Status[b]	Critical Habitat	State Listing Status[c]	PHS Listing Criterion[d]	SGCN (Y/N)[e]	Project Site	Project Vicinity	Shipping Prism
Vaux's Swift (*Chaetura vauxi*)	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 (*Eumatopius jubatus*)	Eastern DPS	None (delisted 11/4/13)	Designated	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.
Whales (Several species)	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	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 (*Odocoileus virginianus leucurus*)	N/A	FE	Not Designated	SE	1	Y	Low – No habitat	Low – No habitat	Moderate – Islands in the Lower Columbia River represent suitable habitat.
Gray-Tailed Vole (*Microtus canicaudus*)	N/A	None	N/A	SC	1, 2	Y	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 (*Corynorhinus townsendii townsendii*)	N/A	FSC	N/A	SC	1, 2	Y	Low – No suitable habitat on-site.	Moderate – potentially suitable foraging habitat throughout Vancouver Lake Lowlands, but limiting roosting habitat.	Low – Not in Columbia River mainstem or marine waters.
Myotis Bats (*Myotis evotis* and *Myotis volans*)	N/A	FSC	N/A	None	N/A	N	Low – No suitable habitat on-site	Moderate – potentially suitable foraging habitat throughout Vancouver Lake Lowlands, but limiting roosting habitat.	Low – Not in Columbia River mainstem or marine waters.

Species	ESU/ DPS[a]	Federal		State			Potential for Occurrence		
		ESA Listing Status[b]	Critical Habitat	State Listing Status[c]	PHS Listing Criterion[d]	SGCN (Y/N)[e]	Project Site	Project Vicinity	Shipping Prism
Invertebrates									
California Floater (*Anodonta californiensis*)	N/A	FSC	N/A	SC	1, 2	Y	Low – No suitable habitat on-site.	Moderate – One or more documented occurrences and potentially suitable habitat in Vancouver Lake.	
Amphibians									
Oregon Spotted Frog (*Rana pretiosa*)	N/A	FT	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 (*Bufo boreas*)	N/A	FSC	N/A	SC	1	Y	Low – No suitable habitat on-site.	Moderate – Potentially suitable habitat throughout Vancouver Lake Lowlands, but no recently documented occurrences.	Low – Not in Columbia River mainstem or marine waters.
Reptiles									
Pacific Pond Turtle (*Actinemys marmorata*)	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.

[a] ESU = evolutionarily significant unit; DPS = distinct population segment

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

[c] Washington State SOC Classifications: SE = state endangered; ST = state threatened; SS = state sensitive; SC = state candidate.

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

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

3.2.1.2 Aleutian Canada Goose (*Branta canadensis* ssp. *leucopareia*)

The Aleutian Canada goose was removed from the federal endangered species list in 2001 (66 FR 15643) and from the Washington list in 2005. It is currently listed as a federal SOC (USFWS 2013), but is not considered a special status species in Washington (WDFW 2008).

Although Washington is potentially part of the species' historical wintering range, today the area is considered to be migration habitat (Hays 1997). The Willapa National Wildlife Refuge (NWR) and surrounding fields and farms in Willapa Bay provide the principal stopover habitat in Washington. Occasionally, individuals and small flocks stop briefly in other parts of the state, including the area in the vicinity of the Ridgefield National Wildlife Refuge (Kraege 2005), and as such, they presumably may utilize aquatic and agricultural habitats throughout the Vancouver Lake Lowlands.

The project site does not provide suitable habitat for Aleutian Canada goose. Aquatic and seasonally inundated habitats throughout the Vancouver Lake Lowlands likely do provide suitable habitat for wintering geese, and agricultural lands on Parcel 3 also likely provide suitable winter foraging habitat. At the scale of the shipping prism, Aleutian Canada geese are more common in the Lower Columbia River watershed, and may also occasionally be present in adjacent marine waters.

3.2.1.3 Cavity-Nesting Ducks (several species)

Breeding concentrations of several species of cavity nesting ducks are considered a priority species by WDFW (WDFW 2008). Cavity-nesting duck species considered in the listing include wood duck (*Aix sponsa*), Barrow's goldeneye (*Bucephala islandica*), common goldeneye (*Bucephala clangula*), bufflehead (*Bucephala albeola*), and hooded merganser (*Lophodytes cucullatus*). Of these species, only Barrow's goldeneye and wood ducks are expected or documented as occurring within the project vicinity.

In Washington, cavity-nesting ducks nest primarily in late successional forests and riparian areas adjacent to low gradient rivers, sloughs, lakes, and beaver ponds (Larsen et al. 2004). They are secondary cavity nesters, using cavities created by large woodpeckers, or by decay, or by damage to the tree. Shallow wetlands within approximately 0.5 mile of cavities provide optimal brood habitat (Larsen et al. 2004).

The project site does not provide any suitable habitat for cavity nesting ducks. Wetlands and forested habitats throughout the greater Vancouver Lake Lowlands provides excellent habitat for these ducks, and both wood ducks and Barrow's goldeneye may be present within the vicinity year-round. Breeding concentrations of wood ducks have been documented in forested habitat adjacent to Vancouver Lake and Buckmire Slough.

3.2.1.4 Common Loon (*Gavia immer*)

Common loon is listed as a state sensitive species and an SGCN by WDFW (WDFW 2008). In its PHS listing, WDFW considers breeding sites, migratory stopover points, and documented areas of regular concentration as priority areas (WDFW 2008).

Common loons breed in North America from the coasts of the Aleutian Islands and Bering Sea, east throughout Canada and south to the northern tier of the lower 48 states. In western North America, common loons winter along the Pacific coast from southern Alaska to Baja California. Migrant loons arrive from the north to winter along Washington's coast, the Columbia and Snake rivers, and on lakes in northeastern Washington (Larsen et. al 2004).

Common loons breed on large lakes in forested areas, typically those greater than approximately 30 acres in size. They typically nest on or near shorelines. Nesting also may occur within approximately 5 feet of shore on masses of emergent vegetation (Larsen et. al 2004). Their primary diet is fish, and they require a healthy fish population on which to feed.

The riparian habitat at the project site does not provide any suitable habitat for common loon. The project vicinity does not likely provide any nesting habitat for common loon, but does provide suitable wintering/migratory habitat. WDFW PHS data indicate that common loon have been observed in the vicinity of Vancouver Lake, but no breeding loons or regular concentrations have been observed. At the scale of the shipping prism, common loon may occasionally be present in the watershed, but their presence is uncommon.

3.2.1.5 Great Blue Heron (*Ardea herodias*)

Great blue heron is listed as a state priority species and an SGCN by WDFW (WDFW 2008). In its PHS listing, WDFW considers documented breeding areas to be priority areas (WDFW 2008).

Foraging, breeding, and pre-nesting habitats for the great blue heron usually are close to each other. Foraging habitat often is adjacent to or within a few kilometers of the nesting colony (Azerrad 2012). Prior to establishing nesting colonies, inland great blue herons gather at pre-nesting sites in habitats that include larger lakes, wetlands, and other watercourses. Nesting colonies, also frequently referred to as rookeries, are then established, typically in mature forested stands near foraging habitat. During the breeding season, herons feed in the shallow margins of various coastal and freshwater habitats, including wetland complexes, large rivers and creeks, and small lakes (Azerrad 2012).

There is no suitable habitat for great blue heron pre-nesting, nesting, or foraging at the project site. Within the greater Vancouver Lake Lowlands, great blue heron are quite common. Several rookeries have been documented in the vicinity of Vancouver Lake and Buckmire Slough, as well as further north on the Shillapoo and Ridgefield NWRs. Great blue herons forage extensively in the wetlands and agricultural lands within the project vicinity, including the wetland mitigation sites, the CRWMB, the wetlands and agricultural fields on Parcel 3, and the emergent wetlands on Terminal 5 West. At the scale of the shipping prism, great blue heron are very common throughout the Lower Columbia River and estuarine waters, but they are not likely present in the portion of the river where shipping traffic will occur.

3.2.1.6 Lewis' Woodpecker (*Melanerpes lewis*)

Lewis' woodpecker is listed as a Washington state candidate species, a priority species, and an SGCN by WDFW (WDFW 2008). In its PHS listing, WDFW considers breeding areas as priority areas (WDFW 2008).

This species recently declined in the Western states (Larsen et al. 2004). In Washington, Lewis' woodpecker is only locally abundant as a breeding bird, and its range has contracted within the last half of the 20th century to include only habitats east of the Cascade crest. The Lewis' woodpecker prefers a forested habitat with an open canopy and a shrubby understory, with snags available for nest sites and hawking perches (Bock 1970). The critical features of Lewis' woodpecker habitat are thought to be forest openness, understory composition, and availability of insect fauna (Bock 1970).

The project site does not provide any forested habitat suitable for nesting for Lewis' woodpecker, nor does it provide any natural habitat suitable for feeding or foraging. Snags and forested habitat in the vicinity of Vancouver Lake may provide potentially suitable nesting habitat for Lewis' woodpecker, and foraging habitat is also likely suitable throughout the lowlands, but this species is rare in Southwest Washington and has not been documented in the vicinity. Lewis' woodpeckers are not expected to be present either at the project site, vicinity, or shipping prism scales.

3.2.1.7 Olive-sided Flycatcher (*Contopus cooperi*)

The olive-sided flycatcher is a federal SOC (USFWS 2013). It is not currently listed or otherwise designated as an SOC by Washington.

The olive-sided flycatcher breeds widely across boreal forests of Canada and the northern United States, extending south along riparian, montane, and subalpine forests of the Rockies, the Sierra Nevada, and in

isolated areas in southern California and northern Baja (Altman and Sallabanks 2000). The olive-sided flycatcher occurs in virtually all forested areas of Washington (Smith et al. 1997).

The olive-sided flycatcher inhabits primarily mature forest, old-growth forest, and wet conifer forest, especially those forests with an abundance of snags (Ehrlich et al. 1988; Sharp 1992). This species may also use mixed woodlands near edges and clearings. Nests are often located high in conifer trees, usually on a horizontal branch far from the trunk. Primary forage consists of insects.

Neither the project site nor the project vicinity provide any forested habitat that is suitable for olive-sided flycatcher nesting. This species is not expected to be present at the project site, vicinity, or shipping prism scales.

3.2.1.8 Pileated Woodpecker (*Dryocopus pileatus*)

The pileated woodpecker is a Washington state candidate species. It is also listed as a state priority species and an SGCN by WDFW (WDFW 2008).

The pileated woodpecker occurs from northern British Columbia south through the Pacific states to central California, in the northern Rockies through Idaho and western Montana, across southern Canada to Nova Scotia, and south to the Gulf Coast and Florida. The pileated woodpecker is found throughout the forested areas of Washington, primarily at low to moderate elevations (Smith et al. 1997).

Pileated woodpecker habitat typically consists of mature and old-growth forests and second-growth forests with substantial numbers of large snags and fallen trees. The species excavates large nest holes in snags or living trees with dead wood, generally excavating through hard outer wood into rotten heartwood. Tree cavities are also used for roosting. Pileated woodpeckers forage mainly by excavating wood and chipping bark from large-diameter dead and down logs, stumps, snags, and live trees. They feed primarily on ants, beetle larvae, and other insects (Bull and Holthausen 1993).

Neither the project site nor the immediate project vicinity provides any forested habitat that is suitable for pileated woodpecker nesting or roosting. Pileated woodpeckers may potentially forage in forested habitats within the project vicinity, particularly in riparian cottonwood forests adjacent to the Columbia River or associated with Vancouver Lake. Pileated woodpeckers are not likely to be present within the shipping prism.

3.2.1.9 Peregrine Falcon (*Falco peregrinus*)

Peregrine falcon is a federal SOC and a state sensitive species. It is also considered a priority species and an SGCN by WDFW (WDFW 2008). Peregrine falcon was downgraded from a state endangered species to a state sensitive species in 2002.

Peregrine falcons occur nearly worldwide. In Washington, nesting may occur in all but the driest parts of the state. Breeding occurrences primarily occur along the outer coast, in the San Juan Islands, and in the Columbia Gorge (Hays and Milner 2004a). Nesting usually occurs on cliffs, typically 150 feet or more in height. The species will also nest on offshore islands and ledges on vegetated slopes, and has also been documented nesting on man-made structures in urban areas. Eggs are laid and young are reared in small caves or on ledges. Nest sites are generally near the water. Peregrines feed on smaller birds that are usually captured on-the-wing (Hays and Milner 2004a). In winter and fall, peregrines spend much of their time foraging in areas with large shorebird or waterfowl concentrations, especially in coastal areas (Dekkar 1995).

The project site does not provide any suitable nesting habitat for peregrine falcon, but does provide open areas that may provide suitable foraging habitat. Within the project vicinity, nesting habitat for peregrine falcon is also extremely limited. There are no large cliffs or ledges, apart from man-made structures, that will provide suitable nesting platforms. A peregrine falcon nest was documented on the I-5 Bridge in 2009, and peregrine falcons have nested on the Fremont Bridge in Portland, so the project vicinity has been

documented as potentially suitable for nesting and foraging. Peregrine falcons are not likely to be present within the shipping prism.

3.2.1.10 Purple Martin (*Progne subis*)

The purple martin is a state candidate species. It is also listed as a state priority species and an SGCN by the WDFW (WDFW 2008).

Purple martins are insectivorous, colonial nesting swallows that nest in cavities (Brown 1997), typically in or near freshwater wetlands or ponds, or saltwater (Hays and Milner 2004b). In Washington, purple martins typically breed near the waters around the Puget Sound, along the Strait of Juan de Fuca, the southern Pacific coastline, and near the Columbia River (Hays and Milner 2004b). They feed in flight on insects (Brown 1997), with preferred foraging habitat consisting of open areas, often located near moist to wet sites, where flying insects are abundant (Hays and Milner 2004b).

The project site does not provide any suitable nesting or foraging habitat for purple martin. The greater project vicinity does likely provide suitable habitat for it. Forested wetland habitats associated with Vancouver Lake and other waterbodies within the Vancouver Lake Lowlands may provide suitable nesting habitat, and these areas, as well as adjacent aquatic habitats, likely provide suitable foraging opportunities. WDFW PHS data indicate that purple martin nests have been documented near Vancouver Lake, and regular concentrations of purple martins have also been documented (WDFW 2013a). Purple martins may also occur within the Lower Columbia and estuarine waters in the shipping prism.

3.2.1.11 Sandhill Crane (*Grus canadensis*)

The sandhill crane is a Washington state listed endangered species. WDFW has also designated the sandhill crane as a priority species and as an SGCN (WDFW 2008). Three subspecies of sandhill crane occur within the Pacific Northwest: the greater sandhill crane, the Canadian sandhill crane, and the lesser sandhill crane. Of these, only the greater sandhill crane is known to breed in the state, and only within Yakima and Klickitat counties. Canadian sandhill cranes breed primarily in coastal British Columbia and winter in Washington or stop in route to wintering areas in California (Littlefield and Ivey 2002). The lesser sandhill cranes belong to the Pacific Flyway Population that stops off during migration to northern breeding grounds in Alaska or wintering areas in California (Littlefield and Ivey 2002).

The fall migration of sandhill cranes through the Vancouver Lake Lowlands typically occurs in late September and early to mid-October (Engler et. al. 2003). Spring migration through the lowlands generally occurs from mid-March to mid-April. Sandhill cranes use the Vancouver Lowlands as stopover habitat during migration and for foraging by over-wintering birds. The Vancouver Lake Lowlands area is the sole example of a sandhill crane staging area in the U.S. that is adjacent to a major metropolitan area (Littlefield and Ivey 2002).

Sandhill cranes use large and small tracts of open habitat where visibility is good from all vantage points. Wet meadows, marshes, shallow ponds, hayfields, and grainfields are all favored for nesting, feeding, and roosting (Bettinger and Milner 2004). Sandhill cranes migrating and staging within the Lower Columbia region typically use shallow lakes with abundant mudflats and bars for roosting and loafing areas. The diet of sandhill cranes varies seasonally and includes grains (corn, barley, oats, rice, and wheat), roots, insects, amphibians, reptiles, earthworms, snails, and small rodents (Littlefield and Ivey 2002). In the spring, cranes eat high protein foods such as insects and other macroinvertebrates. Fall and winter foods typically include wheat, corn, barley, and rice.

The project site does not provide any habitat that could be used by sandhill cranes for resting, foraging, or any other wintering activities. The greater Vancouver Lake Lowlands do provide excellent winter foraging habitat for sandhill cranes, and sandhill cranes are frequently observed there. Agricultural habitats, including Port Parcel 3, provide excellent winter foraging habitat for sandhill cranes. Cranes are known to rest and feed on Parcel 3 which approximately 1 mile from the project site. Cranes more commonly use

Parcels 4 and 5 further from the project site. Sandhill cranes also utilize habitats adjacent to Vancouver Lake, including the wetland and upland complexes south of the lake and within the CRWMB. Sandhill cranes are not expected to use habitats within the Columbia River extensively, nor are they expected to be present in marine waters. For these reasons, they are not expected to be present within the shipping prism.

3.2.1.12 Shorebird Concentrations (several species)

WDFW designates regular concentrations of several species of shorebirds as priority species. In western Washington, breeding concentrations of cormorants (*Phalacrocoracidae*), storm-petrels (*Hydrobatidae*), terns (*Laridae*), and alcids (*Alcidae*) as well as non-breeding concentrations of loons (*Gaviidae*), grebes (*Podicipedidae*), cormorants, fulmar (*Procellariidae*), shearwaters (*Procellariidae*), storm-petrels, and alcids, are provided priority species status. Regular shorebird concentrations are not provided any other state or federal special status.

There is no suitable terrestrial habitat at the project site for any shorebird species, but these species likely occasionally fly over the site. The riparian and aquatic habitats at the site do provide potential foraging and resting opportunities for shorebirds. At the project vicinity scale, WDFW PHS data identify much of the area adjacent to Vancouver Lake as providing documented habitat for regular concentrations of shorebirds. Shorebirds of several species likely use seasonally ponded and emergent wetland habitats throughout the Vancouver Lake Lowlands and Lower Columbia River for feeding, foraging, and resting habitat. Regular concentrations of one or more shorebird species may potentially be present in the project site, vicinity, and shipping prism at any time during the year.

3.2.1.13 Slender-Billed White-Breasted Nuthatch (*Sitta carolinensis aculeata*)

The slender-billed white-breasted nuthatch is a federal species of concern (USFWS 2013) and a state candidate species. It is also considered a priority species and an SGCN by WDFW (WDFW 2008).

The slender-billed white-breasted nuthatch is a cavity user and year-round resident in western Washington (Anderson 1970, Anderson 1972). In Washington and Oregon, this species is associated with Oregon white oak west of the Cascade Range and conifer forest, primarily Ponderosa pine, east of the Cascades (Chappell 2005, Hagar 2006). Large decadent oak trees with a sparse understory are of primary habitat importance for both foraging and nesting (Anderson 1976).

There is no Oregon white oak habitat present on the project site, and Oregon white oak habitat within the vicinity is limited as well. There are sporadic white oak trees throughout the Vancouver Lake lowlands, including along the south end of Vancouver Lake, on the CRWMB, and on Parcel 3. Slender-billed white-breasted nuthatches have been documented near Vancouver Lake, and they may potentially occur within the project vicinity. Slender-billed nuthatches are not expected to use habitats within the Columbia River or adjacent marine waters, and they are unlikely to occur within the shipping prism.

3.2.1.14 Streaked Horned Lark (*Eremophila alpestris strigata*)

The streaked horned lark has been proposed for listing under the federal ESA (77 FR 61937). Critical habitat has also been proposed for the species. It is a state endangered species and a WDFW priority species and SGCN (WDFW 2008).

Along the Willamette and Columbia rivers, nesting habitat for the streaked horned lark historically was found on sandy beaches and spits. Today, the streaked horned lark nests in a broad range of habitats, including native prairies, coastal dunes, fallow and active agricultural fields, wetland mudflats, sparsely vegetated edges of grass fields, recently planted Christmas tree farms with extensive bare ground, moderately to heavily grazed pastures, gravel roads or gravel shoulders of lightly traveled roads, airports, and dredge deposition sites, particularly islands in the Lower Columbia River (77 FR 61937). Wintering streaked horned larks use habitats that are very similar to breeding habitats. On the Columbia River,

these habitats are typically adjacent to and in view of open water, which provides the open landscape context this species needs.

Streaked horned larks need expansive areas of flat, open ground to establish breeding territories. Horned larks forage on the ground in low vegetation or on bare ground (77 FR 61937); adults feed mainly on grass and weed seeds but feed insects to their young. Introduced weedy grasses and forb seeds comprise the winter diet. Horned larks form pairs in spring and create shallow nests in shallow depressions on the ground. The nesting season begins in mid-April and ends in the early part of August and streaked horned larks may re-nest in late June or early July. Most streaked horned larks winter in the Willamette Valley (72 percent) and on islands in the Lower Columbia River (20 percent), with the rest wintering on the Washington coast. Birds that breed on the islands of the Lower Columbia River tend to remain on the islands (77 FR 61937).

The project site does not provide any potentially suitable habitat for nesting or wintering streaked horned larks. The terrestrial portions of the site are largely devoid of vegetation, and there is no suitable nesting habitat present nor is there any vegetation that will provide foraging habitat. In the greater project vicinity, dredge material placement sites and other sparsely vegetated lands on and adjacent to the river provide potentially suitable habitat for streaked horned larks. The species has been documented on dredge material placement sites and a dredge material placement site on Port Parcel 3 provides potentially suitable habitat for streaked horned larks, although this site is likely disturbed too routinely to provide sufficient vegetative cover for suitable nesting or wintering habitat. The Port currently maintains this area as unsuitable for lark (USFWS 2015). Streaked horned larks do not use the aquatic habitats within the shipping prism, and are unlikely to occur there.

3.2.1.15 Marbled Murrelet (*Brachyramphus marmoratus*)

The marbled murrelet is a federal threatened species (USFWS 2013). It is also a state threatened species and a WDFW priority species and SGCN (WDFW 2008).

The marbled murrelet is a small sea bird that feeds primarily on fish and invertebrates in nearshore marine waters (City of Seattle 2007). Marbled murrelets nest in mature stands of coastal forest, typically closely associated with the marine environment, although murrelets have been documented in forested stands at distances of up to 50 miles inland in Washington (Hamer and Cummins 1991). Marbled murrelets require forests with large trees (greater than 30 inches dbh), multi-storied stands, and moderate canopy closure. Murrelets tend to nest in the largest trees in the stand (City of Seattle 2007). Marbled murrelets forage in nearshore marine habitats, generally in waters less than 260 feet deep, on a variety of small fish and invertebrates (FR 61 26256).

There is no habitat for marbled murrelet at the project site or within the vicinity. Marbled murrelets may potentially forage within marine habitats within the shipping prism.

3.2.1.16 Short-tailed Albatross (*Phoebastria albatrus*)

The short-tailed albatross is a federally listed endangered species (USFWS 2013). It is also a state candidate species and a WDFW priority species and an SGCN (WDFW 2008).

Short-tailed albatross are oceanic birds that occur throughout most of the North Pacific Ocean and are often found close to the Pacific Coast (USFWS 2006). The short-tailed albatross generally breeds in the South Pacific, where it nests on the ground on small oceanic islands (NatureServe 2013). There are no breeding populations of short-tailed albatross in the United States, but attempted nesting has been regularly observed on Midway Atoll in the northwestern Hawaiian Islands (USFWS 2006). Short-tailed albatross forage at sea – typically at the water surface – on squid, fish, shrimp and other crustaceans, and the eggs of flying fish (USFWS 2006). Short-tailed albatross are also known to follow ships and forage on scraps and other refuse (NatureServe 2013).

There is no habitat for short-tailed albatross at the project site or within the vicinity. Short-tailed albatross may potentially forage within marine habitats within the shipping prism.

3.2.1.17 Western Snowy Plover (*Charadrius nivosus nivosus*)

Western snowy plover is a federally listed threatened species (USFWS 2013). Critical habitat has also been designated for western snowy plover. It is also a state endangered species and a WDFW priority species and an SGCN (WDFW 2008).

The Pacific Coast population of western snowy plovers occurs from southern Washington to southern Baja California (Page et al. 1995). This species nests beside or near tidal waters on barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat, levees and flats at salt-evaporation ponds, and river bars (USFWS 2007). Plovers lay their eggs in shallow depressions in sandy or salty areas with sparse vegetation between early March and late September (USFWS 2007). Western snowy plovers forage primarily on invertebrates in the wet sand and among surf-cast kelp within the intertidal zone; in dry, sandy areas above high tide; on salt pans; on spoil sites; and along the edges of salt marshes, salt ponds, and lagoons (USFWS 2007).

There is no habitat for western snowy plover at the project site or within the vicinity. Western snowy plover may potentially be present adjacent to marine habitats within the shipping prism.

3.2.1.18 Vaux's Swift (*Chaetura vauxi*)

Vaux's swifts are a Washington state candidate species and a WDFW priority species and an SGCN (WDFW 2008).

This species nests in late-successional coniferous forests (Manuwal and Huff 1987; Bull and Collins 1993). It requires large, hollow snags or cavities in the broken tops of live trees for nesting and night roosting (WDNR 1996) and feeds on flying insects, foraging primarily over the forest canopy or open water (Bull and Collins, 1993). In fall, Vaux's swifts congregate in large flocks, and hundreds of swifts may use a single large hollow tree for night roosting.

There is no late successional forest habitat present at the project site, nor within the Vancouver Lake Lowlands, that will provide suitable nesting habitat for Vaux's swifts. There are few large snags of the size or type that will typically be used by Vaux's swifts for nesting. Forested habitats within the Vancouver Lake Lowlands may provide potentially suitable foraging habitats for Vaux's swifts, but this species has not been documented within the project vicinity. Vaux's swifts do not use the aquatic habitats within the shipping prism, and are unlikely to occur there.

3.2.1.19 Waterfowl Concentrations (*several species*)

WDFW provides priority species designation to regular concentrations of several species of waterfowl. In western Washington, non-breeding concentrations of Barrow's goldeneye (*Bucephala islandica*), common goldeneye (*Bucephala clangula*), and bufflehead (*Bucephala albeola*) are provided priority species status. Regular waterfowl concentrations are not provided any other state or federal special status.

There is no suitable terrestrial habitat at the project site for any waterfowl species, but these species likely occasionally fly over the site during migration. The riparian and aquatic habitats at the site do provide potential foraging and resting opportunities for waterfowl. At the project vicinity scale, WDFW PHS data identify much of the area adjacent to Vancouver Lake as providing documented habitat for regular concentrations of wintering waterfowl. Waterfowl of several species make extensive use of seasonally ponded and emergent wetland habitats throughout the Vancouver Lake Lowlands – as well as throughout the Lower Columbia River within the shipping prism – for feeding, foraging, and resting habitat during migration as well as for wintering habitat. Non-breeding concentrations of waterfowl may potentially be present at any time during the year, and particularly during the winter months.

3.2.2 Mammals

3.2.2.1 Steller Sea Lion (*Eumatopius jubatus*)

The Steller sea lion is a Washington state-listed threatened species and a WDFW priority species and an SGCN (WDFW 2008). The eastern population was removed from the federal Endangered Species list on November 4, 2013 (78 FR 66139).

The range of the Steller sea lion includes the north rim of the Pacific Ocean from California to northern Japan. This sea lion is primarily a coastal and open-ocean species (Oregon Department of Fish and Wildlife [ODFW] 1998), although it does occur in the Rogue River in Oregon and in the estuary of the Columbia River.

Steller sea lions have been sighted as far upriver as Bonneville Dam, but these sightings are relatively rare. USACE has observed small numbers of Steller sea lions present as far upstream in the Columbia River as Bonneville Dam following salmonid runs from January through May (Stansell et al. 2009). In Oregon and Washington, Steller sea lions feed offshore along the coast and in the ocean, although some Steller sea lions make seasonal journeys (usually January through May) into the Lower Columbia River to feed, primarily on sturgeon (personal communication with Brian Wright and Robin Brown, ODFW, March 6, 2010; personal communication with Steve West, WDFW, April 22, 2010).

The project site does not provide significant habitat for Steller sea lion. The species, if present in the project vicinity, is most likely present during the months of January to May, during one of these seasonal feeding journeys. While Steller sea lions do use the Columbia River as a foraging/migration corridor, no Steller sea lion rookeries or documented haulouts occur within the vicinity, so if present, the species will be expected to be moving through, either upstream or downstream. Steller sea lion may potentially be present within one or more portions of the shipping prism during all months of the year.

3.2.2.2 Whales (several species)

Seven species of whales are known to occur off the coasts of Oregon and Washington. These include blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalaena japonica*), sei whale (*Balaenoptera borealis*), southern resident DPS killer whale (*Orcinus orca*), and sperm whale (*Physeter macrocephalus*). All are federally listed endangered species (NMFS 2013b) and are also state-listed endangered species (WDFW 2008).

Whales tend to feed during the summer in the northern latitudes and migrate to the tropical southern latitudes in the winter for breeding. Some whales do not migrate as far north as the rest of the population; therefore, whales can be encountered throughout the year off the coasts of Oregon, Washington, and California.

While the specific migratory patterns and habitat requirements for each whale species differ, it is possible that any of them may potentially be present within the shipping corridor of the proposed project during some time of the year. There is no habitat for these species at the project site, or in the project vicinity, or within the freshwater portion of the shipping channel. ESA-listed whale species could potentially be present within the marine portion of the shipping corridor for the proposed project.

3.2.2.3 Non-ESA-Listed Marine Mammals (several species)

In addition to ESA-listed species described above, the project vicinity and the project's shipping prism represent potentially suitable habitat for several species of non-ESA-listed marine mammals that are also provided special regulatory status. California sea lions (*Zalophus californianus*) and harbor seals (*Phoca vitulina*) forage throughout the Lower Columbia River system.

California sea lions are found from southern Mexico to southeast Alaska. The United States stock is defined geographically for management purposes and is described as comprising animals that breed in

U.S. waters. California sea lions travel up the Columbia River as far as Bonneville Dam following salmonid runs, typically between January and May (Stansell et al. 2009).

Pacific harbor seals inhabit coastal and estuarine waters and shoreline areas from Baja California to western Alaska. They are present throughout the year at the mouth of the Columbia River, although they do exhibit seasonal movements and their numbers within the Columbia River upstream of the South Jetty increase from January to April and then decrease from May through August as they move to adjacent bays (e.g., Netarts Bay, Tillamook Bay, Willapa Bay, and Grays Harbor) during the pupping season (FERC 2008).

There are no seal or sea lion haulouts at the project site or within the vicinity, although California sea lion and harbor seals may occasionally migrate through the project vicinity. Within the shipping prism, there are numerous haulouts in the Columbia River estuary and adjacent marine waters, and the species are likely present within portions of the shipping prism at all times of the year.

3.2.2.4 Columbian White-Tailed Deer (*Odocoileus virginianus leucurus*)

The Columbian white-tailed deer is a state and federal endangered species (WDFW 2008; USFWS 2013). It is also a WDFW priority species and an SGCN (WDFW 2008). It is the westernmost subspecies of the white-tailed deer. Currently, there are two Columbian white-tailed deer DPSs; one is located in Douglas County, Oregon, and the other is located along the Lower Columbia River in Oregon and Washington (FR 68 43647).

Most deer within the Columbia River population are included in one of four subpopulations (Washington mainland, Tenasillahe Island, Puget Island, and the Oregon lowlands). Each subpopulation is geographically separated by major channels of the Columbia River (Brookshier 2004). Both the Washington mainland and Tenasillahe Island subpopulations occur within the Julia Butler Hansen NWR, which was established in 1972 as the Columbian White-tailed Deer National Wildlife Refuge, to protect over 5,600 acres of shoreline and island habitat for the preservation of the Columbian white-tailed deer (Brookshier 2004). In early 2013, the USFWS implemented a program to translocate up to 50 Columbian white-tailed deer from the Julia Butler Hansen NWR to the Ridgefield NWR in Clark County. As of June 2013, approximately 37 Columbian white-tailed deer had been successfully translocated.

Columbian white-tailed deer are unlikely to be present within the project site or vicinity. The shipping prism passes through the Lower Columbia River. Since Columbian white-tailed deer are present on islands in the river and are capable of swimming, they could be present occasionally within the shipping prism. They are unlikely to be present with any frequency, however.

3.2.2.5 Gray-tailed Vole (*Microtus canicaudus*)

Gray-tailed vole is a state candidate species and a WDFW priority species and an SGCN (WDFW 2008).

The gray-tailed vole is a regionally endemic species, known to occur in lower elevations of the Willamette Valley in Oregon and at least two localities north of the Columbia River in Clark County, Washington. It is associated almost exclusively with agricultural lands, especially with grasses grown for seed, small grains, and permanent pastures of legumes and grasses. It can also be present along grass-dominated highway and railroad rights-of-way. Nests are built either underground or aboveground under boards, bales, or other debris, and intricate runway and burrow systems are also constructed underground (Verts and Carraway 1987).

The project site and vicinity are at the northern end of the range of this species; only a few occurrences are documented in Clark County and it has not been documented within the project site or vicinity. The project site does not provide any suitable habitat for gray-tailed vole, as the terrestrial portions of the site are all paved, graveled, or otherwise developed. The agricultural habitats and grass-dominated fields adjacent to and in the vicinity of the project site do provide potentially suitable habitat for gray-tailed vole,

and gray-tailed voles could potentially be present in these habitats. The shipping prism does not provide habitat for gray-tailed vole

3.2.2.6 Pacific Townsend's Big-Eared Bat (*Corynorhinus townsendii townsendii*)

Townsend's big-eared bats are a federal species of concern (USFWS 2013). They are a state candidate species and a WDFW priority species and an SGCN (WDFW 2008).

Townsend's big-eared bats have been documented in nearly every county in Washington (Woodruff and Ferguson 2005). Within its range, distribution is often linked to the presence of suitable maternity roosts and hibernacula located near suitable foraging habitat (Gruver and Keinath 2006). Townsend's big eared bats occupy a broad range of moist and arid habitats. In Washington, they occur in westside lowland conifer-hardwood forest, montane conifer forest, ponderosa pine forest and woodland, shrub-steppe, riparian habitats, and open fields (Johnson and Cassidy 1997). Caves, lava tubes, mines, old buildings, concrete bunkers, and bridges are commonly used as day roosts in Washington (Woodruff and Ferguson 2005). Temperatures, roost dimensions, sizes of roost openings, light quality, and extent of airflow are important factors in the selection of roosts (Hayes and Wiles 2013). Hibernacula occur mainly in caves, mines, lava tubes, and occasionally in buildings (Hayes and Wiles 2013).

There are no natural or man-made structures present on the project site that could provide suitable roosting or hibernacula habitat for Townsend's big-eared bats, and this species is not expected to be present at the project site. Within the greater project vicinity, roosting and hibernacula habitat is also somewhat limited. There are no natural caves, mines, or lava tubes in the vicinity, and most buildings and structures are in regular use. Bridges in the vicinity could potentially provide roosting habitat, but Townsend's big-eared bats have not been documented in the vicinity. At the project vicinity scale, there may be suitable foraging habitat for Townsend's big-eared bat, but there are likely limited opportunities for roosting or hibernacula. The shipping prism does not provide habitat for Townsend's big-eared bat.

3.2.2.7 Myotis Bats (*Myotis evotis and Myotis volans*)

Two species of bats (Western long-eared myotis [Myotis evotis] and long-legged myotis [Myotis volans]) that are known to occur within Clark County are designated as federal SOC (USFWS 2013). These species are not provided any special regulatory status by the state; however, WDFW does identify roosting concentrations of myotis bats as priority species (WDFW 2008). While these species have unique habitat requirements, their similarities allow them to be addressed together in this section.

Western long-eared myotis are most commonly associated with conifer forests ranging from drier ponderosa pine to humid coastal and montane forests (Hayes and Wiles 2013). Day roosts are located beneath loose bark on trees, snags, stumps, and downed logs, as well as in buildings, crevices in ground-level rocks and cliffs, tree cavities, caves, and mines (Hayes and Wiles 2013). Large-diameter conifer snags are typically used as maternity roosts.

Long-legged myotis primarily occur in coniferous forests, but also inhabit riparian forests and dry rangeland. They roost in snags and live trees with loose bark, long vertical cracks, or hollows; cracks and crevices in rocks, stream banks, and the ground; buildings; bridges; caves; and mines. In the Pacific Northwest, maternity sites have been mainly found in snags, but live trees, rock crevices, mines, and buildings are also used (Hayes and Wiles 2013).

There are no natural or man-made structures present on the project site that could provide suitable roosting habitat for any species of myotis bats. As both species are primarily associated with coniferous forest habitat, they are unlikely to be present at the site. Within the greater project vicinity, roosting and foraging habitat is also somewhat limited, as there are few large- diameter conifer snags or forests with mature habitat characteristics in the vicinity. Riparian forest habitat on Parcel 3 could potentially provide suitable roosting and foraging habitat for one or more species of myotis bats. The wetlands and aquatic habitats associated with Vancouver Lake likely provide suitable foraging habitat, and adjacent forest

habitats could potentially provide roosting or maternity sites. The shipping prism does not provide habitat for myotis bats.

3.2.3 Invertebrates

3.2.3.1 California Floater (*Anodonta californiensis*)

California floater is a federal SOC (USFWS 2013). It is also a Washington state candidate species and a WDFW priority species and an SGCN (WDFW 2008).

In Washington, the California floater is known to occur in the Columbia River system and in a few other lakes and rivers in eastern Washington. Historic eastern Washington locations included the Snake, Wenatchee (may be extirpated), and Okanogan rivers, and Hangman Creek (formerly Latah Creek) near Spokane (Larsen et al. 1995). In western Washington, the California floater has been reported from Seattle (a doubtful record), and the Columbia River counties of Wahkiakum, Cowlitz, Clark, Skamania, and Klickitat. There are no recent western Washington records of live California floaters (Frest and Johannes 1993).

The California floater lives, feeds, respires, and reproduces in clean freshwater. These clams feed by filtering planktonic organisms (Frest 1992) which also require clean, well oxygenated water (Larsen et al. 1995). Deriving oxygen, nutrients, and a means of reproduction from the water in which it lives, the California floater readily accumulates pollutants.

The larval stage of this clam is parasitic, adhering to a host fish while metamorphosing into a juvenile clam. When metamorphosis is complete, juvenile clams must fall from the host fish where they can attach to gravel or rocks in clean flowing, well-aerated waters. After growing for some time, young clams are washed downstream and settle in sandy or soft, muddy bottoms in the slower waters of lakes and large rivers where they mature (Larsen et al. 1995). The California floater is most commonly reported from rivers or river lakes in relatively stable, oxygenated mud, sand, or fine gravel beds, often located in pools just downstream from rapids. Another favorite habitat for this species is in fine-sediment bars fringing the mouths of large tributaries to rivers (Frest 1992). Submerged alluvium surrounding the mouths of tributary streams or below riffle areas may support juvenile clams and seem to be especially important (Larsen et al. 1995).

The aquatic habitat at the project site likely does not provide suitable habitat for California floater, as neither a stable or well oxygenated substrate suitable for adult clams nor the gravel substrates required by maturing juvenile clams are provided nearby. Within the greater project vicinity and shipping prism habitat is similarly limited for California floater. The mainstem Columbia River provides limited suitable substrate for juveniles or adults. Vancouver Lake provides potentially suitable habitat, and California floater has been documented, at least historically, in the lake. However, substrate conditions, oxygenation, and limited hydraulic exchange with the mainstem Columbia River in Vancouver Lake are likely limiting factors.

3.3 Amphibians

3.3.1 Oregon Spotted Frog (*Rana pretiosa*)

Oregon spotted frog is a federal candidate for listing under the ESA (USFWS 2013). It is also a state endangered species and a WDFW priority species and an SGCN (WDFW 2008).

The Oregon spotted frog is endemic to the Pacific Northwest. Historically, its range extended from northeast California, through the Puget Trough/Willamette Valley regions of Oregon and Washington, to the lower Fraser River Valley in British Columbia (Nordstrom and Milner 1997a).

In Washington, this frog once occurred throughout the Puget Trough lowlands from the Canadian border as far as Vancouver (Washington), and east into the southern Washington Cascades. Currently, there are only three locations in Washington where these frogs are known to still exist: Dempsey Creek in Thurston County and Trout and Conboy lakes in Klickitat County. Other lowland western Washington populations are believed to have been extirpated (Nordstrom and Milner 1997a).

Oregon spotted frogs are highly aquatic, inhabiting marshes and marshy edges of ponds, streams, and lakes. Spotted frogs usually occur in shallow, slow moving waters with abundant emergent vegetation and a thick layer of dead and decaying vegetation on the bottom. Oregon spotted frogs are active in lowland habitats from February through October, and hibernate in muddy bottoms near their breeding sites in winter. Courtship and breeding occurs between February and March at lower elevations in western Washington and takes place in warm, shallow margins of ponds or rivers or in temporary pools formed by rain or snowmelt. Adult spotted frogs are opportunistic feeders, feeding primarily on invertebrates, generally within one-half meter of shore on dry days (Nordstrom and Milner 1997a).

The project site does not contain any suitable habitat for Oregon spotted frog. There is no marsh habitat within the site that will provide suitable conditions for Oregon spotted frog presence. Within the greater Vancouver Lake Lowlands, emergent wetland and seasonally ponded sites – particularly those associated with the southern end of Vancouver Lake and the CRWMB – do provide potentially suitable habitat for Oregon spotted frog. These habitats are seasonally ponded wetland complexes, with abundant access to adjacent upland foraging habitats.

While there have been no recent documented occurrences in Clark County, the project vicinity does provide potentially suitable habitat for Oregon spotted frog.

3.3.2 Western Toad (*Bufo boreas*)

The western toad is a federal SOC (USFWS 2013), a state candidate species, and a WDFW priority species and an SGCN (WDFW 2008).

The western toad occurs from southeast Alaska eastward through British Columbia, western Alberta, and western Montana, south to Baja California and east to northern Colorado. It is found throughout western Washington and in the mountainous portions of eastern Washington (Dvornich et al. 1997). Western toads occur in forested and brushy areas from sea level to high mountains (ODFW 1996). Moist areas with dense cover are considered optimal (ODFW 1996). During dry weather, toads will spend the day under damp, woody debris or in burrows of other animals; they will also bury themselves in loose soil (Leonard et al. 1996). Western toads breed in springs, ponds, shallow areas in lakes, and slow-moving streams, and also use stock ponds and reservoirs in arid areas (ODFW 1996). Tadpoles form huge aggregations, generally in the warmest portion of a particular water body; western toad tadpoles are found in a wider variety of water bodies than the tadpoles of Pacific Northwest frogs (Blaustein et al. 1995). They can be locally abundant, and can live in a relatively wide variety of habitat types (Blaustein et al. 1995).

There is no forested or brushy aquatic habitat present at the site that will provide potentially suitable habitat for western toad. Within the greater project vicinity, forested and scrub-shrub wetland habitats within the Vancouver Lake Lowlands provide potentially suitable habitat for western toad, although these are likely not preferred habitats, as there is not significant forested wetland habitat in the vicinity. The slow-moving backwater habitats at the south end of Vancouver Lake may provide potentially suitable habitat for western toad breeding. This species has not been documented in the vicinity of the project. Western toads could potentially be present in habitats adjacent to the Columbia River downstream on the Columbia River.

3.3.3 Reptiles

3.3.3.1 Pacific Pond Turtle (*Actinemys marmorata*)

The Pacific pond turtle is a federal SOC under the ESA (USFWS 2013). It is also a state endangered species and a WDFW priority species and an SGCN (WDFW 2008).

The range of the western pond turtle follows the Pacific coast of North America, from the Puget Sound region in Washington to northwestern Baja California. Most populations are found west of the Cascades (Nordstrom and Milner 1997b). Populations in Washington are confirmed only in Klickitat and Skamania counties. Individual turtle sightings were recently confirmed in Pierce and King counties, which are part of the turtle's historic range. Historic records also exist for Clark and Thurston counties (McAllister 1995).

Pacific pond turtles have been found in marshes, ponds, sloughs, and small lakes in Washington from sea level to approximately 2,500 feet. The species has also been found in altered habitats such as gravel pits, reservoirs, stock ponds, and sewage treatment plants. They use both permanent and intermittent bodies of water, and have been found using a variety of substrates, including rock, gravel, sand, mud, decaying vegetation and various combinations of these (Nordstrom and Milner 1997b).

Pacific pond turtles also use open, upland habitats, primarily for nesting, but also for dispersal and overwintering. Female turtles leave the water to nest sometime between late May and July. Females usually dig nests and deposit their eggs in compact, dry soil on upland sites. Terrestrial overwintering sites usually have a thick layer of duff into which the turtle will burrow, and have been found up to 1,640 feet away from watercourses. In aquatic habitats, these turtles will winter under banks or in mud. Movement to overwintering sites occurs between September and November, and emergence from these locations occurs between March and June (Nordstrom and Milner 1997b).

The project site does not provide any suitable aquatic or terrestrial habitat for Pacific pond turtle. Aquatic (and adjacent terrestrial) habitats throughout the Vancouver Lake Lowlands do provide potentially suitable habitat for Pacific pond turtle. The mosaic of wetlands at the south end of Vancouver Lake, with its connectivity to a variety of hydrologic regimes and vegetation communities, provides particularly well-suited habitat. However, Pacific pond turtle have not been documented in the vicinity. Pacific pond turtles could potentially be present in habitats adjacent to the Columbia River downstream on the Columbia River within the shipping prism, but they are not known to be strongly associated with the mainstem Columbia River.

3.3.3.2 Sea Turtles (various species)

Three species of sea turtles have been documented off the coasts of Oregon and Washington. These are the green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*). All three species are federally and state-listed endangered species (NMFS 2013c; WDFW 2008) as well as WDFW priority species and SGCNs.

Green Sea Turtle

The green sea turtle is a federal endangered species (NMFS 2013c). Critical habitat was designated in 1998 for green sea turtles in coastal waters around Culebra Island, Puerto Rico (63 FR 46693).

Green sea turtles are the largest of all the hard-shelled sea turtles (NMFS and USFWS 1998c). Adult green sea turtles are unique among sea turtles in that they eat only plants; they are herbivorous, feeding primarily on seagrasses and algae. This diet is thought to give them greenish-colored fat, from which they take their name. Eastern Pacific populations of the sea turtle primarily occur south of San Diego, but rarely extend northward to southern Alaska. Green sea turtles are rarely recorded in Washington with four individuals stranded on outer coast beaches from 2002 to 2012; the most recent of these occurring in November 2010 (WDFW 2013).

There is no habitat for green sea turtles at the project site or within the vicinity. Green sea turtles may potentially be present within marine waters within the shipping prism, but these species are relatively rare on the West Coast.

Leatherback Sea Turtle

The leatherback sea turtle is a federal endangered species (NMFS 2013c). Critical habitat was designated in 1979 for leatherback sea turtles which includes coastal waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands. NMFS designated additional critical habitat for leatherback sea turtles along the west coast of the U.S. in January 2012 (77 FR 4170).

The leatherback sea turtle is the largest turtle, and one of the largest living reptiles, in the world. The leatherback is the only sea turtle that doesn't have a hard bony shell. Instead, its carapace is about 1.5 inches thick and consists of leathery, oil-saturated connective tissue overlaying loosely interlocking dermal bones (NMFS and USFWS 1998b). Leatherback sea turtles are the most migratory and wide ranging of sea turtle species. Leatherbacks are commonly known as pelagic animals, but they also forage in coastal waters (NMFS and USFWS 1998b). Leatherback turtle nesting grounds are located around the world. The largest remaining nesting assemblages are found on the coasts of northern South America and West Africa. Within the U.S., there are minor nesting colonies in the Caribbean and in Southeast Florida. Leatherbacks migrate seasonally to and along the U.S. West Coast to forage on jellyfish and regularly occur off the coasts of Washington (especially off the Columbia River mouth), Oregon, and California during the summer and fall when large aggregations of jellyfish form (WDFW 2013).

There is no habitat for leatherback sea turtles at the project site or within the vicinity. Leatherback sea turtles are frequently present seasonally within marine waters within the shipping prism off the coast of Washington. Leatherback sea turtles would most likely only be encountered during the summer and fall months when water temperatures are more conducive to foraging for jellyfish.

Loggerhead Sea Turtle

The North Pacific Ocean DPS loggerhead sea turtle is a federal endangered species (NMFS 2013c). Critical habitat has not been designated or proposed for loggerhead sea turtles.

The loggerhead sea turtle is named for its relatively large head, which support powerful jaws and enable them to feed on hard-shelled prey, such as whelks and conch (NMFS and USFWS 1998a). Loggerhead sea turtles occupy three different ecosystems during their lives: 1) beaches (terrestrial habitats), pelagic waters (open ocean), and 3) nearshore coastal areas. Loggerheads can be found throughout tropical to temperate waters in the Pacific; however, their breeding grounds include a restricted number of sites in the North Pacific and South Pacific. Within the North Pacific, loggerhead nesting has been documented only in Japan, although some nesting may also occur outside of Japan in areas surrounding the South China Sea (76 FR 58868). In the eastern Pacific, loggerhead sea turtles have been reported as far north as Alaska, and as far south as Chile. In the U.S., occasional sightings are reported from the coasts of Washington and Oregon, but most records are of juveniles off the coast of California. The west coast of Mexico, including the Baja Peninsula, provides critically important developmental habitats for juvenile loggerhead sea turtles (WDFW 2013).

There is no habitat for loggerhead sea turtles at the project site or within the vicinity. Loggerhead sea turtles may occasionally be present in marine waters within the shipping prism off the coast Washington.

All three species potentially affected by the project are highly migratory. Eastern Pacific populations of sea turtles generally spend the winter months in breeding grounds off southern Mexico and Central America, and although sea turtles have been reported during the summer months as far north as Alaska, occurrences are more common in southern California and northern Mexico (NMFS and USFWS 1998a, 1998b, 1998c). NMFS (Ford 2011) identifies the following major threats to all sea turtles: 1) destruction and alteration of nesting and foraging habitats; 2) incidental capture in commercial and recreational

fisheries; 3) entanglement in marine debris; 4) vessel strikes; 5) disease, specifically fibropapillomatosis; 6) environmental contamination; 7) beach armoring; 8) artificial lighting on or near nesting beaches; and 9) non-native vegetation.

3.4 Special Status Fish Species

The Columbia River 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 a WDFW priority species and an SGCN (WDFW 2008). 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 2013). Table 3 lists the special status fish species that are known or expected to occur in or near in the project vicinity and specifies their likelihood of occurring at the project site or within the vicinity.

3.4.1 Salmon and Trout

3.4.1.1 Bull Trout (*Salvelinus confluentus*)

The proposed project area is located within the range of the Columbia River DPS of bull trout. Excluding one Nevada population, the Columbia River bull trout DPS includes all natural spawning populations in the Columbia River basin and the river's tributaries within the United States. Bull trout in the Columbia River DPS are listed as threatened under the federal ESA, and critical habitat for bull trout has been designated for Columbia River DPS bull trout (USFWS 2013). Bull trout are also a Washington state candidate species and a WDFW priority species and an SGCN (WDFW 2008).

Once widely distributed throughout the Pacific Northwest, bull trout have been reduced to approximately 44 percent of their historical range (LCFRB 2004c). Compared to other salmonids, bull trout are thought to have more specific habitat requirements, and are most often associated with undisturbed habitat with diverse cover and structure. Spawning and rearing are thought to be primarily restricted to relatively pristine cold streams, often within headwater reaches (Rieman and McIntyre 1993). Adults can reside in lakes, reservoirs, and coastal areas or they can migrate to saltwater (63 FR 31647). Juveniles are typically associated with shallow backwater or side-channel areas, while older individuals are often found in deeper pools sheltered by large organic debris, vegetation, or undercut banks (63 FR 31467). Water temperature is also a critical factor for bull trout, and areas where water temperature exceeds 59□ F are thought to limit distribution (Rieman and McIntyre 1993).

In southwest Washington, bull trout have been reported in the North Fork Lewis, White Salmon, and Klickitat river systems. Historically, bull trout were found in the Cowlitz and Kalama basins but are not believed to be present there today. Bull trout populations occur in two drainages downstream of Bonneville Dam: the Willamette River and the Lewis River (USFWS 1998). Because bull trout in the Lower Columbia River basin are not usually anadromous, they are primarily regulated by local habitat conditions, and are not directly affected by conditions in the mainstem Columbia River and its estuary (LCFRB 2004c).

Adult bull trout may be migrating through the project site and vicinity between approximately April and September, and outmigrating juveniles may be found in the Columbia River year-round. If juvenile or adult bull trout were present within the action area, they will likely be migrating quickly through, as there is no suitable rearing or refuge habitat in the vicinity. Bull trout prefer the upper reaches of cold, clear running streams with clean gravel and cobble substrate for spawning.

Table 3. Special Status Fish Species and Their Potential to Occur within the Project Area

Species	ESU/DPS[a]	Federal		State			Potential for Occurrence	
		ESA Listing Status[b]	Critical Habitat	State Listing Status[c]	PHS Listing Criterion[d]	SGCN (Y/N)[e]	Project Site and Vicinity	Shipping Prism
Salmon and Trout								
Bull Trout (*Salvelinus confluentus*)	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 (*Oncorhynchus tshawytscha*)	Lower Columbia River ESU	FT	Designated	SC	1, 2, 3	N		
	Upper Willamette River ESU	FT	Designated	SC	1, 2, 3	N		
	Upper Columbia River spring-run ESU	FE	Designated	SC	1, 2, 3	N		
	Snake River spring/ summer-run ESU	FT	Designated	SC	1, 2, 3	N		
	Snake River fall-run ESU	FT	Designated	SC	1, 2, 3	N		
Chum Salmon (*Oncorhynchus keta*)	Columbia River ESU	FT	Designated	SC	1, 2, 3	N		
Coho Salmon (*Oncorhynchus kisutch*)	Lower Columbia River ESU	FT	Proposed	SC	1 ,2, 3	N		
Sockeye Salmon (*Oncorhynchus nerka*)	Snake River ESU	FE	Designated	SC	1, 2, 3	N		
Steelhead (*Oncorhynchus mykiss*)	Lower Columbia River DPS	FT	Designated	SC	1, 2, 3	Y		
	Upper Willamette River DPS	FT	Designated	SC	1, 2, 3	Y		
	Middle Columbia River DPS	FT	Designated	SC	1, 2, 3	Y		
	Upper Columbia River DPS	FT	Designated	SC	1, 2, 3	Y		
	Snake River Basin DPS	FT	Designated	SC	1, 2, 3	Y		
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		

Species	ESU/DPS[a]	Federal		State			Potential for Occurrence	
		ESA Listing Status[b]	Critical Habitat	State Listing Status[c]	PHS Listing Criterion[d]	SGCN (Y/N)[e]	Project Site and Vicinity	Shipping Prism
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		
Minnow								
Leopard Dace (*Rhinichthys falcatus*)	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 (*Thaleichthys pacificus*)	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.

[a] ESU = Evolutionarily Significant Unit; DPS = Distinct Population Segment

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

[c] Washington SOC Classifications: SE = state endangered; ST = state threatened; SS = state sensitive; SC = state candidate.

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

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

3.4.1.2 Chinook Salmon (*Oncorhynchus tshawytscha*)

The Columbia River is a migratory corridor for five ESU of Chinook salmon: the Lower Columbia River ESU, Upper Willamette River ESU, Upper Columbia River spring-run ESU, Snake River spring/summer run ESU, and Snake River fall-run ESU. These species are all listed as threatened under the federal ESA, with the exception of the Upper Columbia River spring-run ESU, which is listed as endangered (NMFS 2013). The Columbia River has also been designated as critical habitat under the federal ESA for each of these five ESUs. Chinook salmon are also a state candidate species and a WDFW priority species (WDFW 2008).

The Lower Columbia River ESU of Chinook salmon includes all natural spawning populations in river reaches accessible to Chinook salmon in the Columbia River tributaries between the Grays and White Salmon rivers in Washington and the Willamette and Hood rivers in Oregon (70 FR 37160). The other ESUs that have the potential to occur within the project site and vicinity use the Columbia River as a migratory corridor to spawning and rearing habitats higher in the watershed.

Compared to the other Pacific salmon, Chinook salmon have the most complex life history with a large variety of patterns. The length of freshwater and saltwater residency varies greatly (Myers et al. 1998). Channel size and morphology, substrate size and quality, water quality, and cover type and abundance may influence distribution and abundance of Chinook salmon (LCFRB 2004a). After 3–5 years in the ocean, Columbia River stocks return to spawn in the fall and spring. Spawning occurs in the mainstems of larger tributaries in coarse gravel and cobble (Myers et al. 1998).

Habitat use in the Lower Columbia River is variable, depending on the stock. Adult fish migrate through the lower river almost year-round. Depending on the ESU, adults enter the river between February and November and spawn in tributaries from August through September (Myers et al. 1998, LCFRB 2004b). The portion of the Columbia River that is within the project site and vicinity does not provide any suitable spawning or rearing habitat for Chinook salmon, as suitable spawning substrate is virtually non-existent. If they are present, migrating adults and juveniles are expected to be moving quickly through the deep water portion of the river.

Juvenile movement through the river is also variable depending on the stock. Juveniles often move into the Columbia River and estuary to over-winter (LCFRB 2004c). Spring Chinook tend to rear in tributary streams for a year, and yearlings outmigrate rapidly during the spring freshet (LCFRB 2004b). Fall Chinook tend to outmigrate as sub-yearlings in the late summer and fall of their first year (LCFRB 2004b). Over-wintering and outmigrating Chinook salmon juveniles tend to occupy the nearshore habitat in the lower Columbia River.

The project site and vicinity both represent documented habitat for adult and juvenile Chinook salmon. Adult Chinook of one or more ESUs may be present within the lower river year-round. Juvenile Chinook salmon, if present within the vicinity, will likely be migrating quickly through during peak spring and fall migration periods. No suitable spawning or rearing habitat occurs within the project vicinity, and there is little suitable habitat for foraging or refuge. One or more life stages of Chinook salmon could potentially be present within portions of the shipping prism during any time of year.

3.4.1.3 Chum Salmon (*Oncorhynchus keta*)

The proposed project area is located within the Columbia River ESU of chum salmon. This ESU includes all naturally spawning populations in all river reaches accessible to chum salmon in the Columbia River downstream from Bonneville Dam (70 FR 37160). Historically, chum salmon were very abundant in the Columbia River. Today, only three strong populations (Grays River, Hardy Creek, and Hamilton Creek) are found – less than 1 percent of historic levels (LCFRB 2004a, Johnson et. al. 1997b).

Columbia River ESU chum salmon are listed as threatened under the federal ESA, and the Columbia River has been designated as critical habitat for Columbia River chum salmon (NMFS 2013). Chum salmon are also a state candidate species and a WDFW priority species (WDFW 2008).

Chum salmon have the broadest spawning distribution of Pacific salmon species. They have a very short freshwater residency time, and they require cool, clean water and substrate for spawning. Migration to saltwater occurs immediately after emerging from the gravel; therefore, freshwater rearing habitat is a lesser concern for this species. After 3–5 years in saltwater, Columbia River chum salmon return to spawn in the fall. Spawning typically takes place in the lower mainstems of rivers, including the Columbia River, frequently in locations within the tidal zone where there is an abundance of clean gravel (LCFRB 2004a). Juvenile outmigration to the Columbia River estuary for rearing occurs soon after emergence from spawning gravels from mid-February to mid-June. Some stocks of chum salmon spend a month or more rearing in rivers before migrating to the ocean (LCFRB 2004b).

Adults and juveniles likely use the reach of the Columbia River that is within the project vicinity only as a migration corridor. Adult fish migrate through the project vicinity from October to November. Spawning occurs from November through December within the Columbia River and major tributaries (LCFRB 2004b); however, no spawning habitat exists at the project site, and no chum spawning habitat has been identified within the vicinity. Chum salmon are known to spawn in shallow water within and adjacent to the main channel of the Columbia River (LCFRB 2004b). In 2010, chum salmon fry were also observed outmigrating past Bonneville Dam for the first time (the progeny of adult chum migrating above Bonneville Dam) (Ford 2011).

No backwater channels or nearshore habitat suitable for rearing chum salmon occur within the project vicinity, and chum salmon are not likely to rear for significant periods within the vicinity. The shipping prism represents suitable habitat for both outmigrating juvenile chum, migrating adult chum, and estuarine and nearshore marine habitats.

3.4.1.4 Coho Salmon (*Oncorhynchus kisutch*)

The project site and vicinity are located within the range of the Lower Columbia River ESU of coho salmon. This ESU includes all natural spawning populations in Columbia River tributaries below the Klickitat River in Washington and the Deschutes River in Oregon (including the Willamette River up to Willamette Falls) (70 FR 37160). Lower Columbia River ESU coho salmon are listed as threatened under the federal ESA (NMFS 2013). The portion of the Columbia River that is within the project vicinity has also been proposed to be designated as critical habitat for Lower Columbia River coho salmon. Coho salmon are also state candidate species and a WDFW priority species (WDFW 2008).

Historically, the lower Columbia River reach was the center of coho salmon abundance in the Columbia River basin, with the middle and upper reaches also containing large runs of coho salmon. These two populations have been significantly reduced, with the lower Columbia River reach estimated at 5 percent of historic levels (LCFRB 2004b, Johnson et. al. 1991).

Coho salmon have one of the shortest life cycles of all anadromous salmonids. Different patterns of life history are linked to different populations. Forming large schools, juveniles rear in freshwater for 1 year, migrate to the ocean, and return in 5–20 months to spawn. The distribution and abundance of coho salmon are most likely influenced by water temperature, stream size, flow, channel morphology, vegetation type and abundance, and channel substrate size and quality. Coho salmon return from the ocean to spawn during fall freshets in September and October. Spawning occurs in silt to large gravel of tributaries (LCFRB 2004c). Juvenile coho in the LCR ESU tend to rear in small tributaries, and outmigrate as smolts in the late spring of their second year (LCFRB 2004b).

There are two types of run timing associated with coho: Type S, which are early run, and Type N, which are late run (Myers et al. 2006). Type S fish generally return to the Columbia River from August to

October and spawn in October and November. Type N fish return to the Columbia River from October to November/December and spawn in November through January. Some Type N coho can spawn as late as mid-February (Myers et al. 2006).

There is no suitable spawning habitat within the action area for coho salmon, and the Columbia River serves only as a migratory corridor within the project vicinity. Adult Lower Columbia River coho salmon may potentially be migrating through the project vicinity between approximately August and February.

Juveniles rear in smaller tributaries, and likely do not rear in significant numbers within the project vicinity. Juvenile outmigration occurs in the spring and summer of the second year, with the peak occurring in May (LCFRB 2004b). Depending on the degree of maturation, some juveniles may forage in the nearshore during outmigration. Outmigrating juvenile coho likely move quickly through the project site and vicinity, as there is little suitable nearshore foraging or refuge habitat present. One or more life stages of coho salmon could potentially be present within portions of the shipping prism during any time of year.

3.4.1.5 Sockeye Salmon (*Oncorhynchus nerka*)

The reach of the Columbia River within the project vicinity is located within the range of the Snake River ESU of sockeye salmon. This ESU includes all river reaches and estuary areas presently or historically accessible to sockeye salmon in the Columbia River and is defined as all river reaches east of a straight line connecting the west end of the Clatsop Jetty (Oregon side) and the west end of the Peacock Jetty (Washington side), and extending upstream to the confluence of the Snake River, upstream on the Snake River to the confluence of the Salmon River, and upstream on the Salmon River to the confluence of the Alturas Lake Creek and Stanley, Redfish, Yellow Belly, Pettit, and Alturas lakes (including their inlet and outlet tributaries) (70 FR 37160).

The Snake River ESU of sockeye salmon is extremely close to extinction. Factors cited for the decline include overfishing, water diversion for irrigation, and obstacles to migration including dams (LCFRB 2004c). The only extant sockeye salmon in the Snake River ESU spawn in lakes in the Stanley basin of Idaho.

The Snake River ESU of sockeye salmon is listed as endangered under the federal ESA, and the reach of the Columbia River that is within the project vicinity has been designated as critical habitat for Snake River sockeye salmon. Sockeye salmon are also state candidate species and a WDFW priority species (WDFW 2008).

Historically, adult sockeye salmon in the Snake River ESU enter the Lower Columbia River in June and July and migrate upstream through the Snake and Salmon rivers, arriving at their natal lakes in August and September. Spawning peaks in October and occurs in lakeshore gravels. Fry emerge in late April and May and move immediately to the open waters of the lakes where they feed on plankton for 1–3 years before migrating to the ocean. Juvenile sockeye generally leave Redfish Lake from late April through May and migrate to the Pacific Ocean. Snake River ESU sockeye salmon spend 2–3 years in the Pacific Ocean before returning to their natal lakes to spawn.

In the Columbia River basin, sockeye salmon spawn and rear in lakes in the upper Snake River watershed. Adults typically migrate through the Lower Columbia River in June and July. Juvenile outmigration begins in early spring after ice breakup on the lakes (LCFRB 2004c), and outmigrating juveniles may be present within the project vicinity between approximately April and June.

3.4.1.6 Steelhead (*Oncorhynchus mykiss*)

The reach of the Columbia River within the project vicinity represents potential habitat for five DPS of steelhead: Lower Columbia River, Upper Willamette River, Middle Columbia River, Upper Columbia River, and Snake River Basin DPS. These five DPS are all listed as threatened under the federal ESA, and the reach of the Columbia River within the project vicinity has been designated critical habitat for all

five DPS (NMFS 2013). Steelhead are also a state candidate species and a WDFW priority species (WDFW 2008).

Steelhead is the most widely distributed anadromous salmonid. The life history pattern of steelhead can be very complex, involving repeated spawnings and continuous reversals of freshwater to ocean phases (LCFRB 2004c). The distribution and abundance of steelhead are thought to be influenced by water temperature, stream size, flow, channel morphology, vegetation type and abundance, and channel substrate size and quality (LCFRB 2004c). Depending upon the specific requirements of a particular life stage, steelhead use a wide range of habitat types from low-order tributaries to river mainstems (61 FR 41541). Steelhead DPS that migrate within the Lower Columbia River return in the spring and fall to spawn. Spawning occurs in small to large gravel of tributaries and smaller rivers (LCFRB 2004b).

Adult and juvenile steelhead primarily use the project vicinity as a migration corridor. Adults migrate through the action area year-round, depending on the run type. Summer steelhead migrate upstream within the Columbia River between roughly May and October, with spawning occurring in tributaries between late February and early April. Winter-run adults enter the Columbia River between December and May, spawning in tributaries in late April and early May.

Peak adult spawning for both summer and winter runs occurs in the spring. Spawning occurs in the tributaries throughout the Columbia River basin (LCFRB 2004b). In streams that support both summer and winter steelhead runs, summer steelhead tend to spawn higher in the watershed. No suitable steelhead spawning habitat occurs within the project site or vicinity, and the reach of the river within the project vicinity serves largely as a migratory corridor.

The peak juvenile outmigration through the Lower Columbia River occurs in the spring. Over-wintering and outmigrating juvenile steelhead occupy the nearshore habitat within the project area. Juvenile steelhead may be present in high numbers during migration periods, but juvenile steelhead likely move quickly through the project site and vicinity, due to the relatively low quality of nearshore habitat. There is very little in-stream or riparian habitat structural complexity that will provide suitable areas for foraging or refugia for outmigrating juvenile steelhead. One or more life stages of steelhead could potentially be present within portions of the shipping prism during any time of year.

3.4.1.7 Coastal Resident/Sea-Run Cutthroat Trout (*Oncorhynchus clarkii clarkii*)

The coastal cutthroat trout is one of 13 subspecies of cutthroat trout indigenous to North America. The range of this subspecies extends northward along the Pacific Coast from northern California to the Prince William Sound region of southeast Alaska, and eastward to the crest of the Cascade Range (Johnson et al. 1994). This subspecies exhibits both resident fluvial and adfluvial life history patterns (resident) and is the only subspecies to also exhibit an anadromous (sea-run) life history pattern (Behnke 1992). Coastal cutthroat trout in the Columbia River system are part of the Southwest Washington ESU, which is a species of concern under the federal ESA (NMFS 2013). Coastal cutthroat trout are also a WDFW priority species (WDFW 2008).

The life history of the coastal cutthroat is probably the most complex and flexible of any Pacific salmonid (Johnson et al. 1994). Cutthroat trout in the Southwest Washington ESU exhibit fluvial, adfluvial, and anadromous life histories. The extent to which individuals expressing these various strategies are isolated from other life history forms is largely unknown, though there is growing evidence that individuals may express multiple life history behaviors in their life time (Johnson et al. 1994).

Coastal cutthroat trout spawn in the smallest headwater streams and tributaries used by any salmonid species, and the young usually remain in these streams about a year before moving down into larger streams (Palmisano et al. 1993). Individuals that migrate to the sea live in these larger streams for another 2 to 5 years before migrating to the Pacific Ocean as smolts, between approximately April and June (Wydoski and Whitney 2003; Johnson et al. 1994). Some stocks, primarily those with limited or no

possibility of return migration from the ocean, remain as residents of small headwater tributaries, or migrate only into rivers or lakes (Scott and Crossman 1973; Johnson et al. 1994). Sea-run cutthroat do not migrate to the open ocean; rather, they stay in estuarine habitats near the mouths of their migratory streams for 5-8 months of the year (Palmisano et al. 1993; Johnson et al. 1994). Upstream migration to freshwater feeding/spawning areas occurs from late June through March; re-entry timing is consistent from year to year within streams, but varies widely between streams (Johnson et al. 1994). Spawning generally occurs between December and February in the tails of pools located in streams with low gradient and low flows or in shallow riffles (Wydoski and Whitney 2003; Johnson et al. 1994). Preferred water temperatures for spawning and incubation range from 42°F to 63°F; cutthroat are generally not found in waters above 72°F (Johnson et al. 1994).

Coastal cutthroat in the portion of the mainstem Columbia River that is within the project site and vicinity would be sea-run individuals migrating to or from the estuary. Out-migrating coastal cutthroat trout smolts could potentially be present between approximately March and June, while upstream migrating adults could potentially be present between approximately June and March. For this reason, coastal cutthroat trout could be present within the project vicinity or shipping prism during any time of the year.

3.4.1.8 Pink Salmon (*Oncorhynchus gorbuscha*)

Pink salmon are the most abundant of the seven Pacific salmon species (Heard 1991). They are not listed under the federal ESA, but they are considered a WDFW priority species (WDFW 2008).

Pink salmon range throughout the North Pacific Ocean and Bering Sea. Populations originating from different coastal regions of the North Pacific occupy distinct ocean nursery areas. The range shifts southward for winter, northward in warmer months (Heard 1991). In Washington, the most significant runs are in streams tributary to Puget Sound. They are relatively uncommon in the Columbia River basin, with fewer than 100 fish counted at the Bonneville Dam fish ladder in most years. In 2011, however, a record run of 3,828 pink salmon was recorded at the dam (Columbia Basin Fisheries Agencies and Tribes [CBFAT] 2013a).

Pink salmon have the shortest lifespan of all the Pacific salmon found in North America. They mature and complete their entire life cycle in 2 years. This 2-year life cycle has created genetically distinct odd-year and even-year populations of pink salmon in most Puget Sound tributaries. Fish coming in odd years are unrelated to the individuals returning in even years. Odd-year and even-year populations do not interbreed even when they return to the same spawning grounds.

Adult pink salmon spend most of their lives at sea. They return to natal streams in the fall, with spawning occurring in rivers and tributary streams, or in lower tidal areas in some rivers. After juveniles emerge from gravel (in April–May), they immediately move downstream to estuary. Young fish may be found in inshore waters for several months before they move to sea (Scott and Crossman 1973).

Pink salmon are not common in the Columbia River in most years, but large runs have occasionally been recorded. While pink salmon are not expected to be present in significant numbers, it is possible that they may occasionally be present in the project site and/or vicinity in the fall (during adult migration), and spring (during juvenile out-migration). One or more life stages of pink salmon could potentially be present within portions of the shipping prism during any time of year.

3.4.2 Sturgeon

3.4.2.1 North American Green Sturgeon (*Acipenser medirostris*)

North American green sturgeon in the Lower Columbia River are composed of approximately 60 percent northern DPS and 40 percent southern DPS (personal communication with Steve West, WDFW, April 24, 2009), with the southern DPS being listed as threatened under the ESA (USFWS 2013). The Columbia

River estuary upstream to Bonneville Dam has also been designated critical habitat. Green sturgeon is a WDFW priority species and an SGCN (WDFW 2008).

The green sturgeon is distributed throughout Alaska, Washington, California, and Oregon (McCabe and Tracy 1994). In the mid-1930s before Bonneville Dam was constructed, green sturgeon were found in the Columbia River up to the Cascades Rapids; today, they occur upriver to Bonneville Dam but are predominantly found in the lower reach of the river. The estuaries of Willapa Bay, the Columbia River, and Grays Harbor are late summer concentration areas (68 FR 13370). The Columbia River does not support spawning populations of green sturgeon (personal communication with Steve West, WDFW, April 24, 2009).

Green sturgeon, which tend to prefer environments that are more saline, typically are not found in the Columbia River upstream of Skamokawa (personal communication with Steve West, WDFW, April 24, 2009). Adult and sub-adult green sturgeon are typically present in the Lower Columbia River from June through August, with August the peak month (McCabe and Tracy 1994). It is possible, but unlikely, that green sturgeon may be present in the project vicinity during the months of June through August. One or more life stages of green sturgeon could potentially be present within portions of the shipping prism during any time of year.

3.4.2.2 White Sturgeon (*Acipenser transmontanus*)

White sturgeon is a Washington priority species (WDFW 2008). White sturgeon are the largest of North American fishes. They occur from the Pacific slope of North America from the Aleutian Islands to Monterey, California (Lee et al. 1980). In the Columbia River, they spawn at roughly 3 to 11 year intervals, between approximately April and July (Wydoski and Whitney 2003). Larvae hatch from eggs in 1-2 weeks. Males may reach sexual maturity in about 9 years, females in 13-16 years (Wydoski and Whitney 2003). White sturgeon may live over 100 years, and can reach 20 feet in length and weigh over 1,800 pounds.

White sturgeon can be found at sea, usually near shore, as well as in large, cool rivers or streams. Some white sturgeon are anadromous and make extensive saltwater migrations. Many more stay primarily in estuarine waters, moving inland to freshwater to spawn. White sturgeon are bottom feeders. Young sturgeon feed mostly on the larvae of aquatic insects, crustaceans, and mollusks. A significant portion of the diet of larger sturgeon consists of fish.

White sturgeon may potentially be present within the project vicinity and shipping prism at all times of the year.

3.4.3 Lamprey

3.4.3.1 Pacific Lamprey (*Lampetra tridentata*) and River Lamprey (*Lampetra ayresi*)

Two species of lamprey native to the Columbia River basin are provided special regulatory status: Pacific lamprey and river lamprey. Both are species of concern under the federal ESA (NMFS 2013). The river lamprey is currently a candidate for listing in Washington. Both Pacific lamprey and river lamprey are WDFW priority species and an SGCN (WDFW 2008).

The Pacific lamprey is found in coastal streams from southern California to the Gulf of Alaska; in Washington it occurs in most large coastal and Puget Sound rivers, and occurs long distances inland in the Columbia, Snake, and Yakima rivers (Wydoski and Whitney 2003). Larval lampreys (ammocoetes) spend up to 6 years burrowed in the sediment, feeding on diatoms and detritus where they transform into a juvenile stage called macropthalmia. At this stage, the lampreys are silver, develop teeth and a sucker-like disc, and form true eyes. Physiological transformations occur that initiate migratory behaviors and enable them to tolerate sea water (CBFAT 2013b). After a 2-month transformation into adults, Pacific and river lamprey migrate into the ocean where they spend 2 to 3 years parasitizing fishes and mammals

(Pacific States Marine Fisheries Commission [PSMFC] 1997). Pacific lampreys enter saltwater between late winter and early spring, while river lampreys enter saltwater between May and July. Lampreys return to freshwater rivers to spawn in the spring, where they lay up to 100,000 eggs in a nest built in gravel or sandy sediments. Adults die after spawning (PSMFC 1997). Juveniles burrow into soft mud substrates and remain there for up to 6 years. Adults then move to marine environments for 2 to 3 years before returning to tributaries to spawn (Bayer and Seelye 1999).

Adult lamprey may be present within the project vicinity in the late winter and early spring. Juvenile lamprey may potentially be present within the project vicinity at all times of the year. The shallow nearshore habitat at the project site may provide suitable substrate conditions for rearing lamprey, though the limited in-stream complexity and lack of riparian cover limit this function of the habitat. One or more life stages of lamprey could potentially be present within portions of the shipping prism during any time of year.

3.4.3.2 Leopard Dace (*Rhinichthys falcatus*)

Leopard dace is a Washington state candidate for listing and a WDFW priority species and an SGCN (WDFW 2008). It is not provided any special federal regulatory status.

Leopard dace is a species of minnow endemic to the Columbia River system in Oregon, Washington, Idaho, and British Columbia, and to the adjacent Fraser River system in British Columbia (Lee et al. 1980). Its habitat is thought to be similar to that of other species of dace, and includes flowing pools and gravel runs of creeks and small to medium rivers and rocky margins of lakes (Page and Burr 1991). It is usually found in slow-moving current, typically in slower, deeper water than most other species of dace (Wydoski and Whitney 2003). Spawning is thought to occur between May and July in slow-moving riffles (Wydoski and Whitney 2003). Young-of-the-year feed mostly on dipterous larvae. Yearlings begin feeding on aquatic insect larvae (e.g., Ephemeroptera and Diptera); by September, they feed mostly on terrestrial insects. Adults eat aquatic insect larvae and terrestrial insects.

Leopard dace have been documented in the mainstem Columbia River within the project vicinity, and could be present within the project site, project vicinity, and/or project shipping prism at any time of the year. The project site and vicinity likely do not provide suitable spawning habitat for leopard dace, as there is no riffle habitat or suitable substrate.

3.4.4 Eulachon

3.4.4.1 Pacific Eulachon (*Thaleichthys pacificus*)

Pacific eulachon are endemic to the eastern Pacific Ocean ranging from northern California to southwest Alaska and into the southeastern Bering Sea. Eulachon in the Columbia River system are part of the Southern DPS, which is listed as threatened under the federal ESA. The Columbia River has also been designated critical habitat for Pacific eulachon. This is also a state candidate species and a WDFW priority species and an SGCN (WDFW 2008).

Eulachon typically spend 3–5 years in saltwater before returning to freshwater to spawn from late winter through early summer. Typically, spawning grounds are in the lower reaches of larger rivers fed by snowmelt and spawning occurs at night; in the Columbia River, spawning typically occurs at temperatures from 39 to 50 F over sand, coarse gravel, or detrital substrates in January, February, and March. Eulachon eggs hatch in 20–40 days, and then are carried downstream and dispersed by estuarine and ocean currents (NMFS 2010).

According to NMFS (NMFS 2010), most Pacific eulachon production for the southern DPS occurs in the Columbia River basin. In the Columbia River, spawning runs return to the mainstem of the river from RM 25, near the estuary, to immediately downstream of Bonneville Dam (RM 146). While most eulachon production occurs in tributaries downstream of the project vicinity, the Washougal and Sandy rivers,

which empty into the Columbia River approximately 15 miles upstream of the action area, are both known to support smelt runs (NMFS 2010). Adult eulachon typically migrate through the project site and vicinity from approximately December through February, with the peak of the run in January and February (personal communication with Brad James, WDFW, January 21, 2010). The incubation period is approximately 1 month, and the peak outmigration of juvenile smelt larvae is February through April (personal communication with Brad James, WDFW, January 21, 2010).

Adult eulachon may begin migrating through the project site, vicinity, and freshwater portions of the shipping prism near the end of December. No spawning has been documented in the action area and the action area does not represent suitable spawning habitat for Pacific eulachon, and eulachon eggs are not expected to be present in the project vicinity at any time. Larval eulachon may potentially be flowing downstream through the project site, vicinity, and shipping prism between approximately February and April.

4. References

Altman, B., and R. Sallabanks. 2000. Olive-sided flycatcher (*Contopus cooperi*). No. 502. In: The Birds of North America. A. Poole and F. Gill (eds). Philadelphia, PA. 28 pp.

Anderson, S.H. 1976. Comparative food habits of Oregon nuthatches. Northwest Science 50:213−221.

Anderson, S.H. 1972. Seasonal variations in forest birds of western Oregon. Northwest Science 46:194−206.

Anderson, S.H. 1970. The avifaunal composition of Oregon white oak stands. Condor 72:417−423.

Azerrad, J. M. 2012. Management recommendations for Washington's priority species: Great blue heron. Washington Department of Fish and Wildlife, Olympia, Washington.

Bayer, J.M., and J.G. Seelye. 1999. Characteristics of upstream migrating pacific lampreys (*Lampetra tridentata*) in the Columbia River. Final report of research to U.S. Army Corps of Engineers, Portland, Oregon.

Behnke, R.J. 1992. Native trout of western North America. American Fisheries Society Monograph 6. pp. 61−72.

Bettinger, K.A., and R. Milner. 2004. Sandhill crane. In: Management Recommendations for Washington's Priority Species, Volume IV: Birds. E. Larsen, J. M. Azerrad, N. Nordstrom (eds). Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Blaustein, A.R., J.J. Beatty, D.H. Olson, and R.M. Storm. 1995. The biology of amphibians and reptiles in old-growth forests in the Pacific Northwest. Gen. Tech. Rep. PNW-GTR-337. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon. 98 pp.

Bock, C.D. 1970. The ecology and behavior of the Lewis' woodpecker (*Asyndesmus lewis*). University of California, Berkeley. Publications in Zoology 92:1−100.

Brookshier, J.S. 2004. Columbian white-tailed deer. Management recommendations for Washington's priority species: Volume V, Washington Department of Wildlife, Olympia, WA.

Brown C. R. 1997. Purple martin (*Progne subis*). Number 287. In: The Birds of North America. A. Poole and F. Gill (eds). Academy of National Science and American Ornithologists' Union, Philadelphia, Pennsylvania, USA.

Bull, E.L., and C.T. Collins. 1993. Vaux's swift (*Chaetura vauxi*). In: The Birds of North America. A. Poole and F Gill (eds). Acad. Nat. Sci., Philadelphia.

Bull, E.L., and R.S. Holthausen. 1993. Habitat use and management of pileated woodpeckers in northeastern Oregon. Journal of Wildlife Management 57:335−345.

Chappell, C.B. 2005. White-breasted nuthatch. In: Birds of Washington: Status and Distribution. T.R. Wahl, B. Tweit, and S. G. Mlodinow (eds). University of Washington Press, Seattle, WA. pp. 280−281.

City of Seattle. 2007. Seattle Biological Evaluation. Seattle, WA. May 1, 2007.

CBFAT (Columbia Basin Fisheries Agencies and Tribes). 2013a. Adult salmon annual totals. Available at: http://www.fpc.org/adultsalmon/adultqueries/Adult_Annual_Totals_Query_ResultsV2.asp, accessed July 2, 2013.

CBFAT. 2013b. Fish Passage Center – lamprey data. Available at: http://www.fpc.org/lamprey/lamprey_home.html, accessed July 2, 2013.

Dekkar, D. 1995. Prey capture by peregrine falcons wintering on southern Vancouver Island, British Columbia. Journal of Raptor Research 29:26−29.

Dvornich, K.M., K.R. McAllister, and K.B. Aubry. 1997. Amphibians and reptiles of Washington State: location data and predicted distributions. Volume 2. In: Washington State Gap Analysis – Final Report. K.M. Cassidy, C.E. Grue, M.R. Smith, and K.M. Dvornich (eds). Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle, Washington. 146 pp.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. The birder's handbook: A field guide to the natural history of North American birds. Simon and Schuster, New York, New York, USA.

Engler, J.D, E.D. Anderson, and M.A. Stern. 2003. Population status of fall-migrant sandhill cranes along the lower Columbia River, 2003 report. U.S. Fish and Wildlife Service, Ridgefield National Wildlife Refuge Complex, and The Nature Conservancy of Oregon.

FERC (Federal Energy Regulatory Commission). 2008. Bradwood Landing project. Final environmental impact statement. Cooperating agencies: U.S. Army Corps of Engineers, United States Coast Guard, Department of Transportation. June 2008.

Ford, M.J. (ed). 2011. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. NOAA Tech. Memo. NMFS-NWFSC-113, U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 281 pp.

Frest, T.J., and E.J. Johannes. 1993. Mollusc species of special concern within the range of the northern spotted owl. Final report. Prepared for U.S. Department of Agriculture, Forest Service, Ecosystem Management Working Group.

Frest, T.J. 1992. Mollusc fauna in the vicinity of three proposed hydroelectric projects on the middle Snake River, central Idaho. Supplemental report on the California floater *Anodonta californiensis* Lea, 1852. Final Rep. prepared for Don Chapman Consultants. Deixis Consultants, Seattle.

Gruver, J.C., and D.A. Keinath. 2004. Townsend's big-eared bat (*Corynorhinus townsendii*): A technical conservation assessment. U.S. Department of Agriculture, Forest Service, Rocky Mountain Region, Golden, CO.

Hagar, J. 2006. White-breasted nuthatch (*Sitta carolinensis*). In: Birds of Oregon: A General Reference. D.B. Marshall, M.G. Hunter, and A.L. Contreras (eds). Oregon State University Press, Corvallis, OR. pp. 449−451.

Hamer, T.E., and E.B. Cummins. 1991. Relationships between forest characteristics and use of inland sites by marbled murrelets in northern Washington. Report on file; Washington Department of Wildlife, Nongame Program, Olympia, WA. 47 pp.

Hayes, G., and G. J. Wiles. 2013. Washington bat conservation plan. Washington Department of Fish and Wildlife, Olympia, Washington. 138+viii pp.

Hays, D.W., and R.L Milner. 2004a. Peregrine falcon. In: Management recommendations for Washington's priority species, Volume IV: Birds. E. Larsen, J.M. Azerrad, N. Nordstrom (eds). Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Hays, D.W., and R.L Milner. 2004b. Purple martin. In: Management recommendations for Washington's priority species, Volume IV: Birds. E. Larsen, J.M. Azerrad, N. Nordstrom (eds). Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Hays, D. 1997. Status of the Aleutian canada goose in Washington. Washington Department of Fish and Wildlife, Olympia, WA. 18 pp.

Heard, W.R. 1991. Life history of pink salmon (*Oncorhynchus gorbuscha*). pp. 120−230. In: Pacific Salmon Life Histories. C. Groot and L. Margolis (eds). University of British Columbia Press, University of British Columbia, Vancouver. xv + 564 pp.

Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA.

Johnson, R.E., and K.M. Cassidy. 1997. Terrestrial mammals of Washington State: Location data and predicted distributions. In: Washington State Gap Analysis – Final Report. Volume 3. K.M. Cassidy, C.E. Grue, M.R. Smith, and K.M. Dvornich (eds). Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle, WA. pp. 67−97.

Johnson, O.W., W.S. Grant, R.G. Kope, K. Neely, F.W. Waknitz, and R.S. Waples. 1997. Status review of chum salmon from Washington, Oregon, and California. NOAA Technical Memorandum NMFS NWFSC- 32. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, WA.

Johnson, O.W., R.S. Waples, T.C. Wainwright, K.G. Neely, F.W. Waknitz, and L.T. Parker. 1994. Status review for Oregon's Umpqua River sea-run cutthroat trout. NOAA Tech. Memo. NMFS-NWFSC-15. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 122 pp.

Johnson, O.W., T.A. Flagg, D.J. Maynard, G.B. Milner, and F.W. Waknitz. 1991. Status review for Lower Columbia River coho salmon. U.S. National Marine Fisheries Service, Seattle, WA. 95 pp.

Kraege, D. 2005. Washington State status report for the Aleutian Canada goose. Washington Department of Fish and Wildlife, Olympia, Washington. 26 + iii pp.

Larsen, E., E. Rodrick, and R. Milner (eds). 1995. Management recommendations for Washington's priority species, Volume I: Invertebrates. Washington Department of Fish and Wildlife, Olympia, WA, USA.

Larsen, E., J. M. Azerrad, N. Nordstrom (eds). 2004. Management recommendations for Washington's priority species, Volume IV: Birds. Washington Department of Fish and Wildlife, Olympia, WA, USA.

Lee, D.S., C.R. Gilbert, C.H. Hocutt, R.E. Jenkins, D.E. McAllister, and J.R. Stauffer, Jr. 1980. Atlas of North American freshwater fishes. North Carolina State Museum of Natural History, Raleigh, NC. i-x + 854 pp.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1996. Amphibians of Washington and Oregon. Seattle Audubon Society, Seattle, Washington. 168 pp.

Littlefield, C.D., and G.L. Ivey. 2002. Sandhill crane recovery plan (Final). Washington Department of Fish and Wildlife, Olympia, WA.

LCFRB (Lower Columbia Fish Recovery Board). 2004a. Lower Columbia salmon recovery and fish and wildlife subbasin plan, Volume I—Regional plan.

LCFRB. 2004b. Lower Columbia salmon recovery and fish and wildlife subbasin plan, Volume II—Subbasin plans.

LCFRB. 2004c. Lower Columbia salmon recovery and fish and wildlife subbasin plan, A—Focal fish species.

Manuwal, D.A., and M.H. Huff. 1987. Spring and winter bird populations in a Douglas-fir forest sere. Journal of Wildlife Management 51:586−595.

McAllister, K.R. 1995. Distribution of amphibians and reptiles in Washington State. Northwest Fauna 3:81−112.

McCabe, G.T., Jr., and C.A. Tracy, 1994. Spawning and early life history of white sturgeon, *Acipenser transmontanus*, in the lower Columbia River. Fishery Bulletin 92:760–772.

Myers, J., C. Busack, D. Rawding, A. Marshall, D. Teel, D.M. Van Doornik, and M.T. Maher. 2006. Historical population structure of Pacific salmonids in the Willamette River and lower Columbia River basins. NOAA Tech. Memo. NMFS-NWFSC-73, 311 p. NTIS PB2006-109278. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 311 p.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. NOAA Tech. Memo. NMFS-NWFSC-35. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. 443 pp.

NMFS (National Marine Fisheries Service). 2013. ESA salmon listings. Available at: http://www.nwr.noaa.gov/publications/protected_species/salmon_steelhead/status_of_esa_salmon_listings_and_ch_designations_map.pdf, accessed June 26, 2013.

NMFS. 2010. Endangered and threatened wildlife and plants: Threatened status for southern distinct population segment of eulachon. Federal Register/Vol. 75, No. 52/Thursday March 18, 2010.

NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1998a. Recovery plan for U.S. Pacific populations of the loggerhead turtle. National Marine Fisheries Service, Washington, D.C. and U.S. Fish and Wildlife Service.

NMFS and USFWS. 1998b. Recovery plan for U.S. Pacific populations of the leatherback turtle (*Dermochelys coriacea*). National Marine Fisheries Service, Silver Spring, MD and U.S. Fish and Wildlife Service.

NMFS and USFWS. 1998c. Recovery plan for U.S. Pacific populations of the east Pacific green turtle (*Chelonia mydas*). National Marine Fisheries Service, Silver Spring, MD and U.S. Fish and Wildlife Service.

NatureServe. 2013. NatureServe Explorer: An online encyclopedia of life [web application]. Available at; http://www.natureserve.org/explorer, accessed July 2013.

Nordstrom, N., and R. Milner. 1997a. Oregon spotted frog (Rana pretiosa). In:Management Recommendations for Washington's Priority Species, Volume III: Amphibians and Reptiles. E.M. Larsen (ed). Washington Department of Fish and Wildlife, Olympia, WA.

Nordstrom, N., and R. Milner. 1997b. Pacific pond turtle (*Clemmys marmorata*). In: Management Recommendations for Washington's Priority Species, Volume III: Amphibians and Reptiles. E.M. Larsen (ed). Washington Department of Fish and Wildlife, Olympia, WA.

ODFW (Oregon Department of Fish and Wildlife). 1998. Chapter 4: Information specific to steelhead. Revisions to the steelhead supplement. September 6, 2006. Oregon Plan. Oregon Department of Fish and Wildlife, Portland, OR.

ODFW. 1996. Species at risk; sensitive, threatened and endangered vertebrates of Oregon. Second Edition, June 1996. Oregon Department of Fish and Wildlife, Wildlife Diversity Program, Portland, OR.

PSMFC (Pacific States Marine Fisheries Commission). 1997. Available at: http://www.psmfc.org/habitat/edu_lamprey_fact.html, accessed July 2013.

Page, G.W., J.S. Warriner, J.C. Warriner, and P.W.C. Paton. 1995. Snowy plover (*Charadrius alexandrinus*). In: The Birds of North America, No. 154. A. Poole and F. Gill (eds). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, DC.

Page, L.M., and B.M. Burr. 1991. A field guide to freshwater fishes: North America north of Mexico. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Palmisano, J.F, R.H. Ellis, and V.W. Kaczynski. 1993. The impact of environmental and management factors on Washington's wild anadromous salmon and trout. Report prepared for the Washington Forest Protection Association and the Washington Department of Natural Resources, Olympia, WA. 371 pp.

Rieman, B.E. and J.D. McIntyre. 1993. Demographic and habitat requirements for the conservation of bull trout *Salvelinus confluentus*. U.S. Department of Agriculture, Forest Service.

Scott, W.B., and E.J. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada Bulletin 14.

Sharp B.E. 1992. Neotropical migrants on national forests in the Pacific Northwest. Forest Service Publ. No. PB93-12885. U.S. Department of Agriculture, Forest Service.

Smith, M.R., P.W. Mattocks, Jr., and K.M. Cassidy. 1997. Breeding birds of Washington state: location data and predicted distributions. Volume 4. In: Washington State Gap Analysis – Final Report. K.M. Cassidy, C.E. Grue, M.R. Smith, and K.M. Dvornich (eds). Seattle Audubon Society Publications in Zoology No. 1. Seattle, Washington. 538 pp.

Stansell, R. Tackley, S., W. Nagy, and K. Gibbons. 2009. Field report: Evaluation of pinniped predation on adult salmonids and other fishes in the Bonneville Dam tailrace. U.S. Army Corps of Engineers, Fisheries Field Unit, Bonneville Lock and Dam, Cascade Locks, OR. 37 pp.

Stalmaster, M. V. 1987. The bald eagle. Universe Books. New York. 227 pp.

Stinson, D.W., J.W. Watson, and K.R. McAllister. 2007. Washington State status report for the bald eagle. Washington Department of Fish and Wildlife, Olympia. 86 + viii pp.

USFWS (U.S. Fish and Wildlife Service). 2015. Port of Vancouver Maintenance Dredging and Management of Upland Disposal Sites Parcel 3 and T5 West Biological Opinion. FWS-OIEWFW00-2013-F-0172-ROOI. Lacey, WA.

USFWS. 2013. Listed and proposed endangered and threatened species and critical habitat; candidate species; and species of concern in Clark County. U.S. Fish and Wildlife Service, Western Washington Fish and Wildlife Office, Clark County. Revised December 11, 2012. Available at: http://www.fws.gov/wafwo/speciesmap/ClarkCounty121112.pdf, accessed June 26, 2013.

USFWS. 2007. Recovery plan for the Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*). 2 volumes. U.S. Fish and Wildlife Service, Sacramento, CA.

USFWS. 2006. Short-tailed albatross endangered species fact sheet. Available at: http://alaska.fws.gov/fisheries/endangered/pdf/STALfactsheet.pdf.

USFWS. 1998. Endangered and threatened wildlife and plants: Determination of threatened status for the Klamath River and Columbia River distinct population segments of bull trout. Final Rule. June 10, 1998. Fed. Reg. 63(111): 31647-31674.

Verts, B.J., and L.N. Carraway. 1987. *Microtus canicaudus*. Mammalian Species 267:1−4.

WDFW (Washington State Department of Fish and Wildlife. 2013a. Priority habitats and species (PHS). Available at: http://wdfw.wa.gov/mapping/phs/, accessed June 26, 2013.

WDFW. 2013b. Salmonscape database. Available at: http://wdfw.wa.gov/mapping/salmonscape/index.html, accessed June 26, 2013.

WDFW. 2008. Priority habitat and species list. Washington Department of Fish and Wildlife, Olympia, WA. 177 pp.

WDFW 2005. Washington's comprehensive wildlife conservation strategy. Final draft. Washington Department of Fish and Wildlife, Olympia, WA. 618 pp. + appendices. Submitted September 19, 2005.

WDFW. 1996. Draft environmental impact statement for the draft habitat conservation plan. Prepared for the Washington State Department of Natural Resources, Olympia, WA. March 22, 1996.

WNHP (Washington Natural Heritage Program). 2013. Field guide to Washington's rare plants. On-line document: http://www1.dnr.wa.gov/nhp/refdesk/fguide/htm/fsfgabc.htm, accessed June 26, 2013. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA.

WNHP. 2012. Clark County list of rare plants. Available at: http://www1.dnr.wa.gov/nhp/refdesk/lists/plantsxco/clark.html, accessed June 26, 2013, updated August 2012. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA.

WNHP (Washington Natural Heritage Program). 2011. Sections that contain natural heritage features. Available at: http://www.dnr.wa.gov/ResearchScience/HowTo/ConservationRestoration/Pages/amp_nh_data_instructions.aspx, accessed June 26, 2013, updated November 4, 2011.

Woodruff, K., and H. Ferguson. 2005. Townsend's big-eared bat, *Corynorhinus townsendii*. In: Management Recommendations for Washington's Priority Species. Volume V: Mammals. J.M. Azerrad (ed). Washington Department of Fish and Wildlife, Olympia, WA.

Wydoski, R.S., and R.R. Whitney. 2003. Inland fishes of Washington. Second edition, revised and expanded. American Fisheries Society, Bethesda, MD, in association with University of Washington Press, Seattle, WA.

Vancouver Energy
Construction Wildlife Monitoring Plan

EFSEC Application for Site Certification No. 2013-01
Docket No. EF131590

Appendix B
Sample Monitoring Report Template

Appendix B, Sample Report Template

1. Introduction

Vancouver Energy (Facility) provides transloading services for pipeline quality crude oil from railcars to marine vessels. The Facility is located at 5501 NW Old Lower River Road, Vancouver, Washington; it is situated at the Port of Vancouver USA (Port) on the north bank of the Columbia River at approximately River Mile 103.5. Construction of the Facility started [date] in accordance with approved construction plans. The wildlife monitoring period was conducted from DATE to DATE, in accordance with the construction wildlife monitoring plan. XXX days of impact pile driving and Area 300 ground improvements occurred during the monitoring period when surveys were conducted.

2. Noise Monitoring Results

2.1 Area 200 Impact Pile Driving

Describe survey results.

- Measured noise level at monitoring point.
- Predicted noise level at monitoring point.
- Adaptive management measures implemented.

2.2 Area 300 Ground Improvements

Describe survey results.

- Measured noise level at monitoring point.
- Predicted noise level at monitoring point.
- Adaptive management measures implemented.

3. Discussion

4. Conclusions

Summarize results of monitoring.