

large numbers of prey species in Puget Sound, the short term nature of effects to salmonids, and extensive MMs to protect prey species during construction, WSF projects are not expected to have measurable effects on the distribution or abundance of potential murrelet prey species.

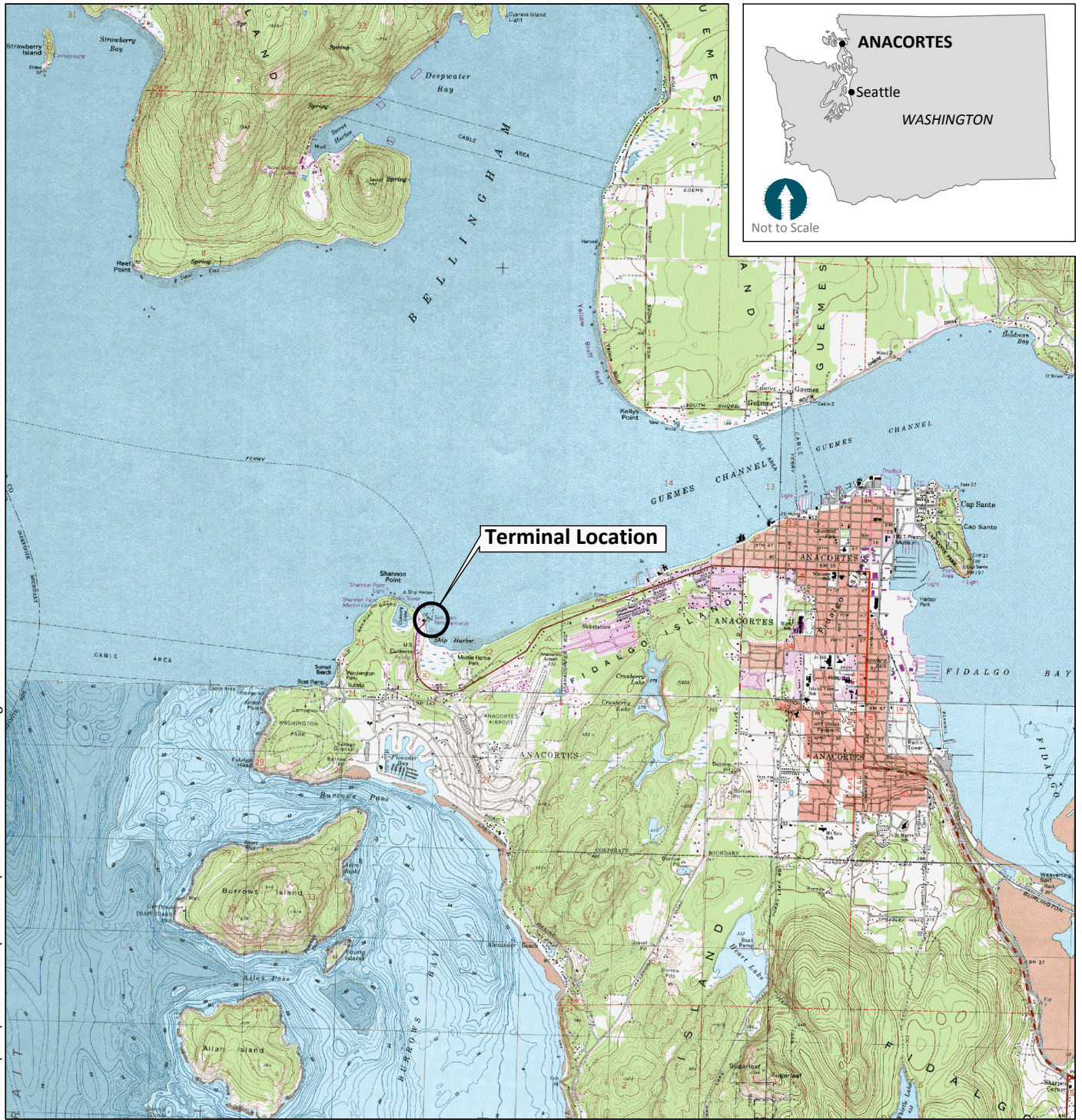
4 TERMINAL SPECIFIC INFORMATION

This chapter provides a summary of the baseline information and distribution of ESA-listed species and critical habitat at each terminal. The chapter begins with three tables summarizing the chemical, physical, and biological indicators for the 19 ferry terminals and one ferry maintenance facility. The chapter is then organized alphabetically by ferry terminal, with more detailed descriptions of the environmental baseline followed by the ESA-listed species and critical habitat distributions for each terminal.

ANACORTES

K:\Jobs\100016-WSF\10001603\10001603-BA-002-ANI.dwg FIG AN-1

Mar 21, 2012 9:31am heriksen



NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Anacortes North and South, Cypress Island, and Decption Pass, Washington.

Section	Township	Range	Lat	Long	County
22	35N	1E	48° 30' 26" N	122° 40' 30" W	Skagit
HUC 171100020204			WRIA 3		

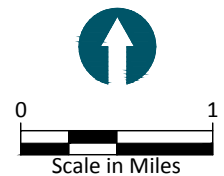
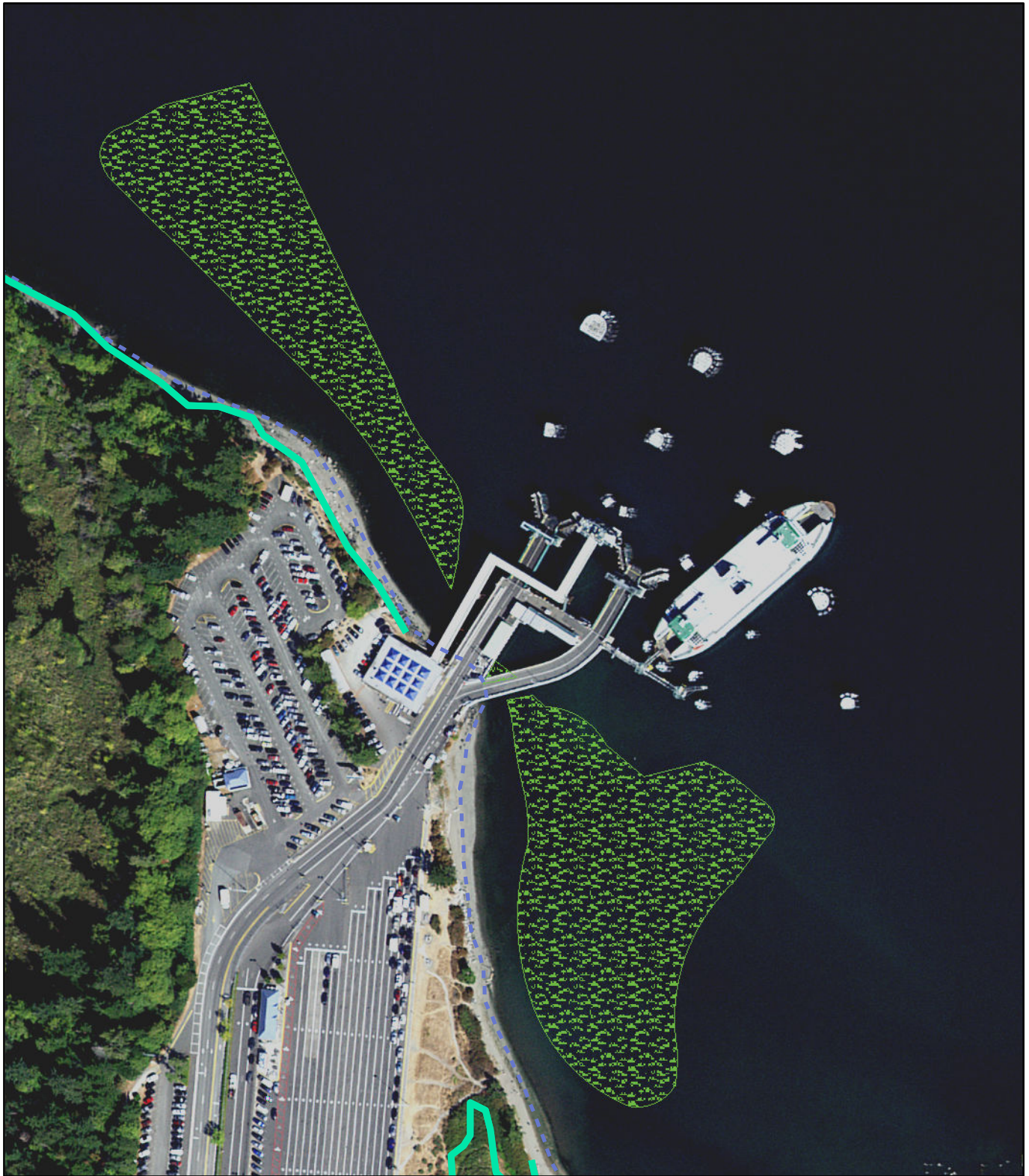


Figure AN-1
Anacortes Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Anacortes, Washington



Anacortes Ferry Terminal: WSF Biological Assessment Reference

- Smelt Spawning
- Approximate Mean High Water (MHW)
- Eel Grass

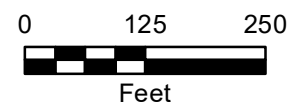
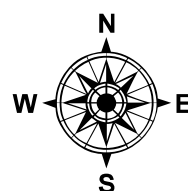


Figure AN-2
Aerial Photo of Anacortes Ferry Terminal
WSF Biological Assessment Reference
Anacortes, Washington

4.1 Anacortes

The Anacortes Ferry Terminal is located in the city of Anacortes, on Fidalgo Island, adjacent to Guemes Channel (see Figures AN-1 and AN-2).

The Anacortes Ferry Terminal provides service to the San Juan Island terminals (Lopez, Shaw, Orcas, and Friday Harbor), and to Sidney B.C. There are three routes that originate from this terminal: Anacortes to Friday Harbor with stops at Orcas, Shaw, and Lopez; inter-island between Friday Harbor, Orcas, Shaw, and Lopez; and international from Anacortes and Friday Harbor to Sidney B.C.

Features of the terminal include a terminal building, four pay parking lots, 15 vehicle holding lanes that accommodate up to 450 vehicles, and overhead passenger loading facilities. The terminal has four slips: main, auxiliary, and two tie-up slips. Steel wingwalls are present in the main and auxiliary slips, a timber half-wing wingwall in Tie-up Slip 1, and a timber wingwall in Tie-up Slip 2. Twenty dolphins are associated with the terminal, fourteen steel and six wood.

4.1.1 Anacortes Environmental Baseline

4.1.1.1 Physical Indicators

Substrate and Slope

Near the terminal, shorelines contain relatively steep, rocky shorelines punctuated by sandy/cobble/gravel beaches (see Figures AN-3 and AN-4). The adjacent Shannon Point Bluff is eroding and is a source of sediment to Guemes Channel, and Ship Harbor is considered a pro-graded beach.

At the ferry terminal, substrates below MLLW are primarily sand and silt, with larger areas of shell fragments in offshore areas. Substrates above MLLW are a mix of gravel, cobble, and sand. Some riprap and hardened shoreline occurs at the bulkhead under the trestle and adjacent to the terminal.



Figure AN-3
Shoreline Area to the West of the Anacortes Ferry Terminal



Figure AN-4
Shoreline Area to the East of the Anacortes Ferry Terminal

The slope is relatively flat above -7.5 feet MLLW and then transitions to a steeper slope. Offshore depths of terminal structures are: head of main slip (-31.4 feet MLLW), auxiliary slip (-36.0 feet MLLW), tie-up slip #3 (-26.4 feet MLLW), and tie-up slip #4 (-21.8 feet MLLW). Maximum depth for fixed dolphins is -45.0 feet MLLW.

Salt/Freshwater Mixing

Near the terminal, there is one small stream that drains into Guemes Channel from Cranberry Lake, approximately 1.5 miles east of the terminal. There are no intermittent or perennial streams located adjacent to the ferry terminal, and no large river systems drain in the area.

There is a palustrine open water (POW) wetland (Cannery Lake) west of the ferry terminal and a POW, palustrine emergent (PEM), palustrine scrub shrub (PSS), and palustrine forested (POF) wetland (Ship Harbor) east of the ferry terminal (see Figure AN-2). These wetlands do not have a direct connection to Guemes Channel. It is possible, depending on tides and groundwater levels, that there is a subsurface connection between the Ship Harbor wetland and Guemes Channel.

Flows and Currents

Strong currents and tidal mixing within the area are influenced by the open marine waters surrounding the ferry terminal and winds and tides. A review of predicted currents between 2006 and 2008 indicates a high of -4.10 knots at a maximum ebb to 2.12 knots at maximum flood.

4.1.1.2 Chemical Indicators

Water Quality

The marine waters of Guemes Channel near the ferry terminal are designated “Extraordinary” for aquatic life use. No water quality parameters of concern were identified at the current terminal location (Ecology 2018). The water quality of adjacent receiving wetland waterbodies is unknown.

Sediment Quality

Anacortes is an urbanized area with industrial, commercial, and recreational uses along the waterfront. It is expected that sediments contain low levels of pollutants associated with urban runoff. At the ferry terminal, there are no known sources of industrial contamination or hazardous waste.

4.1.1.3 *Biological Indicators*

Shoreline Vegetation

Shoreline vegetation at the ferry terminal is generally absent. Existing vegetation consists predominately of shrubs and herbaceous vegetation. Much of this vegetation consists of invasive or non-native vegetation such as Himalayan blackberry (*Rubus discolor*) and Scotch broom (*Cytisus scoparius*) (see Figures AN-5 and AN-6).



Figure AN-5
Marine Riparian Vegetation



Figure AN-6
Buffer Vegetation Between Holding Lanes and Ship Harbor Wetland

Based on a review of aerial photographs, outside of the immediate terminal area it appears that a large portion of the shoreline within the area contains coniferous and deciduous tree and shrub vegetation.

Macroalgae and Eelgrass

Eelgrass and biological resources surveys were conducted in 1996 and 2003. The extent of the eelgrass bed in the area has changed since the 1996 survey. The seaward extent of the eelgrass bed has shifted inshore by 30 to 60 feet. Observations of a berm that ends just offshore of the current eelgrass bed suggest substrate movement and changes in bathymetry since the 1996 survey. The inside margin of the eelgrass bed was of a very similar configuration to that observed in 1996. In addition, the outside margin of the eelgrass bed in the area to the east of the existing tie-up slip was similar to that observed in 1996. Eelgrass is present from 0 feet MLLW to about -15 feet MLLW (see Figure AN-2). Maximum eelgrass densities range from 57.2 to 102.8 shoots per square meter.

Much of the eelgrass observed during the survey of transects had extensive *Smithora naiadum* growth on the blades. Dominant macroalgae consists of *Ulva* sp.

Enteromorpha sp. was often found, but generally covered less than 5 percent of the quadrat area surveyed. *Sarcodiotheca* sp., *Gracilaria* sp., and *Polysiphonia* sp. occur in the area located directly next to the existing auxiliary slip trestle. Sugar wrack (*Laminaria saccharina*) occurs as well as rockweed (*Fucus gardneri*), *Chondracanthus* sp., *Desmarestia* sp., and bull kelp (*Nereocystis leutkeana*).

Epibenthos, Macrofauna, Fish, and Marine Mammals

Substrates at the ferry terminal are expected to support epibenthic production.

Several invertebrates were observed during dive surveys in 1996 and 2003. Species observed include barnacles, limpets (*Diodora aspera*), anemones (*Cnidaria* sp.), sea stars (*Pisaster ochraceus*), perch, sculpin (*Cottus*), hermit crab (*Pagurus* sp.), sand lance (*Ammodytes hexapterus*), red rock crab (*Cancer productus*), graceful crab (*Cancer gracilis*), Dungeness crab (*Cancer magister*), and starry flounder (*Platichthys stellatus*).

In addition to species observed at the ferry terminal, marine mammals that could occur near the terminal include harbor seals (*Phoca vitulina*), harbor porpoises

(*Phocoena phocoena*), Steller sea lion (*Eumetopias jubatus*), and California sea lions (*Salophus californianus*). Offshore, Dall's porpoise (*Phocoenoides dalli*), gray whales, minke whales, and killer whales (*Esrichtichus robustus*, *Baleanoptera acutorostrata*, and *Orcinus orca*, respectively) have been observed. Humpback whales (*Megaptera novaeangliae*) have been sighted rarely since the early 1900s; however, sightings have increased since the early 1990s (Falcone et al. 2005).

Forage Fish

Documented surf smelt (*Hypomesus pretiosus*) spawning is present (see Figure AN-2), extending approximately 184 feet to the northwest and 406 feet to the southeast (WSDOT 2018a). There is no documented herring, herring holding areas, or sand lance spawning at the terminal.

4.1.2 Anacortes Species Distributions

4.1.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon-bearing streams are located near the Anacortes Ferry Terminal. However, major rivers that support Chinook salmon in this area of Puget Sound include the Skagit River (approximately 20 shoreline miles south), Nooksack River (approximately 22 shoreline miles north), and Stillaguamish River (approximately 30 shoreline miles south). Chinook salmon may also be present from rivers and streams in central and southern Puget Sound (WDFW 2007a).

Adult and Sub-adult Chinook

Migrating sub-adult and adult Chinook salmon have free access to the entire marine portion of the Anacortes Ferry Terminal area. These fish could be present near the ferry terminal year-round, but are likely to be more abundant in mid to late summer as they prepare to migrate to their natal rivers to spawn.

Juvenile Chinook

Recent information on anticipated juvenile Chinook utilization in the nearshore habitats of the ferry terminal area consists of research conducted in Skagit Bay and Bellingham Bay. Skagit Bay is located approximately 15 miles south of the ferry terminal and Bellingham Bay is located approximately 12 miles north of the ferry terminal. Given the close proximity of these research areas to major salmon

producing rivers (Skagit and Nooksack Rivers), juvenile Chinook densities in the research areas are likely to be higher than those anticipated at the ferry terminal.

However, both study areas provide data on the timing of juvenile Chinook occurrence in the nearshore. Eight years of beach seine data in Skagit Bay indicates that wild subyearling Chinook are most abundant along the shoreline between May and July, and then tail off in August (Beamer 2004). Wild subyearling Chinook were captured infrequently in Skagit Bay during beach seining efforts in September and October. A nearly identical pattern was observed in Bellingham Bay (Ballenger 1996) where monthly sampling continued through December. The Bellingham Bay research captured two juvenile Chinook in 14 sets in September and no juvenile Chinook were captured between October and December.

Similarly, tow-net sampling in deeper portions of the nearshore reveals a consistent downward trend in Chinook abundance in Skagit Bay between June and October (Rice et al. 2001). Tow-net sampling in Bellingham Bay also documented a summer peak and few juvenile Chinook captured in October (Beamer et al. 2003). No tow-net sampling was conducted in Bellingham Bay during September. In comparison to the beach seine results, juvenile Chinook presence in the Skagit Bay tow-net samples persisted later in the year (Rice et al. 2001). This observation supports the assumption that juvenile Chinook captured in the tow-net are fish that have moved offshore from the immediate shoreline area and are getting closer to beginning their marine migrations. Most of the juvenile Chinook caught from September to November were larger than those captured between February and July (over 110 millimeters).

4.1.2.2 *Puget Sound Chinook Salmon Critical Habitat*

The Anacortes Ferry Terminal lies within Chinook Zone 3 (Federal Register 2005a). Eelgrass beds in close proximity to the ferry terminal may be used by juvenile Chinook for rearing (Anchor 2004a).

The Primary Constituent Elements (PCEs) provided in the ferry terminal area, and their existing conditions, are listed in Table AN-2. PCEs relevant to the terminal area are numbered per Federal Register 2005a.

Table AN-1
Existing Conditions of Chinook Salmon PCEs at the Anacortes Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water ferry terminal structures include overhead loading, the trestles, the main and auxiliary slips, two tie-up slips, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Guemes Channel near the ferry terminal are designated "Extraordinary" for aquatic life use. Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018). The existing stormwater system at the ferry terminal site consists of two drainage areas. Approximately 25.7 acres drains through four outfalls to the Ship Harbor wetland; and 18.4 acres drains through five outfalls to Guemes Channel (note: one outfall to Guemes Channel drains to the Ship Harbor wetland seasonally in winter). The Ship Harbor wetland is likely to drain to Guemes Channel when the wetland stage is high via subsurface flow. A biofiltration swale is directly upgradient of one of the outfalls that drains directly to Guemes Channel (Ship Harbor seasonally), providing basic treatment for approximately 6 acres of impervious surfaces from the upper parking lot. There is no other treatment for stormwater runoff.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Substrates in the area are expected to support epibenthic production.</p> <p>Sand lance spawning occurs 400 feet southeast of the terminal. Documented surf smelt spawning at the terminal extending approximately 184 feet to the northwest and 406 feet to the southeast.</p> <p>Natural Cover Shoreline vegetation is generally absent. A 2003 dive survey identified submerged aquatic vegetation including eelgrass, which occurs north and south of the ferry terminal. Much of the eelgrass observed during the survey of transects had extensive <i>Smithora naiadum</i> growth on the blades. Dominant macroalgae consists of <i>Ulva</i> sp. <i>Enteromorpha</i> sp. was often found, but generally covered less than 5 percent of the quadrat area surveyed. <i>Sarcodiotheca</i> sp., <i>Gracilaria</i> sp., and <i>Polysiphonia</i> sp. were found along each transect in the area located directly next to the existing auxiliary slip trestle. Sugar wrack was observed in the area, as well as <i>Fucus gardneri</i> (rockweed), <i>Chondracanthus</i> sp., <i>Desmarestia</i> sp., and <i>Nereocystis leutkeana</i> (bull kelp) (Anchor 2004a).</p> <p>There is no large overhanging wood vegetation. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas; and gravel, cobble, and sand above MLLW within the defined area of critical habitat (Anchor 2004a). Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Ship Harbor and the portion of Guemes Channel near the ferry terminal are designated "Extraordinary" for aquatic life use per WAC 173-201(a). Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018).</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.1.2.3 *Puget Sound Steelhead (Oncorhynchus mykiss)*

There are no natal streams in the area of the Anacortes Ferry Terminal that support Puget Sound steelhead. However, major river systems that support winter and summer steelhead include the Samish River (approximately 15 shoreline miles northeast), Nooksack River (approximately 22 shoreline miles north), Skagit River (approximately 20 shoreline miles south), Stillaguamish River (approximately 30 shoreline miles south), and Snohomish River (approximately 50 shoreline miles south). Steelhead may also be present from rivers and streams in Hood Canal and southern Puget Sound (WDFW 2007a).

Available data from townet sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In townet sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

Beach seine sampling in Bellingham Bay (north Puget Sound) also captured few steelhead (Lummi Nation, unpublished data). The Bellingham Bay research reported the capture of two juvenile steelhead salmon in 336 sets between February 14 and December 1, 2003. The steelhead were captured in the eastern portion of Bellingham Bay near the Taylor Avenue Dock on June 12 and June 25, 2003.

4.1.2.3.1 *Puget Sound Steelhead Critical Habitat*

The Anacortes Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.1.2.4 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Anacortes ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.1.2.5 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Anacortes ferry terminal. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.1.2.6 *Southern Resident Killer Whale Critical Habitat*

The Anacortes Ferry Terminal area lies within designated critical habitat (Area 1 – Core Sumer Area). Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the terminal area, and their existing conditions, are listed in Table AN-3. PCEs relevant to the terminal area are numbered per Federal Register 2006.

Table AN-2
Existing Conditions of Southern Resident Killer Whale PCEs at the Anacortes Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Guemes Channel are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal are do not identify any water quality parameters of concern (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal site consists of two drainage areas. Approximately 25.7 acres drains through four outfalls to the Ship Harbor wetland; and 18.4 acres drains through five outfalls to Guemes Channel (note: one outfall to Guemes Channel drains to the Ship Harbor wetland seasonally in winter). The Ship Harbor wetland is likely to drain to Guemes Channel when the wetland stage is high via subsurface flow. A biofiltration swale is directly upgradient of one of the outfalls that drains directly to Guemes Channel (Ship Harbor seasonally), providing basic treatment for approximately 6 acres of impervious surfaces from the upper parking lot. There is no other treatment for stormwater runoff.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include a segment of overhead loading and the trestles, the main and auxiliary slips, two tie-up slips, and dolphins. It is unlikely that the presence of these structures affects passage conditions because killer whales can pass freely offshore of the ferry terminal.

4.1.2.7 *Bull Trout (Salvelinus confluentus)*

There are no natal streams in the area of the Anacortes Ferry Terminal that support bull trout (WDFW 2007a).

The aquatic portions of the ferry terminal are within marine foraging, migration, and overwintering (FMO) habitat. While bull trout have not been documented in the ferry terminal area, suitable FMO habitat is present, and bull trout are thought to occur throughout south, central, and northern Puget Sound. Eleven bull trout were captured during a beach seine in the Swinomish Channel in June 2001 (Yates 2001, cited in Goetz et al. 2004). In August 1976, one bull trout was captured in a tow net in Padilla Bay (Miller et al. 1977, cited in Goetz et al. 2004). Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the ferry

terminal area, it is expected that individual bull trout from the Lower Skagit River (approximately 20 shoreline miles south), Stillaguamish River (approximately 30 shoreline miles south), Nooksack River (approximately 22 shoreline miles north), and Snohomish River (approximately 50 shoreline miles south) core areas are most likely to be present (Chan 2005). Bull trout may also be present from rivers and streams in Hood Canal and southern Puget Sound (WDFW 2007a).

4.1.2.8 *Bull Trout Critical Habitat*

The Anacortes Ferry Terminal does not fall within designated bull trout critical habitat (Federal Register 2010a).

4.1.2.9 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of the Anacortes Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.1.2.10 *Green Sturgeon Critical Habitat*

The Anacortes Ferry Terminal does not fall within designated green sturgeon critical habitat (Federal Register 2018).

4.1.2.11 *Marbled Murrelet (Brachyramphus marmoratus)*

The Anacortes terminal area provides suitable marbled murrelet marine foraging habitat.

Documented surf smelt (prey species) spawning is present (see Figure AN-2), extending approximately 183 ft. NW and 414 ft. S of the terminal (WSDOT 2018a).

WDFW surveys conducted from 2001 to 2012 show a density of 1-3 murrelet per square kilometer in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 39 miles SW of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Anacortes murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles), ranges from Zero to Moderately High (WSDOT 2019b).

Five acres of contiguous coniferous forest that may offer nesting opportunity is present within the pile driving/heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c). The 0.25 mile Zone of potential effect is discussed in Section 3.4.

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 5,430 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 3,010 scheduled arrivals and departures (WSDOT 2018d).

Individual marbled murrelets were identified on the water near the terminal (once at 20 meters, twice at 50 meters, and once at 1 kilometer) on four separate days in January and February 2007 during construction of a dolphin replacement project at the terminal (WSF 2007b). A total of five murrelets were seen during the monitoring.

Anecdotal evidence from bird watchers located in Washington Park (facing Rosario Strait) indicate that marbled murrelets are likely in the area year round (Teachout, personal communication 2004).

4.1.2.12 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFWS 1996).

4.1.2.13 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Anacortes Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The water near the Anacortes Ferry Terminal remains shallow (less than 30 feet deep) throughout Guemes Channel.

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). The Guemes Channel is shallow, with muddy substrates. Yelloweye rockfish would be expected to reside in the nearby rocky substrata of the San Juan Islands and the Strait of Georgia, but not in the Guemes Channel.

4.1.2.14 *Rockfish Species Critical Habitat*

The Anacortes Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table AN-3. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Anacortes Ferry Terminal and will not be discussed here.

Table AN-3
Existing Conditions of Rockfish PBFs at the Anacortes Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Guemes Channel near the ferry terminal are designated "Extraordinary" for aquatic life use. Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal site consists of two drainage areas. Approximately 25.7 acres drains through four outfalls to the Ship Harbor wetland; and 18.4 acres drains through five outfalls to Guemes Channel (note: one outfall to Guemes Channel drains to the Ship Harbor wetland seasonally in winter). The Ship Harbor wetland is likely to drain to Guemes Channel when the wetland stage is high via subsurface flow. A biofiltration swale is directly upgradient of one of the outfalls that drains directly to Guemes Channel (Ship Harbor seasonally), providing basic treatment for approximately 6 acres of impervious surfaces from the upper parking lot. There is no other treatment for stormwater runoff.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to rockfish. Substrates in the area are expected to support epibenthic production.</p> <p>Sand lance spawning occurs 400 feet southeast of the terminal. Documented surf smelt spawning at the terminal extending approximately 184 feet to the northwest and 406 feet to the southeast.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>Substrates support epibenthic production. Surf smelt spawn approximately 0.75 mile north of the terminal.</p> <p>Dominant macroalgae in the area is eelgrass (<i>Zostera marina</i> L.) and benthic macroalgae (<i>Ulva</i> spp., <i>Laminaria</i> sp.).</p> <p>There is no large overhanging wood vegetation present to provide a food base from terrestrial organisms. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal.</p>

4.1.2.15 *Pacific Eulachon*

The Anacortes Ferry Terminal is distant from any of the known eulachon spawning rivers. If eulachon are present at the Anacortes Ferry Terminal, they are adults.

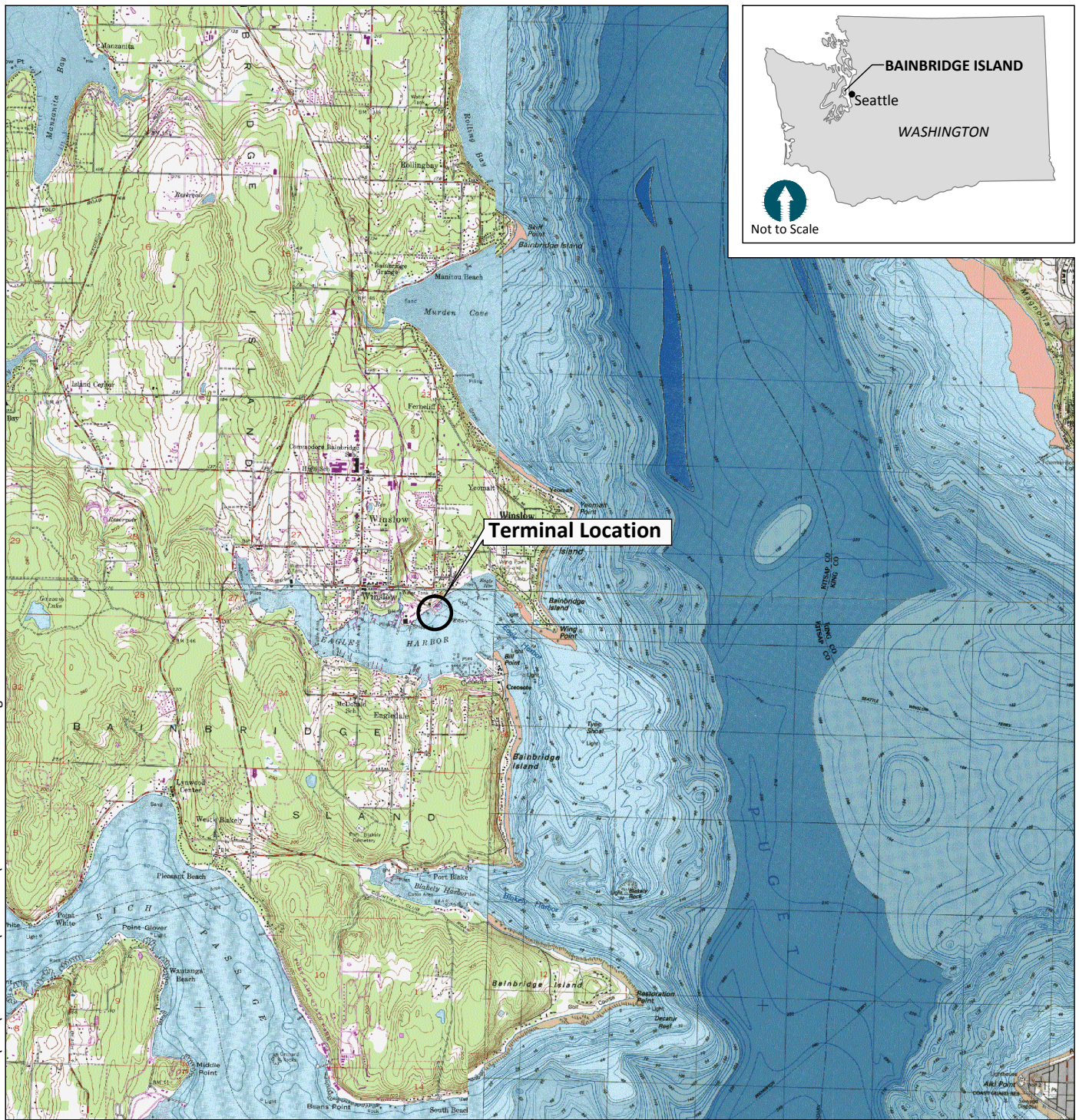
4.1.2.16 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Anacortes Ferry Terminal (Federal Register 2011).

BAINBRIDGE ISLAND

K:\Jobs\100016\WSF\10001603\10001603-BA-005-BA1.dwg FIG BA-1

Mar 14, 2012 12:37pm heriksen



NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Bremerton East, Seattle North and South, and Suquamish, Washington.

Section	Township	Range	Lat	Long	County
26	25N	2E	47° 37' 21" N	122° 30' 32.2" W	Kitsap
HUC 171100190402			WRIA 15		

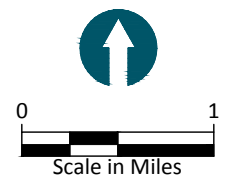


Figure BA-1
Bainbridge Island Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Winslow, Washington



Bainbridge Island Ferry Terminal: WSF Biological Assessment Reference

- Smelt Spawning
- - - Approximate Mean High Water (MHW)
- ▨ Macroalgae

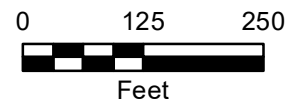
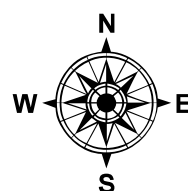


Figure BA-2

Aerial Photo of Bainbridge Ferry Terminal
WSF Biological Assessment Reference
Winslow, Washington



4.2 Bainbridge Island Ferry Terminal

The Bainbridge Island Ferry Terminal is located in the city of Bainbridge Island (formerly Winslow), on the shoreline of Eagle Harbor (see Figures BA-1 and BA-2).

The Bainbridge Ferry Terminal provides service to the Seattle Ferry Terminal (Colman Dock).

Features of the terminal include a terminal building, paid parking lots, 14 vehicle holding lanes that accommodate up to 212 vehicles, and overhead passenger loading facilities. The terminal has three slips that include a main, auxiliary, and tie-up slips. Steel wingwalls are present in the main and auxiliary slips and one 5-pile wingwall is present in the tie-up slip. Seven steel dolphins are associated with the terminal, four in the main slip, two in the auxiliary slip, and one in the tie-up slip.

4.2.1 Bainbridge Environmental Baseline

4.2.1.1 Physical Indicators

Substrate and Slope

The shoreline in the area is generally developed. Some riprap exists east of the ferry terminal. Low, steep bluffs rise behind the terminal on both sides. See Figures BA-3 and BA-4.

Substrate in the area is gently sloping sand, gravel, and shell in the intertidal areas, and drops off steeply toward the end of the terminal entrance. The high intertidal zones are characterized by cobble and gravel-sized sediment, and the mid- to low-intertidal areas are characterized by silt and sand (EPA 1989). Offshore depths of terminal structures are: head of main slip (-29.9 feet MLLW), auxiliary slip (-31.6 feet MLLW), and tie-up slip (-28.8 feet MLLW). Maximum depth for fixed dolphins is -40.4 feet MLLW, and the floating dolphin is -40.0 feet MLLW.



Figure BA-3
Beach Area on South Side of Bainbridge Island Ferry Terminal



Figure BA-4
Beach Area on North Side of Bainbridge Island Ferry Terminal

Salt/Freshwater Mixing

While several small streams drain into Eagle Harbor, there are no significant freshwater flows. A narrow ravine about 0.5 mile long drains into the harbor approximately 0.25 mile west of the ferry terminal.

Flows and Currents

Incoming tides circulate west along the northern shore of Eagle Harbor, and exit east along the center line of the bay. Tidal currents near the ferry terminal tend to follow an east-west direction to approximately -35 feet MLLW. Beyond -35 feet MLLW, currents tend to form a circular pattern during flood tides (EPA 1989).

4.2.1.2 *Chemical Indicators*

Water Quality

The marine waters of Eagle Harbor near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area (Eagle Harbor) include organics and metals (tissue-22 parameters) (Ecology 2018).

Sediment Quality

Impaired sediment quality listings in the terminal area (Eagle Harbor) include organics and metals (32 parameters) (Ecology 2018).

4.2.1.3 *Biological Indicators*

Shoreline Vegetation

Above MHHW, there is a strip about 100 feet wide of shrubs, some trees, and non-native and invasive English ivy and Himalayan blackberry between the beach and the paved ferry terminal holding area. Low but steep bluffs rise behind and on both sides of the terminal.

Macroalgae and Eelgrass

The most common algal species in the vicinity of the facility include *Ulva* sp. and diatoms. While there are no eelgrass or kelp (*Laminaria* sp.) communities in the area near the terminal, both are present at the mouth of Eagle Harbor near Wing Point, approximately 0.75 miles away.

Epibenthos, Macrofauna, Fish, and Marine Mammals

Based on sediment characteristics, substrates are expected to support epibenthic production. Macrofauna observed during a 1996 dive survey include horse clams (*Tresus* sp. *Indet* and *T. capax*), shrimp (*Pandalus danae*), anemones (*Anthozoa* sp. *Indet* and *Metridium giganteum*), and sea cucumbers (*Parastichopus californicus*). Geoduck clams (*Panopea abrupta*) were also recorded during the dive survey (Parametrix 1996).

Large moon snails (*Polinices lewisii*) were abundant under the existing trestles. Fish species commonly found in Eagle Harbor include English sole, rock sole (*Lepidopsetta bilineata*), C-O sole (*Pleuronichthys coenosus*), shiner perch (*Cymatogaster aggregata*), and ratfish. Geoduck and hardshell clam beds are located outside the mouth of Eagle Harbor, over 0.5 mile from the ferry terminal. River otters (*Lontra Canadensis*) are regularly sighted under the Eagle Harbor Maintenance Facility.

Forage Fish

Documented surf smelt spawning is present (see Figure BA-2), extending approximately 661 feet to the southwest and 660 feet to the northeast (WSDOT 2018a). There is no documented herring, herring holding areas, or sand lance spawning at the terminal.

4.2.2 Bainbridge Species Distributions

4.2.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon bearing streams are located near the Bainbridge Island Ferry Terminal. The closest major rivers that support Chinook salmon are the Lake Washington/Cedar River system (approximately 6 miles northeast, shoreline distance), Duwamish/Green River (approximately 7 miles southeast, shoreline distance), and the Puyallup River (approximately 27 miles southeast, shoreline distance) (WDFW 2007a). Chinook may also be present from rivers and streams in southern Puget Sound (WDFW 2007a). Smaller drainages are discussed below.

Adult and Sub-adult Chinook

Adult Puget Sound Chinook salmon destined for Sinclair Inlet and other west-central Puget Sound tributaries probably migrate through Eagle Harbor in late summer and early fall as they return from the ocean to natal streams and rivers (NMFS 2005).

Sub-adult Chinook have access to the terminal area and may be found there at any time of year. Sub-adults have spent a winter in the marine environment and are not closely oriented to the shoreline like juveniles.

Juvenile Chinook

Eagle Harbor provides habitat for multiple populations of Chinook salmon that are natal to streams elsewhere in Puget Sound. Use of this habitat necessitates crossing an open, deep water channel away from the protection of the nearshore environment. In Eagle Harbor, juvenile Chinook salmon have been found between April and August, with peak catches in May and June (NMFS 2005).

Between 2002 and 2004, juvenile Chinook salmon were sampled in beach seines set by the City of Bainbridge Island and the Suquamish Tribe in Eagle Harbor and along the eastern shoreline of Bainbridge Island, approximately 1.5 miles from Eagle Harbor (NMFS 2005). In Eagle Harbor, juvenile Chinook salmon were found between April and August, with peak catches in May and June (Table BA-1). Along the eastern shoreline of Bainbridge Island, juvenile Chinook salmon were found between June and September, with peak catches in June and August (Table BA-2). Mean size in April, May, and possibly September for all three years and both sampling locations was influenced by the small sample size and may not be reflective of the true size distribution (BA-3). However, between June and possibly September, mean size increased from 99 to 137 millimeters (mm) fork length, with standard deviations ranging from 6 mm to 25 mm.

Table BA-1
Total Number of Juvenile Chinook Captured in Beach Seine Sampling
in Eagle Harbor

Month	Year		
	2002	2003	2004
January			0
February			
March			0 (2 sets)
April			1
May		5 (2 sets)	1
June	4	0	0
July		0	
August			4
September		0	
October			0
November		0	
December		0 (2 sets)	0

Source: NMFS 2005

Note: One set per month unless otherwise indicated. Empty cells indicate that zero sets were conducted.

Table BA-2
Total Number of Juvenile Chinook Captured at a Beach Seine Sampling Station
along Eastern Shoreline of Bainbridge Island

Month	Year		
	2002	2003	2004
January			0
February			0
March			0 (2 sets)
April		0	0 (2 sets)
May		0 (2 sets)	0 (2 sets)
June	6	8 (2 sets)	1 (3 sets)
July	3 (3 sets)	4 (3 sets)	1
August	4	2 (2 sets)	8 (2 sets)
September	0 (2 sets)	0	4 (2 sets)
October		0	0
November		0	0
December		0	0

Source: NMFS 2005

Note: One set per month unless otherwise indicated. Empty cells indicate that zero sets were conducted.

Table BA-3
Forklengths of Juvenile Chinook Captured in Beach Seine Sampling
in or near Eagle Harbor

Month	Sample Size	Mean \pm St. Dev. (mm)
January	0	
February	0	
March	0	
April	1	58
May	6	121 \pm 21
June	19	99 \pm 17
July	8	118 \pm 25
August	18	126 \pm 18
September	4	137 \pm 6
October	0	
November	0	
December	0	

Source: NMFS 2005

Note: Data from all 3 years and all sampling locations combined per month

Near Colvos Passage (southwest of the ferry terminal) and in the Sinclair Inlet drainages, there are several small streams that support Chinook salmon. Curley Creek, which drains Long Lake and is a tributary to Yukon Harbor, is the nearest stream with Chinook (approximately 8 miles southwest, shoreline distance). A tributary to Sinclair Inlet, Gorst Creek (approximately 19 miles, shoreline distance) supports both summer and fall-run Chinook salmon (Williams et al. 1975). Chinook salmon spawning in Gorst Creek has increased in recent years, due in part to a reduction in the fishing effort in the area. Most of these fish are believed to be returns from hatchery Chinook salmon released from the Gorst Creek rearing ponds. An escapement of over 17,000 Chinook salmon to the Inlet (fishery harvests plus stream escapement) in 2002 was the largest on record, with over 10,000 adult Chinook salmon in Gorst Creek. Returns to the stream in the previous 3 years averaged about 2,400 adult Chinook salmon. An outmigrant trap recently installed at River Kilometer 1.4 on Gorst Creek (upstream of the hatchery) captured 1,352 juvenile Chinook salmon in 2001 and 324 juvenile Chinook salmon in 2002. Another tributary to Sinclair Inlet, Blackjack Creek (approximately 17.0 miles shoreline distance), supports Chinook salmon (WDFW 2006c).

4.2.2.2 *Puget Sound Chinook Salmon Critical Habitat*

The Bainbridge Island Ferry Terminal lies within Chinook Zone 14 (70 FR 52630). While there are no streams that support Chinook salmon in Eagle Harbor, there are eelgrass beds at the mouth of Eagle Harbor near Wing Point that may be used by juvenile Chinook for rearing (Ash 2001). Use of critical habitat in Eagle Harbor necessitates crossing an open, deep water channel away from the protection of the nearshore environment.

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table BA-4. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630/70 FR 52630).

Table BA-4
Existing Conditions of Chinook Salmon PCEs at the Bainbridge Island Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water ferry terminal structures include the trestles, the main and auxiliary slips, one tie-up slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use. Impaired waters listings for Eagle Harbor include organics and metals (tissue – 22 parameters; sediment – 32 parameters) (Ecology 2018). The existing stormwater system at the ferry terminal site consists of four drainage networks of catch basins that drain to Eagle Harbor. The largest system drains the holding lanes and toll booth approach lanes and consists of five catch basins. These catch basins discharge into a stormwater vault containing Kri-Star stormwater filters that provide secondary level treatment before discharging to Eagle Harbor. A second drainage network drains a portion of the entrance and exit lanes approaching the trestle and discharges under the existing concrete trestle. The other two smaller networks drain parking lots and discharge on the vegetated bank north of the ferry terminal building. None of the runoff from these areas is treated.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Based on sediment characteristics, substrates are expected to support epibenthic production.</p> <p>Surf smelt spawn year-round in Eagle Harbor.</p> <p>Natural Cover The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use. Impaired waters listings for Eagle Harbor include organics and metals (tissue – 22 parameters; sediment – 32 parameters) (Ecology 2018).</p> <p>The shoreline at the ferry terminal consists of riprap to the east. Existing conditions consist of a gently sloping bottom with cobble and gravel in the high intertidal zone; and sand, silt, gravel, and shell in the intertidal area within the defined area of critical habitat. Wood and steel debris is common under the ferry terminal. The bottom drops off steeply toward the wingwalls and dolphins (EPA 1989). Side channels do not occur in the ferry terminal area.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use per WAC 173-201(a). Ecology’s 2012 303 (d) water quality parameters of concern for Eagle Harbor include copper and bacteria (water) and organics and metals (tissue-23 parameters).</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.2.2.3 Puget Sound Steelhead (*Oncorhynchus mykiss*)

There are no natal streams in the area of the Bainbridge Island Ferry Terminal that support Puget Sound steelhead. However, major river systems that support winter steelhead include the Lake Washington system (approximately 6 miles northeast,

shoreline distance), Duwamish/Green (approximately 7 miles southeast, shoreline distance) and the Puyallup (approximately 27 miles southeast, shoreline distance). The Duwamish/Green River also supports a run of summer steelhead. Steelhead may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

In addition, winter steelhead are present in Curley Creek just west of the Southworth Ferry Terminal in Yukon Harbor (approximately 8 shoreline miles southwest), Shingle Mill Creek on Vashon Island (approximately 10 shoreline miles southwest), Blackjack Creek (approximately 13 shoreline miles southwest), Ross Creek (approximately 14 shoreline miles southwest), Anderson Creek (approximately 15 shoreline miles southwest), and Gorst Creek (approximately 16 shoreline miles southwest)—all tributaries to Sinclair Inlet; and Chico Creek (approximately 15 shoreline miles northwest), Barker Creek (approximately 17 shoreline miles northwest), Strawberry Creek (approximately 17 shoreline miles northwest), and Clear Creek (approximately 18 shoreline miles northwest)—all tributaries to Dyes Inlet (WDFW 2007a).

Available data from townet sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In townet sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004). Also during 2001 and 2002, beach seining, tow netting, and purse seining were conducted by WDFW in Sinclair Inlet. This sampling effort focused on beach seining, which occurred monthly from April to October in 2001 and from mid February to September in 2002. Tow netting was conducted monthly

from May to August in 2002 only and purse seining was limited to only 2 days in July of 2002. The sampling effort resulted in the capture of four steelhead out of a total of 21,500 salmonids. Despite the larger effort given to beach seining, of the four steelhead, only one was caught in the beach seine and the remaining three were caught in deeper water with the tow net and purse seine (Fresh et al. 2006).

Steelhead were infrequently captured in a 2002-2004 beach seine study around Bainbridge Island. The study consisted of 271 beach seine sets conducted between April and September 2002 and between April 2003 and December 2004. Three steelhead were captured in the study; one was captured in May and two were captured in September. The steelhead were 179, 280, and 300 mm in total length. One of the three steelhead had been fin clipped, indicating it was of hatchery origin (City of Bainbridge Island, Suquamish Tribe, and WDFW 2005). During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004).

4.2.2.4 *Puget Sound Steelhead Critical Habitat*

The Bainbridge Island Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.2.2.5 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Bainbridge Island ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.2.2.6 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Bainbridge Island ferry terminal. Sightings data will be summarized in each project BA. The data may

come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.2.2.7 *Southern Resident Killer Whale Critical Habitat*

The Bainbridge Island Ferry Terminal lies within Area 2 – Puget Sound considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table BA-5. PCEs relevant to the terminal area are numbered per the CFR (Federal Register 2006).

**Table BA-5
Existing Conditions of Southern Resident Killer Whale PCEs at the Bainbridge Island Ferry Terminal**

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area include organics and metals (tissue-22 parameters; sediment – 32 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal site consists of four drainage networks of catch basins that drain to Eagle Harbor. The largest system drains the holding lanes and toll booth approach lanes and consists of five catch basins. These catch basins discharge into a storm water vault containing Kri-Star storm water filters that provide secondary level treatment before discharging to Eagle Harbor. A second drainage network drains a portion of the entrance and exit lanes approaching the trestle and discharges under the existing concrete trestle. The other two smaller networks drain parking lots and discharge on the vegetated bank north of the ferry terminal building. None of the runoff from these areas is treated.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include a segment of the overhead loading and trestles; the main, auxiliary, and tie-up slips; and dolphins. It is unlikely that the presence of these structures affects passage conditions because killer whales have not been observed in Eagle Harbor.

4.2.2.8 *Bull Trout (Salvelinus confluentus)*

There are no natal streams in the area of the Bainbridge Island Ferry Terminal that support bull trout. It is unlikely that anadromous bull trout would enter Eagle Harbor (WDFW 2007a).

The aquatic portions of the ferry terminal are within marine FMO habitat. Suitable FMO habitat is present, and bull trout are thought to occur throughout south, central, and northern Puget Sound. Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the ferry terminal area, it is expected that individual bull trout from the Lake Washington/Cedar River system (approximately 6 miles northeast, shoreline distance), Duwamish/Green River (approximately 7 miles southeast, shoreline distance), and the Puyallup River (approximately 27 miles southeast, shoreline distance) core areas are most likely to be present. Bull trout may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

In August 2005, an acoustic tag was detected off the northeast point of Bainbridge Island. The tag code corresponded to a bull trout tagged 2 years earlier in the north Swinomish Channel. The fish was only detected once and therefore there is some uncertainty with the finding (Goetz 2007). No other historic or current references indicate the occurrence of bull trout (or Dolly Varden) on the west side of Puget Sound, main basin, or Kitsap Peninsula. Char are infrequent migrants across deep inlets, such as the main basin (Goetz et al. 2004).

4.2.2.9 *Bull Trout Critical Habitat*

The Bainbridge Island Ferry Terminal does not fall within designated bull trout critical habitat (Federal Register 2010a).

4.2.2.10 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of Eagle Harbor that support green sturgeon. Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound

are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.2.2.11 *Green Sturgeon Critical Habitat*

Eagle Harbor does not fall within designated green sturgeon critical habitat (Federal Register 2018).

4.2.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Bainbridge terminal area provides suitable marbled murrelet marine foraging habitat.

Documented surf smelt (prey species) spawning is present (see Figure BA-2), extending approximately 629 ft. N and 625 ft. S of the terminal (WSDOT 2018a).

WDFW surveys conducted from 2001 to 2012 show a density of less than 1 bird per square kilometer in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 27 miles W of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Bainbridge murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles) is Zero (WSDOT 2019b).

Five acres of contiguous forest that may offer nesting opportunity is present within the pile driving/heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c). A WSF Biologist visited the terminal area on 12/13/18. Although there were 5 acres of contiguous forest, it was less than the required 60% coniferous. Therefore, the forest does not offer appropriate nesting opportunity (WSDOT 2018f).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 16,520 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 8,290 scheduled arrivals and departures (WSDOT 2018d).

4.2.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFW 1996).

4.2.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Bainbridge Island Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The water near the Bainbridge Island Ferry Terminal reaches a maximum of 70 feet deep near the harbor mouth (NMFS 2009).

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). Eagle Harbor is relatively shallow, but does not have the rocky substrata required by adult yelloweye rockfish.

4.2.2.15 *Rockfish Species Critical Habitat*

The Bainbridge Island Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table BA-6. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Bainbridge Island Ferry Terminal and will not be discussed here.

Table BA-6
Existing Conditions of Rockfish PBFs at the Bainbridge Island Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use. Impaired waters listings for Eagle Harbor include organics and metals (tissue – 22 parameters; sediment – 32 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal site consists of four drainage networks of catch basins that drain to Eagle Harbor. The largest system drains the holding lanes and toll booth approach lanes and consists of five catch basins. These catch basins discharge into a stormwater vault containing Kri-Star stormwater filters that provide secondary level treatment before discharging to Eagle Harbor. A second drainage network drains a portion of the entrance and exit lanes approaching the trestle and discharges under the existing concrete trestle. The other two smaller networks drain parking lots and discharge on the vegetated bank north of the ferry terminal building. None of the runoff from these areas is treated.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Based on sediment characteristics, substrates are expected to support epibenthic production.</p> <p>Surf smelt spawn year-round in Eagle Harbor.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>The most common macroalgae species under the ferry terminal are <i>Ulva</i> sp. and diatoms. While there are no eelgrass or kelp communities in the area near the terminal, both are present at the mouth of Eagle Harbor near Wing Point, approximately 0.75 miles away. The upper shoreline in the area is relatively flat and is characterized by trees, shrubs, and some residential clearing. Low but steep bluffs rise behind and on both sides of the ferry terminal (Anchor 2005a).</p> <p>The shoreline at the ferry terminal consists of riprap to the east. Existing conditions consist of a gently sloping bottom with cobble and gravel in the high intertidal zone; and sand, silt, gravel, and shell in the intertidal area within the defined area of critical habitat. Wood and steel debris is common under the ferry terminal. The bottom drops off steeply toward the wingwalls and dolphins (EPA 1989). Side channels do not occur in the ferry terminal area.</p>

4.2.2.16 *Pacific Eulachon*

The Bainbridge Island Ferry Terminal is distant from any of the known eulachon spawning rivers. According to NMFS, eulachon are rare/absent in mid and south Puget Sound, and do not need to be consulted on for this terminal (Carey, personal communication, 2013).

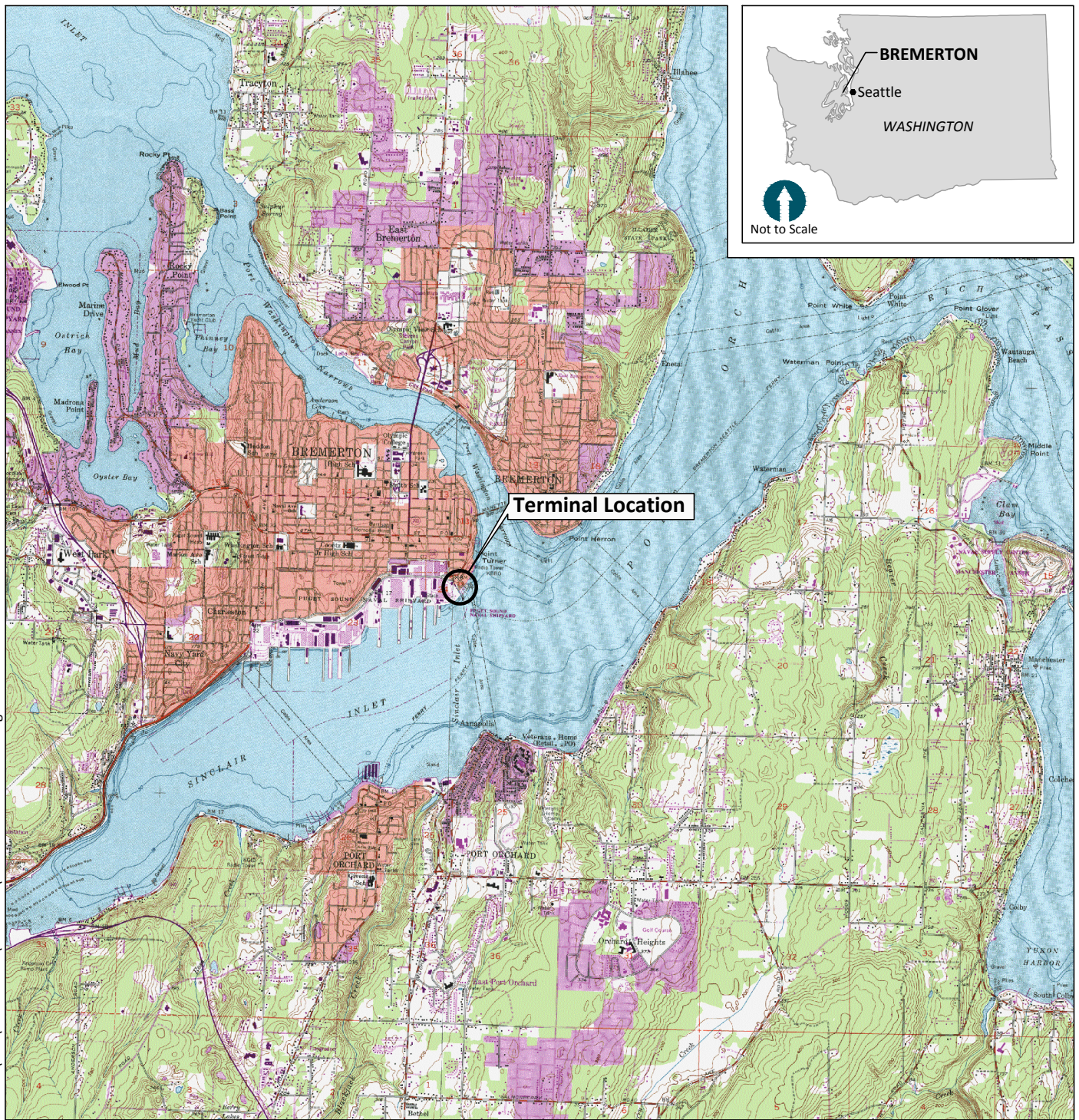
4.2.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Bainbridge Island Ferry Terminal (FEDERAL REGISTER 2011).

BREMERTON

K:\Jobs\10001603\10001603-BA-008-BR1.dwg FIG BR-1

Jan 09, 2012 3:37pm heriksen



NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Bremerton East and West, Washington.

Section	Township	Range	Lat	Long	County
24	24N	1E	47° 33' 44" N	122° 37' 23" W	Kitsap
HUC 171100190103			WRIA 15		



Figure BR-1
Bremerton Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Bremerton, Washington



Bremerton Ferry Terminal: WSF Biological Assessment Reference

--- Approximate Mean High Water (MHW)

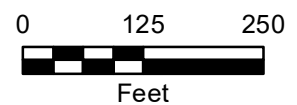
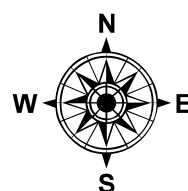


Figure BR-2
Aerial Photo of Bremerton Ferry Terminal
WSF Biological Assessment Reference
Bremerton, Washington

4.3 Bremerton Ferry Terminal

The Bremerton Ferry Terminal is located in the city of Bremerton, east of the Navy ship yard. Bremerton is on the shoreline of Sinclair Inlet, south of Bainbridge Island (see Figures BR-1 and BR-2).

The Bremerton Ferry Terminal provides service to the Seattle Ferry Terminal (Colman Dock).

Features of the terminal include a terminal building, 13 vehicle holding lanes that accommodate up to 230 vehicles, and overhead passenger loading facilities. No paid parking is available at the Bremerton Ferry Terminal. The terminal has main and auxiliary slips. Steel wingwalls are present in the main and auxiliary slips. Six steel dolphins are associated with the terminal, three in the main slip and three in the auxiliary slip. Two timber dolphins are also associated with the terminal, one each in the main and auxiliary slips.

4.3.1 Bremerton Environmental Baseline

4.3.1.1 Physical Indicators

Substrate and Slope

Substrates in Sinclair Inlet are comprised of gravel, sand, mud/clay, and shell hash. Some woody debris and garbage (i.e., bottles, tires, and cable) are present. The shoreline is heavily armored with riprap (see Figures BR-3 and BR-4). Offshore depths of terminal structures are: head of main slip (-29.9 feet MLLW), auxiliary slip (-31.6 feet MLLW), and tie-up slip (-28.8 feet MLLW). Maximum depth for fixed dolphins is -40.4 feet MLLW.



Figure BR-3
Shoreline Area to the West of the Bremerton Ferry Terminal



Figure BR-4
Shoreline Area to the East of the Bremerton Ferry Terminal

Salt/Freshwater Mixing

There are no streams, creeks, or rivers in the vicinity of the ferry terminal that drain into Sinclair Inlet.

Flows and Currents

Currents passing through Port Washington Narrows can reach as high as 4 knots. As the mouth of the Narrows opens in the vicinity of the ferry terminal, maximum currents slow to 2 knots.

4.3.1.2 *Chemical Indicators*

Water Quality

The marine waters of Sinclair Inlet near the ferry terminal are designated “Excellent” for aquatic life use. The impaired waters listings in the terminal area include dissolved oxygen, and temperature (water), and arsenic (tissue) (Ecology 2018).

Sediment Quality

The terminal is east of the Puget Sound Naval Shipyard Superfund Site. Sediments contaminated with PCBs and mercury were dredged and placed in a confined aquatic disposal site in 2004. Monitoring indicates that post-clean up goals for PCBs are not being met, and additional remedial actions are being developed.

Impaired sediment quality listings in the terminal area (Sinclair Inlet) include organics and metals (22 parameters) (Ecology 2018).

4.3.1.3 *Biological Indicators*

Shoreline Vegetation

The shoreline is heavily armored with bulkheads and riprap, and there is no shoreline vegetation at the terminal. Minimal riparian buffer vegetation occurs north of the ferry terminal (see Figure BR-2).

Macroalgae and Eelgrass

No significant macroalgae occurs in the vicinity of the ferry terminal. Recorded macroalgae includes red algae (*Iridaea cordata*) and gracilaria (*Gracilaria pacifica*). No eelgrass occurs in the vicinity of the ferry terminal.

Epibenthos, Macrofauna, Fish, and Marine Mammals

The lack of nearshore intertidal habitat combined with the heavily armored shoreline are not expected to support significant epibenthic production. Macrofauna occurring in the vicinity of the ferry terminal include sea pens, anemones, rock crab, shrimp, sea cucumber, sea stars, and few geoduck. Intertidal hardshell clams occur in the Port Washington Narrows. Harbor seals, harbor porpoise, and killer whales occur near the area, and gray whales have been sighted in the Port Washington Narrows over the years.

Forage Fish

There is no documented forage fish spawning present in the terminal area (WSDOT 2018a). A herring pre-spawn holding area is located approximately 4,000 feet east of the terminal.

4.3.2 Bremerton Species Distributions

4.3.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon-bearing streams are located near the Bremerton Ferry Terminal. The nearest Chinook salmon-bearing streams are Blackjack Creek (approximately 1 shoreline mile south) and Gorst Creek (approximately 4 shoreline miles southwest), both located in Sinclair Inlet; and Chico Creek (approximately 6 shoreline miles northwest), Barker Creek (approximately 6 shoreline miles north), and Clear Creek (approximately 7 shoreline miles north), all located in Dyes Inlet (WDFW 2007a). Chinook may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

Adult and Sub-adult Chinook

Adult Chinook salmon may be found near the terminal at any time of year, but are most abundant in the late summer and fall when returning from the ocean to their natal streams.

Sub-adult Chinook have access to the terminal area and may be found there at any time of year. Sub-adults have spent a winter in the marine environment and are not closely oriented to the shoreline like juveniles.

Juvenile Chinook

In 2001/2002, WDFW conducted a field study of juvenile salmon use of Sinclair Inlet, focusing on sub-yearling Chinook salmon. Study goals included assessing juvenile Chinook use of nearshore and offshore habitat, determining residence time of hatchery salmonids, and evaluating salmonids diet, along with predator and competitor diet.

In both years, 21 sites were sampled in three study areas to track spatial and temporal patterns of fish distribution in beach seine surveys from February through

September. Most of the analyses were based on a limited number of regularly sampled sites; eight in 2001 and 13 in 2002. In 2002, additional beach seining was done to recapture juvenile Chinook salmon marked with florescent pigment in order to estimate their residence time in Sinclair Inlet. A tow net (or a two-boat surface trawl) was used to sample the upper 3 meters of the water column of study sites within Sinclair Inlet in 2002 only. Tow net samples were collected monthly from May to August 2002 during day and night hours along both shorelines and offshore. Table BR-1 provides juvenile Chinook catch numbers for the months when sampling occurred in 2002. The report (WDFW 2006c) did not provide similar data for 2001.

Table BR-1
Total Number of Juvenile Chinook Captured in Sinclair Inlet in 2002

Month	Number Captured
February	0
March	0
April	0
May	2,964
June	2,325
July	1,431
August	208
September	26

Source: WDFW 2006c

A major source of both naturally produced and hatchery Chinook salmon in the study area was Gorst Creek, at the terminus of Sinclair Inlet. In addition, juvenile Chinook salmon originated from a large number of sources outside the study area. In general, about 10 percent of the juvenile Chinook salmon collected each year and in each habitat type (nearshore and offshore) were unmarked sub-yearlings and possibly the progeny of naturally spawning fish. There was little difference in patterns of distribution, abundance, and size of hatchery origin and naturally spawning fish, suggesting: 1) hatchery and naturally spawning fish behave similarly; or 2) most fish assumed to be naturally spawning were unmarked hatchery fish.

The findings of this study indicate that Sinclair Inlet is used by three major groups of juvenile Chinook salmon:

- The first group consists of hatchery origin fish released into Gorst Creek, typically in late May through the end of June. The fish disperse throughout

the Inlet (appearing to use both inshore and offshore habitats), with most of the fish rapidly leaving the Inlet.

- Second, hatchery fish from sources outside the Inlet migrate into Sinclair Inlet. This group is present from July to September. It is possible that some of these fish may reside for an extended period of time in Sinclair Inlet.
- Third, naturally spawning Chinook salmon use the Inlet. These fish could be naturally spawning fish from Gorst Creek or nearby local systems, or move into the Inlet from other river systems. The only way to identify wild fish was by a lack of marks or tags identifying them as hatchery fish. Differences in distribution, growth patterns, or diet composition between hatchery and naturally spawning Chinook were not detected. It is possible that unmarked fish are of hatchery origin. However, this may be due to the unmarked hatchery component of the naturally spawning group or the low numbers captured of naturally spawning fish overall. Alternatively, the two groups may behave similarly during their early life history in Sinclair Inlet.

Juvenile Chinook salmon are present in Sinclair Inlet littoral habitats from early spring through early fall, at a minimum. Sinclair Inlet shorelines are host to juvenile Chinook salmon from throughout Puget Sound during late spring and summer months, and likely include both hatchery and natural origin fish (WDFW 2006c).

4.3.2.2 *Puget Sound Chinook Salmon Critical Habitat*

The Bremerton Ferry Terminal lies within Chinook Zone 14 (70 FR 52630). The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table BR-2. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630).

Table BR-2
Existing Conditions of Chinook Salmon PCEs at the Bremerton Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include overhead loading, the trestles, the main and auxiliary slips, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Sinclair Inlet near the ferry terminal are designated "Excellent" for aquatic life use. The impaired waters listings in the terminal area include dissolved oxygen, and temperature (water), arsenic (tissue), and organics and metals (sediment – 22 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal site consists of the holding area and dock. The holding area is drained by a series of catch basins, area drains, and drop pipes that lead to a 30-inch storm drain pipe. Treatment is provided by a sedimentation/oil vault before discharging to Sinclair Inlet. The treatment system is maintained by the City of Bremerton. The dock area is drained by area drains and drop pipes that discharge untreated stormwater directly to Sinclair Inlet.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>The lack of nearshore intertidal habitat, combined with the heavily armored shoreline, make it unlikely that the area supports significant epibenthic production.</p> <p>Surf smelt spawn approximately 0.25 mile north of the terminal.</p> <p>Natural Cover There is no shoreline vegetation at the terminal. Sparse riparian vegetation exists north of the terminal. No significant macroalgae occurs in the vicinity of the terminal, and there is no eelgrass at the terminal. The existing conditions consist of large rock within the defined area of critical habitat. Side channels do not occur in the ferry terminal area.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Sinclair Inlet are designated "Excellent" for aquatic life use. The impaired waters listings in the terminal area include dissolved oxygen and temperature (water), arsenic (tissue), and organics and metals (sediment – 22 parameters) (Ecology 2018)</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.3.2.3 Puget Sound Steelhead (*Oncorhynchus mykiss*)

Natal streams in the area of the Bremerton Ferry Terminal that support Puget Sound steelhead include Blackjack Creek (approximately 1 shoreline mile south), Ross Creek (approximately 2 shoreline miles southwest), Anderson Creek (approximately 4 shoreline miles southwest), and Gorst Creek (approximately 4 shoreline miles southwest), all located in Sinclair Inlet; and Chico Creek (approximately 6 shoreline miles northwest), Barker Creek (approximately 6 shoreline miles north), Strawberry

Creek (approximately 6.8 shoreline miles north), and Clear Creek (approximately 7 shoreline miles north), all located in Dyes Inlet (WDFW 2007a).

Major river systems in this area of Puget Sound that support winter steelhead include the Lake Washington/Cedar River system (approximately 16 miles northeast, shoreline distance), Duwamish/Green River (approximately 14 miles southeast, shoreline distance), and the Puyallup River (approximately 31 miles southeast, shoreline distance). The Duwamish/Green River also supports a run of summer steelhead.

Available data from townet sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In townet sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004). Also during 2001 and 2002, beach seining, tow netting, and purse seining were conducted by WDFW in Sinclair Inlet. This sampling effort focused on beach seining, which occurred monthly from April to October in 2001 and from mid February to September in 2002. Tow netting was conducted monthly from May to August in 2002 only and purse seining was limited to only 2 days in July of 2002. The sampling effort resulted in the capture of four steelhead out of a total of 21,500 salmonids. Despite the larger effort given to beach seining, of the four steelhead, only one was caught in the beach seine and the remaining three were caught in deeper water with the tow net and purse seine (Fresh et al. 2006).

Steelhead were also infrequently captured in a beach seine study around Bainbridge Island (City of Bainbridge Island, Suquamish Tribe, and WDFW 2005). The study

consisted of 271 beach seine sets conducted between April and September 2002 and between April 2003 and December 2004. Three steelhead were captured in the study: one was captured in May and two were captured in September. The steelhead were 179, 280, and 300 mm in total length. One of the three steelhead had been fin clipped, indicating it was of hatchery origin.

4.3.2.4 *Puget Sound Steelhead Critical Habitat*

The Bremerton Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.3.2.5 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Bremerton ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.3.2.6 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Bremerton ferry terminal. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.3.2.7 *Southern Resident Killer Whale Critical Habitat*

The Bremerton Ferry Terminal lies within Area 2 – Puget Sound, considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table BR-3. PCEs relevant to the terminal area are numbered per the CFR (Federal Register 2006).

Table BR-3
Existing Conditions of Southern Resident Killer Whale PCEs at the Bremerton Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Sinclair Inlet are designated “Excellent” for aquatic life use. The impaired waters listings in the terminal area include dissolved oxygen and temperature (water), arsenic (tissue), and organics and metals (sediment – 22 parameters) (Ecology 2018)</p> <p>The existing stormwater system at the ferry terminal site consists of the holding area and dock. The holding area is drained by a series of catch basins, area drains, and drop pipes that lead to a 30-inch storm drain pipe. Treatment is provided by a sedimentation/oil vault before discharging to Sinclair Inlet. The treatment system is maintained by the City of Bremerton. The dock area is drained by area drains and drop pipes that discharge untreated stormwater directly to Sinclair Inlet.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include a segment of the overhead loading and trestles, the main and auxiliary slips, and dolphins.

4.3.2.8 Bull Trout (*Salvelinus confluentus*)

There are no natal streams in the area of the Bremerton Ferry Terminal that support bull trout (WDFW 2007a).

The aquatic portions of the ferry terminal are within marine FMO habitat. While bull trout have not been documented in the ferry terminal area, suitable FMO habitat is present, and bull trout are thought to occur throughout south, central, and northern Puget Sound. Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the ferry terminal area, it is possible that individual bull trout from the Lake Washington/Cedar River system (approximately 16 miles northeast, shoreline distance), the Duwamish/Green River (approximately 14 miles east, shoreline distance) and the Puyallup River (approximately 31 miles southeast shoreline distance) could be present (WDFW 2007a).

During 2001 and 2002, beach seining, tow netting, and purse seining was conducted by WDFW to determine juvenile salmon use of Sinclair Inlet. This sampling effort focused on beach seining, which occurred monthly from April to October in 2001 and from mid February to early September in 2002. Tow netting was conducted monthly from May to August in 2002 only and purse seining was limited to only 2 days in July of 2002. No bull trout were captured during this 2-year sampling effort. In August 2005, an acoustic tag was detected off the northeast point of Bainbridge Island. The tag code corresponded to a bull trout tagged 2 years earlier in the north Swinomish Channel. The fish was only detected once and therefore there is some uncertainty with the finding (Goetz 2007). No other historic or current references indicate the occurrence of bull trout (or Dolly Varden) on the west side of Puget Sound, main basin, or Kitsap Peninsula. Char are infrequent migrants across deep inlets, such as the main basin, and observations of bull trout suggest they frequent shoreline areas (Goetz et al. 2004).

4.3.2.9 *Bull Trout Critical Habitat*

The Bremerton Ferry Terminal does not fall within designated bull trout critical habitat (Federal Register 2010a).

4.3.2.10 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of the Bremerton Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.3.2.11 *Green Sturgeon Critical Habitat*

The Bremerton Ferry Terminal does not fall within designated green sturgeon critical habitat (Federal Register 2009).

4.3.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Bremerton terminal area provides suitable marbled murrelet marine foraging habitat.

There is no documented forage fish spawning present at the terminal (WSDOT 2018ac).

WDFW surveys conducted from 2001 to 2012 show a density of less than 1 bird per square kilometer in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 22 miles NW of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Bremerton murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles) is Zero (WSDOT 2019b). There are no coniferous forest that may offer nesting opportunity within the pile driving/heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 10,900 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 5,465 scheduled arrivals and departures (WSDOT 2018d).

In preparation for a WSDOT project to rehabilitate the Manette Bridge in Bremerton, ten at-sea surveys for marbled murrelet and marine mammals were completed by the U.S. Department of Agriculture Pacific Research Station in Sinclair Inlet between

July 2006 and January 2007 (at 2 to 4 week intervals). No marbled murrelet were observed during these surveys (USDA 2007).

4.3.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFWS 1996).

4.3.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Bremerton Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The Sinclair Inlet reaches depths of over 100 feet within 3 miles to the northeast of the terminal (NMFS 2009). It is possible that adult bocaccio could be found in these deeper waters.

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). Substrates near the terminal are generally sandy. Rocky substrates such as those favored by yelloweye rockfish are not found in Sinclair Inlet.

4.3.2.15 *Rockfish Species Critical Habitat*

The Bremerton Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table BR-4. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Anacortes Ferry Terminal and will not be discussed here.

Table BR-4
Existing Conditions of Rockfish PBFs at the Bremerton Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Guemes Channel near the ferry terminal are designated "Extraordinary" for aquatic life use. Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal site consists of two drainage areas. Approximately 25.7 acres drains through four outfalls to the Ship Harbor wetland; and 18.4 acres drains through five outfalls to Guemes Channel (note: one outfall to Guemes Channel drains to the Ship Harbor wetland seasonally in winter). The Ship Harbor wetland is likely to drain to Guemes Channel when the wetland stage is high via subsurface flow. A biofiltration swale is directly upgradient of one of the outfalls that drains directly to Guemes Channel (Ship Harbor seasonally), providing basic treatment for approximately 6 acres of impervious surfaces from the upper parking lot. There is no other treatment for stormwater runoff.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to rockfish. Substrates in the area are expected to support epibenthic production.</p> <p>Sand lance spawning occurs 400 feet southeast of the terminal. Documented surf smelt spawning at the terminal extending approximately 184 feet to the northwest and 406 feet to the southeast.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>There is no shoreline vegetation at the terminal. Sparse riparian vegetation exists north of the terminal. No significant macroalgae occurs in the vicinity of the terminal, and there is no eelgrass at the terminal. The existing conditions consist of large rock within the defined area of critical habitat. Side channels do not occur in the ferry terminal area.</p>

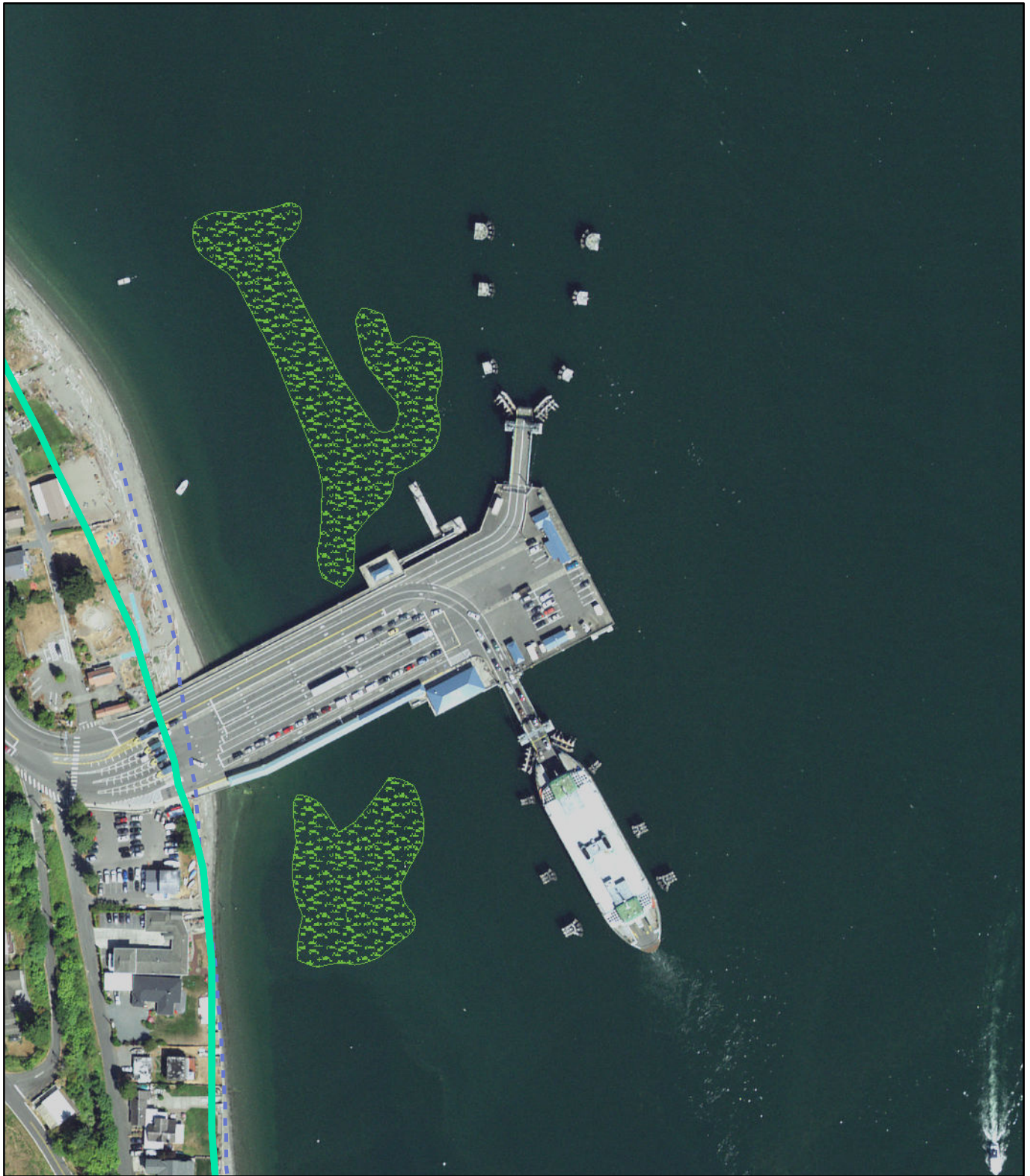
4.3.2.16 *Pacific Eulachon*

The Bremerton Ferry Terminal is distant from any of the known eulachon spawning rivers. According to NMFS, eulachon are rare/absent in mid and south Puget Sound, and do not need to be consulted on for this terminal (Carey, personal communication, 2013).

4.3.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Bremerton Ferry Terminal (FEDERAL REGISTER 2011).

Insert Clinton Tab



Clinton Ferry Terminal: WSF Biological Assessment Reference

- Smelt Spawning
- Approximate Mean High Water (MHW)
- Eel Grass

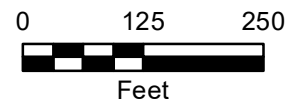
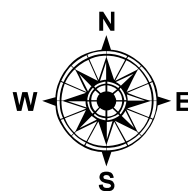


Figure CL-2

Aerial Photo of Clinton Ferry Terminal
WSF Biological Assessment Reference
Clinton, Washington



4.4 Clinton Ferry Terminal

The Clinton Ferry Terminal is one of two WSF terminals on Whidbey Island. Clinton is close to the southern tip of the island, on the eastern side facing Possession Sound (see Figures CL-1 and CL-2).

The Clinton Ferry Terminal provides service to the Mukilteo Ferry.

Features of the terminal include a terminal building, 10 vehicle holding lanes that accommodate up to 190 vehicles, an upper parking lot, and roadside holding. The terminal has main and auxiliary slips. Steel wingwalls are present in both the main slip and auxiliary slip. Twelve steel dolphins are associated with the terminal, six in the main slip and six in the auxiliary slip.

4.4.1 Clinton Environmental Baseline

4.4.1.1 Physical Indicators

Substrate and Slope

A small sandy beach with low bank waterfront exists north of the terminal. South of the terminal, the beach is moderately sloping coarse sand to approximately MLLW. See Figures CL-3 and CL-4. The terminal exists in a portion of beach that is somewhat steeper than areas within 0.5 mile north and 0.5 mile south of the terminal.



Figure CL-3
Shoreline Area to the North of the Clinton Ferry Terminal



Figure CL-4
Shoreline Area to the South of the Clinton Ferry Terminal

Seaward of MLLW, the beach slope decreases, and substrates consists of medium to fine sands, wood, and shell debris. Offshore depths of terminal structures are: head of main slip (-34.0 feet MLLW) and auxiliary slip (-33.1 feet MLLW). Maximum depth for fixed dolphins is -40.8 feet MLLW.

Salt/Freshwater Mixing

A few small streams near and north and south of the terminal drain into Possession Sound but are not likely to contribute much freshwater. The location of one of these outfalls is shown on Figure CL-2.

Flows and Currents

Currents in Possession Sound are considered weak and variable.

4.4.1.2 Chemical Indicators

Water Quality

The marine waters of Possession Sound are designated “Excellent” for aquatic life use. No water quality parameters of concern were identified at the current terminal location (Ecology 2018).

Sediment Quality

No sediment quality data is available in the immediate terminal area (Ecology 2018).

4.4.1.3 Biological Indicators

Shoreline Vegetation

There is very little to no shoreline riparian vegetation in the vicinity of the ferry terminal. Extensive residential development exists to the north and south of the terminal and the adjacent uplands. The shoreline to the south of the terminal has an extensive length of bulkheads and hardened shoreline.

Macroalgae and Eelgrass

Dominant macroalgae in the area is green algae and kelp (*Ulva* spp.) and benthic diatoms. *Ulva* is found between MLLW and -12 feet MLLW, and *Laminaria* typically occurs at depths greater than -10 feet MLLW. Eelgrass is abundant and is primarily distributed from MLLW to -10 feet MLLW (see Figure CL-2). Redevelopment of the Clinton Ferry Terminal in the late 1990s resulted in a large scale mitigation action that included transplanting eelgrass, monitoring associated epibenthic assemblages, and installation of rubble mounds and collars on piling to support invertebrates, kelp, and fish. Glass blocks were also installed in the pedestrian walkway to increase light penetration.

Epibenthos, Macrofauna, Fish, and Marine Mammals

Epibenthic assemblages occur at and in the vicinity of the ferry terminal. Dive surveys identified 12 fish and 17 macroinvertebrate taxa. Sea stars, Dungeness crab, red rock crab, and bivalves were among the invertebrates observed. The WDFW PHS maps (WDFW 2006b) identify subtidal geoduck beds offshore from the ferry terminal and nearshore and offshore areas supporting Dungeness crab and pandalid shrimp. Fish species included various rock fish, flatfish, perch, and sculpins. An unnamed stream south of the terminal supports coho salmon. Killer whale, sea lion, harbor seal, and harbor porpoise may occur in Possession Sound.

Forage Fish

Documented surf smelt spawning is present at the terminal (see Figure CL-2), extending approximately 180 feet to the south and 837 feet to the north. There is no documented herring, herring holding areas, or sand lance spawning at the terminal (WSDOT 2018a).

4.4.2 Clinton Species Distributions

4.4.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon-bearing streams are located near the Clinton Ferry Terminal. However, major rivers that support Chinook salmon in this area of Puget Sound include the Snohomish River (approximately 8 miles northeast), Stillaguamish River (approximately 25 shoreline miles north), Skagit River (approximately 30 shoreline miles north), Lake Washington/Cedar River system (approximately 10 shoreline miles southeast), and the Duwamish/Green River (approximately 16 shoreline miles southeast) (WDFW 2007a). Chinook may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

Adult and Subadult Chinook

Migrating sub-adult and adult Chinook salmon have free access to the entire marine portion of the ferry terminal area. These fish could be present near the ferry terminal year-round, but are likely to be more abundant in mid to late summer as they prepare to migrate to their natal rivers to spawn.

Juvenile Chinook

Beach seines conducted from April through September of 2001 and 2002 in the southeastern Whidbey Basin showed juvenile Puget Sound Chinook salmon first entered the area in late April with numbers peaking in early May. A second smaller pulse occurred in late July with numbers steadily tapered off through August and September. The average fork length was approximately 80 mm for those juvenile Chinook caught in May and 110 mm for those caught in late August (Duffy et al. 2005).

In February and August of 2005, Washington Trout crews surveyed the nearshore waters of Admiralty Inlet on Whidbey Island for juvenile salmonid presence. From

February through August, crews sampled 10 sites that represent the range of habitats available to juvenile salmon as they migrate along the western shore of Whidbey Island from natal rivers to the Pacific Ocean. Two types of beach seines were employed. A large net beach seine, 120 feet long and 12 feet deep, was used at deep water sites and open beaches, while a small net, 80 feet long and 6 feet deep, was used to sample shallow sites with more complex habitat structure. Figure CL-5 shows the sampling sites.

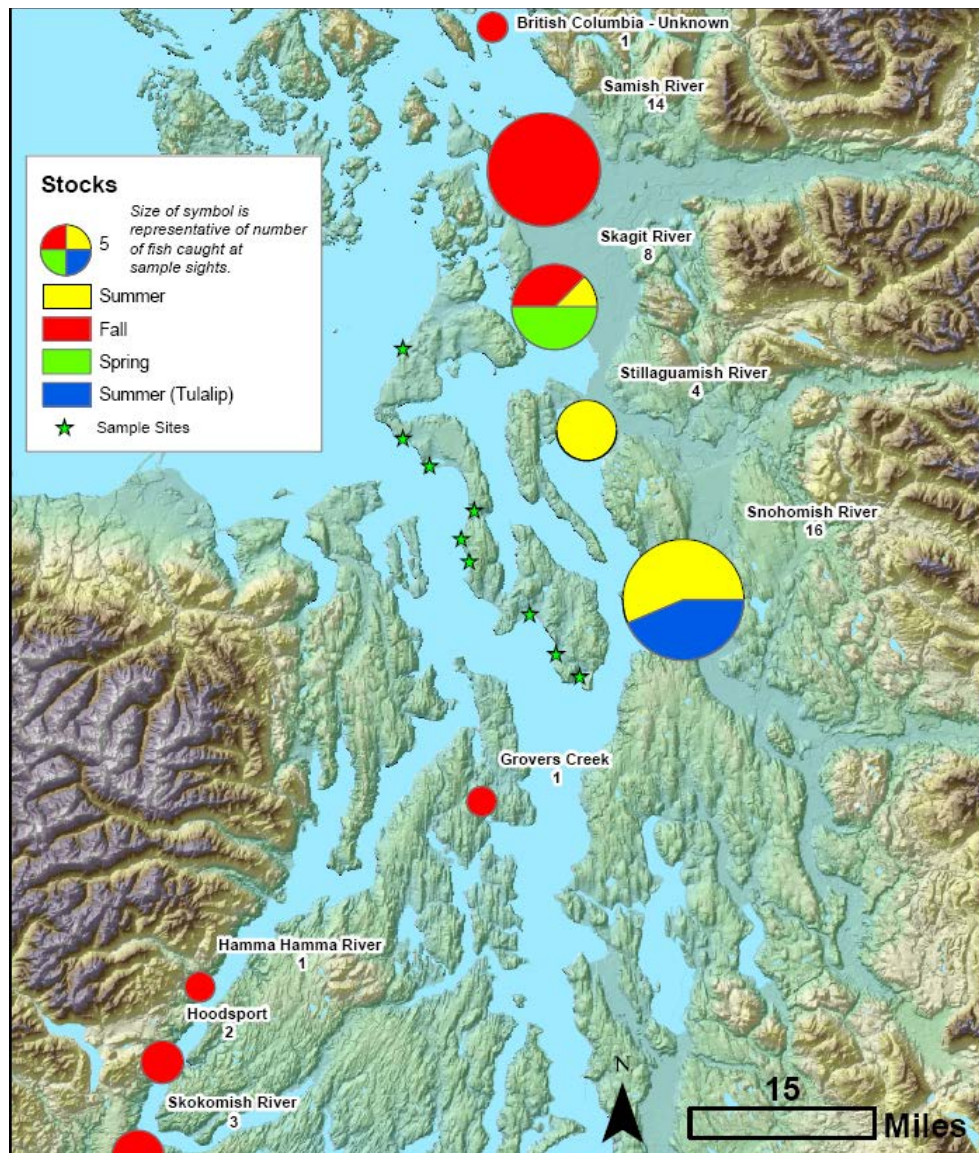


Figure CL-5
Stock and River of Origin for all 50 Coded-wire Tagged Juvenile Chinook Recovered Along the West Coast of Whidbey Island (February through August 2005)

Source: Wild Fish Conservancy 2007

Figure CL-6 shows the catch per unit of effort for juvenile salmon at all sites, across the entire field season using the large net, while Figure CL-7 shows the catch per unit effort for juvenile salmon at all sites, across the entire field season using the small net. Overall, chum salmon were the most common juvenile salmon caught, while coho salmon were the least common. The Cultus Bay sampling sites are nearest to the Clinton Ferry Terminal. One Chinook salmon was caught in the Cultus Bay Channel with the large beach seine (see Figure CL-6).

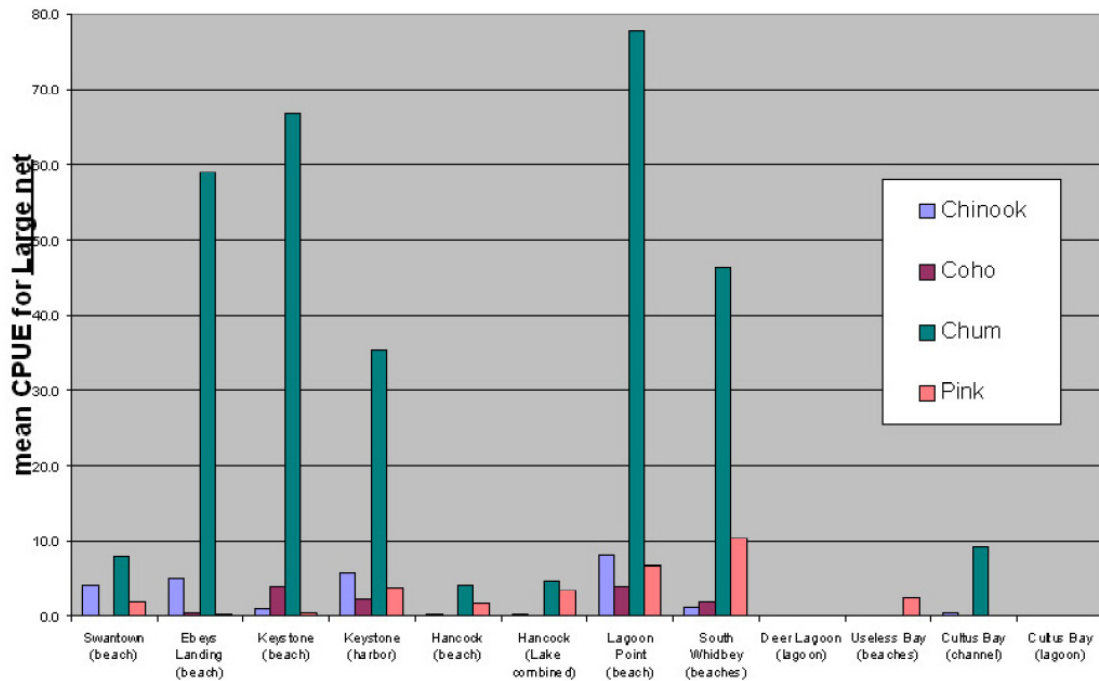


Figure CL-6
Total Catch per Unit Effort for all Juvenile Salmon at all Sites, Across the Sampling Season (February to August) Using the Large Beach Seine

Source: Wild Fish Conservancy 2007

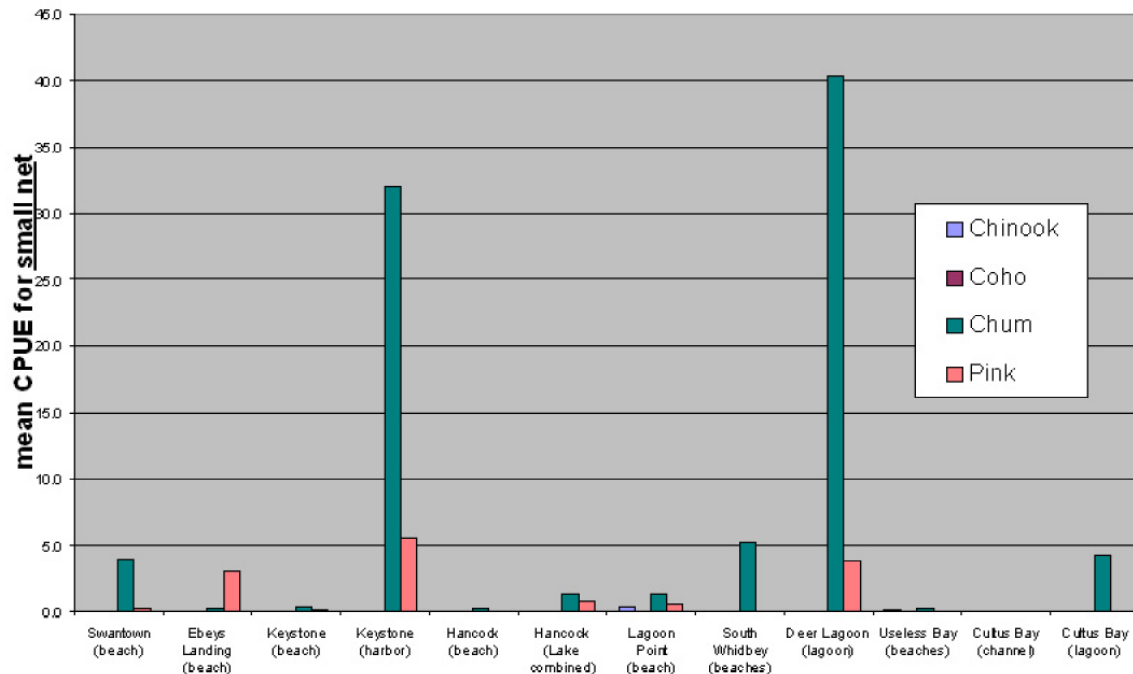


Figure CL-7
Total Catch per Unit Effort for all Juvenile Salmon at all Sites, Across the Sampling Season (February to August) Using the Small Beach Seine

Source: Wild Fish Conservancy 2007

Approximately 8 percent of the juvenile Chinook caught during the monitoring season were marked with coded wire tags (CWTs). These tags identify the stock and river of origin for tagged fish, usually hatchery salmon. Figure CL-5 shows the stock and river of origin for the 50 juvenile Chinook sampled with recovered CWTs.

Eleven percent of the recovered CWT fish were from rivers draining into the Hood Canal Watershed, indicating that these fish crossed Admiralty Inlet to utilize habitats along Whidbey Island's western shore. Twenty-eight percent of the recovered CWT fish were from the three rivers draining into the Whidbey Basin: the Skagit, Stillaguamish, and Snohomish River systems. One of the recovered fish had a British Columbia tag; however, the stock and river of origin have not been determined for this fish. Fourteen percent of the recovered fish were from the Samish River, which drains into north Puget Sound.

None of the recovered CWT fish were from south Puget Sound river basins, such as the Puyallup or Nisqually. This could be a result of small sample sizes, hatchery release timing, sample timing, or could indicate that juvenile Chinook from these

basins are not occupying habitats on the western shore of Whidbey Island in the same abundances as fish from the Hood Canal, Whidbey Basin, and north Puget Sound (Wild Fish Conservancy 2007).

4.4.2.2 *Puget Sound Chinook Salmon Critical Habitat*

The Clinton Ferry Terminal lies within Chinook Zone 5 (70 FR 52630). While there are no streams that support Chinook salmon near the ferry terminal, there are eelgrass beds in close proximity that may be used by juvenile Chinook for rearing (Thom et al. 1995). The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table CL-1. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630).

Table CL-1
Existing Conditions of Chinook Salmon PCEs at the Clinton Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include trestles, main and auxiliary slips, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Possession Sound near the ferry terminal are designated “Excellent” for aquatic life use. No water quality parameters of concern were identified at the current terminal location (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. Two of the areas include treatment. The first drainage area drains the toll booth area, and consists of four catch basins that flow through an oil/water separator (inspected annually), and discharge through a shared 32-inch outfall to the south of the trestle. A fifth catch basin managed by WSDOT is connected upgradient of this drainage area, and shares the same outfall.</p> <p>The second drainage area drains the holding lanes on the trestle and the area around the terminal building. The holding lane drainage consists of two trench drains that run most of the length of the trestle. The terminal building drainage consists of two shallow trench drains. All of the trench drains flow through the oil/water separator and discharge through the 32-inch outfall.</p> <p>The third drainage area drains the end of the trestle, and consists of five catch basins, two located at the entrance to the auxiliary transfer span, and three more to the southwest that drain the remainder of the main trestle. All five catch basins are fitted with stormwater filter units (inspected annually), and each discharges directly to surface water.</p> <p>The fourth drainage area consists of the transfer spans (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharge by sheet-flow directly to surface water.</p> <p>The Clinton Ferry Terminal no longer has creosote treated piles, therefore leaching of PAHs from piles has been eliminated at this terminal.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Epibenthic assemblages occur at and in the vicinity of the ferry terminal.</p> <p>Surf smelt spawn at the terminal, and sand lance and surf smelt spawning occur 0.75 mile north of the terminal.</p> <p>Natural Cover There is little to no shoreline vegetation in the vicinity of the terminal. Dominant macroalgae in the area is eelgrass (<i>Zostera marina</i> L.) and benthic macroalgae (<i>Ulva</i> spp., <i>Laminaria</i> sp.). Eelgrass is primarily distributed from MLLW to -10 feet MLLW. <i>Ulva</i> is also found between MLLW and -10 feet MLLW, and <i>Laminaria</i> typically occurs at depths greater than -10 feet MLLW (Thom et al. 1995). There is no large overhanging wood vegetation. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas, and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Possession Sound near the ferry terminal are designated “Excellent” for aquatic life use. No water quality parameters of concern were identified at the current terminal location (Ecology 2018).</p> <p>Clinton no longer has creosote treated piles, therefore leaching of PAHs from piles has been eliminated at this terminal.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.4.2.3 *Puget Sound Steelhead (Oncorhynchus mykiss)*

There are no natal streams in the area of the Clinton Ferry Terminal that support Puget Sound steelhead. However, major river systems that support winter and summer steelhead include the Snohomish River (approximately 8 miles northeast), Samish River (approximately 15 shoreline miles northeast), Stillaguamish River (approximately 25 shoreline miles north), Skagit River (approximately 30 shoreline miles north), and the Duwamish/Green River (approximately 16 shoreline miles southeast). The Lake Washington/Cedar River system (approximately 20 shoreline miles south) supports winter steelhead only. In addition, numerous small streams in the Sinclair/Dyes Inlets (see Bainbridge Island Ferry Terminal, Section 4.2, for more information), and southern Puget Sound rivers and streams support winter steelhead (WDFW 2007a).

Available data from townet sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In townet sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004). Beach seine sampling in Bellingham Bay (north Puget Sound) also captured few steelhead (Lummi Nation, unpublished data). The Bellingham Bay research reported the capture of two juvenile steelhead salmon in 336 sets between February 14 and December 1, 2003. The steelhead were captured in the eastern portion of Bellingham Bay near the Taylor Avenue Dock on June 12 and June 25, 2003.

4.4.2.4 *Puget Sound Steelhead Critical Habitat*

The Clinton Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.4.2.5 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Clinton ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.4.2.6 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Clinton ferry terminal. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.4.2.7 *Southern Resident Killer Whale Critical Habitat*

The Clinton Ferry Terminal lies within Area 2 – Puget Sound considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table CL-2. PCEs relevant to the terminal area are numbered per the CFR (Federal Register 2006).

Table CL-2
Existing Conditions of Southern Resident Killer Whale PCEs at the Clinton Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Possession Sound near the ferry terminal are designated "Excellent" for aquatic life use. No water quality parameters of concern were identified at the current terminal location (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. Two of the areas include treatment.</p> <p>The first drainage area drains the toll booth area, and consists of four catch basins that flow through an oil/water separator (inspected annually), and discharge through a shared 32-inch outfall to the south of the trestle. A fifth catch basin managed by WSDOT is connected upgradient of this drainage area, and shares the same outfall.</p> <p>The second drainage area drains the holding lanes on the trestle and the area around the terminal building. The holding lane drainage consists of two trench drains that run most of the length of the trestle. The terminal building drainage consists of two shallow trench drains. All of the trench drains flow through the oil/water separator and discharge through the 32-inch outfall.</p> <p>The third drainage area drains the end of the trestle, and consists of five catch basins, two located at the entrance to the auxiliary transfer span, and three more to the southwest that drain the remainder of the main trestle. All five catch basins are fitted with stormwater filter units (inspected annually), and each discharges directly to surface water.</p> <p>The fourth drainage area consists of the transfer spans (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharge by sheet-flow directly to surface water.</p> <p>The Clinton Ferry Terminal no longer has creosote treated piles, therefore leaching of PAHs from piles has been eliminated at this terminal.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include the trestles, main and auxiliary slips, and dolphins.

4.4.2.8 Bull Trout (*Salvelinus confluentus*)

There are no natal streams in the area of the Clinton Ferry Terminal that support bull trout (WDFW 2007a).

The aquatic portions of the ferry terminal are within marine FMO habitat and bull trout are thought to occur throughout south, central, and northern Puget Sound.

Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS

2004b). Within the ferry terminal area, it is expected that individual bull trout from the Snohomish River (approximately 8 miles northeast), Stillaguamish River (approximately 25 shoreline miles north), Skagit River (approximately 30 shoreline miles north), Lake Washington/Cedar River system (approximately 10 shoreline miles southeast), and the Duwamish/Green River (approximately 16 shoreline miles southeast) are most likely to be present (WDFW 2007a). Bull trout may also be present from rivers and streams in Hood Canal and southern Puget Sound (WDFW 2007a).

Preliminary study results indicate that subadult and adult bull trout first enter the lower Snohomish estuary and marine nearshore by early to mid-April. Presence in the estuary occurs through mid-summer, after which the bull trout begin moving back to freshwater (Goetz et al. 2004). Bull trout were observed in the lower estuary or marine nearshore the first week of August 2003 (Pentec 2004). This is consistent with bull trout monitoring conducted from late summer through winter 2001 in the Snohomish River. Sampling weekly, no bull trout were collected at stations located at north Jetty Island and Priest Point when the study began in mid-August, through the following winter (Pentec 2004).

4.4.2.9 *Bull Trout Critical Habitat*

The Clinton Ferry Terminal is within designated bull trout critical habitat (Federal Register 2010a). The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table CL-3. PCEs relevant to the terminal area are numbered per the CFR (Federal Register 2010a).

Table CL-3
Existing Conditions of Bull Trout PCEs at the Clinton Ferry Terminal

PCEs	Existing Conditions
2) Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	In-water structures include the trestles, the main and auxiliary slips, and dolphins. The existing ferry terminal may affect fish passage in the nearshore, and may reduce the production of aquatic invertebrates that are prey species to bull trout.
3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	<p>Substrates support epibenthic production. Surf smelt spawn approximately 0.75 mile north of the terminal.</p> <p>Dominant macroalgae in the area is eelgrass (<i>Zostera marina</i> L.) and benthic macroalgae (<i>Ulva</i> spp., <i>Laminaria</i> sp.).</p> <p>There is no large overhanging wood vegetation present to provide a food base from terrestrial organisms. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal.</p>
4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.	<p>In-water structures include the trestles, the main and auxiliary slips, and dolphins. The existing ferry terminal may affect fish passage in the nearshore, and may reduce the production of aquatic invertebrates that are prey species to bull trout.</p> <p>There is no large overhanging wood vegetation present to provide a food base from terrestrial organisms. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal.</p> <p>Dominant macroalgae in the area is eelgrass (<i>Zostera marina</i> L.) and benthic macroalgae (<i>Ulva</i> spp., <i>Laminaria</i> sp.).</p>
5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.	East Puget Sound water temperatures can range from 41.4 to 75.7 °F (5.2 to 24.3 °C) with an average of 51 °F (10.58 °C) (Ecology 2007). Water temperature data for specific ferry terminals is not available. The in-water components of the ferry terminal provide some shade, which may cause slight localized reductions in water temperatures.
8) Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	<p>The marine waters of Possession Sound near the ferry terminal are designated "Excellent" for aquatic life use. No water quality parameters of concern were identified at the current terminal location (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. Two of the areas include treatment.</p> <p>The first drainage area drains the toll booth area, and consists of four catch basins that flow through an oil/water separator (inspected annually), and discharge through a</p>

PCEs	Existing Conditions
	<p>shared 32-inch outfall to the south of the trestle. A fifth catch basin managed by WSDOT is connected upgradient of this drainage area, and shares the same outfall.</p> <p>The second drainage area drains the holding lanes on the trestle and the area around the terminal building. The holding lane drainage consists of two trench drains that run most of the length of the trestle. The terminal building drainage consists of two shallow trench drains. All of the trench drains flow through the oil/water separator and discharge through the 32-inch outfall.</p> <p>The third drainage area drains the end of the trestle, and consists of five catch basins, two located at the entrance to the auxiliary transfer span, and three more to the southwest that drain the remainder of the main trestle. All five catch basins are fitted with stormwater filter units (inspected annually), and each discharges directly to surface water.</p> <p>The fourth drainage area consists of the transfer spans (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharge by sheet-flow directly to surface water.</p> <p>The Clinton Ferry Terminal no longer has creosote treated piles, therefore leaching of PAHs from piles has been eliminated at this terminal.</p>

4.4.2.10 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of the Clinton Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.4.2.11 *Green Sturgeon Critical Habitat*

The Clinton Ferry Terminal does not fall within designated green sturgeon critical habitat (Federal Register 2009).

4.4.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Clinton terminal area provides suitable marbled murrelet marine foraging habitat.

Documented surf smelt (prey species) spawning is present (see Figures CL-2), extending approximately 193 ft. S and 805 ft. N of the terminal (WSDOT 2018a).

WDFW surveys conducted from 2001 to 2012 show a density of 1-3 birds per square kilometer in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 29 miles SW of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Clinton murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles) is Zero (WSDOT 2019b).

There are no coniferous forest that may offer nesting opportunity within the pile driving/heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 26,800 scheduled arrivals and departures from the Clinton terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 13,595 scheduled arrivals and departures (WSDOT 2018d).

4.4.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFW 1996).

4.4.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Clinton Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The water in

Possession Sound reaches depths over 100 feet at the midpoint between Whidbey Island and the mainland (NMFS 2009), which is shallower than ideal for bocaccio.

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). Possession Sound reaches depths of over 100 feet; however, it does not have the rocky substrata preferred by yelloweye.

4.4.2.15 *Rockfish Species Critical Habitat*

The Clinton Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table CL-4. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Clinton Ferry Terminal and will not be discussed here.

Table CL-4
Existing Conditions of Rockfish PBFs at the Clinton Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Possession Sound near the ferry terminal are designated "Excellent" for aquatic life use. No water quality parameters of concern were identified at the current terminal location (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. Two of the areas include treatment. The first drainage area drains the toll booth area, and consists of four catch basins that flow through an oil/water separator (inspected annually), and discharge through a shared 32-inch outfall to the south of the trestle. A fifth catch basin managed by WSDOT is connected upgradient of this drainage area, and shares the same outfall.</p> <p>The second drainage area drains the holding lanes on the trestle and the area around the terminal building. The holding lane drainage consists of two trench drains that run most of the length of the trestle. The terminal building drainage consists of two shallow trench drains. All of the trench drains flow through the oil/water separator and discharge through the 32-inch outfall.</p> <p>The third drainage area drains the end of the trestle, and consists of five catch basins, two located at the entrance to the auxiliary transfer span, and three more to the southwest that drain the remainder of the main trestle. All five catch basins are fitted with stormwater filter units (inspected annually), and each discharges directly to surface water.</p> <p>The fourth drainage area consists of the transfer spans (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharge by sheet-flow directly to surface water.</p> <p>The Clinton Ferry Terminal no longer has creosote treated piles, therefore leaching of PAHs from piles has been eliminated at this terminal.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Epibenthic assemblages occur at and in the vicinity of the ferry terminal.</p> <p>Surf smelt spawn at the terminal, and sand lance and surf smelt spawning occur 0.75 mile north of the terminal.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>There is little to no shoreline vegetation in the vicinity of the terminal. Dominant macroalgae in the area is eelgrass (<i>Zostera marina</i> L.) and benthic macroalgae (<i>Ulva</i> spp., <i>Laminaria</i> sp.). Eelgrass is primarily distributed from MLLW to -10 feet MLLW. <i>Ulva</i> is also found between MLLW and -10 feet MLLW, and <i>Laminaria</i> typically occurs at depths greater than -10 feet MLLW (Thom et al. 1995). There is no large overhanging wood vegetation. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas, and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>

4.4.2.16 *Pacific Eulachon*

Adult eulachon could be present at the Clinton Ferry Terminal. The terminal is distant from the river mouths where spawning is known to occur. Any eulachon found at this terminal would likely be adults.

4.4.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Clinton Ferry Terminal (FEDERAL REGISTER 2011).

COUPEVILLE

K:\jobs\100016\WSF\10001603\10001603-BA-014-CO1.dwg FIG CO-1

Jan 11, 2012 12:43pm heriksen



NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Camano, Coupeville, and Port Townsend, Washington.

Section	Township	Range	Lat	Long	County
22	31N	1E	48° 09' 33" N	122° 40' 14" W	Island
HUC 171100190301			WRIA 6		



Figure CO-1
Coupeville Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Coupeville, Washington



Coupeville Ferry Terminal: WSF Biological Assessment Reference

- Smelt Spawning
- - - Approximate Mean High Water (MHW)

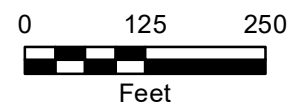
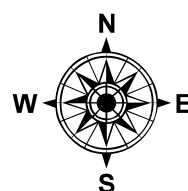


Figure CO-2
Aerial Photo of Coupeville Ferry Terminal
WSF Biological Assessment Reference
Coupeville, Washington

4.5 Coupeville Ferry Terminal

The Coupeville Ferry Terminal (formerly known as the Keystone Ferry Terminal) is one of two terminals located on Whidbey Island. The Coupeville Ferry Terminal is on the western side, near the center between the northern and southern sections of the island. The Coupeville Ferry Terminal links Whidbey Island with Port Townsend, across Admiralty Inlet. See Figures CO-1 and CO-2.

The Coupeville Ferry Terminal provides service to the Port Townsend Ferry Terminal.

Features of the terminal include a terminal building, 10 vehicle holding lanes that accommodate up to 120 vehicles, one small parking lot, and roadside holding areas. The terminal has one slip with steel wingwalls. Three dolphins are associated with the terminal, one steel and two timber dolphins in the main slip.

4.5.1 Coupeville Environmental Baseline

4.5.1.1 Physical Indicators

Substrate and Slope

There are three distinct areas within Keystone Harbor with respect to substrate composition. The center of the harbor, ferry lane, and terminal area are mostly cobble and gravel with a few patches of sand/shell debris. The side slopes of the harbor are composed of mostly gravel, with some cobble. The areas outside of propeller wash influence and not on a slope are composed of sand, mud, and mud with wood debris. Outside of the harbor mouth, substrate is either gravel or cobble. The jetty that forms the east side of the harbor is composed of large, angular riprap boulders. There are other areas of riprap, most notably the area around the terminal where riprap is used to armor the shoreline from propeller wash scour. The intertidal zone areas that are not riprap are either gravel or mixed sand and gravel. The intertidal and shallow subtidal area on the east side of the harbor is clean homogeneous large gravel, indicative of high energy and regular movement.

See Figures CO-3 and CO-4 for pictures of the shoreline areas west and east of the ferry terminal.



Figure CO-3
Shoreline Area to the West of the Coupeville Ferry Terminal



Figure CO-4
Shoreline Area to the East of the Coupeville Ferry Terminal

The shoreline within Keystone Harbor is characterized by a nearly level surface with a gentle slope down toward the water of about 4 percent. The seafloor surface slopes from the shoreline down to the south, with an overall gradient of about 12 percent, with the steepest portion closest to the beach at about 20 percent. Offshore depths of terminal structures are: head of slip (-22.7 feet MLLW). Maximum depth for fixed dolphins is -28.0 feet MLLW. A steep slope, located west of the terminal, is a near-vertical bluff on Keystone Harbor.

The shoreline in the vicinity of the terminal is a depositional beach located in a convergent zone where sediment from two different drift cells meets.

Salt/Freshwater Mixing

The only quasi-freshwater body near the existing ferry terminal is Crockett Lake. The lake drains to Keystone Harbor via a culvert under SR 20. Crockett Lake is brackish from the inflow of marine water from the harbor.

Flows and Currents

Nearshore currents are generally westerly and move on the order of 2 feet per second, although currents in excess of 3 feet per second do occur. Wave action at the mouth of the harbor is predominantly in an easterly direction. This results in an easterly transport of sediments originating from the bluffs at nearby Fort Casey State Park. These sediments are transported to the east, past the mouth of the harbor. Annual sediment transport is estimated to be 15,000 cubic yards. The sediments tend to accumulate at the harbor mouth and periodic dredging (by the Corps) is required to maintain adequate depth for ferry operations.

During flood flows, numerous eddies prevail in several locations of Admiralty Inlet, including Admiralty Bay where a counterclockwise rotating eddy is evident. The prevailing flood flow is toward the southwest off the entrance to Keystone Harbor. Unlike flood currents, the counterclockwise eddy is not present during maximum ebb flow.

4.5.1.2 Chemical Indicators

Water Quality

The marine waters of Keystone Harbor are designated “Extraordinary” for aquatic life use. No water quality parameters of concern were identified at the current location (Ecology 2018).

Sediment Quality

The Corps has dredged the harbor a number of times over the past two decades. The dredged material is used to nourish the beach immediately east of the harbor jetty.

The sediment chemistry had been characterized previously and found to be suitable for open-water disposal.

4.5.1.3 *Biological Indicators*

Shoreline Vegetation

There are several shoreline vegetation communities in and around Keystone Harbor. Coastal dunes with a mosaic of open sand with sparse herbaceous vegetation to dense evergreen shrubs are present. Coastal headland shrub lands and grass lands consisting of evergreen and/or deciduous shrubs and native grasses occur in the area. Along the bluff at Fort Casey State Park, lowland conifer hardwood forest occurs and consists of Douglas fir (*Pseudotsuga menziesii*) and coast pine (*Pinus contorta*) in the tree layer with salal (*Gaultheria shallon*), sword fern (*Nephrolepis cordifolia*), oceanspray, and salmonberry (*Rubus spectabili*) in the shrub layer.

A small, apparently excavated basin on the Keystone Spit contains herbaceous wetland vegetation consisting of Pacific silverweed (*Argentina egedii*) and soft-stem bulrush (*Schoenoplectus tabernaemontani*).

Crockett Lake is considered to be a tidal marsh and is adjacent to the ferry terminal. It consists of marsh species including pickleweed (*Salicornia sp.*), areas dominated by alkali bulrush, seaside arrowgrass, Pacific silverweed, and areas of native and non-native grasses and other herbaceous vegetation.

Macroalgae and Eelgrass

Most of the harbor bottom is covered with macroalgae of various species and density. The dominant species is sugar kelp (*Laminaria saccharina*). The ferry lane down the middle of the harbor has relatively sparse macroalgae growth with a prevalence of small, tightly anchored red algae species.

Eelgrass (*Zostera Marine L.*) is absent in Keystone Harbor. No eelgrass is present at Keystone Spit except for one small patch next to the historic Army wharf (Quartermaster Dock), approximately 1,000 feet west of the Keystone Harbor entrance. The closest large documented eelgrass bed occurs about 2 miles east of the ferry terminal. It starts at about -4 feet MLLW and has patches of mixed sugar kelp

and eelgrass. The width of the bed is variable, but in general, extends offshore for a distance of about 400 feet.

The dominant aquatic plants on the Keystone Jetty are kelp species including bull kelp, sugar kelp, ribbon kelp (*Egregia menziesii*), sea palm (*Postelsia palmaeformis*), sea lettuce (*Ulva fenestrata*), rockweed, red ribbon (*Palmaria* spp.), and coralline algae (*Corallinaceae* spp.).

Epibenthos, Macrofauna, Fish, and Marine Mammals

Substrate characteristics in Keystone Harbor are suitable for epibenthic production. Recent surveys (CH2MHILL 2006a) indicate the presence of Dungeness crab, red rock crab, sunflower star (*Pycnopodia helianthoides*), unidentified flatfish, shiner perch, and unidentified sculpins (various genera).

Dominant macrofauna on the jetty is a massive wall and pasture of white plumed anemones (*Metridium senile*), barnacles, false ochre sea star (*Picaster ochraceus*), sunflower stars, orange sea cucumbers (*Cucumaria miniata*), short spine sea stars (*Pisaster brevispinus*), decorator crabs (*Oregonia gracilis*), kelp crabs (*Pugettia producta*), helmet crabs (*Telmessus cheiragonus*), painted anemones (*Urticina crassicornis*), and bryozoans.

WDFW divers have assessed the density of fish at the Keystone jetty for the past decade, which includes a mix of species typical of nearshore rocky habitats. Rockfish and surfperches were the most dominant species at the jetty. The schooling Puget Sound rockfish was the most abundant observed species, followed by the striped seaperch (*Embiotoca lateralis*). Yellowtail rockfish (*Sebastes flavidus*), primarily juveniles, was the second most dominant rockfish, with copper rockfish (*Sebastes caurinus*) the third most common rockfish. Pile and shiner perch were the fifth and sixth dominant species. Black rockfish (*Sebastes melanops*) were commonly observed, especially juveniles and adults schooling at the offshore end of the jetty. Other species often observed were gobies (*Gobiidae* sp.), wolfeel (*Anarrhichthys ocellatus*), Pacific octopus (*Octopus dofleini*), and a diverse array of sculpins. Greenlings and lingcod were also commonly observed.

Marine mammals that might use marine habitat in Admiralty Bay and Admiralty Inlet include harbor seal, Steller sea lion, California sea lion, harbor porpoise, Dall's porpoise, humpback whale, gray whale, minke whale, and both resident and transient killer whale.

Several seal, Steller sea lion, and California sea lion haul-outs are located within Admiralty Inlet and around Marrowstone and Indian islands. One large haul-out is located at Fort Flagler State Park, approximately 5 miles southwest of the Coupeville Ferry Terminal. Three separate haul-outs for two to four animals are on marine buoys within the Admiralty Inlet channel and two rock sites are located off the east side of Marrowstone Island.

Forage Fish

There is no documented forage fish spawning present at the terminal (WSDOT 2018a).

4.5.2 Coupeville Species Distributions

4.5.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon-bearing streams are located near the Coupeville Ferry Terminal (WDFW 2007a). Chinook may be present from any of the rivers in central and south Puget Sound, including the Stillaguamish River (approximately 52 miles south then northeast, shoreline distance), Skagit River (approximately 60 miles south then northeast, shoreline distance), the Snohomish River (approximately 43 miles south then northeast, shoreline distance), the Lake Washington/Cedar River system (approximately 35 miles southeast), and Duwamish/Green River (approximately 42 miles southeast). Chinook may also be present from rivers and streams in Hood Canal and Puget Sound (WDFW 2007a). Chinook salmon are expected to be found seasonally as migrant juveniles and throughout the year as immature sub-adults in the ferry terminal area (CH2MHILL 2006a).

Adult and Sub-adult Chinook

Adult and sub-adult Chinook salmon could be found near the terminal at any time of year. Sub-adults have spent a winter in the marine environment and are not closely oriented to the shoreline like juveniles.

Juvenile Chinook

In February and August of 2005, Wild Fish Conservancy crews surveyed the nearshore waters of Admiralty Inlet on Whidbey Island for juvenile salmonid presence. From February through August, crews sampled 10 sites that represent the range of habitats available to juvenile salmon as they migrate along the western shore of Whidbey Island from natal rivers to the Pacific Ocean. Two types of beach seines were employed. A large net beach seine, 120 feet long and 12 feet deep, was used at deep water sites and open beaches, while a small net, 80 feet long and 6 feet deep, was used to sample shallow sites with more complex habitat structure. Figure CO-5 shows the sampling sites.

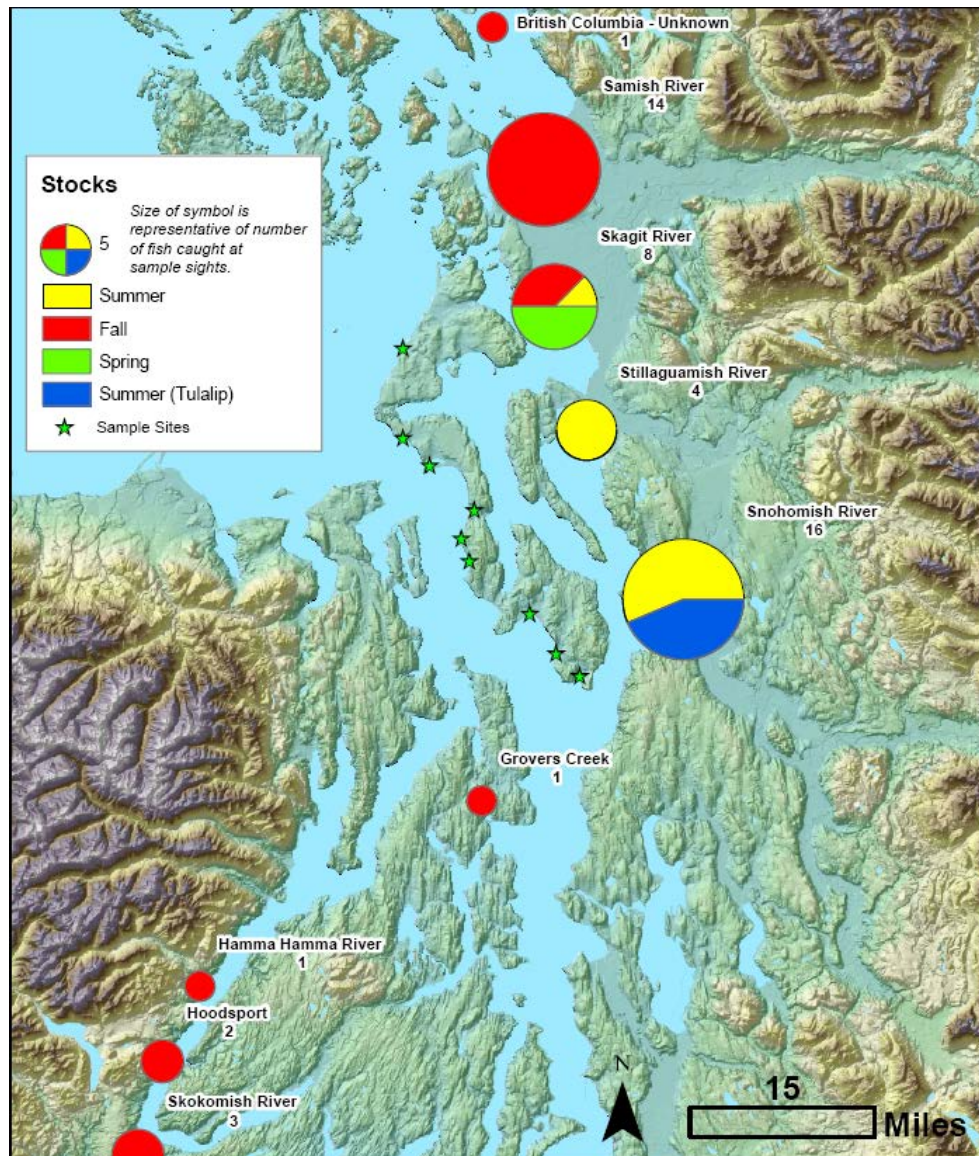


Figure CO-5
Stock and River of Origin for all 50 Coded-wire Tagged Juvenile
Chinook Recovered Along the West Coast of Whidbey Island
(February through August 2005)

Figure CO-6 shows the catch per unit of effort for juvenile salmon at all sites, across the entire field season using the large net, while Figure CO-7 shows the catch per unit effort for juvenile salmon at all sites, across the entire field season using the small net. Overall, chum salmon were the most common juvenile salmon caught, while coho salmon were the least common.

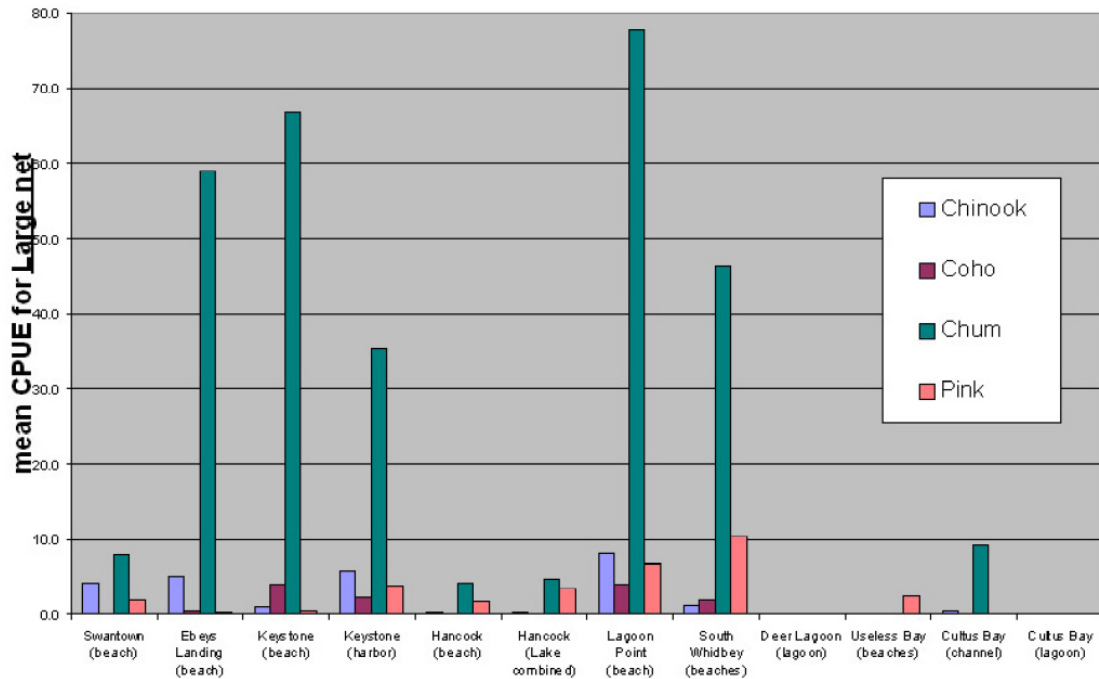


Figure CO-6
Total Catch per Unit Effort for all Juvenile Salmon at all Sites, Across the Sampling Season (February to August) Using the Large Beach Seine

Source: Wild Fish Conservancy 2007

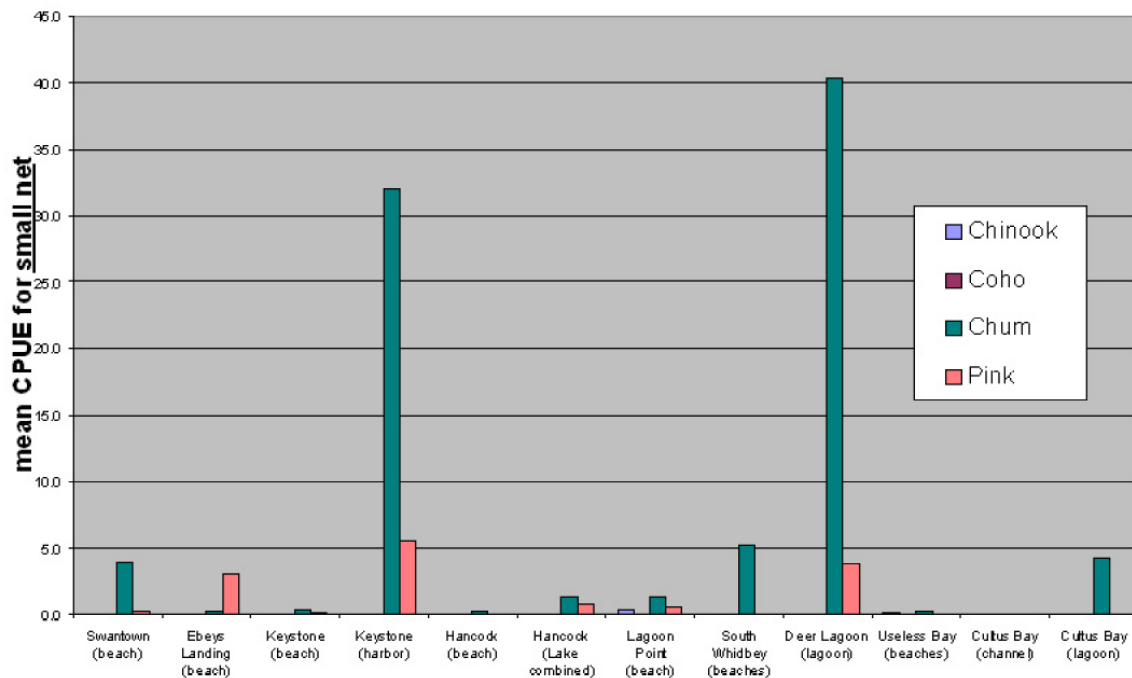


Figure CO-7
Total Catch per Unit Effort for all Juvenile Salmon at all Sites, Across the Sampling Season (February to August) Using the Small Beach Seine

Source: Wild Fish Conservancy 2007

Approximately 8 percent of the juvenile Chinook caught during the study were marked with CWTs. These tags identify the stock and river of origin for tagged fish, usually hatchery salmon. Figure CO-5 shows the stock and river of origin for the 50 juvenile Chinook sampled with recovered CWTs. Eleven percent of the recovered CWT fish were from rivers draining into the Hood Canal Watershed, indicating that these fish crossed Admiralty Inlet to utilize habitats along Whidbey Island's western shore. Twenty-eight percent of the recovered CWT fish were from the three rivers draining into the Whidbey Basin: the Skagit, Stillaguamish, and Snohomish River systems. One of the recovered fish had a British Columbia tag; however, the stock and river of origin have not been determined for this fish. Fourteen percent of the recovered fish were from the Samish River, which drains into the north Puget Sound.

None of the recovered CWT fish were from south Puget Sound river basins, such as the Puyallup or Nisqually. This could be a result of small sample sizes, hatchery release timing, sample timing, or could indicate that juvenile Chinook from these basins are not occupying habitats on the western shore of Whidbey Island in the same abundances as fish from the Hood Canal, Whidbey Basin, and north Puget Sound (Wild Fish Conservancy 2007).

4.5.2.2 *Puget Sound Chinook Salmon Critical Habitat*

The Coupeville Ferry Terminal lies within Chinook Zone 5 (70 FR 52630). While there are no streams that support Chinook salmon near the ferry terminal, eelgrass beds are present in Admiralty Bay that may be used by juvenile Chinook for rearing. The nearest eelgrass bed to Keystone Harbor is approximately 2 miles southeast (shoreline distance) (CH2MHILL 2006a).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table CO-1. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630).

Table CO-1
Existing Conditions of Chinook Salmon PCEs at the Coupeville Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include the trestle, the slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Keystone Harbor near the ferry terminal are designated “Extraordinary” for aquatic life. Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018). The existing stormwater system at the ferry terminal consists of two drainage areas that drain to Keystone Harbor. One of the areas includes treatment.</p> <p>The first drainage area consists of three catch basins that drain the holding lanes, and two catch basins that drain the parking areas. Some input from the WSDOT Highway 20 system connects to this area. All of the catch basins pass through an oil/water separator (inspected annually) and discharge through a shared outfall to the west of the trestle.</p> <p>The second drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Substrate characteristics in Keystone Harbor are suitable for epibenthic production.</p> <p>There are no forage fish spawning areas in the vicinity, however, the fish community is abundant and diverse.</p> <p>Natural Cover There are several shoreline vegetation communities in the vicinity, including a tidal marsh (Crockett Lake). No eelgrass is present in Keystone Harbor. Most of the harbor bottom is covered by macroalgae, with the dominant species being sugar kelp. In the ferry lane, small, tightly anchored red algae species are present (CH2MHILL 2006b).</p> <p>There is no large overhanging wood vegetation. The existing conditions within the defined area of critical habitat consist of cobble and gravel with small patches of sand/shell debris in the ferry lane. Side slopes of the harbor are mostly gravel with some cobble. Areas outside of propeller wash and not on slopes are sand, mud, and mud with wood debris. The jetty that forms the east side of the harbor is composed of large, angular riprap boulders (CH2MHILL 2006a). Some riprap and hardened shoreline are adjacent to the ferry terminal. Given this is a marine environment, side channels do not occur in the ferry terminal area.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Keystone Harbor near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018).</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.5.2.3 *Hood Canal Summer-Run Chum Salmon (*Oncorhynchus keta*)*

No chum salmon bearing streams are located near the Coupeville Ferry Terminal (WDFW 2007a). Chum bearing streams in the area include Chimacum Creek (Port Townsend Bay, approximately 8 miles southwest, shoreline distance), Salmon and Snow Creeks (Discovery Bay, approximately 24 miles southwest, shoreline distance), and Jimmycomelately Creek (Sequim Bay, approximately 26 miles west, shoreline distance). Chum may also be present from rivers and streams in southern Hood Canal and Puget Sound (WDFW 2007a).

Hood Canal summer chum salmon are expected to be present seasonally as migrant juveniles and adults. A number of rivers in Hood Canal produce summer chum that could cross Admiralty Inlet and spend some time along the west Whidbey Island shoreline during their migration out to sea (CH2MHILL 2006a).

During the Wild Fish Conservancy survey, chum salmon were caught in Keystone Harbor. However, for the time of season caught (fall), they were larger than fall chum were expected to be, raising the possibility that they could be summer chum (because the Hood Canal summer chum spawn earlier, emerge earlier, and therefore their fry tend to be larger earlier in the season). Tissue samples were taken, and the Wild Fish Conservancy is looking for funding to have genetic work done to determine their origin. In both years of sampling in Keystone Harbor, Wild Fish Conservancy caught CWT Chinook from Hood Canal hatcheries, and numerous other studies that confirm very small fish crossing large channels in Puget Sound (Wait, personal communication 2007).

However, the working assumption of the Hood Canal Summer Run Chum Salmon Recovery Plan (HCCC 2005) is that juvenile summer chum stay on the west side of Admiralty Inlet, and do not cross to the west side of Whidbey Island (Brewer, personal communication 2007).

4.5.2.4 *Hood Canal Summer-Run Chum Critical Habitat*

The Coupeville Ferry Terminal does not fall within designated Hood Canal summer-run chum critical habitat (70 FR 52630).

4.5.2.5 *Puget Sound Steelhead (Oncorhynchus mykiss)*

There are no natal streams in the area of the Coupeville Ferry Terminal that support Puget Sound steelhead (WDFW 2007a).

Steelhead bearing streams in the area include Chimacum Creek (approximately 10 miles southwest, shoreline distance, a tributary to Port Townsend Bay), and numerous Hood Canal streams. Major rivers that support winter and summer steelhead include the Skokomish River (approximately 65 miles southwest shoreline distance), Skagit River (approximately 60 miles south then northeast shoreline distance), Stillaguamish River (approximately 52 miles south then northeast shoreline distance), Snohomish River (approximately 43 miles south then northeast shoreline distance), and the Duwamish/Green River (approximately 42 shoreline miles southeast). The Lake Washington/Cedar River (approximately 35 shoreline miles southeast) supports winter steelhead. Steelhead may also be present from southern Puget Sound rivers and streams (WDFW 2007a).

Available data from tow-net sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In tow-net sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

Beach seine sampling in Bellingham Bay (north Puget Sound) also captured few steelhead (Lummi Nation, unpublished data). The Bellingham Bay research reported the capture of two juvenile steelhead salmon in 336 sets between February 14 and December 1, 2003. The steelhead were captured in the eastern portion of Bellingham Bay near the Taylor Avenue Dock on June 12 and June 25, 2003.

4.5.2.6 *Puget Sound Steelhead Critical Habitat*

The Coupeville Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.5.2.7 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Coupeville ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.5.2.8 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Coupeville ferry terminal. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.5.2.9 *Southern Resident Killer Whale Critical Habitat*

The Coupeville Ferry Terminal lies within Area 2 – Puget Sound, considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table CO-2. PCEs relevant to the terminal area are numbered per Federal Register 2006.

Table CO-2
Existing Conditions of Southern Resident Killer Whale PCEs at the Coupeville Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Keystone Harbor near the ferry terminal are designated "Extraordinary" for aquatic life use. Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of two drainage areas that drain to Keystone Harbor. One of the areas includes treatment.</p> <p>The first drainage area consists of three catch basins that drain the holding lanes, and two catch basins that drain the parking areas. Some input from the WSDOT system connects to this area. All of the catch basins pass through an oil/water separator (inspected annually) and discharge through a shared outfall to the west of the trestle.</p> <p>The second drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include the head of the slip and dolphins.

4.5.2.10 Bull Trout (*Salvelinus confluentus*)

There are no natal streams in the area of the Coupeville Ferry Terminal that support bull trout (WDFW 2007a). The aquatic portions of the ferry terminal are within marine FMO habitat. While bull trout have not been documented in the ferry terminal area, suitable FMO habitat is present, and bull trout are thought to occur throughout south, central, and northern Puget Sound. Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the ferry terminal area, it is expected that individual bull trout from the Skokomish River (approximately 65 miles southwest, shoreline distance), Skagit River (approximately 60 miles south then northeast, shoreline distance), Stillaguamish River

(approximately 52 miles south then northeast, shoreline distance), Snohomish River (approximately 43 miles south then northeast, shoreline distance), Lake Washington/Cedar River (approximately 35 shoreline miles southeast), and the Duwamish/Green River (approximately 42 shoreline miles southeast) core areas are most likely to be present.

4.5.2.11 *Bull Trout Critical Habitat*

The shoreline of the Coupeville Ferry Terminal is not within designated bull trout critical habitat (Federal Register 2010a).

4.5.2.12 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of the Coupeville Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.5.2.13 *Green Sturgeon Critical Habitat*

The Coupeville Ferry Terminal does not fall within designated green sturgeon critical habitat (Federal Register 2009).

4.5.2.14 *Marbled Murrelet (Brachyramphus marmoratus)*

The Coupeville terminal area provides suitable marbled murrelet marine foraging habitat.

There is no documented forage fish spawning present at the terminal (WSDOT 2018ac).

WDFW surveys conducted from 2001 to 2012 show a density of 1-3 birds per square kilometer in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 21 miles SW of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Coupeville murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles), ranges from Zero to Marginal (WSDOT 2019b).

Five acres of contiguous coniferous forest that may offer nesting opportunity is present adjacent to the terminal, in Fort Casey State Park (WSDOT 2018c). The 0.25 mile radius of potential effect due to heavy equipment and pile driving in-air noise sources was evaluated. Trees that are ≥ 15 DBH are present within the 0.25 mile radius extent of the forest stand. Nesting platforms that are a minimum of 4 inches wide and a minimum of 33 feet above ground are present within the 0.25 radius extent of the forest stand. Therefore the stand does have suitable nesting habitat (WSDOT 2014).

Although the coniferous stand meets the definition of potentially suitable nesting habitat, it is an isolated patch of habitat in a disturbed area. The Fort Casey State Park area has a high level of disturbance; including camping, boating, kite flying and corvid presence that increase predation risk for murrelets, making this habitat less suitable. In addition, U.S. Navy jets from nearby Naval Air Station Whidbey Island may fly over the State Park at any time for several hours. Navy personnel conduct training missions at various times during the day and night. Depending on the direction of the wind, their flight pattern may put them above the Park, creating noisy conditions.

It is extremely unlikely that nesting marbled murrelets will be exposed to construction/pile driving noise associated with a project because (1) the nearest known nesting site is on the Olympic Peninsula 21 miles SW of the terminal, (2) no

murrelet breeding behavior has been documented within Fort Casey State Park, and (3) existing levels of disturbance likely preclude murrelet presence.

There are no records of marbled murrelets occurring within Keystone Harbor itself. It is unlikely murrelet would use this small harbor as it contains disturbed habitat, and is consistently occupied by WSF vessels, pleasure boats, campers, fishermen, and beachcombers (WSF 2004).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 8,930 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 5,192 scheduled arrivals and departures (WSDOT 2018d).

4.5.2.15 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFWS 1996).

4.5.2.16 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Coupeville Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The waters south of the terminal are shallow, less than 40 feet deep (NMFS 2009).

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). Admiralty Bay and the waters north of Coupeville do not have the rocky substrates preferred by yelloweye.

4.5.2.17 *Rockfish Species Critical Habitat*

The Coupeville Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological

features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table CO-3. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Coupeville Ferry Terminal and will not be discussed here.

Table CO-3
Existing Conditions of Rockfish PBFs at the Coupeville Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Keystone Harbor near the ferry terminal are designated “Extraordinary” for aquatic life. Impaired waters listings in the terminal area do not identify any water quality parameters of concern (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of two drainage areas that drain to Keystone Harbor. One of the areas includes treatment.</p> <p>The first drainage area consists of three catch basins that drain the holding lanes, and two catch basins that drain the parking areas. Some input from the WSDOT Highway 20 system connects to this area. All of the catch basins pass through an oil/water separator (inspected annually) and discharge through a shared outfall to the west of the trestle.</p> <p>The second drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Substrate characteristics in Keystone Harbor are suitable for epibenthic production.</p> <p>There are no forage fish spawning areas in the vicinity, however, the fish community is abundant and diverse.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>There are several shoreline vegetation communities in the vicinity, including a tidal marsh (Crockett Lake). No eelgrass is present in Keystone Harbor. Most of the harbor bottom is covered by macroalgae, with the dominant species being sugar kelp. In the ferry lane, small, tightly anchored red algae species are present (CH2MHILL 2006b).</p> <p>There is no large overhanging wood vegetation. The existing conditions within the defined area of critical habitat consist of cobble and gravel with small patches of sand/shell debris in the ferry lane. Side slopes of the harbor are mostly gravel with some cobble. Areas outside of propeller wash and not on slopes are sand, mud, and mud with wood debris. The jetty that forms the east side of the harbor is composed of large, angular riprap boulders (CH2MHILL 2006a). Some riprap and hardened shoreline are adjacent to the ferry terminal. Given this is a marine environment, side channels do not occur in the ferry terminal area.</p>

4.5.2.18 *Pacific Eulachon*

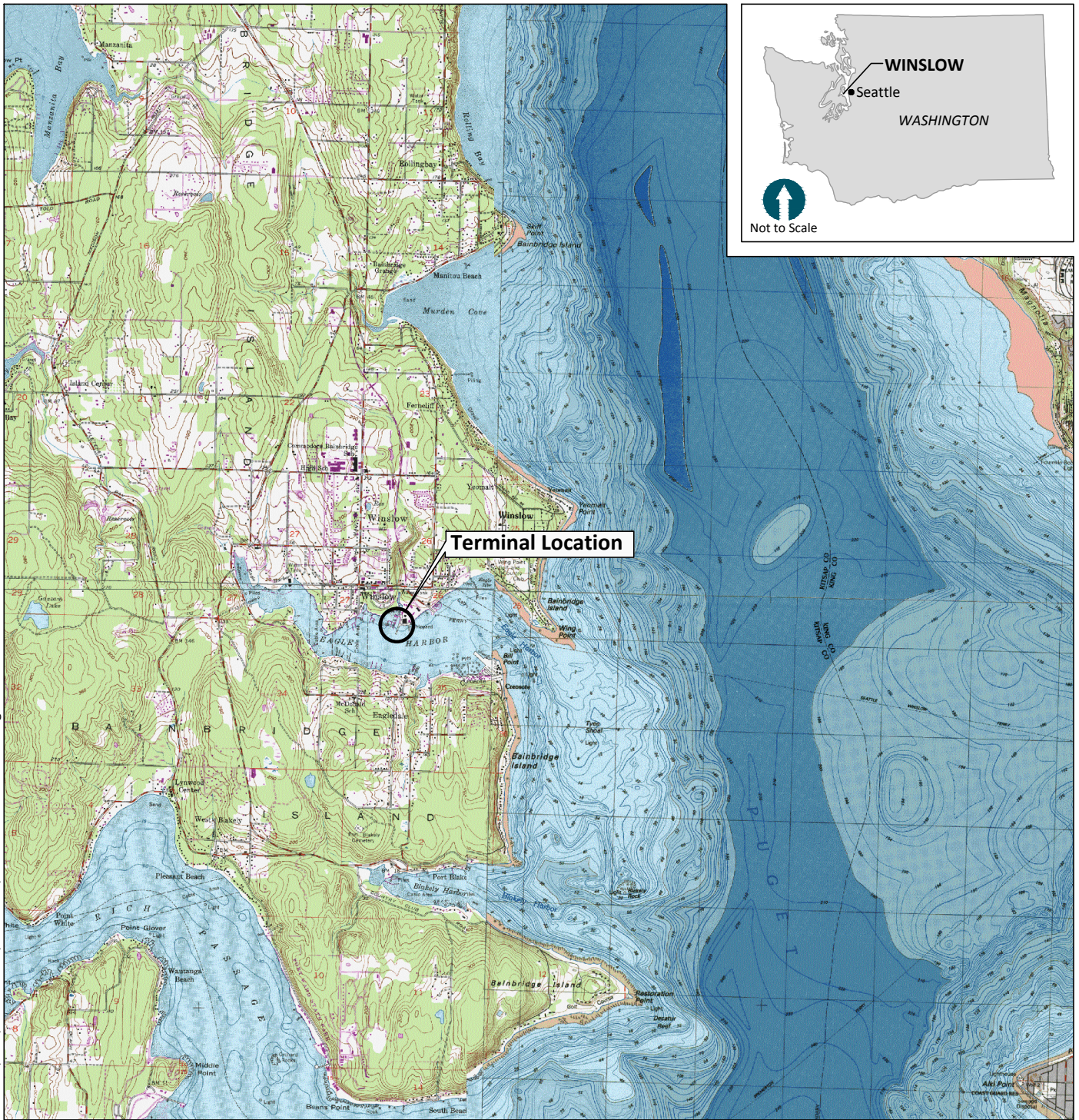
Adult eulachon could be present at the Coupeville Ferry Terminal. The terminal is distant from the river mouths where spawning is known to occur. Any eulachon found at this terminal would likely be adults.

4.5.2.19 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Coupeville Ferry Terminal (FEDERAL REGISTER 2011).

EAGLE HARBOR

K:\Jobs\10001603-WSF\10001603\10001603-BA-020-EH1.dwg FIG EH-1



Jan 11, 2012 1:08pm heriksen

NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Bremerton East, Seattle North and South, and Suquamish, Washington.

Section	Township	Range	Lat	Long	County
26	25N	2E	47° 37' 21" N	122° 30' 32.2" W	Kitsap
HUC 171100190402			WRIA 15		



Figure EH-1
Eagle Harbor Maintenance Facility Vicinity Map
WSF Biological Assessment Reference
Winslow, Washington



Eagle Harbor Maintenance Facility: WSF Biological Assessment Reference

- Smelt Spawning
- Approximate Mean High Water (MHW)

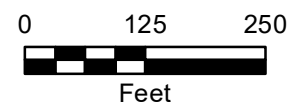
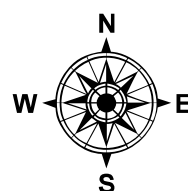


Figure EH-2
Aerial Photo of Eagle Harbor Maintenance Facility
WSF Biological Assessment Reference
Winslow, Washington

4.6 Eagle Harbor Maintenance Facility

The Eagle Harbor Maintenance Facility is located on Bainbridge Island, on the Eagle Harbor shoreline just west of the Bainbridge Island Ferry Terminal (see Figures EH-1 and EH-2).

The Eagle Harbor Maintenance Facility provides routine and emergency maintenance services for all WSF ferries and terminals. Features of the facility include maintenance buildings and parking areas for contractors and employees. The facility has six slips, two slips have vehicle loading capability and one is a passenger-only ferry tie-up slip. Six wingwalls are present at the facility, one steel and five timber wingwalls. Nineteen dolphins are associated with the facility, four steel, 15 timber, and one floating timber dolphin.

4.6.1 Eagle Harbor Environmental Baseline

4.6.1.1 Physical Indicators

Substrate and Slope

Substrate conditions adjacent to the maintenance facility are highly variable. Substrate beneath the facility is sandy silt, gravel, and shell. Propeller scour has removed most fine material leaving coarse sand, gravel, and shell debris. The depth/slope in the area is relatively flat with shallow depths (especially in the western portion of the harbor) and shoaling near the outlet to Puget Sound on the east side of the harbor. Offshore depths of maintenance facility structures are: head of Pier 1 (-35.8 feet MLLW), Pier 2 (-30.0 feet MLLW), and Slip E (-25.4 feet MLLW). Maximum depth for fixed dolphins is -37.0 feet MLLW.

See Figures EH-3 and EH-4 for pictures of the shoreline areas east and west of the maintenance facility.



Figure EH-3
Shoreline Area East of the Eagle Harbor Maintenance Facility



Figure EH-4
Shoreline Area West of the Eagle Harbor Maintenance Facility

Salt/Freshwater Mixing

There are three year-round streams and six seasonal streams that discharge into Eagle Harbor. A narrow, approximately 0.5-mile-long ravine drains into the harbor adjacent to the maintenance facility (see Figure EH-5).



Figure EH-5
The Ravine Adjacent to the Eagle Harbor Maintenance Facility (photo is looking upstream)

Flows and Currents

Circulation in Eagle Harbor is driven predominantly by tidal mixing, which can be influenced by wind. The current flow moves through the center of the channel and follows an east to west direction (EPA 1989).

4.6.1.2 Chemical Indicators

Water Quality

Marine waters in Eagle Harbor are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area include bacteria and copper (water) and arsenic (tissue).

Sediment Quality

Portions of Eagle Harbor, including some areas of the maintenance facility, are within the Wyckoff Eagle Harbor Superfund site. Within the Superfund site, PAHs and mercury are the primary chemicals of potential concern. Cleanup of the West Harbor, including the maintenance facility, was driven by mercury concentrations that exceeded state Sediment Management Standards (SMS). Remediation consisted of dredging and capping. No action was taken in areas where sediment chemical concentrations were below the standards.

4.6.1.3 *Biological Indicators*

Shoreline Vegetation

Ravine Creek (aka Canyon/Winslow) flows into Eagle Harbor at the northwest corner of the maintenance facility property into an inlet that is lined with large overhanging wood vegetation on the west (see Figure EH-6). There is little to no shoreline vegetation in the remaining area of the maintenance facility. The east side of the inlet adjacent to the maintenance facility property is lined with riprap and gravel, covered with a habitat mix along much of the bank. Shoreline vegetation east of the maintenance facility is characterized by grass above a bulkhead. Shoreline vegetation within the area is variable ranging from undeveloped areas with mature trees overhanging the upper intertidal zone to grass lawns behind a vertical bulkhead.



Figure EH-6
The Mouth of Ravine Creek as it Empties into Eagle Harbor

Macroalgae and Eelgrass

No eelgrass occurs around the maintenance facility (BERGER/ABAM 2006). While there are no eelgrass or kelp (*Laminaria* sp.) communities in the area near the maintenance facility, both are present at the mouth of Eagle Harbor near Wing Point, approximately 0.95 miles away. Based on a 1999 dive survey (Antrium et al. 2000) macroalgae were relatively abundant and likely provide habitat for benthic and demersal species in areas landward of -22 feet MLLW. Sparse cover of unattached *Ulva* and *Porphyra perforate* was observed from -6 feet MLLW to -22 feet MLLW. No

macroalgae was observed deeper than -22 feet MLLW. Other types of macroalgae that are typical of Puget Sound are expected throughout the harbor.

As part of a seep remediation, much of the bank along the east edge was re-graded in August 2006 to provide a better slope for habitat. The shallow inlet supports macroalgae growth.

Epibenthos, Macrofauna, Fish, and Marine Mammals

Upper intertidal areas within the Eagle Harbor Maintenance Facility and within the area near the facility are characterized by barnacles, amphipods, periwinkle snails, mussels, and infrequently by crabs. The mid to lower intertidal areas contain bivalves, sea stars, clams, urchins, and sea pens. Fish species in the area may include coho and chum salmon, and cutthroat trout. Additionally, sole species, perch (especially around piling), ratfish, rockfish, sand dabs, and other species typically found in embayments are also expected. Seals, Steller sea lions, California sea lions, and river otters may occur in Eagle Harbor. Other marine mammals (e.g., killer whale) do not occur in Eagle Harbor.

Forage Fish

Documented surf smelt spawning is present (see Figure EH-2), approximately 228 feet northeast of the maintenance facility (WSDOT 2018a). There is no documented herring or sand lance spawning at the terminal.

4.6.2 Eagle Harbor Species Distributions

4.6.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon bearing streams are located near the Eagle Harbor Maintenance Facility. However, major rivers that support Chinook salmon in this area of Puget Sound include the Lake Washington/Cedar River system (approximately 6 miles northeast, shoreline distance), Duwamish/Green River (approximately 7 miles southeast, shoreline distance), and the Puyallup River (approximately 27 miles southeast, shoreline distance) (WDFW 2007a). Chinook may also be present from rivers and streams in southern Puget Sound (WDFW 2007a). Smaller drainages are discussed below.

Adult and Subadult Chinook

Adult Puget Sound Chinook salmon destined for Sinclair Inlet and other west-central Puget Sound tributaries probably migrate through Eagle Harbor in late summer and early fall as they return from the ocean to natal streams and rivers (NMFS 2005).

Sub-adult Chinook have access to the terminal area and may be found there at any time of year. Sub-adults have spent a winter in the marine environment and are not closely oriented to the shoreline like juveniles.

Juvenile Chinook

Eagle Harbor provides habitat for multiple populations of Chinook salmon that are natal to streams elsewhere in Puget Sound. Use of this habitat necessitates crossing an open, deep water channel away from the protection of the nearshore environment. In Eagle Harbor, juvenile Chinook salmon have been found between April and August, with peak catches in May and June (NMFS 2005).

Near Colvos Passage (southwest of the maintenance facility) and in the Sinclair Inlet drainages, there are several small streams that support Chinook salmon. Curley Creek, which drains Long Lake and is a tributary to Yukon Harbor, is the nearest stream with Chinook salmon (approximately 8 miles southwest, shoreline distance). A tributary to Sinclair Inlet, Gorst Creek (approximately 19 miles, shoreline distance), supports both summer and fall-run Chinook salmon (Williams et al. 1975). Chinook salmon spawning in Gorst Creek has increased in recent years, due in part to a reduction in the fishing effort in the area. Most of these fish are believed to be returns from hatchery Chinook salmon released from the Gorst Creek rearing ponds. An escapement of over 17,000 Chinook salmon to the Inlet (fishery harvests plus stream escapement) in 2002 was the largest on record, with over 10,000 adult Chinook salmon in Gorst Creek. Returns to the stream in the previous 3 years averaged about 2,400 adult Chinook salmon. An outmigrant trap recently installed at River Kilometer 1.4 on Gorst Creek (upstream of the hatchery) captured 1,352 juvenile Chinook salmon in 2001 and 324 juvenile Chinook salmon in 2002. Another tributary to Sinclair Inlet, Blackjack Creek (approximately 17 miles, shoreline distance), supports Chinook salmon (WDFW 2006c).

Between 2002 and 2004, juvenile Chinook salmon were sampled in beach seines set by the City of Bainbridge Island and the Suquamish Tribe in Eagle Harbor and along the eastern shoreline of Bainbridge Island, approximately 1.5 miles from Eagle Harbor (NMFS 2005). In Eagle Harbor, juvenile Chinook salmon were found between April and August, with peak catches in May and June (Table EH-1). Along the eastern shoreline of Bainbridge Island, juvenile Chinook salmon were found between June and September, with peak catches in June and August (Table EH-2). Mean size in April, May, and possibly September for all 3 years and both sampling locations was influenced by the small sample size and may not be reflective of the true size distribution (Table EH-3). However, between June and possibly September, mean size increased from 99 mm to 137 mm fork length, with standard deviations ranging from 6 mm to 25 mm.

Table EH-1
Total Number of Juvenile Chinook Captured in Beach Seine Sampling in Eagle Harbor

Month	Year		
	2002	2003	2004
January			0
February			
March			0 (2 sets)
April			1
May		5 (2 sets)	1
June	4	0	0
July		0	
August			4
September		0	
October			0
November		0	
December		0 (2 sets)	0

Source: NMFS 2005

Note: One set per month unless otherwise indicated. Empty cells indicate that zero sets were conducted.

Table EH-2
Total Number of Juvenile Chinook Captured at a Beach Seine Sampling Station
along Eastern Shoreline of Bainbridge Island

Month	Year		
	2002	2003	2004
January			0
February			0
March			0 (2 sets)
April		0	0 (2 sets)
May		0 (2 sets)	0 (2 sets)
June	6	8 (2 sets)	1 (3 sets)
July	3 (3 sets)	4 (3 sets)	1
August	4	2 (2 sets)	8 (2 sets)
September	0 (2 sets)	0	4 (2 sets)
October		0	0
November		0	0
December		0	0

Source: NMFS 2005

Note: One set per month unless otherwise indicated. Empty cells indicate that zero sets were conducted.

Table EH-3
Forklengths of Juvenile Chinook Captured in Beach Seine Sampling
in or near Eagle Harbor

Month	Sample Size	Mean \pm St. Dev. (mm)
January	0	
February	0	
March	0	
April	1	58
May	6	121 \pm 21
June	19	99 \pm 17
July	8	118 \pm 25
August	18	126 \pm 18
September	4	137 \pm 6
October	0	
November	0	
December	0	

Source: NMFS 2005

Note: Data from all 3 years and all sampling locations combined per month

4.6.2.2 Puget Sound Chinook Salmon Critical Habitat

The Eagle Harbor Maintenance Facility lies within Chinook Zone 14 (70 FR 52630). While there are no streams that support Chinook salmon in Eagle Harbor, there are eelgrass beds at the mouth of Eagle Harbor near Wing Point that may be used by juvenile Chinook for rearing (Ash 2001). Use of critical habitat in Eagle Harbor necessitates crossing an open, deep water channel away from the protection of the nearshore environment.

The PCEs provided in the maintenance facility area, and their existing conditions, are listed in Table EH-4. PCEs relevant to the maintenance facility area are numbered per the CFR (70 FR 52630).

Table EH-4
Existing Conditions of Chinook Salmon PCEs at the Eagle Harbor Maintenance Facility

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include the maintenance facility dock, passenger only piers, two main piers, one with a passenger only float, two trestles, two vessel slips, four tie-up slips, and dolphins. The existing maintenance facility may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use per WAC 173-201(a). The impaired waters listings in the terminal area include bacteria and copper (water), and arsenic (tissue) (Ecology 2018).</p> <p>The existing stormwater system at the maintenance facility site consists of two networks of catch basins that drain to Eagle Harbor. One system drains the area of the maintenance building, and consists of 15 open drains and four standard catch basins that discharge under the pier to Eagle Harbor. None of the runoff from this area is treated. The large yard to the west and north is drained by four standard catch basins that flow through three oil/water separators and then discharge through two outfalls to Eagle Harbor. The maintenance facility operates under an Ecology National Pollutant Discharge Elimination System (NPDES) Stormwater Baseline General Permit (1/2/2015), and undergoes regular monitoring.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing maintenance facility structures may reduce the production of aquatic invertebrates that are prey species to salmon. Sediment remediation, including capping, has been done in portions of the site. Sediments are expected to support epibenthos.</p> <p>Surf smelt spawn year-round in Eagle Harbor. There is also a sand lance spawning area directly across the harbor from the maintenance facility.</p> <p>Natural Cover There is little to no shoreline vegetation in the vicinity of the maintenance facility with the exception of overhanging mature trees and woody debris along the west side of Ravine Creek, which flows into Eagle Harbor at the northwest corner of the facility. The remaining shoreline areas are armored with riprap and bulkheads. No eelgrass occurs near the maintenance facility. Macro algae, dominated by <i>Ulva</i> and <i>Porphyra perforate</i>, is abundant out to depth of -22 MLLW. Ravine Creek is the only side channel near the maintenance facility.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use per WAC 173-201(a). Ecology’s 2012 303(d) water quality parameters of concern for Eagle Harbor include bacteria and temperature (water), and arsenic (tissue).</p> <p>In-water structures include the maintenance facility dock, passenger only piers, two main piers, one with a passenger only float, two trestles, two vessel slips, four tie-up slips, and dolphins. The existing maintenance facility may affect fish passage in the nearshore.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.6.2.3 *Puget Sound Steelhead (Oncorhynchus mykiss)*

There are no natal streams in the area of the Eagle Harbor Maintenance Facility that support Puget Sound steelhead. However, major river systems that support winter steelhead include the Lake Washington/Cedar River system (approximately 6 miles northeast, shoreline distance), Duwamish/Green River (approximately 7 miles southeast, shoreline distance), and the Puyallup River (approximately 27 miles southeast, shoreline distance). The Duwamish/Green River also supports a run of summer steelhead. Steelhead may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

In addition, winter steelhead are present in Curley Creek just west of the Southworth Ferry Terminal in Yukon Harbor (approximately 8 shoreline miles southwest), Shingle Mill Creek on Vashon Island (approximately 10 shoreline miles southwest), Blackjack Creek (approximately 13 shoreline miles southwest), Ross Creek (approximately 14 shoreline miles southwest), Anderson Creek (approximately 15 shoreline miles southwest), and Gorst Creek (approximately 16 shoreline miles southwest)—all located in Sinclair Inlet; and Chico Creek (approximately 15 shoreline miles northwest), Barker Creek (approximately 17 shoreline miles northwest), Strawberry Creek (approximately 17 shoreline miles northwest), and Clear Creek (approximately 18 shoreline miles northwest)—all located in Dyes Inlet (WDFW 2007a).

Available data from tow-net sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In tow-net sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm

(Brennan et al. 2004). Also during 2001 and 2002, beach seining, tow netting, and purse seining were conducted by WDFW in Sinclair Inlet. This sampling effort focused on beach seining, which occurred monthly from April to October in 2001 and from mid February to September in 2002. Tow-netting was conducted monthly from May to August in 2002 only and purse seining was limited to only 2 days in July of 2002. The sampling effort resulted in the capture of four steelhead out of a total of 21,500 salmonids. Despite the larger effort given to beach seining, of the four steelhead, only one was caught in the beach seine and the remaining three were caught in deeper water with the tow net and purse seine (Fresh et al. 2006).

Steelhead were infrequently captured in a 2002-2004 beach seine study around Bainbridge Island. The study consisted of 271 beach seine sets conducted between April and September 2002 and between April 2003 and December 2004. Three steelhead were captured in the study; one was captured in May and two were captured in September. The steelhead were 179, 280, and 300 mm in total length. One of the three steelhead had been fin clipped, indicating it was of hatchery origin (City of Bainbridge Island, Suquamish Tribe, and WDFW 2005). During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004).

4.6.2.4 *Puget Sound Steelhead Critical Habitat*

The Eagle Harbor Maintenance Facility does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.6.2.5 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Eagle Harbor Maintenance Facility. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.6.2.6 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Eagle Harbor Maintenance Facility. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.6.2.7 *Southern Resident Killer Whale Critical Habitat*

The Eagle Harbor Maintenance Facility lies within Area 2 – Puget Sound considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the maintenance facility area, and their existing conditions, are listed in Table EH-5. PCEs relevant to the maintenance facility area are numbered per the CFR (Federal Register 2006).

Table EH-5
Existing Conditions of Killer Whale PCEs at the Eagle Harbor Maintenance Facility

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Eagle Harbor are designated “Extraordinary” for aquatic life use per WAC 173-201(a). The impaired waters listings in the terminal area include bacteria and copper (water), and arsenic (tissue) (Ecology 2018). The existing stormwater system at the maintenance facility site consists of two networks of catch basins that drain to Eagle Harbor. One system drains the area of the maintenance building, and consists of 15 open drains and four standard catch basins that discharge under the pier to Eagle Harbor. None of the runoff from this area is treated. The large yard to the west and north is drained by four standard catch basins that flow through three oil/water separators and then discharge through two outfalls to Eagle Harbor. The maintenance facility operates under an Ecology NPDES Stormwater Baseline General Permit (1/2/2015), and undergoes regular monitoring.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include a segment of the piers used to tie up passenger only vessels, the two main piers, one with a floating dolphin, one of the vessel slips (Slip E), four tie-up slips, and dolphins. It is unlikely that the presence of these structures affects passage conditions because killer whales have not been observed in Eagle Harbor.

4.6.2.8 Bull Trout (*Salvelinus confluentus*)

There are no natal streams in the area of the Eagle Harbor Maintenance Facility that support bull trout. It is unlikely that anadromous bull trout would enter Eagle Harbor (WDFW 2007a).

The aquatic portions of the maintenance facility are within marine FMO habitat. While bull trout have not been documented in the maintenance facility area, suitable FMO habitat is present, and bull trout are thought to occur throughout south, central, and northern Puget Sound. Therefore, it is expected that the maintenance facility area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the maintenance facility area, it is expected that individual bull trout from the Lake Washington/Cedar River system (approximately 6 miles southeast, shoreline distance) Duwamish/Green River (approximately 7 miles southeast, shoreline distance), and the Puyallup River (approximately 27 miles southeast, shoreline distance) core areas are most likely to be present (WDFW 2007a).

In August 2005, an acoustic tag was detected off the northeast point of Bainbridge Island. The tag code corresponded to a bull trout tagged 2 years earlier in the north Swinomish Channel. The fish was only detected once and therefore there is some uncertainty with the finding (Goetz 2007). No other historic or current references indicate the occurrence of bull trout (or Dolly Varden) on the west side of Puget Sound, main basin, or Kitsap Peninsula. Char are infrequent migrants across deep inlets, such as the main basin (Goetz et al. 2004).

4.6.2.9 *Bull Trout Critical Habitat*

The Eagle Harbor Maintenance Facility does not fall within designated bull trout critical habitat (Federal Register 2010a).

4.6.2.10 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of the Eagle Harbor Maintenance Facility that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.6.2.11 *Green Sturgeon Critical Habitat*

The Eagle Harbor Maintenance Facility does not fall within designated green sturgeon critical habitat (Federal Register 2009).

4.6.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Eagle Harbor facility area provides suitable marbled murrelet marine foraging habitat.

There is no documented forage fish spawning present at the facility. The WDFW Spawning Location Map shows surf smelt spawning on the west side of the facility. However, the survey was done in 1992, and the Eagle Harbor Superfund West Operable Unit Confined Disposal Facility (upland cap) was completed in 1997, which eliminated the surf smelt spawning survey area on the west side. Documented surf smelt (prey species) spawning is present approximately 260 ft NE of the facility (see Figure EH-2) (WSDOT 2018a).

WDFW surveys conducted from 2001 to 2012 show a density of less than 1 bird per square kilometer in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 27 miles W of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Eagle Harbor murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles), is Zero (WSDOT 2019b).

Five acres of contiguous forest that may offer nesting opportunity is present within the pile driving/heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c). The 0.25 mile zone radius of potential effect was evaluated. A WSF Biologist visited the facility area on 12/13/18. Although there were 5 acres of contiguous forest, it was less than the required 60% coniferous. Therefore, the forest does not offer appropriate nesting opportunity (WSDOT 2018f).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 16,520 scheduled arrivals and departures from the Bainbridge terminal (1,000 ft. NE of the facility). During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 8,290 scheduled arrivals and departures (WSDOT 2018d).

4.6.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the facility (USFW 1996).

4.6.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Eagle Harbor Maintenance Facility at any time of year. Adult bocaccio generally move to very deep water. The water near the Eagle Harbor Maintenance Facility reaches a maximum of 70 feet deep near the harbor mouth, about 1 mile from the facility (NMFS 2009).

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). Eagle Harbor is relatively shallow, but does not have the rocky substrata required by adult yelloweye rockfish.

4.6.2.15 *Rockfish Species Critical Habitat*

The Eagle Harbor Maintenance Facility is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table EH-6. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Eagle Harbor Maintenance Facility and will not be discussed here.

Table EH-6
Existing Conditions of Rockfish PBFs at the Eagle Harbor Maintenance Facility

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Eagle Harbor are designated "Extraordinary" for aquatic life use per WAC 173-201(a). The impaired waters listings in the terminal area include bacteria and copper (water), and arsenic (tissue) (Ecology 2018).</p> <p>The existing stormwater system at the maintenance facility site consists of two networks of catch basins that drain to Eagle Harbor. One system drains the area of the maintenance building, and consists of 15 open drains and four standard catch basins that discharge under the pier to Eagle Harbor. None of the runoff from this area is treated. The large yard to the west and north is drained by four standard catch basins that flow through three oil/water separators and then discharge through two outfalls to Eagle Harbor. The maintenance facility operates under an Ecology National Pollutant Discharge Elimination System (NPDES) Stormwater Baseline General Permit 1/2/2015), and undergoes regular monitoring.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing maintenance facility structures may reduce the production of aquatic invertebrates that are prey species to salmon. Sediment remediation, including capping, has been done in portions of the site. Sediments are expected to support epibenthos.</p> <p>Surf smelt spawn year-round in Eagle Harbor. There is also a sand lance spawning area directly across the harbor from the maintenance facility.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>There is little to no shoreline vegetation in the vicinity of the maintenance facility with the exception of overhanging mature trees and woody debris along the west side of Ravine Creek, which flows into Eagle Harbor at the northwest corner of the facility. The remaining shoreline areas are armored with riprap and bulkheads. No eelgrass occurs near the maintenance facility. Macro algae, dominated by <i>Ulva</i> and <i>Porphyra perforate</i>, is abundant out to depth of -22 MLLW. Ravine Creek is the only side channel near the maintenance facility.</p>

4.6.2.16 *Pacific Eulachon*

The Eagle Harbor Maintenance Facility is distant from any of the known eulachon spawning rivers. According to NMFS, Pacific eulachon are rare/absent in mid and south Puget Sound, and do not need to be consulted on for this terminal (Carey, personal communication, 2013).

4.6.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Eagle Harbor Maintenance Facility (FEDERAL REGISTER 2011).

EDMONDS

K:\Jobs\100016-WSF\10001603\10001603-BA-017-ED1.dwg FIG ED-1

Jan 11, 2012 12:56pm heriksen



NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Edmonds East and West, Washington.

Section	Township	Range	Lat	Long	County
23	27N	3E	47° 48' 47" N	122° 23' 04" W	Snohomish
HUC 171100190401			WRIA 8		



Figure ED-1
Edmonds Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Edmonds, Washington



Edmonds Ferry Terminal: WSF Biological Assessment Reference

- Smelt Spawning
- Approximate Mean High Water (MHW)
- Eel Grass Eel Grass

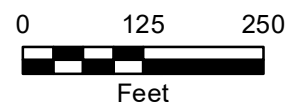
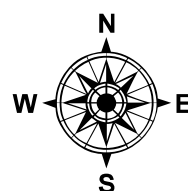


Figure ED-2
Aerial Photo of Edmonds Ferry Terminal
WSF Biological Assessment Reference
Edmonds, Washington

4.7 Edmonds Ferry Terminal

The Edmonds Ferry Terminal is in the city of Edmonds, along the downtown waterfront. The Edmonds-Kingston ferry route is part of SR 104 between the mainland and the Kitsap Peninsula. Edmonds is approximately 15 miles north of Seattle (see Figures ED-1 and ED-2).

The Edmonds Ferry Terminal provides service to the Kingston Ferry Terminal.

Features of the terminal include a terminal building, five vehicle holding lanes that accommodate up to 120 vehicles, three additional holding lanes for 54 vehicles on the dock and associated roadside holding areas, and overhead passenger loading facilities. Paid parking is available at the terminal, though the paid parking areas are not associated with WSDOT. The terminal has one slip with steel wingwalls. Six steel dolphins are associated with the terminal.

4.7.1 Edmonds Environmental Baseline

4.7.1.1 Physical Indicators

Substrate and Slope

The shoreline is gently sloping low-bank beachfront (see Figures ED-3 and ED-4). Between -7 feet and -15 feet MLLW, substrate consists of 95 percent sand, 4 percent fines, and 0.4 percent gravel. At -25 feet MLLW, the substrate changes to 61 percent sand, 27.4 percent fines, and 11.6 percent gravel, with sand composition increasing to 91 percent at -40 feet MLLW. Offshore depths of terminal structures are: head of main slip (-36.5 feet MLLW). Maximum depth for fixed dolphins is -39.2 feet MLLW.

East of the terminal is an underwater park that contains large rock, cobble, and sand, as well as sunken material (boats, etc.) to provide habitat structure. West of the terminal, substrates are mostly sand above -15 feet MLLW with underwater rock reefs scattered between -15 and -90 feet MLLW.



Figure ED-3
Shoreline Area East of the Edmonds Ferry Terminal



Figure ED-4
Shoreline Area West of the Edmonds Ferry Terminal

Salt/Freshwater Mixing

Willow Creek, a small perennial suburban stream, drains approximately 4,000 feet south of the terminal. Flows are on the order of 0.1 to 0.5 cubic feet per second (cfs) at the mouth. Shell Creek drains approximately 5,000 feet north of the terminal.

Flows and Currents

Currents are estimated to be at least 1.1 to 1.3 knots for maximum floods and ebbs, respectively.

4.7.1.2 *Chemical Indicators*

The marine waters of Possession Sound are designated "Extraordinary" for aquatic life. Ecology's 2012 303(d) water quality parameters of concern for Edmonds Possession Sound include bacteria (water) and organics and metals (tissue-25 parameters).

4.7.1.3 *Sediment Quality*

Impaired waters listings in the terminal area include chromium, copper, lead, zinc, and bis(2-ethylhexyl)phthalate (sediment) (Ecology 2018).

4.7.1.4 *Biological Indicators*

Shoreline Vegetation

Dominant species of vegetation above the high water mark along the Edmonds waterfront include dune wildrye (*Elymus mollis*), white sweet-clover (*Melilotus alba*), and Puget Sound gumweed (*Grindelia integrifolia*) with oceanspray (*Holodiscus discolor*), English plantain (*Plantago lanceolata*), and Scotch broom. There is no shoreline vegetation east of the terminal and bushes and grass occur above MHHW west of the terminal.

Macroalgae and Eelgrass

Aquatic vegetation in the area includes eelgrass (*Zostera marina*) to the north and south of the terminal, as well as *Ulva*, *Iridea*, *Fucus*, *Sarcodiothea*, *Porphyra*, *Smithora*, *Bothryoglossum*, *Gigartina*, and *Polyneura*. Macroalgae, including kelp, is nearly continuous between about -5 feet and -60 feet MLLW. Eelgrass beds are continuous from the marina to the ferry pier and from the ferry pier north through the underwater park at depths ranging from about -2 feet to -20 feet MLLW. The total area of eelgrass is 4.0 acres. Green algae (*Ulva lactuca*) and red algae (*Gracilaria sjoestedtii*) are also common (CH2MHILL 2003).

Epibenthos, Macrofauna, Fish, and Marine Mammals

Substrates along the Edmonds waterfront area and in the vicinity of the ferry terminal are suitable to support epibenthos. The eelgrass beds to the north and south of the terminal are important habitat for Dungeness crab. Subtidal geoduck beds occur north of the terminal. Fish known to occur near the terminal include chum and coho salmon, sea-run and resident cutthroat trout, perch, lingcod (*Ophiodon elongates*), dogfish (*Squalus acanthias*), flatfish, and other bottom fish. Adjacent to the terminal is an underwater park that predominately supports lingcod, cabezon (*Scorpaenichthys marmoratus*), rockfish, greenlings (*Hexagrammus decagrammus*), perch, and crab. Shrimp, crab, clams, and a variety of fish species common to Puget Sound have been documented in the area. Harbor seals and California and northern Elephant seals (*Mirounga angustirostris*) have been observed in the area, and killer whales may occur seasonally in the area.

Forage Fish

Documented surf smelt spawning is present (see Figure ED-2) approximately 105 feet northeast of the terminal (WSDOT 2018a). There is no documented herring, herring holding areas, or sand lance spawning at the terminal.

4.7.2 Edmonds Species Distributions

4.7.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon-bearing streams are located near the Edmonds Ferry Terminal. However, major rivers that support Chinook salmon in this area of Puget Sound include the Skagit River (approximately 30 shoreline miles north), Stillaguamish River (approximately 25 shoreline miles north), Snohomish River (approximately 17 miles north), Lake Washington/Cedar River (approximately 10 shoreline miles south), and the Duwamish/Green River (approximately 20 shoreline miles south). Chinook may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

Salmonids originating in the Lake Washington/Cedar River, Duwamish/Green River, and Snohomish River are likely to form the majority of juvenile salmonids present in the ferry terminal area.

Adult and Sub-adult Chinook

Adult Chinook pass through the Edmonds area before they return to the Lake Washington/Cedar River, Duwamish/Green River, and the Snohomish River to spawn.

Sub-adult Chinook have access to the terminal area and may be found there at any time of year. Sub-adults have spent a winter in the marine environment and are not closely oriented to the shoreline like juveniles.

Juvenile Chinook

Juvenile Chinook from the Snohomish/Lake Washington/Cedar River and Duwamish/Green River probably migrate along the Edmonds shoreline prior to moving offshore (CH2MHILL 2003).

Fall Chinook are most likely to be found in nearshore areas and can be found into July and August. Beach seines conducted from April through September of 2001 and 2002 along the mainland of central Puget Sound from Golden Gardens to Picnic Point showed juvenile Puget Sound Chinook salmon first entered the area in mid-May with numbers peaking in mid-June and tapering off through August and September. The average fork length was approximately 85 mm for those juvenile Chinook caught in May and 130 mm for those caught in September (Duffy et al. 2005).

4.7.2.2 Puget Sound Chinook Salmon Critical Habitat

The Edmonds Ferry Terminal lies within Chinook Zone 7 (70 FR 52630). While there are no streams that support Chinook salmon near the ferry terminal, there are eelgrass beds in close proximity that may be used by juvenile Chinook for rearing.

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table ED-1. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630).

Table ED-1
Existing Conditions of Chinook Salmon PCEs at the Edmonds Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include overhead loading, the trestle, the slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Possession Sound near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings in the terminal area include bacteria (water), organics and metals (tissue-25 parameters), and chromium, copper, lead, zinc, and bis(2-ethylhexyl)phthalate (sediment) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. One of the areas includes treatment.</p> <p>The first drainage area drains the vehicle holding area, and consists of eight catch basins that drain through the WSDOT system to the Edmonds Marsh.</p> <p>The second drainage area drains the holding lanes, and consists of two trench drains that run the length of the holding lanes. Each trench drain has eight open drains that discharge directly to surface water.</p> <p>The third drainage area drains the area near the Terminal Supervisor’s office and the trestle, and consists of two trench drains that flow through a coalescing plate oil/water separator (inspected annually) with an oil boom, that discharges through a City of Edmonds outfall to the south of the ferry terminal area.</p> <p>The fourth drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharges by sheet-flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Substrates along the Edmonds waterfront area and in the vicinity of the ferry terminal are suitable to support epibenthos.</p> <p>Surf smelt spawn on upper intertidal areas of the beach northeast of the terminal.</p> <p>Natural Cover There is no shoreline vegetation north of the terminal; bushes and grass occur above MHHW south of the terminal. The area near the existing ferry terminal has expansive macroalgae and eelgrass beds. Macroalgae, including <i>Laminaria</i> and <i>Nereocystis</i>, are nearly continuous from the -5 foot contour to the -60 foot MLLW contour. Eelgrass beds are continuous from the marina to the ferry pier and from the ferry pier north through the underwater park at depths ranging from about -2 feet to -20 feet MLLW. The total area of eelgrass is 4.0 acres. Green algae (<i>Ulva lactuca</i>) and the red algae <i>Gracilaria sjoestedtii</i> are also common (CH2MHILL 2003).</p> <p>There is no large overhanging wood vegetation near the terminal. The existing conditions within the defined area of critical habitat consist of sand in the nearshore area between the ferry terminal and the Port of Edmonds Marina. There are areas of artificial reef materials and rock at depths of -15 to -90 feet MLLW and some mixed sand/gravel at +5 to -15 feet MLLW (CH2MHILL 2003). Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>

PCEs	Existing Conditions
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Possession Sound near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings in the terminal area include bacteria (water), organics and metals (tissue-25 parameters), and chromium, copper, lead, zinc, and bis(2-ethylhexyl)phthalate (sediment) (Ecology 2018).</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.7.2.3 Puget Sound Steelhead (*Oncorhynchus mykiss*)

There are no natal streams in the area of the Edmonds Ferry Terminal that support Puget Sound steelhead. The nearest small drainage that supports steelhead is Lunds Gulch (approximately 9 shoreline miles northeast), a tributary to Possession Sound.

Major river systems that support winter and summer steelhead include the Snohomish River (approximately 17 miles northeast), Stillaguamish River (approximately 25 shoreline miles northeast), Skagit River (approximately 30 shoreline miles northeast), and the Duwamish/Green River (approximately 20 shoreline miles south). The Lake Washington/Cedar River (approximately 10 shoreline miles south) supports winter steelhead only. In addition, numerous small streams in the Sinclair/Dyes Inlets (see Section 4.2 for more information), and central and southern Puget Sound rivers and streams support winter steelhead (WDFW 2007a).

Available data from tow-net sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In tow-net sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between

May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004).

4.7.2.4 *Puget Sound Steelhead Critical Habitat*

The Edmonds Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.7.2.5 *Humpback Whale (*Megaptera novaeangliae*)*

Humpback whales may be present near the Edmonds ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.7.2.6 *Southern Resident Killer Whale (*Orcinus orca*)*

Southern Resident Killer Whale (SRKW) may be present near the Edmonds ferry terminal. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.7.2.7 *Southern Resident Killer Whale Critical Habitat*

The Edmonds Ferry Terminal lies within Area 2 – Puget Sound considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table ED-2. PCEs relevant to the terminal area are numbered per Federal Register 2006.

Table ED-2
Existing Conditions for Southern Resident Killer Whale PCE at the Edmonds Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Possession Sound near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings in the terminal area include bacteria (water), organics and metals (tissue-25 parameters), and chromium, copper, lead, zinc, and bis(2-ethylhexyl)phthalate (sediment) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. One of the areas includes treatment.</p> <p>The first drainage area drains the vehicle holding area, and consists of eight catch basins that drain through the WSDOT system to the Edmonds Marsh.</p> <p>The second drainage area drains the holding lanes, and consists of two trench drains that run the length of the holding lanes. Each trench drain has eight open drains that discharge directly to surface water.</p> <p>The third drainage area drains the area near the Terminal Supervisors office and the trestle, and consists of two trench drains that flow through a coalescing plate oil/water separator (inspected annually) with an oil boom, that discharges through a City of Edmonds outfall to the south of the ferry terminal area.</p> <p>The fourth drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet-flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include a segment of the overhead loading, the trestle, the slip, and dolphins.

4.7.2.8 Bull Trout (*Salvelinus confluentus*)

There are no natal streams in the area of the Edmonds Ferry Terminal that support bull trout (WDFW 2007a).

The aquatic portions of the ferry terminal are within marine FMO habitat. Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration and overwintering (USFWS 2004a).

Within the ferry terminal area it is expected that individual bull trout from the Skagit River (approximately 30 shoreline miles north), Stillaguamish River (approximately

25 shoreline miles north), Snohomish River (approximately 17 miles north), Lake Washington/Cedar River (approximately 10 shoreline miles south), and the Duwamish/Green River (approximately 20 shoreline miles south) are most likely to be present (WDFW 2007a; USFWS 2004b). Bull trout may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

4.7.2.9 Bull Trout Critical Habitat

The shoreline of the Edmonds Ferry Terminal is within designated bull trout critical habitat (Federal Register 2010a). The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table ED-3. PCEs relevant to the terminal area are numbered per Federal Register 2010a.

Table ED-3
Existing Conditions of Bull Trout PCEs at the Edmonds Ferry Terminal

PCEs	Existing Conditions
2) Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	In-water structures include overhead loading, the trestle, the slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore, and may reduce the production of aquatic invertebrates that are prey species to bull trout.
3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Substrates support epibenthic production. Surf smelt spawn approximately 0.75 mile north of the terminal. Dominant macroalgae in the area is eelgrass (<i>Zostera marina</i> L.) and benthic macroalgae (<i>Ulva</i> spp., <i>Laminaria</i> sp.). There is no large overhanging wood vegetation present to provide a food base from terrestrial organisms. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal.
4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.	In-water structures include overhead loading, the trestle, the slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore, and may reduce the production of aquatic invertebrates that are prey species to bull trout. There is no large overhanging wood vegetation present to provide a food base from terrestrial organisms. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal. Dominant macroalgae in the area is eelgrass (<i>Zostera marina</i> L.) and benthic macroalgae (<i>Ulva</i> spp., <i>Laminaria</i> sp.).
5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper	East Puget Sound water temperatures can range from 41.4 to 75.7 °F (5.2 to 24.3 °C) with an average of 51 °F (10.58 °C) (Ecology 2007). Water temperature data for specific ferry terminals is not available. The in-water

PCEs	Existing Conditions
end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.	components of the ferry terminal provide some shade, which may cause slight localized reductions in water temperatures.
8) Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	<p>The marine waters of Possession Sound near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings in the terminal area include bacteria (water), organics and metals (tissue-25 parameters), and chromium, copper, lead, zinc, and bis(2-ethylhexyl)phthalate (sediment) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. One of the areas includes treatment.</p> <p>The first drainage area drains the vehicle holding area, and consists of eight catch basins that drain through the WSDOT system to the Edmonds Marsh.</p> <p>The second drainage area drains the holding lanes, and consists of two trench drains that run the length of the holding lanes. Each trench drain has eight open drains that discharge directly to surface water.</p> <p>The third drainage area drains the area near the Terminal Supervisor's office and the trestle, and consists of two trench drains that flow through a coalescing plate oil/water separator (inspected annually) with an oil boom, that discharges through a City of Edmonds outfall to the south of the ferry terminal area.</p> <p>The fourth drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharges by sheet-flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Existing creosote-treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p>

4.7.2.10 Green Sturgeon (*Acipenser medirostris*)

There are no natal streams in the area of the Edmonds Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal

migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.7.2.11 *Green Sturgeon Critical Habitat*

The Edmonds Ferry Terminal does not fall within designated green sturgeon critical habitat (Federal Register 2009).

4.7.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Edmonds terminal area provides suitable marbled murrelet marine foraging habitat.

There is no documented forage fish spawning present at the terminal. Documented surf smelt (prey species) spawning is present approximately 120 ft. NE of the terminal (see Figure ED-2) (WSDOT 2018a).

WDFW density surveys were not conducted in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 34 miles SW of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Edmonds murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles), is Zero (WSDOT 2019b).

There are no coniferous forest that may offer nesting opportunity within the pile driving/heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 17,210 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 8,630 scheduled arrivals and departures (WSDOT 2018d).

The number of marbled murrelets near the terminal varies seasonally; but the reported fluctuations are consistent with other areas of Puget Sound. Marbled murrelets have been observed year-round at the Edmonds Marina. The number of marbled murrelet sightings at Edmonds begins to increase in April with the coming of the nesting season. Marbled murrelets have also been observed in the Edmonds area in September, in both breeding and nonbreeding plumages (USFW 2004a). In May and June 2001, during dye studies in the vicinity of the Edmonds Marina, two to three marbled murrelets were regularly observed at the mouth of the marina (Li, personal communication 2004). The number of sightings peak from May through July.

Abundance of marbled murrelets appears to drop off in October and observation become less frequent November through March; however, marbled murrelets that have been reported flying through the area during the annual Audubon Christmas Count ranged from zero to 10 individuals per year between 1999 and 2002. The area where marbled murrelets have been observed extends north from the Edwards Point to about 0.5 mile N of Brackets Landing (USFW 2004a).

4.7.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFWS 1996).

4.7.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Edmonds Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The water near the Edmonds Ferry Terminal reaches 100 feet within 1 mile of shore (NMFS 2009), but does not get much deeper. Edmonds is at the southern limit of what is considered the “north Puget Sound;” adult bocaccio may be in the vicinity of the terminal.

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). Puget Sound in the terminal vicinity is fairly deep (around 100 feet), but lacks the rocky substrate preferred by yelloweye rockfish.

4.7.2.15 *Rockfish Species Critical Habitat*

The Edmonds Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table ED-4. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Edmonds Ferry Terminal and will not be discussed here.

Table ED-4
Existing Conditions of Rockfish PBFs at the Edmonds Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Possession Sound near the ferry terminal are designated "Extraordinary" for aquatic life use. The impaired waters listings in the terminal area include bacteria (water), organics and metals (tissue-25 parameters), and chromium, copper, lead, zinc, and bis(2-ethylhexyl)phthalate (sediment) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of four drainage areas that drain to Possession Sound. One of the areas includes treatment.</p> <p>The first drainage area drains the vehicle holding area, and consists of eight catch basins that drain through the WSDOT system to the Edmonds Marsh.</p> <p>The second drainage area drains the holding lanes, and consists of two trench drains that run the length of the holding lanes. Each trench drain has eight open drains that discharge directly to surface water.</p> <p>The third drainage area drains the area near the Terminal Supervisor's office and the trestle, and consists of two trench drains that flow through a coalescing plate oil/water separator (inspected annually) with an oil boom, that discharges through a City of Edmonds outfall to the south of the ferry terminal area.</p> <p>The fourth drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharges by sheet-flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Substrates along the Edmonds waterfront area and in the vicinity of the ferry terminal are suitable to support epibenthos.</p> <p>Surf smelt spawn on upper intertidal areas of the beach northeast of the terminal.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>There is no shoreline vegetation north of the terminal; bushes and grass occur above MHHW south of the terminal. The area near the existing ferry terminal has expansive macroalgae and eelgrass beds. Macroalgae, including <i>Laminaria</i> and <i>Nereocystis</i>, are nearly continuous from the -5 foot contour to the -60 foot MLLW contour. Eelgrass beds are continuous from the marina to the ferry pier and from the ferry pier north through the underwater park at depths ranging from about -2 feet to -20 feet MLLW. The total area of eelgrass is 4.0 acres. Green algae (<i>Ulva lactuca</i>) and the red algae <i>Gracilaria sjoestedtii</i> are also common (CH2MHILL 2003).</p> <p>There is no large overhanging wood vegetation near the terminal. The existing conditions within the defined area of critical habitat consist of sand in the nearshore area between the ferry terminal and the Port of Edmonds Marina. There are areas of artificial reef materials and rock at depths of -15 to -90 feet MLLW and some mixed sand/gravel at +5 to -15 feet MLLW (CH2MHILL 2003). Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>

4.7.2.16 *Pacific Eulachon*

Adult eulachon could be present at the Edmonds Ferry Terminal. The terminal is distant from the rivers where spawning is known to take place; therefore, it is not likely that juveniles would be present. According to NMFS, eulachon are rare/absent in mid and south Puget Sound, and do not need to be consulted on for this terminal (Carey, personal communication, 2013).

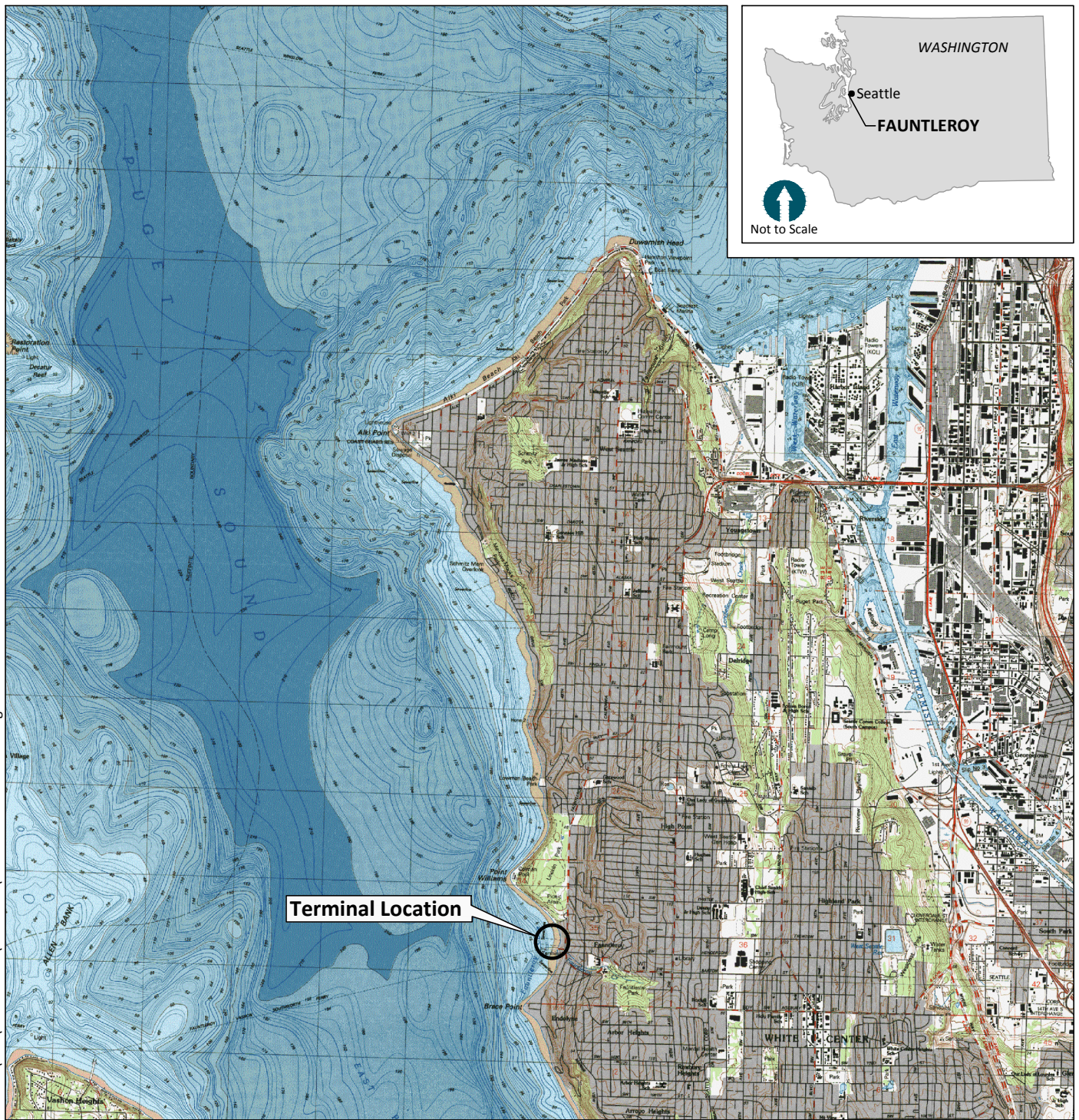
4.7.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Edmonds Ferry Terminal (FEDERAL REGISTER 2011).

FAUNTLEROY

K:\Jobs\100016-WSF\10001603\10001603-BA-023-FA1.dwg FIG FA-1

Jan 11, 2012 1:17pm heriksen



NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Seattle South, Washington.


Section	Township	Range	Lat	Long	County
35	24N	3E	47° 31' 24" N	122° 23' 37" W	King
HUC 171100190403			WRIA 9		



Figure FA-1
Fauntleroy Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Seattle, Washington



Fauntleroy Ferry Terminal: WSF Biological Assessment Reference

- Smelt Spawning
- SandLance
- - - Approximate Mean High Water (MHW)
-  Macroalgae

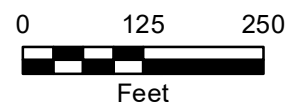
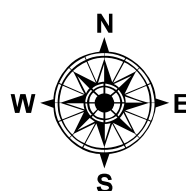


Figure FA-2

Aerial Photo of Fauntleroy Ferry Terminal
WSF Biological Assessment Reference
Seattle, Washington

4.8 Fauntleroy Ferry Terminal

The Fauntleroy Ferry Terminal is located in West Seattle, south of Lincoln Park. The Fauntleroy Ferry Terminal serves two destinations: Vashon Island and Southworth. See Figures FA-1 and FA-2.

The Fauntleroy Ferry Terminal provides service to the Vashon and Southworth Ferry Terminals.

Features of the terminal include a terminal building, four vehicle holding lanes that accommodate up to 84 vehicles, and roadside holding. Vanpool parking is also available at the terminal. The terminal has one slip with steel wingwalls. Five steel dolphins are associated with the terminal.

4.8.1 Fauntleroy Environmental Baseline

4.8.1.1 Physical Indicators

Substrate and Slope

Aerial photographs indicate the presence of large woody debris along the shoreline in the area near the terminal. The high intertidal zone is characterized by fine-grained sand, whereas the mid to low intertidal areas are predominantly coarse sand and gravel. Bathymetry gently slopes seaward out to about -15 to -20 feet MLLW at the end of the trestle, and then drops off steeply (about 15 percent) at the end of the trestle. Offshore depths of terminal structures are: head of main slip (-33.6 feet MLLW). Maximum depth for fixed dolphins is -47.4 feet MLLW. The substrate is comprised predominately of sand and gravel. See Figures FA-3 and FA-4 for pictures of the shoreline areas south and north of the ferry terminal.



Figure FA-3
Shoreline Area South of the Fauntleroy Ferry Terminal



Figure FA-4
Shoreline Area North of the Fauntleroy Ferry Terminal

Salt/Freshwater Mixing

Fauntleroy Creek discharges into Fauntleroy Cove just south of the ferry terminal (see Figures FA-2 and FA-5) and contributes a small volume of freshwater to the cove.



Figure FA-5
The Mouth of Fauntleroy Creek at the South End of the Ferry Terminal

Flows and Currents

Fauntleroy Cove is a moderately protected marine embayment with an unimpaired connection to Puget Sound. Flows are to the south prior to maximum flood, and reverse direction after the maximum flood. Average current speed is about 0.5 knots (0.85 feet per second). Tides, waves, winds, vessel traffic, and Fauntleroy Creek also likely affect local current patterns.

4.8.1.2 *Chemical Indicators*

Water Quality

The marine waters of Fauntleroy Cove are designated “Extraordinary” to aquatic life use. The impaired waters listings near the terminal area include bacteria, ammonia, DO, temperature, and shellfish habitat (Ecology 2018). Water quality near the terminal may be influenced by freshwater input from Fauntleroy Creek and urban runoff.

Sediment Quality

Impaired waters listings in the terminal area include organics and metals (sediment – 35 parameters) (Ecology 2018).

4.8.1.3 *Biological Indicators*

Shoreline Vegetation

There is limited shoreline vegetation in the vicinity of the terminal; that which exists consists mostly of residential landscaping.

Macroalgae and Eelgrass

The area provides suitable physical and chemical conditions for primary production (e.g., macroalgae). Unidentified macroalgae occurs off the northern and southern sides of the trestle (see Figure FA-2). There is no eelgrass in the area near the terminal.

Epibenthos, Macrofauna, Fish, and Marine Mammals

Macroalgae and sediment characteristics suggest that the area around the terminal likely supports epibenthos. Subtidal geoduck beds occur in the vicinity of the terminal and north and south of the terminal. The area is also a migratory corridor for adult and juvenile coho salmon and cutthroat trout, which utilize the nearshore area and Fauntleroy Creek. Other fish species common to Puget Sound are expected in the area. Marine mammals likely to occur in the area include killer whale, harbor seal, Steller sea lion, California sea lion, harbor porpoise, and Dall's porpoise.

Forage Fish

Documented surf smelt spawning is present (see Figure FA-2), extending approximately 783 feet to the south and 550 feet to the north and documented sand lance spawning 2,000 feet to the south and 307 feet to the north (WSDOT 2018a). There is no documented herring spawning or herring holding areas at the terminal.

4.8.2 *Fauntleroy Species Distributions*

4.8.2.1 *Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)*

No Chinook salmon-bearing streams are located near the Fauntleroy Ferry Terminal (WDFW 2007a).

Adult and Sub-adult Chinook

Salmon stocks that may be present in the ferry terminal area for variable lengths of time include runs originating from the Duwamish/Green River (approximately 8 shoreline miles northeast) and the Puyallup River (approximately 22 shoreline miles

south). Chinook may also be present from rivers and streams in southern Puget Sound (WDFW 2007a). Adults and sub-adults may be present any time of year.

Juvenile Chinook

Juvenile Chinook from the Duwamish/Green River may be present along the Fauntleroy shoreline (Williams et al. 1975).

Beach seining conducted in 2000 at Fauntleroy Cove and Seahurst Park from June 5 through August 16 had the highest catches of juvenile Chinook in mid-June and again in late July. The size of Chinook smolts captured averaged 85 mm in late July, 100 mm in July, and 130 mm in August (Mavros and Brennan 2001). Beach seines conducted from April through September of 2001 and 2002 along the mainland of central Puget Sound from Lincoln Park (just north of the ferry terminal) to Marine View Park showed juvenile Puget Sound Chinook salmon first entered the area in mid-May with numbers peaking in mid-June and tapered off through August and September. The average fork length was approximately 85 mm for those juvenile Chinook caught in May and 130 mm for those caught in September (Duffy et al. 2005). Peak outmigration of juveniles from the Duwamish/Green River system occurs from April through June (Port of Seattle 2006).

4.8.2.2 Puget Sound Chinook Salmon Critical Habitat

The Fauntleroy Ferry Terminal lies within Chinook Zone 7 (70 FR 52630). While there are no streams that support Chinook salmon near the ferry terminal, waters in close proximity to the ferry terminal may be used by juvenile Chinook for rearing.

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table FA-1. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630).

Table FA-1
Existing Conditions of Chinook Salmon PCEs at the Fauntleroy Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include the ferry terminal building, the trestle, the slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Fauntleroy Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings near the terminal area include bacteria, ammonia, DO, temperature, and shellfish habitat (water) and metals and organics (sediment – 35 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of two drainage areas that drain to Fauntleroy Cove. None of the runoff is treated.</p> <p>The first drainage area drains the trestle holding lanes and the terminal building area, and consists of one catch basin that connects to the City of Seattle system, and 29 open drains that discharge directly to surface water.</p> <p>The second drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Macroalgae and sediment characteristics near the terminal indicate that the area supports epibenthos.</p> <p>Surf smelt and sand lance spawn on the upper intertidal beaches in Fauntleroy Cove.</p> <p>Natural Cover Limited shoreline vegetation exists near the terminal in the form of residential landscaping. Dense ulvoid macroalgae impairs the growth of other beneficial macroalgae and eelgrass. Ulvoid macroalgae occurs to the north and south of the ferry terminal trestle. There is no eelgrass in the area. The shoreline is free of private docks and barriers. Aerial photos indicate the presence of large woody debris along the ferry terminal area shoreline (PIE 2001).</p> <p>There is no large overhanging wood vegetation near the terminal. The existing conditions within the defined area of critical habitat consist of sand in the nearshore and coarse sand and gravel in the mid to low intertidal areas (PIE 2001). Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Fauntleroy Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings near the terminal area include bacteria, ammonia, DO, temperature, and shellfish habitat (water) and metals and organics (sediment – 35 parameters) (Ecology 2018).</p> <p>Offshore areas provide habitat for forage fish.</p>

4.8.2.3 Puget Sound Steelhead (*Oncorhynchus mykiss*)

There are no natal streams in the area of the Fauntleroy Ferry Terminal that support Puget Sound steelhead. However, major river systems that support winter steelhead

include the Duwamish/Green River (approximately 8 miles northeast, shoreline distance) and the Puyallup River (approximately 22 miles south, shoreline distance). The Duwamish/Green River also supports a run of summer steelhead. In addition, numerous rivers and streams in central and southern Puget Sound support winter steelhead (WDFW 2007a).

Available data from tow-net sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In tow-net sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004).

4.8.2.4 *Puget Sound Steelhead Critical Habitat*

The Fauntleroy Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.8.2.5 *Humpback Whale (*Megaptera novaeangliae*)*

Humpback whales may be present near the Fauntleroy ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.8.2.6 *Southern Resident Killer Whale (*Orcinus orca*)*

Southern Resident Killer Whale (SRKW) may be present near the Fauntleroy ferry terminal. Sightings data will be summarized in each project BA. The data may come

from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.8.2.7 Southern Resident Killer Whale Critical Habitat

The Fauntleroy Ferry Terminal lies within Area 2 – Puget Sound considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table FA-2. PCEs relevant to the terminal area are numbered per Federal Register 2006.

Table FA-2
Existing Conditions of Southern Resident Killer Whale PCEs at the Fauntleroy Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Fauntleroy Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings near the terminal area include bacteria, ammonia, DO, temperature, and shellfish habitat (water) and metals and organics (sediment – 35 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of two drainage areas that drain to Fauntleroy Cove. None of the runoff is treated.</p> <p>The first drainage area drains the trestle holding lanes and the terminal building area, and consists of one catch basin that connects to the City of Seattle system, and 29 open drains that discharge directly to surface water.</p> <p>The second drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include the trestle, the slip, and dolphins. It is unlikely that the presence of these structures affect passage of killer whales.

4.8.2.8 *Bull Trout (Salvelinus confluentus)*

There are no natal streams in the area of the Fauntleroy Ferry Terminal that support bull trout (WDFW 2007a).

The aquatic portions of the ferry terminal are within marine FMO habitat. While bull trout have not been documented in the ferry terminal area, suitable FMO habitat is present, and bull trout are thought to occur throughout south, central, and northern Puget Sound. Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the ferry terminal area, it is expected that individual bull trout from the Duwamish/Green River (approximately 8 miles northeast, shoreline distance) and the Puyallup River (approximately 22 miles south, shoreline distance) core areas are most likely to be present (WDFW 2007a).

4.8.2.9 *Bull Trout Critical Habitat*

The shoreline of the Fauntleroy Ferry Terminal is within designated bull trout critical habitat (Federal Register 2010a). The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table FA-3. PCEs relevant to the terminal area are numbered per Federal Register 2010a.

Table FA-3
Existing Conditions of Bull Trout PCEs at the Fauntleroy Ferry Terminal

PCEs	Existing Conditions
2) Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	In-water structures include the trestle, the slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore, and may reduce the production of aquatic invertebrates that are prey species to bull trout.
3) An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	<p>Ulvoid macroalgae occurs to the north and south of the ferry terminal trestle. There is no eelgrass in the area. The shoreline is free of private docks and barriers.</p> <p>Aerial photos indicate the presence of large woody debris along the ferry terminal area shoreline (PIE 2001). The existing conditions within the defined area of critical habitat consist of sand in the nearshore and coarse sand and gravel in the mid to low intertidal areas (PIE 2001). Some riprap and hardened shoreline are adjacent to the ferry terminal.</p> <p>Macroalgae and sediment characteristics indicate that the area likely supports epibenthos. Dense ulvoid macroalgae cover impairs the growth of other</p>

PCEs	Existing Conditions
	beneficial macroalgae and eelgrass. Surf smelt and sand lance spawn on the upper intertidal beaches in Fauntleroy Cove.
4) Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.	<p>In-water structures include the trestle, the slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore, and may reduce the production of aquatic invertebrates that are prey species to bull trout.</p> <p>Aerial photos indicate the presence of large woody debris along the ferry terminal area shoreline (PIE 2001). The existing conditions within the defined area of critical habitat consist of sand in the nearshore and coarse sand and gravel in the mid to low intertidal areas (PIE 2001). Some riprap and hardened shoreline are adjacent to the ferry terminal.</p> <p>Ulvoid macroalgae occurs to the north and south of the ferry terminal trestle. There is no eelgrass in the area. The shoreline is free of private docks and barriers.</p>
5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.	East Puget Sound water temperatures can range from 41.4 to 75.7 °F (5.2 to 24.3 °C) with an average of 51 °F (10.58 °C) (Ecology 2007). Water temperature data for specific ferry terminals is not available. The in-water components of the ferry terminal provide some shade, which may cause slight localized reductions in water temperatures.
8) Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	<p>The marine waters of Fauntleroy Cove near the ferry terminal are designated “Extraordinary” for aquatic life use per WAC 173-201(a). Ecology’s 2012 303(d) water quality parameters of concern for Fauntleroy Cove include bacteria, ammonia, DO, temperature, and shellfish habitat.</p> <p>The existing stormwater system at the ferry terminal consists of two drainage areas that drain to Fauntleroy Cove. None of the runoff is treated.</p> <p>The first drainage area drains the trestle holding lanes and the terminal building area, and consists of one catch basin that connects to the City of Seattle system, and 29 open drains that discharge directly to surface water.</p> <p>The second drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p>

4.8.2.10 Green Sturgeon (*Acipenser medirostris*)

There are no natal streams in the area of the Fauntleroy Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is

uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.8.2.11 *Green Sturgeon Critical Habitat*

The Fauntleroy Ferry Terminal does not fall within designated green sturgeon critical habitat per Federal Register 2018.

4.8.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Fauntleroy terminal area provides suitable marbled murrelet marine foraging habitat.

Documented sand lance (prey species) spawning is present (see Figures FA-2), extending approximately 790 ft. S and 200 ft. N of the terminal. Documented surf smelt spawning is present starting 200 ft. N of the terminal, and extends 375 ft. further north (WSDOT 2018a).

WDFW density surveys were not conducted in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 34 miles SW of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Fauntleroy murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles), is Zero (WSDOT 2019b).

There are no coniferous forest that may offer nesting opportunity within the pile driving/heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 14,040 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 7,080 scheduled arrivals and departures (WSDOT 2018d).

4.8.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFW 1996).

4.8.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Fauntleroy Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The water near the Fauntleroy Ferry Terminal drops off quickly to very deep water, reaching 650 feet within 2 miles of the shore. Adult bocaccio could be in these very deep waters.

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). The waters adjacent to the Fauntleroy Ferry Terminal are deep enough for yelloweye, but they do not provide the rocky substrata favored by yelloweye rockfish. It is possible, but not likely, that any life stage of yelloweye rockfish could be in the terminal vicinity.

4.8.2.15 *Rockfish Species Critical Habitat*

The Fauntleroy Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table FA-4. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (>

98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Fauntleroy Ferry Terminal and will not be discussed here.

Table FA-4
Existing Conditions of Rockfish PBFs at the Fauntleroy Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of Fauntleroy Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. The impaired waters listings near the terminal area include bacteria, ammonia, DO, temperature, and shellfish habitat (water) and metals and organics (sediment – 35 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of two drainage areas that drain to Fauntleroy Cove. None of the runoff is treated.</p> <p>The first drainage area drains the trestle holding lanes and the terminal building area, and consists of one catch basin that connects to the City of Seattle system, and 29 open drains that discharge directly to surface water.</p> <p>The second drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Macroalgae and sediment characteristics near the terminal indicate that the area supports epibenthos.</p> <p>Surf smelt and sand lance spawn on the upper intertidal beaches in Fauntleroy Cove.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>Limited shoreline vegetation exists near the terminal in the form of residential landscaping. Dense ulvoid macroalgae impairs the growth of other beneficial macroalgae and eelgrass. Ulvoid macroalgae occurs to the north and south of the ferry terminal trestle. There is no eelgrass in the area. The shoreline is free of private docks and barriers. Aerial photos indicate the presence of large woody debris along the ferry terminal area shoreline (PIE 2001).</p> <p>There is no large overhanging wood vegetation near the terminal. The existing conditions within the defined area of critical habitat consist of sand in the nearshore and coarse sand and gravel in the mid to low intertidal areas (PIE 2001). Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>

4.8.2.16 *Pacific Eulachon*

Adult eulachon could be present at the Fauntleroy Ferry Terminal. The terminal is distant from the rivers where spawning is known to occur; therefore, juveniles would not likely be present at this terminal. According to NMFS, eulachon are

rare/absent in mid and south Puget Sound, and do not need to be consulted on for this terminal (Carey, personal communication, 2013).

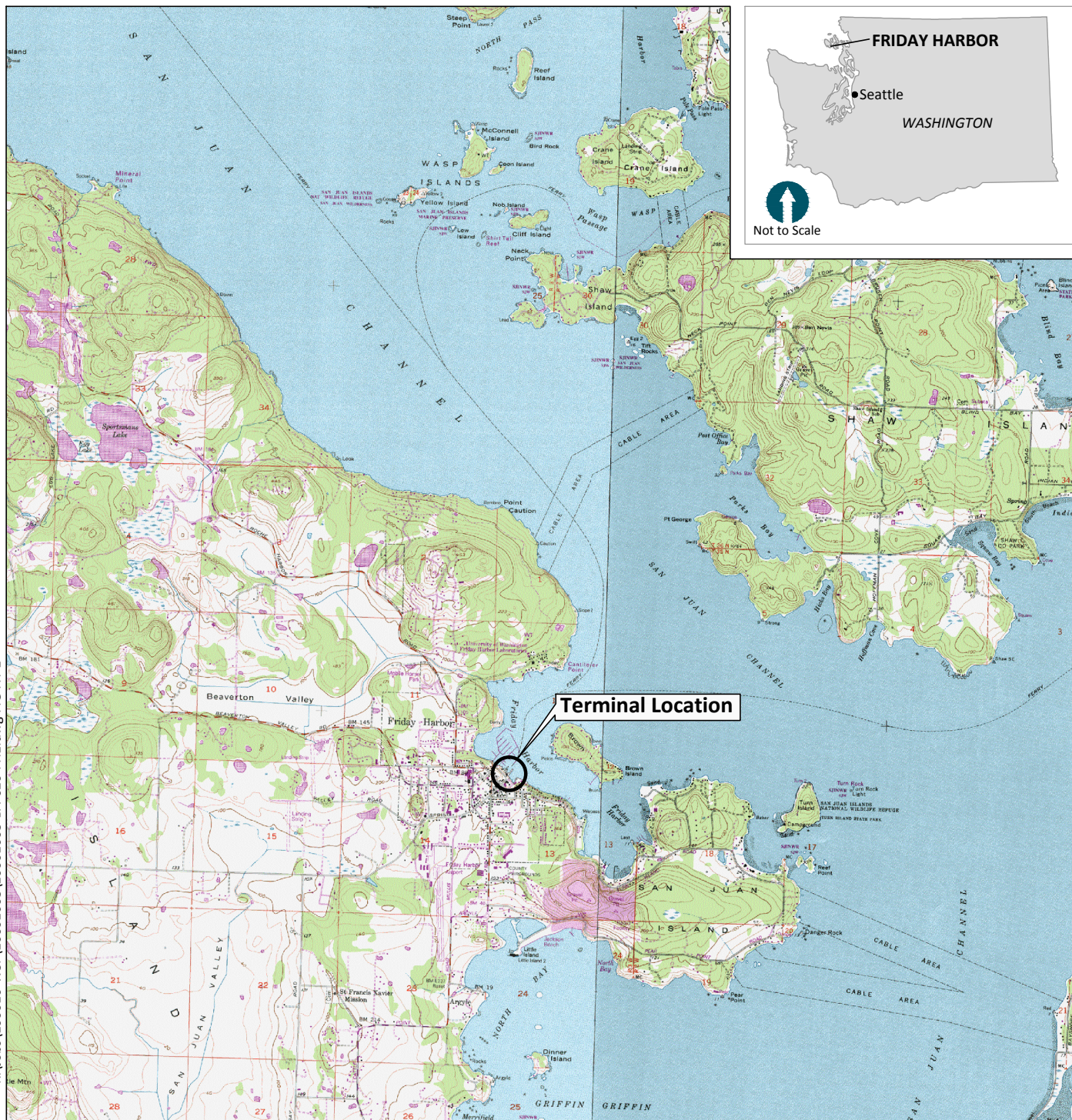
4.8.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Fauntleroy Ferry Terminal (FEDERAL REGISTER 2011).

FRIDAY HARBOR

K:\Jobs\100016-WSF\10001603\10001603-BA-026-FH1.dwg FIG FH-1

Jan 11, 2012 1:29pm heriksen



NOTE: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Friday Harbor and Shaw Island, Washington.

Section	Township	Range	Lat	Long	County
13	35N	3W	48° 32' 10" N	123° 00' 50" W	San Juan
HUC 171100190501			WRIA 2		

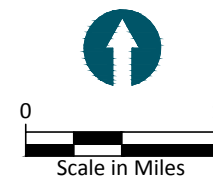
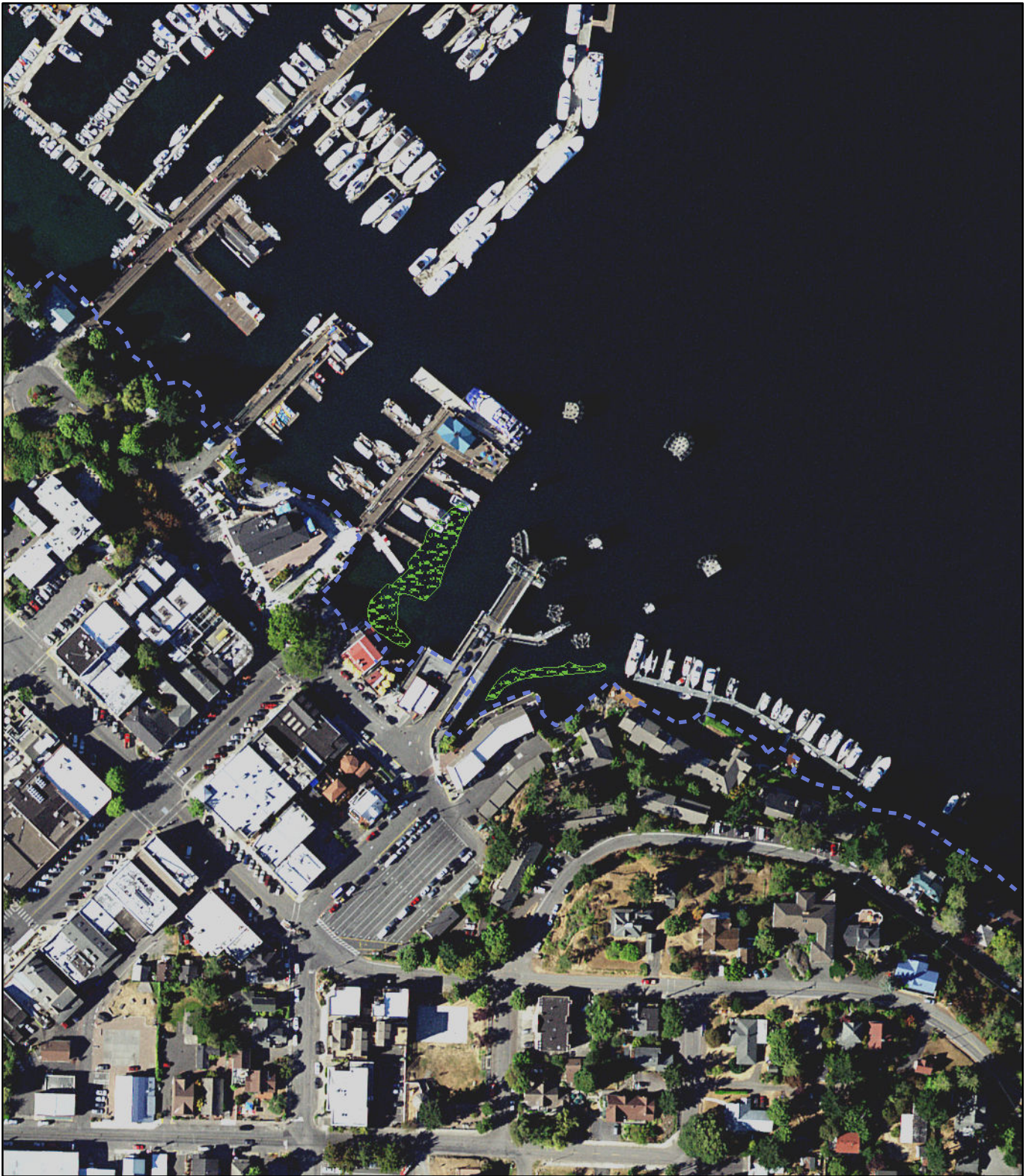

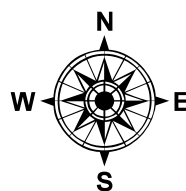


Figure FH-1
Friday Harbor Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Friday Harbor, Washington



Friday Harbor Ferry Terminal: WSF Biological Assessment Reference

--- Approximate Mean High Water (MHW)  Eel Grass




0 125 250

 Feet

Figure FH-2
 Aerial Photo of Friday Harbor Ferry Terminal
 WSF Biological Assessment Reference
 Friday Harbor, Washington

4.9 Friday Harbor Ferry Terminal

The Friday Harbor Ferry Terminal is located in the town of Friday Harbor, on San Juan Island. The terminal is in a protected harbor that borders on the San Juan Channel (see Figures FH-1 and FH-2).

The Friday Harbor Ferry Terminal provides service to the Anacortes Ferry Terminal, the San Juan inter-island terminals (Lopez, Shaw, Orcas, and Friday Harbor), and to Sidney B.C.

Features of the terminal include a terminal building and 12 vehicle holding lanes that accommodate up to 136 vehicles. No parking lots or overhead passenger loading facilities are present at the terminal. The terminal has two slips, a main and a tie-up slip with steel wingwalls. Six steel dolphins are associated with the terminal.

4.9.1 Friday Harbor Environmental Baseline

4.9.1.1 Physical Indicators

Substrate and Slope

Substrate conditions adjacent to the terminal are highly variable. Coarser grained sediments and gravel are more prevalent along the offshore areas of the facility and within the areas subject to operations. The shoreline is predominantly bedrock with some coarse sand and cobble (see Figures FH-3 and FH-4). Offshore depths of terminal structures are: head of main slip (-35.4 feet MLLW) and tie-up slip (-30.5 feet MLLW). Maximum depth for fixed dolphins is -46.5 feet MLLW.



Figure FH-3
Shoreline Area on the Northwest Side of the Friday Harbor Ferry Terminal



Figure FH-4
Shoreline Area on the Southeast Side of the Friday Harbor Ferry Terminal (the structure on the left houses private commercial businesses)

Salt/Freshwater Mixing

San Juan Island is drained by a number of small, mostly unnamed streams. Most streams are seasonal, and are typically dry in the summer months. There are no significant freshwater drainages near the Friday Harbor Ferry Terminal. A small stream drains approximately 4,100 feet (0.78 miles) north of the terminal.

Flows and Currents

Strong currents, deep channels, and tidal mixing influence the open marine waters of the San Juan Islands.

4.9.1.2 Chemical Indicators

Water Quality

Marine waters in the San Juan Channel are designated “Extraordinary” for aquatic life use. The impaired waters listings in the terminal area include DO and bacteria (water) (Ecology 2018).

Sediment Quality

The impaired waters listings in the terminal area include PAHs (sediment) (Ecology 2018).

4.9.1.3 Biological Indicators

Shoreline Vegetation

The majority of the shoreline in the vicinity of the terminal is armored with very little vegetation along the shoreline.

Macroalgae and Eelgrass

Eelgrass and biological resource surveys were conducted in March 2002 and August 2002 (PIE 2002d). Both surveys were conducted to determine the areal extent of eelgrass. The survey in March 2002 also cataloged macroalgae, macrofauna, and fish within the area. Divers also collected shoot counts from identified eelgrass beds. Table FH-1 lists macroalgae and macrofauna species identified at the Friday Harbor Ferry Terminal.

Table FH-1
List of Macroalgae and Macrofauna Species Identified at the
Friday Harbor Ferry Terminal

Common Name	Scientific Name
Vegetation	
Turkish towel	<i>Chondracanthus exasperatus</i>
Bleached brunette	<i>Cryptosiphonia woodii</i>
Rockweed	<i>Fucus distichus</i>
Splendid iridescent seaweed	<i>Iridaea cordata</i>
Iridescent seaweed	<i>Iridaea sp.</i>
Sugar kelp	<i>Laminaria saccharina</i>
Sea lettuce	<i>Ulva fenestrata</i>
Eelgrass	<i>Zostera marina L.</i>
Green algae	Unidentified
Invertebrates	
Sea squirt	<i>Ascidian</i>
Hermit crab	<i>Pagurus spp.</i>
Coon-stripe shrimp	<i>Pandalus danae</i>
Flap-tipped piddock	<i>Penitella penita</i>
Rock oyster	<i>Pododesmus macrochisma</i>
Chiton	<i>Polyplacophora</i>
Sunflower star	<i>Pycnopodia helianthoides</i>
Polychaete tube worm	<i>Serpulidae</i>
Bryozoan	Unidentified
Fish	
Sturgeon poacher	<i>Agonidae</i>

Eelgrass (*Zostera marina* L.) occurs west of the main slip and four small eelgrass beds occur east of the tie-up slip. Data collected during the August 2002 eelgrass survey showed the larger eelgrass bed (1) located west of the trestle along the nearby floats is approximately 9,104 square feet and extends from approximately 0 feet to -11 feet MLLW. The area of the larger bed on the east side of the trestle (2) measured 1,418 square feet. The remaining small isolated patches (3, 4, and 5) along the east side cover a combined area of approximately 233 square feet.

Density data were not collected from within the eelgrass bed (1) west of the ferry terminal during the March 2002 investigation but were collected in August 2002. In August 2002, eelgrass density ranged between 16 and 112 shoots per square meter. Densities within the 1,418 square foot eelgrass bed (2) ranged between 92 and 153 shoots per square meter in August 2002. Densities within this same area in March 2002 were between 29 and 57 shoots per square meter. The density of the small eelgrass patch (3) (approximately 124 square feet in size) averaged 65 shoots per

square meter. Eelgrass shoot densities in bed 4 were 48 to 52 shoots per square meter and densities in bed 5 were 50 to 88 shoots per square meter.

Several species of macroalgae occur throughout the survey area. Macroalgae does not occur with the immediate area of the main slip. However, macroalgae does occur at many locations surrounding the tie-up slip. Fastened specimens were typically attached to large pieces of hard substrate and shell. Dominant species include *Ulva fenestrata*, *Cryptosiphonia woodii*, and unidentified green algae.

Epibenthos, Macrofauna, Fish, and Marine Mammals

Several invertebrate species were observed during the dive surveys. Divers frequently observed pandalid shrimp. Piddock clams occur at lower elevations. Fish were not well represented, with a single sturgeon poacher being the only species observed during the March 2002 survey. Marine mammals likely to occur in the area include killer whale, harbor seal, Steller sea lion, California sea lion, harbor porpoise, and Dall's porpoise.

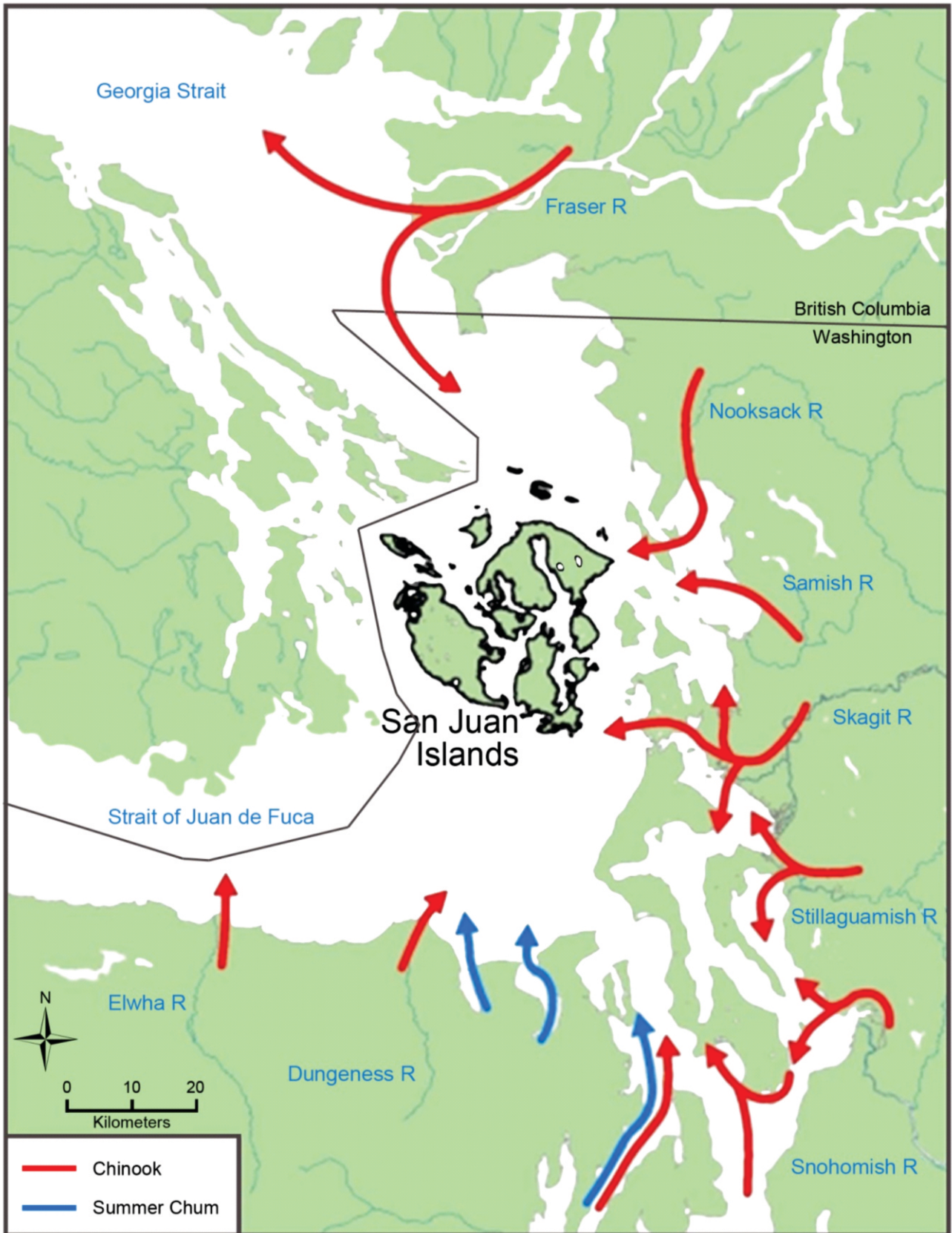
Forage Fish

There is no documented forage fish spawning present at the terminal (WSDOT 2018a). No herring holding areas are present at near the terminal.

4.9.2 Friday Harbor Species Distributions

4.9.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)

No Chinook salmon-bearing streams are located near the Friday Harbor Ferry Terminal (WDFW 2007a). However, major rivers that support Chinook salmon occur in this area of Puget Sound, including the Nooksack River (approximately 30 miles northeast), Samish River (approximately 32 miles east), Skagit River (approximately 32 miles southeast), and Stillaguamish River (approximately 42 miles southeast). Chinook may also be present from rivers and streams in central and southern Puget Sound (WDFW 2007a). The results of beach seine sampling completed from March to October in 2008 and 2009 indicate that juvenile Chinook salmon arrive in the San Juan Islands by April, peak in the month of June, remain relatively high in shoreline areas during summer months, and are present through October. Chinook may be present from numerous river systems, as shown in Figure FH-5 (SRSC and NOAA 2012).



SOURCE: SRSC/NOAA Fisheries 2012.

Figure FH-5
Migratory Pathways for Juvenile Salmon from
Source Population Rivers to the San Juan Islands Area
WSF Biological Assessment Reference
Friday Harbor, Washington

Adult and Sub-adult Chinook

The watersheds of the San Juan Islands are not large enough to support sustainable wild Chinook salmon populations (Sanford, personal communication 2002).

However, the marine environment of northern Puget Sound is a migratory corridor for adults. Adult Chinook salmon collected in the waters around the San Juan archipelago are usually Puget Sound or Fraser River populations (Sanford, personal communication 2002). WDFW micro-tag data analyzed from 1985 showed that five Chinook salmon stocks have been identified in the San Juan region (Moulton, personal communication 2001).

Sub-adult Chinook have access to the terminal area and may be found there at any time of year. Sub-adults have spent a winter in the marine environment and are not closely oriented to the shoreline like juveniles.

Juvenile Chinook

Chinook salmon do not spawn in the San Juan archipelago (Otis, personal communication 2000). Juveniles that could occur near the ferry terminal are likely of hatchery origin (a hatchery exists on Orcas Island) or have crossed open water to reach the San Juan Islands. Juvenile Chinook salmon habitat in the ferry terminal area includes those occurring in the open water (pelagic zones) of the San Juan Islands and the nearshore and intertidal zones in the San Juan Islands, particularly in areas supporting eelgrass and macroalgae.

4.9.2.2 Puget Sound Chinook Salmon Critical Habitat

The Friday Harbor Ferry Terminal lies within Chinook Zone 2 (70 FR 52630). While there are no streams that support Chinook salmon near the ferry terminal, there are eelgrass beds in close proximity to the ferry terminal that may be used by juvenile Chinook for rearing.

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table FH-2. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630).

Table FH-2
Existing Conditions of Chinook Salmon PCEs at the Friday Harbor Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include the trestles, the main slip, the tie-up slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of San Juan Channel near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listing in the terminal area include DO and bacteria (water) and PAHs (sediment) (Ecology 2018). The existing stormwater system at the ferry terminal site consists of four drainage areas that drain to San Juan Channel. One of the areas includes treatment.</p> <p>The first drainage area drains the Front Street holding lanes, and consists of three catch basins that discharge through an outfall to the south of the trestle. A city street catch basin also shares this outfall.</p> <p>The second drainage area drains the A Street holding lanes, and consists of two catch basins that each flow through an oil/water separator (inspected annually) that connects to the city system.</p> <p>The third drainage area drains the trestle approach, and consists of a single catch basin that discharges through an outfall on the immediate south side of the trestle.</p> <p>The fourth drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Invertebrates such as pandalid shrimp have been observed during dive surveys.</p> <p>The nearest forage fish spawning is over 5 miles away.</p> <p>Natural Cover The majority of the shoreline in the vicinity is armored, with little overhanging vegetation. One large eelgrass (<i>Zostera marina</i> L.) bed occurs west of the main slip and four small eelgrass beds occur east of the tie-up slip.</p> <p>Several species of macroalgae occur throughout the survey area. Macroalgae does not occur with the immediate area of the main slip. However, macroalgae does occur at many locations surrounding the tie-up slip. Fastened specimens were typically attached to large pieces of hard substrate and shell. Dominant species include <i>Ulva fenestrata</i>, <i>Cryptosiphonia woodii</i>, and unidentified green algae (PIE 2002d).</p> <p>There is no large overhanging wood vegetation. The existing conditions within the defined area of critical habitat consist of coarser grained sediments and gravel along the offshore areas of the ferry terminal and within the areas subject to operations. The shoreline is predominantly bedrock with some coarse sand and cobble (Anchor 2003c). Side channels do not occur in the ferry terminal area.</p>
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates	<p>The marine waters of San Juan Channel near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listing in the terminal area include DO and bacteria (water) and PAHs (sediment) (Ecology 2018).</p>

PCEs	Existing Conditions
and fishes, supporting growth and maturation.	Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity. Offshore areas provide habitat for forage fish.

4.9.2.3 *Puget Sound Steelhead (Oncorhynchus mykiss)*

There are no natal streams in the area of the Friday Harbor Ferry Terminal that support Puget Sound steelhead. However, major river systems that support winter and summer steelhead include the Nooksack River (approximately 30 miles northeast), Skagit River (approximately 32 miles southeast), and Stillaguamish River (approximately 42 miles southeast). The Samish River (approximately 32 miles southeast) supports winter steelhead only. Steelhead may also be present from rivers and streams in central and southern Puget Sound (WDFW 2007a).

Available data from tow-net sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In tow-net sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

Beach seine sampling in Bellingham Bay (north Puget Sound) also captured few steelhead (Lummi Nation, unpublished data). The Bellingham Bay research reported the capture of two juvenile steelhead salmon in 336 sets between February 14 and December 1, 2003. The steelhead were captured in the eastern portion of Bellingham Bay near the Taylor Avenue Dock on June 12 and June 25, 2003.

4.9.2.4 *Puget Sound Steelhead Critical Habitat*

The Friday Harbor Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.9.2.5 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Friday Harbor ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be

summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.9.2.6 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Friday Harbor ferry terminal. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.9.2.7 *Southern Resident Killer Whale Critical Habitat*

The Friday Harbor Ferry Terminal area lies within Area 1 – Core Sumer Area. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table FH-3. PCEs relevant to the terminal area are numbered per Federal Register 2006.

Table FH-3
Existing Conditions of Southern Resident Killer Whale PCEs at the Friday Harbor Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of San Juan Channel near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listing in the terminal area include DO and bacteria (water) and PAHs (sediment) (Ecology 2018). The existing stormwater system at the ferry terminal site consists of four drainage areas that drain to San Juan Channel. One of the areas includes treatment.</p> <p>The first drainage area drains the Front Street holding lanes, and consists of three catch basins that discharge through an outfall to the south of the trestle. A city street catch basin also shares this outfall.</p> <p>The second drainage area drains the A Street holding lanes, and consists of two catch basins that each flow through an oil/water separator (inspected annually) that connects to the city system.</p> <p>The third drainage area drains the trestle approach, and consists of a single catch basin that discharges through an outfall on the immediate south side of the trestle.</p> <p>The fourth drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	<p>Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.</p>
3) Passage conditions to allow for migration, resting, and foraging	<p>Existing structures that occur below -20 feet in critical habitat include the main slip trestle, the main slip, a segment of the tie-up slip trestle, the tie-up slip, and dolphins. These structures are unlikely to impede passage of killer whales.</p>

4.9.2.8 Bull Trout (*Salvelinus confluentus*)

There are no natal streams in the area of the Friday Harbor Ferry Terminal that support bull trout (WDFW 2007a).

The aquatic portions of the ferry terminal are within marine FMO habitat. While bull trout have not been documented in the ferry terminal area, suitable FMO habitat is present, and bull trout are thought to occur throughout south, central, and northern Puget Sound. Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the ferry terminal area, it is expected that

individual bull trout from the Nooksack River (approximately 30 miles northeast), Samish River (approximately 32 miles southeast), Skagit River (approximately 32 miles southeast), and Stillaguamish River (approximately 42 miles southeast) are most likely to be present. Bull trout may also be present from rivers and streams in central and southern Puget Sound (WDFW 2007a).

4.9.2.9 *Bull Trout Critical Habitat*

The Friday Harbor Ferry Terminal does not fall within designated bull trout critical habitat (Federal Register 2010a).

4.9.2.10 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of the Friday Harbor Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.9.2.11 *Green Sturgeon Critical Habitat*

The Friday Harbor Ferry Terminal does not fall within designated green sturgeon critical habitat (Federal Register 2009).

4.9.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Friday Harbor terminal area provides suitable marbled murrelet marine foraging habitat.

There is no documented forage fish spawning present at the terminal (WSDOT 2018a).

WDFW surveys conducted from 2001 to 2012 show a density of less than 1 bird per square kilometer in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 38 miles S of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Friday Harbor murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles), is Zero (WSDOT 2019b).

There are no coniferous forest that may offer nesting opportunity within the pile driving /heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 4,920 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 2,570 scheduled arrivals and departures (WSDOT 2018d).

4.9.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terry Terminal (USFWS 1996).

4.9.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). The water in Friday Harbor is shallow (less than 30 feet deep), and remains fairly shallow east toward the Upright Channel. The water deepens to the north into the San Juan Channel to depths between 50 and 100 feet (NMFS 2009). Substrates are rocky throughout the area. This area may be occupied by all life stages of bocaccio.

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010b). The San Juan and Upright Channels offer this rocky substrate. Yelloweye larvae and juveniles could be present within Friday Harbor; adults could be found in the channels beyond the harbor.

4.9.2.15 *Rockfish Species Critical Habitat*

The Friday Harbor Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table FH-4. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Friday Harbor Ferry Terminal and will not be discussed here.

Table FH-4
Existing Conditions of Rockfish PBFs at the Friday Harbor Ferry Terminal

PBFs	Existing Conditions
1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.	<p>The marine waters of San Juan Channel near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listing in the terminal area include DO and bacteria (water) and PAHs (sediment) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal site consists of four drainage areas that drain to San Juan Channel. One of the areas includes treatment.</p> <p>The first drainage area drains the Front Street holding lanes, and consists of three catch basins that discharge through an outfall to the south of the trestle. A city street catch basin also shares this outfall.</p> <p>The second drainage area drains the A Street holding lanes, and consists of two catch basins that each flow through an oil/water separator (inspected annually) that connects to the city system.</p> <p>The third drainage area drains the trestle approach, and consists of a single catch basin that discharges through an outfall on the immediate south side of the trestle.</p> <p>The fourth drainage area consists of the transfer span (typically 90 feet long by 24 feet wide that carries traffic between the trestle and ferry), which discharges by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p>

PBFs	Existing Conditions
	<p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Invertebrates such as pandalid shrimp have been observed during dive surveys.</p> <p>The nearest forage fish spawning is over 5 miles away.</p>
2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.	<p>The majority of the shoreline in the vicinity is armored, with little overhanging vegetation. One large eelgrass (<i>Zostera marina</i> L.) bed occurs west of the main slip and four small eelgrass beds occur east of the tie-up slip.</p> <p>Several species of macroalgae occur throughout the survey area. Macroalgae does not occur with the immediate area of the main slip. However, macroalgae does occur at many locations surrounding the tie-up slip. Fastened specimens were typically attached to large pieces of hard substrate and shell. Dominant species include <i>Ulva fenestrata</i>, <i>Cryptosiphonia woodii</i>, and unidentified green algae (PIE 2002d).</p>

4.9.2.16 *Pacific Eulachon*

Adult eulachon could be present at the Friday Harbor Ferry Terminal. The terminal is near the mouth of the Elwha and Fraser Rivers, where spawning is known to take place; therefore, juveniles could also be present at this terminal.

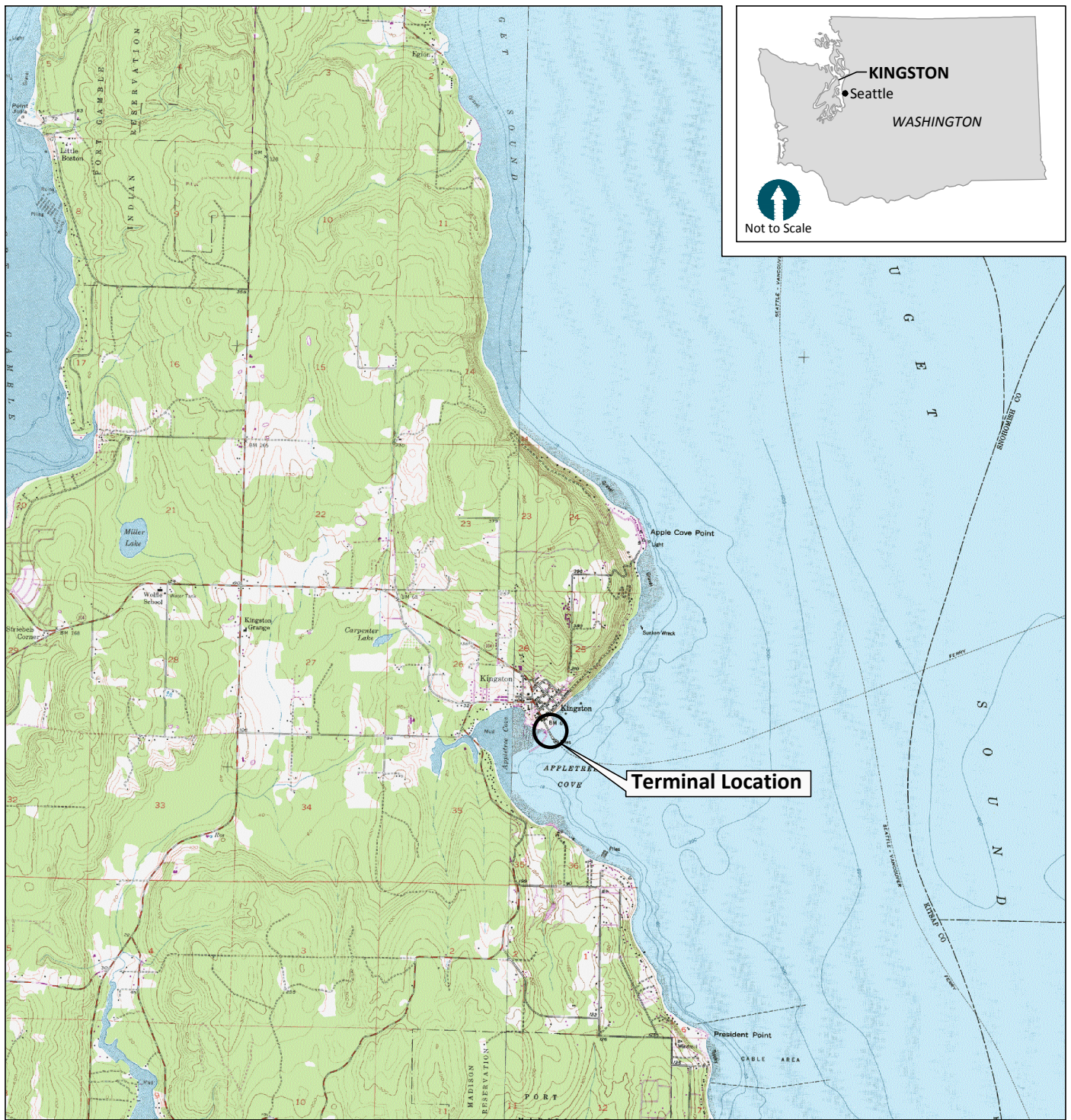
4.9.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Friday Harbor Ferry Terminal (FEDERAL REGISTER 2011).

KINGSTON

K:\Jobs\100016-WSF\10001603\10001603-BA-029-K11.dwg FIG K1-1

Jan 11, 2012 1:50pm heriksen



Note: Base map prepared from Terrain Navigator Pro USGS 7.5 minute quadrangle map(s) of Edmonds West and Port Gamble, Washington.

Section	Township	Range	Lat	Long	County
25	27p N	2E	47° 47' 36" N	122° 24' 44" W	Kitsap
HUC 171100190101			WRIA 8		

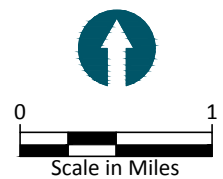
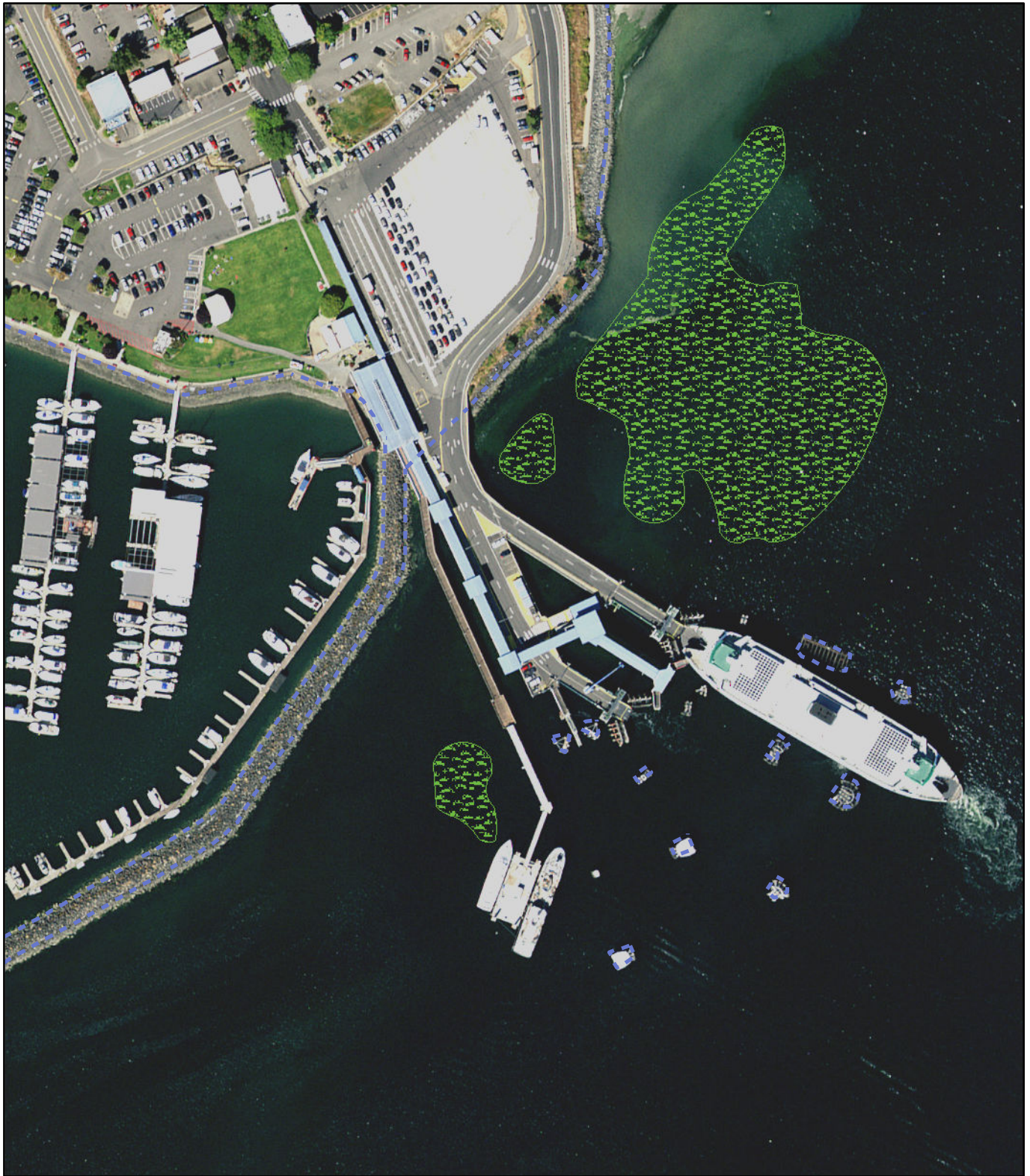


Figure K1-1
Kingston Ferry Terminal Vicinity Map
WSF Biological Assessment Reference
Kingston, Washington



Kingston Ferry Terminal: WSF Biological Assessment Reference

- - - Approximate Mean High Water (MHW)
 Eel Grass

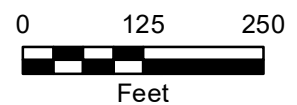
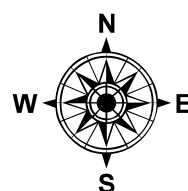


Figure KI-2
Aerial Photo of Kingston Ferry Terminal
WSF Biological Assessment Reference
Kingston, Washington

4.10 Kingston Ferry Terminal

The Kingston Ferry Terminal is located in the town of Kingston, on the Kitsap Peninsula. The terminal is on the shoreline of Appletree Cove, which opens onto Puget Sound (see Figures KI-1 and KI-2).

The Kingston Ferry Terminal provides service to the Edmonds Ferry Terminal.

Features of the terminal include a terminal building, 24 vehicle holding lanes that accommodate up to 288 vehicles, and overhead passenger loading facilities. The terminal has two slips, one main and one tie-up slip. Steel wingwalls are present in the main slip and six-pile steel wingwalls are present in the tie-up slip. Ten dolphins are associated with the terminal, nine steel and one floating timber dolphin in the main slip. No parking is available at the terminal.

4.10.1 Kingston Environmental Baseline

4.10.1.1 Physical Indicators

Substrate and Slope

The shoreline is heavily armored in the vicinity of the terminal (see Figures KI-3 and KI-4). Steep (2 horizontal to 1 vertical [2H:1V]) riprap slopes dominate from MHHW to about -8 feet MLLW. Beyond about -8 feet MLLW, there is a gentle slope to about -20 or -30 feet MLLW. Deeper intertidal and shallow subtidal substrates consist of gravel and sand, with occasional boulders. Offshore depths of terminal structures are: head of Slip 1 (-42.2 feet MLLW), Slip 2 (-33.5 feet MLLW), and tie-up slip (-26.0 feet MLLW). Maximum depth for fixed dolphins is -36.9 feet MLLW and for floating dolphins -35.7 feet MLLW.



Figure KI-3
Shoreline Area North of the Kingston Ferry Terminal



Figure KI-4
Shoreline Area South of the Kingston Ferry Terminal

Salt/Freshwater Mixing

Four streams draining into Appletree Cove contribute freshwater in the vicinity of the terminal.

Flows and Currents

According to Ecology's report on *Net Shore-Drift in Washington State* (Ecology 1991), the net littoral drift along the drift cell (approximately 1 mile in length) north of the

Kingston Ferry Terminal is towards the south. This southerly sediment transport, however, is small and it settles offshore in deeper, more quiescent areas.

According to Ecology's report (Ecology 1991), the net sediment drift in the littoral cell south of the Kingston Ferry Terminal is to the northwest, ending in Appletree Cove. This sediment does not move farther north (clockwise) into the terminal area. Evidence of this is the fact that maintenance dredging of the entrance channel to the marina has not been required since original dredging of the channel in 1967. This strongly suggests that sediment drifting northward is deposited in the cove and does not travel across the marina entrance channel into the terminal area.

4.10.1.2 Chemical Indicators

Water Quality

The marine waters near the terminal (Appletree Cove) are designated "Extraordinary" for aquatic use. Impaired waters listings in the terminal area include dissolved oxygen, bacteria, and temperature (water) (Ecology 2018).

Sediment Quality

Impaired waters listings in the terminal area include organics (sediment – 8 parameters) (Ecology 2018).

4.10.1.3 Biological Indicators

Shoreline Vegetation

There is some shoreline vegetation (shrubs) adjacent to the holding lanes, north of the terminal, above the riprap. A wide shrub and forested area occurs farther north of the terminal along the shoreline.

Macroalgae and Eelgrass

A variety of red, green, and brown macroalgae occurs in the vicinity of the terminal including rockweed, Turkish towel, sugar wrack, bull kelp, and sea lettuce. Eelgrass occurs northeast and southwest of the terminal. Eelgrass northeast of the terminal is much more abundant than the small, sparse patches of eelgrass southwest of the terminal.

Epibenthos, Macrofauna, Fish, and Marine Mammals

Deeper intertidal substrates and the presence of eelgrass would support epibenthos. Macrofauna and fisheries resources observed in the area include Dungeness and red rock crab, cockles (*Clinocardium nuttallii*), nudibranchs (*Triopha catalinae*), anemone, pandalid shrimp, sea stars, kelp, greenling, rock sole, lingcod, starry flounder, a variety of flatfish, and sculpin. Subtidal geoduck beds and Dungeness crab areas are located in the vicinity of the terminal. The streams draining into Appletree Cove support chum and coho salmon and resident cutthroat. Harbor seals, California sea lion, Steller sea lion, and killer whale may occur in the area.

Forage Fish

There is no documented forage fish spawning present in the terminal area (WSDOT 2018a). No herring holding areas are located near the terminal.

4.10.2 Kingston Species Distributions**4.10.2.1 Puget Sound Chinook Salmon (*Oncorhynchus tshawytscha*)**

No Chinook salmon-bearing streams are located near the Kingston Ferry Terminal (WDFW 2007a). Salmon stocks that may be present in the ferry terminal area include runs originating from Dogfish Creek, a tributary to Liberty Bay (approximately 20 miles southwest, shoreline distance). Chinook are present in this stream in very limited numbers (Williams et al. 1975). The closest major rivers that support Chinook salmon include the Skagit River (approximately 37 shoreline miles north), Stillaguamish River (approximately 30 shoreline miles north), Snohomish River (approximately 22 miles north), Lake Washington/Cedar River (approximately 10 shoreline miles south), and the Duwamish/Green River (approximately 20 shoreline miles south). Chinook may also be present from rivers and streams in southern Puget Sound (WDFW 2007a).

Adult and Sub-adult Chinook

Adult Chinook salmon could be present in the ferry terminal area year-round in relatively low numbers. The highest abundance of adults in the ferry terminal area would occur during the summer and early fall as they return from the ocean to their home rivers.

Sub-adult Chinook have access to the terminal area and may be found there at any time of year. Sub-adults have spent a winter in the marine environment and are not closely oriented to the shoreline like juveniles.

Juvenile Chinook

Juveniles are likely to use portions of the shoreline during spring (March to June), although most should be located well offshore due to their size (greater than 70 mm) (WSF 1999). Beach seines conducted from April through September of 2001 and 2002 along the mainland of central Puget Sound from Golden Gardens to Picnic Point showed juvenile PS Chinook salmon first entered the area in mid-May with numbers peaking in mid-June and tapered off through August and September. The average fork length was approximately 85 mm for those juvenile Chinook caught in May and 130 mm for those caught in September (Duffy et al. 2005).

4.10.2.2 Puget Sound Chinook Salmon Critical Habitat

The Kingston Ferry Terminal lies within Chinook Zone 14 (70 FR 52630). While there are no streams that support Chinook salmon near the ferry terminal, there are eelgrass beds in close proximity to the ferry terminal that may be used by juvenile Chinook for rearing.

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table KI-1. PCEs relevant to the terminal area are numbered per the CFR (70 FR 52630).

Table KI-1
Existing Conditions of Chinook Salmon PCEs at the Kingston Ferry Terminal

PCEs	Existing Conditions
5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.	<p>Obstructions In-water structures include the overhead loading, the trestles, the main and auxiliary slips, the tie-up slip, and dolphins. The existing ferry terminal may affect fish passage in the nearshore.</p> <p>Water Quality and Forage The marine waters of Appletree Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area include dissolved oxygen, bacteria, and temperature (water) and organics (sediment – 8 parameters) (Ecology 2018). The existing stormwater system at the ferry terminal consists of five drainage areas that drain to Appletree Cove. None of the runoff is treated.</p> <p>The first drainage area drains the holding lanes, and consists of five catch basins on the west side of the holding lanes that discharge through an outfall to the immediate west of the terminal building.</p> <p>The second drainage area drains the holding lanes further to the east of the first drainage area, and consists of a trench drain that flows through two catch basins to a line shared by four catch basins to the east of the trench drains. Some input from the Kingston and WSDOT systems connect to this area. All six catch basins discharge through an outfall south of the holding lanes.</p> <p>The third drainage area consists of two catch basins, each with separate outfall. The first one drains the exit lane area, and the second drains the parking area off of the exit lanes.</p> <p>The fourth drainage area drains the trestle, and consists of open drains spaced at 20 foot intervals along either side of the trestle that discharge directly to surface water.</p> <p>The fifth drainage area consists of the transfer spans (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharge by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Deeper intertidal substrates and the presence of eelgrass indicate probable epibenthic production.</p> <p>Natural Cover Little shoreline vegetation exists adjacent to the holding lanes. A wide shrub and forested area occurs farther north of the terminal. Eelgrass is present primarily north of the ferry terminal, with sparse small patches to the southwest up to 600 feet offshore. Below -5 feet MLLW, macroalgae <i>Ulva</i>, <i>Sargassum</i>, <i>Iridaea</i>, and <i>Gracilaria</i> are present (McKenzie 1999).</p> <p>There is no large overhanging wood vegetation. The existing conditions within the defined area of critical habitat consist of silty to coarse sand and fine gravel (WSF 1999). Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area.</p>

PCEs	Existing Conditions
6) Offshore areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.	<p>The marine waters of Appletree Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area include dissolved oxygen, bacteria, and temperature (water) and organics (sediment – 8 parameters) (Ecology 2018). Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Offshore areas provide habitat for forage fish.</p>

4.10.2.3 *Puget Sound Steelhead (Oncorhynchus mykiss)*

There are no natal streams in the area of the Kingston Ferry Terminal that support Puget Sound steelhead. Small drainages that support steelhead include Grovers Creek, a tributary to Miller Bay (approximately 9 shoreline miles southwest), and Dogfish Creek, a tributary to Liberty Bay (approximately 20 miles southwest, shoreline distance).

Major rivers that support winter and summer steelhead include the Stillaguamish River (approximately 30 shoreline miles northeast), Skagit River (approximately 37 shoreline miles northeast), the Snohomish River (approximately 22 shoreline miles northeast), and the Duwamish/Green River (approximately 19 miles southeast, shoreline distance). The Lake Washington/Cedar River (approximately 10 shoreline miles southeast) supports winter steelhead only.

In addition, numerous small streams in the Sinclair/Dyes Inlets (see Section 4.2 for more information), and southern Puget Sound rivers and streams support winter steelhead (WDFW 2007a).

Available data from tow-net sampling (deeper nearshore) and beach seine sampling (shallow nearshore) efforts around Puget Sound have reported the capture of few steelhead. In tow-net sampling in north and south Puget Sound, NMFS captured a total of 18 steelhead (Rice, unpublished data). The total sampling effort data was not available, but the mean steelhead catch ranged from 0 to 0.2 per net in north Puget Sound and 0.1 to 0.8 per net in south Puget Sound.

During 2001 and 2002, beach seining conducted in central Puget Sound by King County Department of Natural Resources captured only nine steelhead out of a total

of approximately 34,000 juvenile salmonids. All the steelhead were caught between May and August and ranged in size from 141 to 462 mm with a mean size of 258 mm (Brennan et al. 2004).

4.10.2.4 *Puget Sound Steelhead Critical Habitat*

The Kingston Ferry Terminal does not fall within designated steelhead critical habitat (Federal Register 2016a).

4.10.2.5 *Humpback Whale (Megaptera novaeangliae)*

Humpback whales may be present near the Kingston ferry terminal. Critical habitat has not been designated for humpback whales. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.10.2.6 *Southern Resident Killer Whale (Orcinus orca)*

Southern Resident Killer Whale (SRKW) may be present near the Kingston ferry terminal. Sightings data will be summarized in each project BA. The data may come from previous WSF projects, relevant Navy documents, or reports requested from the Friday Harbor Whale Museum.

4.10.2.7 *Southern Resident Killer Whale Critical Habitat*

The Kingston Ferry Terminal lies within Area 2 – Puget Sound, considered to be used by killer whales for fall feeding. Areas with water less than 20 feet deep relative to the extreme high water mark are not included in the critical habitat designation (Federal Register 2006).

The PCEs provided in the ferry terminal area, and their existing conditions, are listed in Table KI-2. PCEs relevant to the terminal area are numbered per Federal Register 2006.

Table KI-2
Existing Conditions of Southern Resident Killer Whale PCEs at the Kingston Ferry Terminal

PCEs	Existing Conditions
1) Water quality to support growth and development	<p>The marine waters of Appletree Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area include dissolved oxygen, bacteria, and temperature (water) and organics (sediment – 8 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of five drainage areas that drain to Appletree Cove. None of the runoff is treated.</p> <p>The first drainage area drains the holding lanes, and consists of five catch basins on the west side of the holding lanes that discharge through an outfall to the immediate west of the terminal building.</p> <p>The second drainage area drains the holding lanes further to the east of the first drainage area, and consists of a trench drain that flows through two catch basins to a line shared by four catch basins to the east of the trench drains. Some input from the Kingston and WSDOT systems connect to this area. All six catch basins discharge through an outfall south of the holding lanes.</p> <p>The third drainage area consists of two catch basins, each with separate outfall. The first one drains the exit lane area, and the second drains the parking area off of the exit lanes.</p> <p>The fourth drainage area drains the trestle, and consists of open drains spaced at 20 foot intervals along either side of the trestle that discharge directly to surface water.</p> <p>The fifth drainage area consists of the transfer spans (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharge by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column, degrading water quality in the terminal vicinity.</p>
2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth	Salmonids are the primary prey of SRKW, and may be present near the terminal. Further information on prey can be found in the Puget Sound Chinook section, and Appendix B – Species Biology.
3) Passage conditions to allow for migration, resting, and foraging	Existing structures that occur below -20 feet in critical habitat include a segment of the overhead loading, the trestles, the main and auxiliary slips, the tie-up slip, and dolphins.

4.10.2.8 Bull Trout (*Salvelinus confluentus*)

There are no natal streams in the area of the Kingston Ferry Terminal that support bull trout (WDFW 2007a). The aquatic portions of the ferry terminal are within marine FMO habitat. Therefore, it is expected that the ferry terminal area would be used by anadromous adult and sub-adult bull trout for foraging, migration, and overwintering (USFWS 2004b). Within the ferry terminal area, it is expected that individual bull trout from the Skagit River (approximately 37 shoreline miles north),

Stillaguamish River (approximately 30 shoreline miles north), Snohomish River (approximately 22 miles north), Lake Washington/Cedar River (approximately 10 shoreline miles south), the Duwamish/Green River (approximately 20 shoreline miles south), and the Puyallup River (approximately 43 shoreline miles south) are most likely to be present (WDFW 2007a).

4.10.2.9 *Bull Trout Critical Habitat*

The shoreline of the Kingston Ferry Terminal is not within designated bull trout critical habitat (Federal Register 2010a).

4.10.2.10 *Green Sturgeon (Acipenser medirostris)*

There are no natal streams in the area of the Kingston Ferry Terminal that support green sturgeon.

Two confirmed Southern DPS green sturgeon were detected in Puget Sound in 2006, but the extent to which green sturgeon from the Southern DPS use Puget Sound is uncertain (Federal Register 2018). Observations of green sturgeon in Puget Sound are much less common compared to the coastal Washington estuaries and bays such as Willapa Bay, Grays Harbor, and the Lower Columbia River estuary (Federal Register 2018). In addition, Puget Sound does not appear to be part of the coastal migratory corridor that Southern DPS fish use to reach overwintering grounds north of Vancouver Island (Federal Register 2018).

4.10.2.11 *Green Sturgeon Critical Habitat*

The Kingston Ferry Terminal does not fall within designated green sturgeon critical habitat (Federal Register 2009).

4.10.2.12 *Marbled Murrelet (Brachyramphus marmoratus)*

The Kingston terminal area provides suitable marbled murrelet marine foraging habitat.

There is no documented forage fish spawning present at the terminal (WSDOT 2018a).

WDFW density surveys were not conducted in the terminal area (WDFW 2016). The nearest documented marbled murrelet nesting site is located 42 miles SW of the terminal (WSDOT 2018b).

The Northwest Forest Plan Marbled Murrelet Effectiveness Monitoring Program (2012) identified habitat suitability throughout the range of the species, and ranked it as Zero, Low, Marginal, Moderately High and Highest. The Kingston murrelet habitat suitability within the pile driving/heavy equipment zone of potential effect (0.25 miles), is Zero (WSDOT 2019b).

There are no coniferous forest that may offer nesting opportunity within the pile driving /heavy equipment zone of potential effect (0.25 miles) (WSDOT 2014/2018c).

Ferry traffic creates regular disturbance in the immediate terminal area. From July 2017 to June 2018, there were approximately 17,210 scheduled arrivals and departures from the terminal. During the nesting season (April 1-September 23), when foraging murrelet are more active, there were approximately 8,630 scheduled arrivals and departures (WSDOT 2018d).

4.10.2.13 *Marbled Murrelet Critical Habitat*

No marbled murrelet critical habitat has been designated near the terminal (USFWS 1996).

4.10.2.14 *Rockfish Species*

Bocaccio

Bocaccio are rarely caught in north Puget Sound and only sparse records exist for the Strait of Georgia (Federal Register 2010b). Because larvae are widely dispersed, it is possible that bocaccio juveniles could be found near the Kingston Ferry Terminal at any time of year. Adult bocaccio generally move to very deep water. The waters within Appletree Cove are shallow, less than 40 feet deep. Outside the cove, the

bottom drops off steeply to about 100 feet deep, and 150 feet deep in the main channel south of the terminal (NMFS 2009).

Yelloweye Rockfish

Yelloweye rockfish are more closely aligned with rocky, high-relief substrates than with very deep water (Federal Register 2010bFederal Register 2010b). The waters near the Kingston Ferry Terminal do not have the rocky substrates preferred by yelloweye.

4.10.2.15 Rockfish Species Critical Habitat

The Kingston Ferry Terminal is within rockfish nearshore critical habitat (less than or equal to 98 feet in depth) (Federal Register 2014). The physical and biological features (PBFs) (Federal Register 2014) essential to the conservation of juvenile Bocaccio rockfish are listed in Table KI-3. PBFs relevant to the terminal area are numbered per the CFR (Federal Register 2014). These PBFs are specific to nearshore environments, where only juvenile Bocaccio rockfish could be found. Deepwater (> 98 feet in depth) PBFs exist for adult Bocaccio, and adult and juvenile yelloweye rockfish; however, this habitat is not present at the Kingston Ferry Terminal and will not be discussed here.

Table KI-3
Existing Conditions of Rockfish PBFs at the Kingston Ferry Terminal

PBFs	Existing Conditions
<p>1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.</p>	<p>The marine waters of Appletree Cove near the ferry terminal are designated “Extraordinary” for aquatic life use. Impaired waters listings in the terminal area include dissolved oxygen, bacteria, and temperature (water) and organics (sediment – 8 parameters) (Ecology 2018).</p> <p>The existing stormwater system at the ferry terminal consists of five drainage areas that drain to Appletree Cove. None of the runoff is treated.</p> <p>The first drainage area drains the holding lanes, and consists of five catch basins on the west side of the holding lanes that discharge through an outfall to the immediate west of the terminal building.</p> <p>The second drainage area drains the holding lanes further to the east of the first drainage area, and consists of a trench drain that flows through two catch basins to a line shared by four catch basins to the east of the trench drains. Some input from the Kingston and WSDOT systems connect to this area. All six catch basins discharge through an outfall south of the holding lanes.</p> <p>The third drainage area consists of two catch basins, each with separate outfall. The first one drains the exit lane area, and the second drains the parking area off of the exit lanes.</p> <p>The fourth drainage area drains the trestle, and consists of open drains spaced at 20 foot intervals along either side of the trestle that discharge directly to surface water.</p> <p>The fifth drainage area consists of the transfer spans (typically 90 feet long by 24 feet wide that carry traffic between the trestle and ferry), which discharge by sheet flow directly to surface water.</p> <p>Existing creosote treated piles may leach PAHs into the water column degrading water quality in the terminal vicinity.</p> <p>Overwater coverage from the existing ferry terminal structures may reduce the production of aquatic invertebrates that are prey species to salmon. Deeper intertidal substrates and the presence of eelgrass indicate probable epibenthic production.</p>
<p>2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.</p>	<p>Little shoreline vegetation exists adjacent to the holding lanes. A wide shrub and forested area occurs farther north of the terminal. Eelgrass is present primarily north of the ferry terminal, with sparse small patches to the southwest up to 600 feet offshore. Below -5 feet MLLW, macroalgae <i>Ulva</i>, <i>Sargassum</i>, <i>Iridaea</i>, and <i>Gracilaria</i> are present (McKenzie 1999).</p> <p>There is no large overhanging wood vegetation. The existing conditions within the defined area of critical habitat consist of silty to coarse sand and fine gravel (WSF 1999). Some riprap and hardened shoreline are adjacent to the ferry terminal. Side channels do not occur in the ferry terminal area. There is no large overhanging wood vegetation present to provide a food base from terrestrial organisms. The existing conditions consist of sand and silt below MLLW, with shell fragments in offshore areas and gravel, cobble, and sand above MLLW within the defined area of critical habitat. Some riprap and hardened shoreline are adjacent to the ferry terminal.</p>

4.10.2.16 *Pacific Eulachon*

Adult eulachon could be present at the Kingston Ferry Terminal. The terminal is distant from the river mouths where spawning is known to occur. According to NMFS, eulachon are rare/absent in mid and south Puget Sound, and do not need to be consulted on for this terminal (Carey, personal communication, 2013).

4.10.2.17 *Pacific Eulachon Critical Habitat*

No Pacific eulachon critical habitat has been designated near the Kingston Ferry Terminal (FEDERAL REGISTER 2011).

LOPEZ