Biological Evaluation

North Marina Maintenance Dredging

Port of Everett, Washington

Prepared for

Port of Everett

May 19, 2021

151-006-001

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Biological Evaluation

North Marina Maintenance Dredging

Port of Everett, Washington

1.0 INTRODUCTION

The Port of Everett (Port) is proposing to conduct maintenance dredging within the west basin of the North Marina to maintain safe navigational access around existing pier and dock structures. This Biological Evaluation (BE) has been prepared to aid the Port, National Oceanic and Atmospheric Administration (NOAA) Fisheries and U.S. Fish and Wildlife Service (USFWS) assess the potential effects of the proposed dredging on fish and wildlife species listed as threatened or endangered under the Endangered Species Act (ESA).

Section 7 of the ESA requires that any action by a federal agency is "not likely to jeopardize the continued existence of any [listed] species or result in the destruction or adverse modification of habitat of such species…." Issuance of a Section 10/404 permit for sediment removal in the lower Snohomish River qualifies as such an action. Under ESA Section 7(c), the lead federal agency—in this case, the U.S. Army Corps of Engineers (USACE)—must prepare a BE or Biological Assessment (BA) of the potential influence of the action on listed species and their critical habitat. Depending on the conclusion, the USACE may be required to confer formally with NOAA Fisheries or the USFWS regarding the project.

In addition, since the proposed operation is located within the shorelines of the City of Everett (City), under the City's Shoreline Master Program (SMP) Director's Initiative 2-2000, the Port must prepare a Habitat Assessment of the potential influence of the operation's actions on listed species and their critical habitat. This document is intended to meet both the requirements of a Section 7(c) Consultation under ESA, and of the City's SMP for an assessment of potential impacts on ESA-listed species and their habitats within the City's shorelines.

Because this work will occur in nearshore areas of the Snohomish River estuary, the proposed project has the potential to impact 14 species listed as threatened or endangered under the ESA or their critical habitat. The ESA status of each of these species, as well as the effects determination of this BE, is summarized in Table 1.

Several other federally-listed species occur or have the potential to occur in Snohomish County. Additional animal species on this list include the Canada lynx (*Lynx Canadensis*), grizzly bear (*Ursus arctos horribilis*), and northern spotted owl (*Strix occidentalis caurina)*. Proposed species include the gray wolf (Canis *lupus*) and Dolly Varden (*Salvelinus malma*) due to their similarity of appearance to bull trout in the Coastal Puget Sound area. If present in Snohomish County, the gray wolf, grizzly bear, and Canada lynx likely inhabit areas along the Cascade foothills and mountains and would not be present within the project action area. Northern spotted owls require large tracts of mature dense forest. None of these habitats are present in the urbanized waterfront of Port Gardner. The proposed project will have no effect on these species and no further mention of them will be made in this BE.

Table 1 – ESA-Listed Species Documented in Puget Sound.

Species	Listing Status	ESA Agency	Effects Determination	Critical Habitat in Action Area	Critical Habitat Effects Determination
Puget Sound Chinook (*Oncorhynchus tshawytscha*)	Threatened	NOAA	NLAA	Designated	NLAA
Puget Sound steelhead trout (*O. mykiss*)	Threatened	NOAA	NLAA	Designated	NLAA
Coastal-Puget Sound bull trout (*Salvelinus confluentus*)	Threatened	USFWS	NLAA	Designated	NLAA
Georgia Basin Bocaccio (*Sebastes paucispinis*)	Endangered	NOAA	NE	No	--
Georgia Basin Yelloweye Rockfish (*S. ruberrimus*)	Threatened	NOAA	NE	No	--
Pacific Eulachon (*Thaleichthys pacificus*)	Threatened	NOAA	NE	No	--
Green Sturgeon (*Acipenser medirostris*)	Threatened	NOAA	NE	No	--
Southern resident killer whale (*Orcinus orca*)	Endangered	NOAA	NLAA	No	--
Marbled Murrelet (*Brachyramphus marmoratus*)	Threatened	USFWS	NLAA	No	--
Humpback whale (*Megaptera novaeangliae*)	Threatened	NOAA	NE	No	--
Leatherback turtle (*Dermochelys coriacea*)	Threatened	NOAA	NE	No	--
Loggerhead sea turtle (*Caretta caretta*)	Threatened	NOAA	NE	No	--
Green sea turtle (*Chelonia mydas*)	Threatened	NOAA	NE	No	--
Olive Ridley sea turtle (*Lepidochelys olivacea*)	Threatened	NOAA	NE	No	--
Oregon spotted frog (*Rana pretiosa*)	Threatened	USFWS	NE	No	--

Notes:

NE = No effect
NLAA = Not likely to adversely affect

If they were to be listed in the future, an evaluation of Dolly Varden, including the proposed conservation measures and effects determination, would be identical to bull trout and are therefore addressed in this BE as such.

An evaluation of the effects of the proposed project on essential fish habitat (EFH) has also been prepared and included in Section 3.4, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act as amended by the 1996 Sustainable Fisheries Act.

2.0 PROJECT DESCRIPTION

2.1 Description of Project Site and Action Area

The Port of Everett Marina, including the South, Central, and North basins, is located adjacent to the lower Snohomish River at River Mile (RM) 0.8 to 1.3 in tidal portions of the river in Everett, Washington (Section 18, Township 29 North, Range 5 East) (Figure 1; Sheets 1 and 2). These basins contain the docks that make up the largest public marina on the West Coast, with 2,300 permanent and guest moorage slips for commercial and recreational tenants. The Port's boat launch, adjacent the project site, is the largest in Washington State with 13 lanes to launch from, which appeals to guests of the Everett Marina and increases demand for guest dock use. This project site only includes the western portion of the North Marina, one large guest dock, and Docks A, B, and C, overall consisting of 132 designated slips (Sheet 3). The "action area," where direct or indirect effects of the proposed action may occur, is defined as a 200-foot radius from dredging activities to account for the potential effects from turbidity (consistent with the allowable mixing zone for turbidity in an estuarine environment; Washington Administrative Code 173-201A-400(1)(b)(i)).

The "project site" includes only the nearshore dredge footprint within the marina where dredging activities will occur (Figure 1; Sheets 1 and 2).

2.2 Overview and Purpose

The Port has operated and maintained the North Marina since its completion in 2007. The marina's location along the lower Snohomish River results in constant sedimentation due to the influx of sediment from the river into the marina basins. Regular dredging is required to maintain safe under-keel clearances for the vessels that use these facilities. The maintained elevation in the marina is -14 feet mean lower low water (MLLW).

The North Marina was last dredged in 2005 before facility construction. Considerable sediment has recently accumulated in the western portion of the North basin to such an extent that widespread shoaling exists in major fairways and under docks with potential to ground moored vessels and/or cut off access to marina slips. The Port is statutorily authorized to operate and maintain these facilities and is required by their tenant agreements to maintain safe navigational depths. Maintenance is required due to the persistent deposition of sediment that adversely affects under-keel clearance requirements. Maintenance produces significant benefits, including the safe egress and ingress of vessels and the prevention of boats and dock infrastructure from grounding.

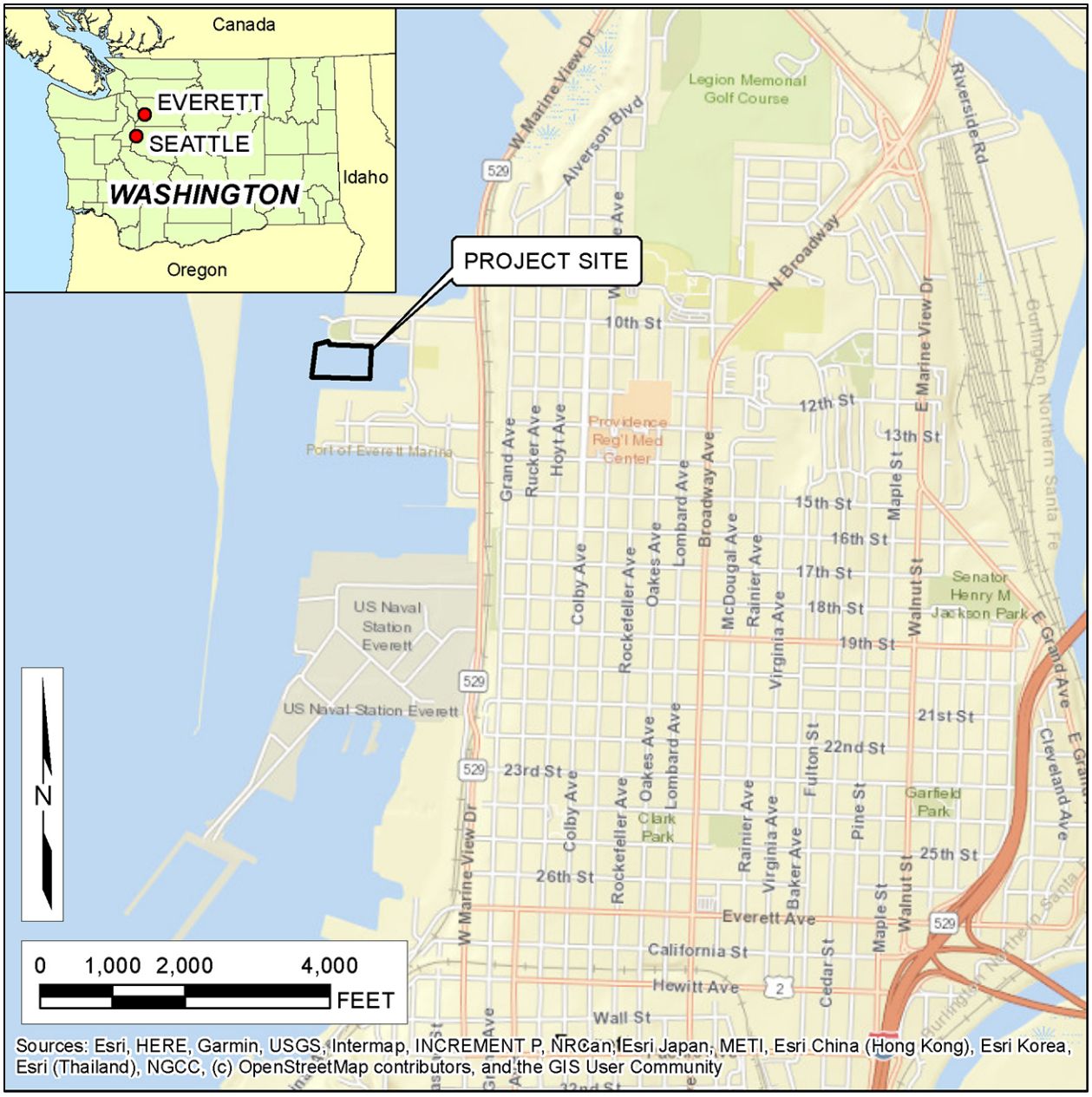

Figure 1 – North Marina Maintenance Dredging Project Site and Vicinity.

2.3 Project Description

Proposed maintenance dredging will allow continued use of the North basin facilities and maintain access to existing pier and dock structures. Dredging is planned to be initiated during the 2022 – 2023 in-water work window (July 16 – February 15), but will take several seasons to complete. Approximately 103,675 cubic yards of material will be dredged over an area of approximately 9.2 acres to a design dredge depth of -14 feet MLLW, plus 2 feet of over dredge allowance (Sheets 4, 5 and 6). An allowance volume of 20,000 cubic yards is included in the total volume to allow for an additional dredge event to remove sediment that may be deposited following the initial dredging event.

Dredging will be conducted using barge-based clamshell and/or fixed-arm excavation equipment that may be anchored or use spuds to maintain position. Dredged material will typically be placed on small barges for dewatering within the marina. Barges will be fitted with appropriate containment basins and filter materials (e.g., nonwoven geotextile filters) at all locations and will be filled in a manner that prevents overflow and spillage of dredged material to surface water.

Sediment characterization is underway pursuant to the Dredge Material Management Program (DMMP). Results of the DMMP sediment characterization will ultimately determine the suitability of dredge material for open water placement. A suitability determination in anticipated in May/June 2021. Dredged materials suitable for open water placement will be transported to the Port Gardner offshore placement site by bottom-dump barge (Sheet 7). More information about the Port Gardner non-dispersive site can be found in the Multi-User Dredged Material Disposal Sites BiOp (NMFS 2015). Sediments requiring upland placement will be loaded onto trucks for transport to an appropriate placement site based on the sediment characterization results. This dredged material will be managed throughout the transloading process to ensure there is no erosion or release of dredged material back into the aquatic environment.

Construction methods, conservation measures, and Best Management Practices (BMPs) will be consistent with the previously approved maintenance dredging permits for the North Marina with one addition: a 12-inch-diameter debris screen (i.e., grizzly) will be used to remove deleterious material prior to barge transport and placement.

2.4 Project Schedule

Initial dredging of the North Marina is planned for the 2022 – 2023 dredge season but it may take several seasons to complete due to the Port's budgetary constraints. All in-water work will occur within the agency approved in-water work window for Snohomish Estuary (July 16 through February 15).

2.5 Conservation Measures

The following avoidance, minimization techniques and BMPs will be implemented to protect the aquatic environment.

2.5.1 Timing, Spill Prevention, and Control

- All in-water work will be limited to the approved in-water work window of July 16 through February 15 to minimize potential adverse effects on listed species.
- The contractor will be responsible for the preparation and implementation of a Spill Prevention, Control, and Countermeasures (SPCC) Plan. The SPCC Plan will be submitted to the project engineer prior to the commencement of any construction activities. A copy of the plan with any updates will be maintained at the work site by the contractor. The contractor will also maintain the applicable equipment and materials at the job site that is designated in the SPCC Plan.
- All equipment will be inspected daily to ensure that it is in proper working condition and has no fluid leaks. Should a leak develop during use, the leaking equipment shall be immediately removed from the project site and not used again until it has been repaired.

- Excess or waste materials, petroleum products, chemicals, or other toxic or deleterious materials will not be allowed to enter waters of the state.

2.5.2 Mechanical Dredging

- Dredging and GPS software will be used to track the dredge prism and previously dredged areas to maximize dredging efficiency. The Port will ensure that its contractors are aware of authorized dredge depths and dredge volumes and will work closely with its contractor to achieve compliance. The selected dredging contractor will implement operational controls as required to meet water quality standards, including modifying the bucket speed; ensuring that the bucket is closed before ascent; adjusting bucket flaps; filling the bucket to capacity to minimize water in the bucket; not overfilling the bucket; and modifying the bucket size and/or type.
- If a backhoe excavator is used, the excavator bucket will follow all applicable BMPs described above for mechanical dredging. Once full of material, the bucket will be raised in an upright position to help reduce loss of sediment through the water column.
- In addition to visual screening, a debris screen (grizzly) with a 12-inch screen size will be utilized to filter out deleterious materials from the dredged material prior to disposal at the open water disposal site.

2.5.3 Material Transport and Placement

- The Port would handle all dredged material in a manner consistent with its characterization. Large pieces of recyclable material that may be removed with sediments may be taken to an approved recycling center. Dredge material would be transported to an approved upland, in-water, or landfill site.
- The barge will be loaded so that enough of the freeboard remains to allow for safe movement of the barge and its material on its planned route to the approved placement facility.
- Any water decanted from the barge will be filtered through materials such as geotextile fabric or similar filtering materials.
- Only a bottom-dump barge shall be used to dispose of material at the DMMP open water site.

3.0 SPECIES INFORMATION

3.1 Species Information

This BE addresses Chinook Salmon, bull trout, steelhead trout, two species of rockfish, southern resident killer whale (SRKW), marbled murrelet, humpback whale, Pacific Eulachon, Green Sturgeon, Oregon spotted frog, and four species of sea turtles. These species have been listed as threatened or endangered. This section provides environmental baseline information, including biological data on salmonids, and information regarding the presence of all species in the vicinity of the action area.

3.1.1 Chinook Salmon

The Puget Sound evolutionarily significant unit (ESU) of Chinook Salmon was designated as threatened under ESA on May 24, 1999. Like other Pacific salmon, Chinook Salmon reproduce in fresh water, but most of their growth occurs in marine waters. Chinook Salmon prefer to spawn and rear in the mainstem of rivers and larger streams (Healey 1991). In watersheds with an unaltered estuary, and currently in the

Snohomish River Estuary (Pentec 1992), Chinook Salmon smolts spend a prolonged period (several days to several weeks) during their spring outmigration, feeding in saltmarshes and distributary channels as they transition gradually into more marine waters (Simenstad et al. 1982). Chinook Salmon fry and subyearlings in saltmarsh and other shallow habitat predominantly prey on emergent insects and epibenthic crustaceans such as gammarid amphipods, mysids, and cumaceans. As Chinook Salmon mature and move to neritic habitat, they feed on small nekton (decapod larvae, larval and juvenile fish, and euphausiids) and neustonic drift insects (Simenstad et al. 1982; see also detailed life history review in Healey 1991).

According to the Washington Department of Fish and Wildlife (WDFW) Salmon and Steelhead Stock Inventory, Snohomish River summer/fall Chinook are managed as a single unit (WDFW and WWTIT 2002). The Chinook annual escapement goal for the entire Snohomish River Basin is 5,250 fish. The average escapement for the years 1981 through 2018 was 4,765 fish, which is below the escapement goal (Table 2).

3.1.2 Steelhead Trout

The Puget Sound distinct population segment (DPS) of steelhead trout was designated as threatened under ESA on May 7, 2007. Steelhead is the name commonly applied to the anadromous form of rainbow trout. The species exhibits perhaps the most complex suite of life-history traits of any of the Pacific salmon. Steelhead can be anadromous or freshwater residents, and in some circumstances, yield offspring of the opposite life-history form. The anadromous form can spend up to 7 years in fresh water prior to smoltification, although 2 years is most common, and then spend up to 4 years in salt water prior to first spawning. Unlike the Pacific salmon species, steelhead are iteroparous (individuals can spawn more than once; Behnke 1992).

Within the Snohomish and Puget Sound basins, steelhead can be divided into two basic reproductive strategies, based on the state of sexual maturity at the time of river entry. The summer-run steelhead is a stream maturing fish that enters fresh water in a sexually immature condition between May and October and requires several months to mature and spawn. The winter-run steelhead is an ocean-maturing fish that enters fresh water between November and April with well-developed gonads and spawns shortly after entrance. In basins with both summer and winter steelhead runs, the summer run generally occurs where habitat is not fully utilized by the winter run, or where an ephemeral hydrologic barrier separates them such as a seasonal velocity barrier or at a waterfall. Summer-run steelhead usually spawn farther upstream than winter run (Federal Register, Vol. 72, No. 91, pp. 26722–26735).

Summer-run and winter-run steelhead stocks are present in the Snohomish basin and both summer and winter fish are composed of wild and hatchery-raised steelhead. The winter run is the larger of the two stocks. Three wild winter steelhead stocks have been identified—Snohomish/Skykomish, Snoqualmie, and Pilchuck Rivers. Wild winter-run fish run predominantly in the late winter through spring (February through April), while hatchery fish run from late fall through early winter (mid-November through mid-February). Spawning occurs through most of this entire winter/spring period. The annual escapement goal for Snohomish basin wild winter steelhead is 6,500 fish; this goal has only been met on 10 occasions since the early 1980s (Table 2).

Table 2 – Annual Snohomish Basin Escapement of ESA-Listed Salmonids.

Year	Chinook	Steelhead	Bull Trout Redds
1981	3,330	2,954	
1982	4,498	4,160	
1983	4,537	5,158	
1984	3,484	6,432	
1985	4,730	6,508	
1986	4,534	7,790	
1987	4,689	7,672	
1988	4,513	7,744	21
1989	3,173	7,078	49
1990	4,209	5,386	67
1991	2,820	5,936	156
1992	2,708	8,588	82
1993	4,019		159
1994	3,626	6,992	35
1995	3,176	7,722	75
1996	4,851		60
1997	4,292		170
1998	6,304	5,250	177
1999	4,799	6,371	110
2000	6,092	2,822	236
2001	8,164	3,122	319
2002	7,220	2,234	538
2003	5,446	3,599	
2004	10,606	6,144	359
2005	4,484	4,410	247
2006	8,307	5,266	247
2007	3,999		136
2008	8,373		195
2009	2,309		93
2010	4,299	1,688	115
2011	1,883	2,366	105
2012	5,123	2,516	83
2013	3,244	2,658	
2014	3,902	2,686	128
2015	3,863	2,914	141
2016	5,153	3,120	
2017	6,119	1,992	
2018	4,210	1,252	88
2019	1,642	959	86
2020		1,598	

Sources: Peter Verhey, WDFW unpublished data 2021; Diego Holmgren, Tulalip Tribe unpublished data 2017.
Note: Escapement data calculated from Redd counts on the North Fork Skykomish River.

Three summer steelhead stocks are present in the Snohomish River Basin—in the upper Tolt, North Fork Skykomish, and South Fork Skykomish rivers. The summer steelhead in the Tolt and North Fork Skykomish Rivers are native while the South Fork Skykomish summer steelhead stock developed by the colonization of non-native fish (WDFW and WWTIT 1994; Jackson, C., Fisheries Biologist, WDFW, personal communication, April 2, 2008). Native summer stocks are small runs of fish limited by their habitats, spawning in areas isolated by native winter stocks. This occurs upstream of falls that were probably once migration barriers, except during the low flows of summer and fall. Since only a few miles of stream are used for spawning, native summer steelhead populations are small. Total populations are not known, and data are not sufficient to set escapement goals (WDFW and WWTIT 2002).

Wild juveniles typically spend 2 full years in fresh water before outmigrating during the spring. Because of the larger size at outmigration, steelhead do not typically spend a large amount of time in the nearshore; rather, they tend to quickly outmigrate to open water (Behnke 1992).

3.1.3 Bull Trout

The Coastal Puget Sound DPS of bull trout was designated as threatened under ESA on December 1, 1999. Bull trout spawn in the fall in streams containing clean gravel and cobble substrate, gentle slopes, and cold, unpolluted water. Bull trout require long incubation periods (4 to 5 months) compared with other salmon and trout. Fry hatch in late winter or early spring and remain in the gravel for up to 3 weeks before emerging. Small bull trout eat terrestrial and aquatic insects. Large bull trout are primarily piscivores, feeding on whitefish, sculpins, and other salmonids. Bull trout are more sensitive to changes in temperature, poor water quality, and low-flow conditions in fresh water than many other salmon because of their life history requirements (USFWS 2015).

Little is known about the anadromous form of bull trout or their movements in estuarine waters of Puget Sound (USFWS 2015). Limited data and anecdotal information from larger stocks, such as those present in the Snohomish and Skagit River Basins, indicate that fish have annual migrations to marine areas beginning in late winter and peaking in spring to mid-summer (Pentec 2002a; Goetz et al. 2004). Larger subadult and adult bull trout migrate to marine areas and occupy shallow nearshore habitats (adults are reproductively mature, and subadults are immature fish that have migrated to salt water). Anecdotal information in central Puget Sound suggests that bull trout aggregations are associated with surf smelt spawning beaches, presumably because the fish feed on this forage species.

Most anadromous bull trout move back to fresh water by late summer, although not necessarily into the same river systems from which they emigrated. Tagging data indicate that bull trout do not always spawn and overwinter in the same systems. Most mature adults migrate to upper-river spawning grounds beginning in late May and continuing through mid-July. Subadults may remain in marine areas as late as September before migrating to lower-river freshwater habitats, where they reside during the winter months (Goetz et al. 2004). Overwinter habitats for subadults have been identified in the Snohomish River between RMs 12 and 16 (Pentec 2002a). There is some indication that the persistent cold waters found in the Snohomish and Skykomish Rivers may offer longer-term support to juvenile bull trout as they develop in these areas.

3.1.4 Rockfish

On April 28, 2010, NOAA Fisheries announced the listing of three species of Georgia Basin rockfish under ESA. Bocaccio is listed as endangered, and Yelloweye Rockfish are listed as threatened. On January 23, 2017, NOAA Fisheries issued a final rule to remove the Puget Sound/Georgia Basin Canary Rockfish from the Federal List of Threatened and Endangered Species and remove its critical habitat designation (Federal Register, Vol. 82 No. 13 pp 7711-7731). NOAA Fisheries proposed these actions based on newly obtained samples and genetic analysis that demonstrated that the Canary Rockfish population does not meet the DPS criteria and therefore does not qualify for listing under ESA. All three are listed as species with designated EFH in Puget Sound.

Information and data on the distribution of both listed species is based principally on recreational and some commercial harvests, much of which were collected in the 1960s and 1970s when the species were more common. Bocaccio once made up 8 to 9 percent of recreational catch in the late 1970s, with the majority of fish caught in the areas around Point Defiance and the Tacoma Narrows in south Puget Sound.

Bocaccio have always been rare in north Puget Sound. The species is often pelagic, so it does not have a high affinity for hard or complex bottom structures. In contrast, the distribution of Yelloweye Rockfish frequently coincides with areas of high relief and complex rocky habitats. Therefore, the Yelloweye Rockfish is more commonly observed in north Puget Sound and the Strait of Georgia than in south Puget Sound, likely due to the larger amount of rocky habitat present in northern portions of the Georgia Basin.

Both rockfish species are long-lived, with documented life spans ranging from 54 to 118 years. Reproductive maturity occurs relatively late, after 5 years or more before first spawning. Rockfish produce substantial number of eggs, ranging from 20,000 to 2.7 million per female. The three species, like most rockfish, give birth to live larval young that reside in surface waters before settling to the bottom. Pelagic larval stages last from 116 to 155 days. The reproductive season occurs over an extended period, but generally takes place from January through mid-summer, peaking in the spring. Juvenile Yelloweye Rockfish are not dependent on rearing in shallow waters and are very rarely found in waters less than 120 feet (NMFS 2017). Both juvenile Bocaccio and Yelloweye Rockfish require kelp, rock, or cobble features in their rearing habitat, which is not found in the Snohomish River delta where the project action area occurs (NMFS 2017). Adults generally move into deeper water as they increase in size and age (Palsson et al. 2009; Drake et al. 2010). Considering the location of the marinas, lack of complex habitat, and very shallow waters, Bocaccio and Yelloweye Rockfish are not anticipated to occur within the project action area.

3.1.5 Pacific Eulachon

Pacific Eulachon is an anadromous forage fish that can be found from northern California to southwest Alaska. The southern DPS was granted ESA-listing as threatened on March 18, 2010 (Federal Register, Vol. 75, No. 52, pp. 13012–13024). Critical habitat was established on October 20, 2011, for 16 specific areas from California to Washington. Puget Sound was not designated as critical habitat.

Pacific Eulachon spawn in rivers during winter and spring months. Eggs develop from 14 to 30 days before hatching. Larvae disperse into estuarine and marine environments within several weeks and develop in the ocean. Juvenile Pacific Eulachon migrate into nearshore and deeper waters from 20 to 150 meters. Adult fish return to fresh water to spawn after 1 to 3 years (WADNR 2014).

There is currently no stock assessment available for Puget Sound, but Pacific Eulachon are thought to be an important food source for local marine birds and mammals, particularly during migration periods by Pacific Eulachon adults returning to river (Therriault et al. 2009). The Fraser River is thought to be the largest contributor to Pacific Eulachon that may be found in Puget Sound. These fish are not expected to be found in the project vicinity as they have not been observed within the Snohomish River nor delta and are a great distance from documented spawning areas.

3.1.6 Green Sturgeon

Green Sturgeon and White Sturgeon are the two anadromous species of the family Acipenseridae found on the west coast. The southern DPS of Green Sturgeon range from the Bering Sea, Alaska, to Ensenada, Mexico, occupying nearshore marine and freshwater rivers from California to British Columbia (Federal Register, Vol. 74, No. 195, pp. 52300–52351). Green Sturgeon juveniles feed and grow in fresh and estuarine waters for 1 to 4 years before migrating into nearshore marine water, where they spend most of their time as adults, returning to fresh water only to spawn.

Critical habitat established by the National Marine Fisheries Service (NMFS) includes the Strait of Juan de Fuca, but specifically excludes Puget Sound. Specific habitat use by Green Sturgeon have not been clearly defined within Puget Sound but are rarely seen east of Rosario Strait, they are not expected to be found in the project vicinity.

3.1.7 Southern Resident Killer Whale

Two sub-populations of killer whale, also known as orca, are found in Puget Sound: "residents" and "transients." These two groups of orcas have different behavior and movement patterns, but both can be found seasonally in Puget Sound. Transient orcas travel in smaller groups (called "pods") and hunt other marine mammals for food. Southern resident orcas spend more time in Puget Sound, travel in larger pods and eat mostly fish (Krahn et al. 2004). The Puget Sound southern residents consists of three social groups, identified as the J, K, and L pods, and are most often seen in Puget Sound from late fall through the winter (Wiles 2004). SRKW were designated as endangered under ESA on November 18, 2005 (Federal Register Vol. 70, No. 222, pp. 69903–69912).

The SRKW population has gone through several periods of growth and decline since 1974. Between 1974 and 1980, total whale numbers expanded by 19 percent from 70 to 83 animals. This was followed by four consecutive years of decrease from 1981 to 1984, when counts fell by 11 percent (to 74 whales). Beginning in 1985, the SRKW entered an 11-year growth phase peaking at 98 animals in 1995, representing a population increase of 32 percent during the period. Yet another period of decline began in 1996, declining to 80 whales by 2001, representing an 18 percent decrease. This decline appears to have resulted from an unprecedented 9-year span of relatively poor survival in nearly all age classes, as well as from an extended period of poor reproduction. Since that time, the SRKW population had appeared to plateau somewhat between 2006 and 2011 at approximately 89 animals. However, in addition to lack of prey, vessel noise, and pollution, between 1999 and 2020 the SRKW male to female sex ratio has been skewed and females representing a small proportion of the population has contributed to low birth rates. As a result, the DPS recently dropped to near its 1984 population size at an estimated total of 74 whales (Marine Mammal Commission 2020).

SRKW will often venture into inland waters of Puget Sound to hunt for Chinook Salmon, typically for a few days at a time before returning to the San Juan Islands and Haro Strait. According to the Orca Network, which manages orca sightings within the project action area of Puget Sound, SRKW have often been sighted in Possession Sound and Port Susan near the mouth of the Snohomish River and Hat Island. During the 2020-2021 in-water work window thus far, SRKW were observed in or near Possession Sound for a day at a time between mid-October and late December with a week to two weeks between sightings.

3.1.8 Marbled Murrelet

The marbled murrelet, a small seabird that nests in the coastal old-growth forests of the Pacific Northwest, inhabits the Pacific coast of North America from the Bering Sea to central California. In contrast to other seabirds, murrelets do not form dense colonies, and may fly 75 kilometers (46.6 miles) or more inland to nest, generally in older coniferous forests (Rodway et al. 1995). They are more commonly found inland during the summer breeding season but make daily trips to the ocean to gather food, primarily fish and

invertebrates, and have been detected in forests throughout the year. When not nesting, the birds live at sea, spending their days feeding and then moving several miles offshore at night (SEI 1999).

The breeding season of the marbled murrelet generally begins in April, with most egg laying occurring in late May and early June. Peak hatching occurs in July after a 27- to 30-day incubation. Chicks remain in the nest and are fed by both parents. By the end of August, chicks have fledged and dispersed from nesting areas (Hamer and Nelson 1995). The murrelets typically appear to exhibit high fidelity to their nesting areas and have been observed in forest stands for up to 20 years (Divoky and Horton 1995). Marbled murrelets have not been known to nest in other habitats, such as alpine forests, bog forests, scrub vegetation, or screen slopes (Marks and Bishop 1999). At sea, foraging murrelets are usually found as widely spaced pairs. In some instances, murrelets form or join flocks that are often associated with river plumes and currents. These flocks may contain sizable portions of local populations (Strachan et al. 1995).

The contiguous U.S. has a population of marbled murrelets estimated to be approximately 23,260 individuals; the larger proportion of the North American population with an estimate at 99,000 marbled murrelets is in Canada (USFWS 2019). Due to the highly mobile nature of marbled murrelets and effort required to survey them effectively, it is difficult to quantify their population and a clear trend across the western states is obscured. Instead, the general population has been broken into Conservation Zones; the project action area is located within Conservation Zone 1. The 2017, 5-Year Review by the USFWS found that there is a general trend of population decline within Conservation Zone 1 at a rate of approximately 4.9 percent. The most serious limiting factor for marbled murrelets is the loss of habitat through the removal of old-growth forests and fragmentation of forests. Forest fragmentation may be making nests near forest edges vulnerable to predation by other birds such as jays, crows, ravens, and great-horned owls (Federal Register 50 CFR Part 17, Vol 61, No 102 pp 26255 - 26320).

Marbled murrelets may rest or feed in waters of Port Gardner and have potential to occasionally be found in or near the action area.

3.1.9 Humpback Whale

Humpback whales do not reside within Puget Sound but are known to use the North Pacific Ocean and the waters off the western U.S. while in transit to their preferred feeding grounds in the Arctic. The populations of humpback whales with potential to be in the Puget Sound include the Mexico DPS, listed as threatened, and the Central America DPS, listed as endangered (Federal Register Vol. 81 pp 62259-62320). Humpback whales inhabit coastal waters and are typically found within approximately 50 nautical miles from shore (Evans 1987; Calambokidis and Steiger 1995). The coastal waters that attract the whales represent areas of high productivity in plankton and forage fish that are important food sources for these animals (Evans 1987). They depend on these abundant food resources because of their size and metabolic needs for reproduction, nursing, and sustenance during times of the year when food resources are less abundant (i.e., wintering grounds; Evans 1987).

Humpback whales use coastal habitats because of their productivity. They are not expected to be routinely present in Puget Sound because of the lack of appropriate habitat and food availability for these large mammals. This expectation is based on limited data, because most studies of these animals are focused on the areas the whales frequent, not areas where they are rarely, if ever, seen. Beginning in 2017, there

were more frequent sightings reported to local groups identifying humpback whales within Puget Sound. Since then, there has been two to six different individuals observed in the inland waters of Puget Sound, one as recently as November 2020 was found within Port Susan approximately 15 miles north of the project action area (Orca Network 2021).

3.1.10 Sea Turtles

The leatherback, loggerhead, green, and Olive Ridley sea turtles spend most of their lives in the ocean migrating thousands of miles migrating between foraging and nesting habitats (NMFS 1999a). The leatherback turtle (*Dermochelys coriacea*) is most adapted to temperate climates because of its ability to thermoregulate; thus, it is one of the most widely distributed of all turtles (NMFS 2020). Their breeding grounds are located in the tropical and subtropical latitudes, although they are regularly seen in more temperate areas (NMFS and USFWS 1998). The leatherback turtle is the most likely species to wander into Puget Sound, but occurrence in this region is considered extremely rare. Sea turtles are not expected to be found in the project action area and are not addressed further in this BE.

3.1.11 Oregon Spotted Frog

The Oregon spotted frog (*Rana pretiosa*) was listed as Threatened in August 2014, with Critical Habitat designated in May 2016; Puget Sound was not included in the management units. Preferred habitats include freshwater lakes, ponds, wetlands, and riverine sloughs with zones of shallow water and floating or emergent aquatic plants (Federal Register 79 Vol. 168 pp 51657-51710). Breeding occurs as early as mid-March for populations in low elevation and takes place in shallow pools. Eggs hatch within three weeks, after which the tadpoles graze on plant tissue and bacteria until their first summer when they become froglets. Winter habitat requirements for the Oregon spotted frog include flowing, oxygenated water with plenty of shelter locations for protection from predators and potential freezing (*ibid.*). Current estimates place an extant population scattered throughout the Puget Trough Ecoregion (Hammerson and Pearl, 2004); however, there are no known populations of the Oregon spotted frog within the project action area nor within Snohomish County (WA Herp Atlas 2009). Considering no populations have been observed near the action area and the lack of standing freshwater habitat in the action area, Oregon spotted frog are not expected to be found in the project action area and are not addressed further in this BE.

3.2 Species Use of Port Gardner and Snohomish Estuary

Several past studies of fish use in nearby Port Gardner and the Snohomish Estuary provide information to describe its use by important species, including juvenile Chinook Salmon (Beauchamp 1986; Northwest Enviro-Metric Sciences 1987; Pentec 1991, 1992, 1996a, 1996b, 2002b, 2003, and 2004; Frierson et al. 2017; Frick and Kagley 2020). These studies have focused on juvenile salmonid use of the estuary and have confirmed that the estuary is used to varying degrees by juveniles of Chinook Salmon and Coho Salmon, as well as juvenile steelhead and anadromous Cutthroat Trout (*Oncorhynchus clarki*) and Dolly Varden (*Salvelinus malma*)/bull trout. Stomach analyses indicate that juvenile salmon feed actively as they move through the estuary and across the Maulsby Mudflat (Pentec 1991 and 1996a). The most recent beach seining of the East Waterway, approximately 1 mile south of the project site with similar habitat and depths, in spring 2015, 2016, and 2021 the only ESA-listed species encountered was Chinook Salmon (Frick and Kagley 2020).

3.2.1 Juvenile Salmonid use of the Snohomish River Estuary

Fisheries studies using beach seining in the nearshore regions of the Snohomish River Estuary report finding several salmonids, including Chinook Salmon, Chum Salmon (*Oncorhynchus keta*), Coho Salmon, Pink Salmon (*O. gorbuscha*), Cutthroat Trout, and steelhead (*O. mykiss*). Juvenile Coho Salmon and Chinook Salmon, as well as bull trout, move through the estuary during their spring and summer outmigrations from the Snohomish River system. Use of the area occurs primarily between May and late June for Chinook and Coho Salmon (Beauchamp 1986; Northwest Enviro-Metric Sciences 1987; Pentec 1992; Frierson et al. 2017) and from mid-April through mid-July for bull trout (Goetz et al. 2004; Figure 2). However, some juvenile salmonid use of estuarine rearing areas has been documented year-round (Pentec 1992 and 2002b; M. Rowse, NOAA Fisheries, personal communication, 2009).

No data are available to provide a definitive estimate of the residence times of juvenile salmon in the lower Snohomish River or East Waterway, but inferences can be made from available data and literature reports from other estuaries.

3.2.1.1 Chinook Salmon

Chinook Salmon smolts have been identified as highly dependent on estuarine rearing, because a high proportion of all life history types (i.e., summer, fall runs) feed and grow for a significant time in estuaries (Healey 1982a and 1982b). Beach seine catches at the upper end of Ebey Slough (Beauchamp 1986), at two other locations in the middle estuary, and within the East Waterway, Chinook Salmon smolts were abundant from the beginning of May to the end of June (Figure 3). Earlier outmigrants are identified as yearlings and represent the less numerous summer run. Later outmigrants were young of the year and are presumed to be fall run fish.

Chinook Salmon outmigration through the estuary begins in late March (Pentec 1992). Chinook Salmon smolts use marshes and channels in the estuary from early April through mid-May 1991. In June, most fish were captured in the channels rather than in the marshes (*ibid*.). Subsequent surveys reaffirm previous findings that Chinook density appears to peak between April and July corresponding with out-migrating juveniles.

Beach seining in the Union Slough Restoration Site during the fall of 2001 documented that Chinook juvenile usage continued into November (Pentec 2002b). Only limited numbers of Chinook Salmon smolts were taken on the Maulsby Mudflat in studies by Pentec during the spring of 1994 (Pentec 1996a).

Beach seining by NMFS in the East Waterway during the spring and summer of 2015 and 2016 had a peak catch rate in May and June, further reinforcing understanding of juvenile Chinook use of the estuary in recent years (Frierson et al. 2017). During both years of seining, most of the Chinook encountered were hatchery fish with 82 percent of the juvenile Chinook lacking an adipose fin; catches closely corresponded to hatchery release in May and June of each survey year (*ibid*.).

Species	Freshwater Life Phase	Month J	F	M	A	M	J	J	A	S	O	N	D
Summer/ Fall Chinook	Upstream migration						■	■	■	■			
	Spawning									■	■	■	
	Intragravel develop.	■	■							■	■	■	■
	Juvenile rearing		■	■	■	■	■	■					
	Juv. outmigration				■	■	■	■					
Steelhead	Upstream migration	■	■	■	■	■						■	■
	Spawning	■	■	■	■	■							
	Intragravel develop.	■	■	■	■	■	■	■	■				■
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■
	Juv. outmigration				■	■	■	■					
Bull trout	Upstream migration						■	■	■	■			
	Spawning									■	■	■	
	Intragravel develop.	■	■	■	■	■				■	■	■	■
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■
	Juv. outmigration			■	■	■							
	Estuarine Period			■	■	■	■	■	■	■			

Sources: PNRBC 1970; WDFW and WWTIT 1994; Kraemer, personal communication, 2001.

Figure 2 – Life history stages of anadromous salmonids in the Snohomish River System.

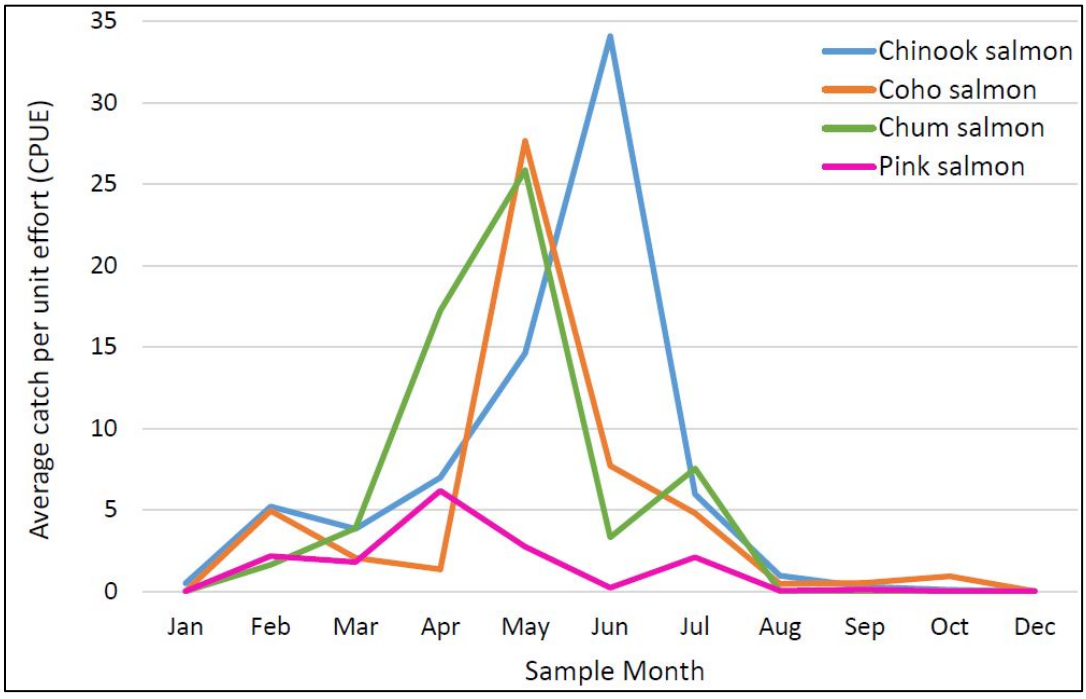

Figure 3 – Mean weekly catch of juvenile salmon in the Lower Snohomish Estuary and Port Gardner.

3.2.1.2 Bull Trout

As reported, very few data have been collected for anadromous bull trout; however, an acoustic tagging and tracking study within the Snohomish Estuary and adjacent marine nearshore was completed in 2004 (Goetz et al. 2004). Results from this study indicate that subadult and adult bull trout first enter the lower estuary and marine nearshore by early to mid-April. Presence in the estuary occurred through mid-summer, after which fish began moving back to fresh water. The latest that fish were observed in the lower estuary or marine nearshore was the first week in August (Hart Crowser, unpublished data 2002). This is consistent with bull trout monitoring conducted from late summer through winter 2001 in the Snohomish River. No bull trout were collected at locations at north Jetty Island and Priest Point; these stations were sampled weekly from mid-August, through the following winter (Pentec 2002a).

Acoustic tracking data also indicate that the Snohomish River delta north of Jetty Island was used by bull trout to a greater degree than the navigation channel between Jetty Island and the mainland, although some use occurred in the channel. Fish tended to move north into Port Susan rather than south into Port Gardner during spring and summer marine residence periods (Goetz et al. 2004).

3.2.1.3 Steelhead Trout

Very few juvenile steelhead trout have been found in the many nearshore studies conducted within the Snohomish Estuary and adjacent marine nearshore. This is consistent with what is known about the early life history of the species. Most native steelhead rear in fresh water for 2 or more years, outmigrating at a large size relative to the other salmonid species. Juvenile steelhead residence in the nearshore is brief, as they quickly migrate to open waters.

3.2.2 Adult Salmonid Use of Snohomish River Estuary

Adult salmonid use of Port Gardner has not been studied extensively. Healey (1991) reported that if river flows were not adequate for upstream migration, adult salmon may extend their stay in estuaries until river flows increase. This situation has not been documented in the Snohomish River system.

Adult Chinook move through Port Gardner and the Snohomish River Estuary from June through September and adult Coho Salmon move through the estuary from mid-July to mid-December. Adult bull trout move through Port Gardner and Port Susan from April through July, while subadults may remain until mid-September. Upstream migrating summer and winter run adult steelhead are known to move through the area almost throughout the year (Figure 2).

3.2.3 Rockfish Use of Port Gardner

Scant documentation exists pertaining to the use of adult rockfish species in Port Gardner. A multi-volume report by Miller and Borton (1980) on the geographic distribution of fish in Puget Sound indicates that each of the three rockfish species (*Sebastes paucispinus*, *S. ruberrimus*, *S. pinniger*) have been observed in Possession Sound adjacent to the project and action areas. At present, no known data exist on actual observations of these listed rockfish species in Port Gardner. Basic life history patterns of these rockfish species suggest that adult populations occupy depths greater than those found within the project action area. Juveniles typically use shallow water areas associated with eelgrass, kelp, and other marine macrovegetation, which is not present in the project action area.

3.2.4 SRKW Use of Port Gardner

According to The Whale Museum, which manages a long-term orca sightings database in Puget Sound, occasional sightings of SRKW have occurred in or near the action area during most of the year but are seasonally more abundant during the fall and early winter.

The Whale Museum, which manages a long-term orca sightings database in Puget Sound, analyzed SRKW sightings in the project action area between 2010 and 2019 to gauge use of the action area and surrounding travel routes (Abdel-Raheem and Wood 2021). Sightings are summarized in "whale days", or days in which there was a sighting of SRKW, rather than individual sightings since the opportunistic nature of whale observations lead to multiple reports of the same animal or group of animals. In this timeframe, only five whale days occurred within 4.6 kilometers of the project action area. Surrounding areas around the project site from the southern tip of Camano Island to Possession Point saw higher use by SRKW for transit between the inner waters of Puget Sound and Juan de Fuca (146 whale days). On an annual basis, the average number of days in which SRKW have been observed are 1/2 a day a year for the immediate project action area and 14.6 days for the surrounding Possession Sound. Though SRKW may pass through the surrounding area of Possession Sound and Whidbey Island, the shallow waters of the project action area are much less likely to support SRKW.

According to the Orca Network, sightings of "orcas" (either SRKW or unidentified and assumed to be SRKW) in the 2020-2021 in-water work window occurred adjacent to the action area three times – once in Port Susan and twice off of Possession Point – both locations range 7 to 10 miles from the project action area (Orca Network 2021). These observations predominately saw orcas briefly traveling through the area or moving toward the west coast of Whidbey Island, where they hunt more consistently.

Sightings within the main transit areas of northern Puget Sound (Deception Pass southward surrounding Whidbey Island) most frequently occurred between October and January, peaking in December (The Whale Museum 2021).

3.2.5 Marbled Murrelet Use of Port Gardner

According to WDFW's Priority Habitats and Species maps, no marbled murrelets are known to reside within the action area (WDFW 2021), though they may loaf and forage in the waters of Port Gardner and Possession Sound. Marbled murrelets are occasionally seen during the Christmas Bird Count between Everett and Marysville (10-year annual mean from 2009 to 2019 is 4.8 birds per year, ranging from 0 to 16 birds in a year; National Audubon Society 2021), but specific locations of these sightings are unknown.

3.2.6 Humpback Whale Use of Port Gardner

Similar to SRKW, observations of humpback whales in the action area are opportunistic and frequently include multiple sightings of the same animal. According to The Whale Museum, between 2010 and 2019 there were eight days during which at least one humpback whale was sighted within 4.6 kilometers of the project area and 61 days during which a humpback whale was sighted in the greater Possession Sound between the southern tip of Camano Island and Possession Point (Abdel-Raheem and Wood 2021). Between 2010 and 2019, 2017 had the greatest number of reported sightings in the broader Possession

Sound, adjacent to the action area with 17 sightings that year; the peak within 4.6 kilometers of the action area was in 2019 with four sightings in the year (*ibid.*).

Data between 2010 and 2019 indicates a marked uptick in humpback whale sightings in the broader Possession Sound and transit areas surrounding Whidbey Island starting in 2014 and remaining consistently frequent starting in 2017. Sightings of humpback whales seem to peak in northern Puget Sound in July and October.

3.3 Critical Habitat

3.3.1 Chinook Salmon and Steelhead Trout

On September 2, 2005, NOAA Fisheries released the final rule designating critical habitat for the Puget Sound Chinook Salmon ESU and other populations of federally protected salmon species in Washington, Oregon, and Idaho. All marine, estuarine, and river reaches accessible to Puget Sound Chinook Salmon are designated as critical habitat, save for a number of watersheds, military lands, and tribal lands that are excluded. Estuarine and marine areas surrounding the City lie within the designated critical habitat for Puget Sound Chinook Salmon (Federal Register, Vol. 70, No. 170, pp. 52630–52858).

The project action area lies in critical habitat Unit 19, the Nearshore Marine Area (Federal Register, Vol. 70, No. 170, pp. 52630–52858). This area provides important rearing, feeding, and migration habitat for Chinook and other salmonids. As a result of these biological functions, these areas are considered to be primary constituent elements (PCEs) essential to the conservation of the species. The relevant PCE present within the project and action areas are estuarine habitats:

> *"Nearshore marine areas free of obstruction and excessive predation with: (i) water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and (ii) natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels." (p. 52685).*

On February 24, 2016, NOAA Fisheries designated critical habitat for Puget Sound steelhead in most of the same reaches designated for Chinook Salmon, including the project action area. The PCE listed above for Chinook is the same for steelhead.

Along the Port Gardner shore, physical and biological features that contribute to PCE functions for Chinook Salmon and steelhead include:

- Water quality and quantity conditions generally acceptable for fish health.
- Suitable invertebrate production for fish to support growth and maturation.

The project action area does not have any significant submerged or overhanging large wood, or side channels. Large rocks in the project action area consist of riprap along the shoreline that support some epibiota. The nearshore portions of the action area is composed of pile supported overwater structures, some of which may affect juvenile salmon outmigratory behavior.

3.3.2 Bull Trout

On October 18, 2010, the USFWS revised the final rule designating critical habitat for coastal Puget Sound bull trout that includes all Puget Sound river basins containing bull trout populations and marine nearshore areas extending from the Canadian border to the Nisqually delta. This area has been designated as critical habitat Unit 28 – Puget Sound (Federal Register, Vol. 75, No. 200, pp. 63898–64070). Estuarine and marine areas of Port Gardner lie within the designated critical habitat for bull trout.

USFWS identified nine PCEs that are considered to be essential for the conservation of bull trout. While most of these are relevant only to freshwater life history phases of bull trout, those that are, at least in part, relevant to marine areas include:

- 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.
- An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- 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 structures.
- Water temperatures ranging from 2 to 15° C, with adequate thermal refugia available for temperatures that exceed the upper end of this range.
- Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
- Sufficiently low levels of occurrence of nonnative predatory, interbreeding, or competing species that, if present, are adequately isolated temporally and spatially from bull trout.

3.3.3 Other Species

The final critical habitat designation for SRKW does not include waters shallower than 20 feet based on extreme high tide (Federal Register, Vol. 71, No. 229, pp 69061). Waters within the dredge footprint and surrounding action area are shallower than 20 feet, therefore, the action area does not provide critical habitat for SRKW.

Dense and mature forest nesting sites are considered to be the factor limiting the numbers of marbled murrelets in recent years. Such habitats are far removed from the project and action areas of the lower Snohomish River and surrounding urban environments. Accordingly, the lower Snohomish River and Port Gardner are not included in the designated critical habitat for marbled murrelet.

On November 13, 2014, NOAA Fisheries designated critical habitat for Bocaccio and Yelloweye Rockfish in Puget Sound (Federal Register, Vol. 79 p. 68,041). Critical habitat does not include the project action area.

The project action area is not within designated critical habitat for Pacific Eulachon, Green Sturgeon, steelhead trout, humpback whale, Oregon spotted frog, or the four species of sea turtles.

3.4 Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act set forth the EFH provision to identify and protect important habitats of federally managed marine and anadromous fish species. Federal agencies, such as the USACE, which fund, permit, or undertake activities that may adversely affect EFH, are required to consult with NOAA Fisheries regarding the potential effects of their actions on EFH and respond in writing to NOAA Fisheries' recommendations.

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate. "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities (NMFS 1999b).

Groundfish, coastal pelagic, and salmonid fish species that have designated EFH in Puget Sound are listed in Table 3. Some of these species may occur in the project action area. The most probable species to be found in the project action area include salmonids, cottids, flat fish, and forage fish. Refer to the relevant EFH designations (Casillas et al. 1998; PFMC 1998a, 1998b, and 1999) for life history stages of these species that may occur in the project vicinity. Assessment of the impacts to these species' EFH from the proposed project is based on this information.

3.5 Existing Environmental Conditions

This section presents a summary of existing environmental conditions within the marine nearshore of the project and action areas in the vicinity of the North Marina portion of the Everett Waterfront.

3.5.1 Hydromodifications

The Everett Marina is in an area that has been altered by the previously authorized dredging and filling to convert portions of the shoreline to commercial uses since early in the 20th Century.

The Snohomish River has significant bedload transport of sediment that requires frequent dredging by the USACE to maintain elevations of the federal navigation channel. Marina basins are situated at the edge of the river channel and have lower flow velocities. They may act as a depositional "settling basin" for material transported by the river as bedload.

3.5.2 Water Quality

Salinities in Port Gardner are generally between 20 and 28 parts per thousand with occasional periods when lower salinity plumes from the Snohomish River extend to the site. No industrial discharges currently occur within the project action area, but stormwater discharges and offshore discharges from the City of Everett and Naval Station Everett occur near the action area.

Table 3 – Species of Fish with Essential Fish Habitat in the Project Action Area.

Groundfish Species
Spiny Dogfish, *Squalus acanthias*
Big Skate, *Raja binoculata*
California Skate, *R. inornata*
Longnose Skate, *R. rhina*
Spotted Ratfish, *Hydrolagus colliei*
Pacific Cod, *Gadus macrocephalus*
Pacific Hake, *Merluccius productus*
Black Rockfish, *Sebastes melanops*
Bocaccio, *S. paucispinis*
Brown Rockfish, *S. auriculatus*
Canary Rockfish, *S. pinniger*
China Rockfish, *S. nebulosus*
Copper Rockfish, *S. caurinus*
Darkblotched Rockfish, *S. crameri*
Greenstriped Rockfish, *S. elongatus*
Pacific Ocean Perch, *S. alutus*
Quillback Rockfish, *S. maliger*
Redbanded Rockfish, *S. babcocki*
Redstripe Rockfish, *S. proriger*
Rosethorn Rockfish, *S. helvomaculatus*
Rosy Rockfish, *S. rosaceus*
Rougheye Rockfish, *S. aleutianus*
Sharpchin Rockfish, *S. zacentrus*
Splitnose Rockfish, *S. diploproa*
Stripetail Rockfish, *S. saxicola*
Tiger Rockfish, *S. nigrocinctus*
Vermilion Rockfish, *S. miniatus*
Yelloweye Rockfish, *S. ruberrimus*
Yellowtail Rockfish, *S. flavidus*
Shortspine Thornyhead, *Sebastolobus alascanus*
Cabezon, *Scorpaenichthys marmoratus*
Lingcod, *Ophiodon elongatus*
Kelp Greenling, *Hexagrammos decagrammus*
Sablefish, *Anoplopoma fimbria*
Jack Mackerel, *Trachurus symmetricus*
Pacific Sanddab, *Citharichthys sordidus*
Butter Sole, *Pleuronectes isolepis*
Curlfin Sole, *Pleuronichthys decurrens*
Dover Sole, *Microstomus pacificus*
English Sole, *Pleuronectes vetulus*
Flathead Sole, *Hippoglossoides elassodon*
Petrale Sole, *Eopsetta jordani*
Rex Sole, *Errex zachirus*
Rock Sole, *Pleuronectes bilineata*
Sand Sole, *Psettichthys melanostictus*
Starry Flounder, *Platichthys stellatus*
Arrowtooth Flounder, *Atheresthes stomias*
Coastal Pelagic Species
Northern Anchovy, *Engraulis mordax*
Pacific Sardine, *Sardinops sagax*
Chub Mackerel, *Scomber japonicus*
Market Squid, *Loligo opalescens*
Salmonid Species
Chinook Salmon, *Oncorhynchus tshawytscha*
Coho Salmon, *O. kisutch*
Puget Sound Pink Salmon, *O. gorbuscha*

Water quality data is continually collected from the nearby Port Susan Bay at the mouth of the Stillaguamish River via monitoring buoy set at 0.8 meters deep. The Port Susan Bay location is the closest active monitoring point to the project action area and likely mimics season influence from nearby river run off. Data collection from 2019 indicated temperatures from 3.4 to 20.9 degrees Celsius, salinity fluctuates between <1 and 30 Practical Salinity Unit (PSU), dissolved oxygen ranges from approximately 3 to 22 milligrams per liter (mg/L), and pH is slightly alkaline between 7 and 9 (PSEMP 2020).

According to the Washington Department of Ecology (Ecology) Water Quality Atlas, exceedance of water quality parameters is located within the project action area in the North Marina; this body of water is listed as Category 2 and exceeded criteria for bacteria (Ecology 2021). Category 2 waters are identified as "waters of concern" that do not show persistent impairment but are monitored through continued testing.

3.5.3 Habitat and Biota

3.5.3.1 Juvenile Salmonids and their Prey

No recent sampling of juvenile salmonids has occurred within the marina basins, but data from adjacent areas are representative of the timing and nature of use that can be expected in the project action area. Juvenile salmonids that use the Snohomish River system were caught on Jetty Island, Maulsby Mudflat, and other portions of the lower river, outmigrating during the spring and early summer months (Pentec 1996a; Rice et al. 2013). Chum and pink salmon were the most common by far; pink salmon were present and abundant because of the odd-year timing of the sampling (Pentec 1996a). Juvenile Chinook Salmon were also commonly observed and maintained the longest residence period within the estuary (Rice et al. 2013; Rowse and Fresh 2003). Recent sampling of the East Waterway was limited to sampling during the fall and winter months (due to COVID-19 restrictions) but confirmed limited presence of juvenile Chinook, chum and Coho Salmon in nearshore areas during December and February (Frick and Kagley 2021).

3.5.3.2 Prey Availability and Utilization

Chinook Salmon smolts sampled in the lower estuary in spring and early summer 1991 had been found to be feeding on several gammarid amphipods, including *Corophium* spp. and cladocerans (Pentec 1991). The most abundant salmonid prey taxon found on the Maulsby Mudflats during April and May sampling periods was the amphipod *Eogammarus confervicolus* (Pentec 1996a). This species and the amphipods of the genus *Corophium* sp. were also the dominant prey taxa in terms of biomass on the flat. The harpacticoid *Tisbe* sp. was the second most abundant taxon at the lower and middle tidal area stations but contributed less than 1 percent of the total biomass of epibenthic zooplankton at any station.

Harpacticoids, amphipods, and chironomids were the dominant prey items consumed by the chum and pink salmon collected on the mudflat. Amphipods, the mysid *Neomysis mercedis*, and a larval fish were the major prey consumed by the juvenile Chinook Salmon. The single coho salmon collected on the flat appeared to have been feeding exclusively on amphipods (*Corophium* sp.). In the more marine waters in the project action area, juvenile salmonids are expected to be feeding on more pelagic prey (Pentec 1996a).

3.5.3.3 Vegetation

Vegetation on the adjacent uplands is limited to grass lawn and landscaping but is mostly hardscaping such as parking lots and sidewalks. In the marina basin, very little marine macrovegetation is present. The northern shoreline of the North Marina Basin was vegetated with a mix of riparian trees, shrubs, and forbs following construction. A narrow “ecobench” suitable for establishment of upper intertidal marsh vegetation was also constructed, planted, and monitored for 6 years. Vegetation development has largely been successful and is providing significant riparian function (Pentec 2012). A substantial amount of water column shading precludes marine algae except in sporadic unshaded areas of the intertidal zone where light penetration occurs on existing pilings and floating booms (i.e., at much shallower depths). Vegetation is restricted to a few sparse patches of rockweed *Fucus* spp. and sea lettuce, *Ulva* spp. Partial marine macrovegetation surveys conducted in 2016 near Seiner Wharf within marina basin found no marine microvegetation. A preliminary underwater video survey was conducted in December 2020 by the Ocean Research College Academy of Everett Community College through the project site. No eelgrass was

identified at that time; however, this preliminary survey was conducted during a period when eelgrass is dormant.

3.5.3.4 Substrate

Substrates within the marina basins are composed primarily of sand and silty-clay substrates, deposited from the Snohomish River. No natural beach environments are present.

3.5.3.5 Forage Fish

Spawning areas for Pacific Herring (*Clupea pallasi*), Pacific Sand Lance (*Ammodytes hexapterus*), and Surf Smelt (*Hypomesus pretiosus*) have not been documented in the project action area. The riprap armoring in the upper intertidal zone is not suitable spawning habitat for any of the species. The nearest spawning areas for surf smelt and sand lance are located approximately 0.5 mile southwest of the project action area along Howarth beach between Port Gardner and Mukilteo (WDFW 2018). The nearest spawning area for Pacific herring is in Port Susan, over 10 miles northwest of the project action area.

3.5.3.6 Contaminants and Sediments

Sediment characterization is underway with a suitability determination to follow in June or July 2021.

In 2008, a sediment sample within the project action area failed to meet Sediment Management Standard Sediment Quality Standards bioassay criteria and thus was given Category 5 status (303d list) by the Washington State Department of Ecology. Category 5 waters are impaired to the point that they require a water improvement project, or Total Maximum Daily Load (Ecology 2021). So far, there has been no new evidence to remove the area from the 303d list.

History of the surrounding uplands includes previous use by industrial marine construction, repair, and manufacturing that included use and storage of materials containing contaminants of concern. A Risk Investigation and Feasibility Study by Ecology indicated historical groundwater and soils in the area contained heavy metals and polycyclic aromatic hydrocarbons in 2011; they believed the sources for contaminants of concern in the area to be removed and no further source has been identified (Ecology 2011). During their investigations, a small patch (approximately 80 feet by 80 feet) of sediment east of the project site was found to contain high levels of fluoranthene in close proximity to the shore due to a creosote-treated bulkhead in the area; the bulkhead was removed in 2006 and replaced with steel piles (Ecology 2011).

4.0 EFFECTS ANALYSIS

The effects of proposed dredging on ESA-listed species and their habitats are described in this section. The discussion describes how activities associated with the project will contribute to improvement, maintaining, or degradation of habitats used by listed species. Potential disturbances caused by project activities are presented in Table 4, along with measurable indicators of habitat health.

Table 4 – Effects of Project Activities on Habitats used by Salmonids in the Project and Action Areas.

		Effects of Action		
Project Activities	**Habitat Indicator**	**Improve[1]**	**Maintain[2]**	**Degrade[3]**
Construction Disturbances	Noise		♦	
	Entrainment		♦	
	Stranding		♦	
Water Quality Disturbance	Turbidity		♦	
	Chemical contamination/nutrients		♦	
	Temperature		♦	
	Dissolved oxygen		♦	
Sediment Disturbance	Sedimentation sources/rates		♦	
	Sediment quality		♦	
Habitat Disturbance	Fish access/refugia		♦	
	Depth		♦	
	Substrate		♦	
	Slope		♦	
	Shoreline		♦	
	Riparian conditions		♦	
	Flow and hydrology/current patterns/saltwater-freshwater mixing patterns		♦	
	Overwater structures		♦	
	Disturbance		♦	
Biota Disturbance	Prey—epibenthic and pelagic zooplankton		♦	
	Infauna		♦	
	Prey—forage fish		♦	
	Aquatic/wetland vegetation		♦	
	Nonindigenous species		♦	
	Ecological diversity		♦	

Notes:

[1] Action will contribute to long-term improvement, over existing conditions, of the habitat indicator.

[2] Action will maintain existing conditions.

[3] Action will contribute to long-term degradation, over existing conditions, of the habitat indicator.

Presented below is a discussion of short-term and long-term direct and indirect effects of project activities as well as the net effects of those activities. Net effect is considered to be the overall effect on the species and habitat in the long term. Moreover, if short-term adverse conditions occur when few or no listed species are present, and if those conditions are no longer present when listed species return to the area, those conditions do not constitute adverse modification of the indicator of habitat quality.

Note that the potential effects of dredged material placement at the Port Gardner non-dispersive unconfined open water placement site have been addressed under the NMFS consultation number WCR-2015-2975 and are not addressed further herein. For details regarding effects of disposal refer to the NMFS Biological Opinion Statutory Response to EFH Conservation Recommendations for the Continued Use of Multi-User Dredged Material Disposal Sites in Puget Sound and Grays Harbor (Fourth Field HUCs 17110020 Dungeness-Elwha, 17110002 Strait of Georgia, 1711019 Puget Sound, and 17100105 Grays Harbor) Washington. NMFS Consultation Number: WCR-2015-2975 (NMFS 2015).

4.1 Construction Disturbances

4.1.1 Short-Term Effects on ESA-Listed Species

Direct Effects. Noise and physical disturbances from proposed dredging in the project action area are expected to be minor and near ambient noise levels within a highly utilized marina but may result in the temporary avoidance of the project action area by listed salmonids and avian species. All dredging will take place during agency-approved work windows when few juvenile salmonids are present in the nearshore. In addition, underwater acoustic monitoring studies conducted during maintenance dredging within the lower Snohomish River navigation channel show a range of underwater sound levels between 144 and 164 decibels referenced to 1 micropascal (dB re 1 µPa; sound measured between 13 and 100 meters from the dredge; Hart Crowser and Evans Hamilton 2010). These sound levels are substantially lower than current interim criteria adopted by NOAA Fisheries for the protection of fish from pile driving (FHWG 2008). Indeed, underwater sounds measured near the dredge site were lower than those measured at the I-5 bridge crossing (170 dB re 1 µPa; Hart Crowser and Evans Hamilton 2010). The North Marina is a popular boating site and contains frequent boat noise and has a raised ambient noise level. As such, noise due to dredging is expected to be near ambient levels.

Marbled murrelets that could venture into the project action area during dredging could be exposed to slight increases in noise levels. However, noise from maintenance dredge operations within the lower river have been measured at levels well below the marbled murrelet pile driving criteria for injury (202 dB Sound Exposure Level). Movements of tugs and barges to the disposal area could briefly disturb murrelets feeding or resting on the water within the path of the vessels. Winter densities of murrelets are very low in this area (based on recent Audubon Christmas Bird Count data) and such disturbance would not have a significant long-term effect on murrelet populations.

Because of the industrial nature of the Everett waterfront, the existing levels of industrial and recreational activity, low levels of both in-water and airborne noise, and that all dredging will occur within the existing active marina less than 20 feet in depth, dredging operations are not expected to have any direct disturbance effects on marbled murrelet or SRKW. Therefore, effects resulting from noise disturbances on all ESA-listed species are considered discountable.

No short-term direct effects on ESA-listed salmonids, rockfish, Pacific Eulachon, and Green Sturgeon are anticipated as the result of noise disturbances as they are will not be present in the action area during dredging.

Indirect Effects. No short-term indirect effects will result from noise and disturbances generated by dredging within the project and action areas.

4.1.2 Long-Term Effects on ESA-Listed Species

No long-term direct or indirect effects will result from noise and disturbances generated by dredging within the project and action areas.

4.1.3 Net Effects

Dredging activities will result in minor and temporary increases in noise in the project action area, possibly causing salmonids and bird species to avoid the nearshore for the duration of activities. However, all work will be conducted during approved work windows, and previous acoustic monitoring of dredge activities showed noise levels well below those shown to injure fish. The net effect will be to maintain (neither improve nor degrade) the present condition of this indicator (Table 4).

4.2 Water Quality Disturbances

4.2.1 Short-Term Effects on ESA-Listed Species

Direct Effects. Dredging of sediment may produce localized impacts on water quality in the form of elevated turbidity plumes that could last several minutes. Elevated turbidity plumes are likely to occur in the immediate vicinity of the dredging within the marina basin and may extend short distances up or downgradient of the dredge footprint (depending upon tidal stage). Generalized turbidity effects on fish depend on the amount and timing of exposure. Because fish present in the action area have evolved in Pacific Northwest systems that periodically experience short-term pulses of high suspended sediment, they are adapted to such exposures. Increases in turbidity that result from dredging activities are typically of much less magnitude than increases caused by natural storm events (Nightingale and Simenstad 2001).

Juvenile salmon have been shown to avoid areas of unacceptably high turbidities (Servizi 1988), although they may seek out areas of moderate turbidity (10 to 80 nephelometric turbidity units [NTU]), presumably as cover against predation (Cyrus and Blaber 1987a and 1987b). Feeding efficiency of juveniles is impaired by turbidities in excess of 70 NTU, well below sublethal stress levels (Bisson and Bilby 1982). Reduced preference by adult salmon homing to spawning areas has been demonstrated where turbidities exceed 30 NTU (20 milligrams per liter [mg/L] suspended sediments; Sigler 1990). However, Chinook Salmon exposed to 650 mg/L of suspended volcanic ash were still able to find their natal water (Whitman, et al. 1982).

In addition, turbidity due to dredging will be short term, temporary, and localized (NMFS 2003). The mechanisms by which clamshell dredging causes increased suspended sediment concentrations include the impact and withdrawal of the bucket from the substrate, the washing of material out of the bucket as it moves through the water column, and the loss of water as the sediment is loaded onto the barge (Hayes et al. 1984; Nightingale and Simenstad 2001). The dredge contractor will implement BMPs to minimize turbidity (see Section 2.5). Elevated turbidity is expected to occur in short pulses that last only for a few minutes during active dredging operations. Turbidity levels would return to background levels between dredging events.

Studies and data indicate that turbidity effects on listed juvenile salmonids will be discountable because work will occur during the approved in-water work window for the area when juvenile salmonids are not expected to be present. Adult salmonids could be present year-round in low numbers; however, the turbidity levels and potential durations of exposure would not reach the levels where effects occur and are insignificant. Adult and juvenile rockfish are not expected in the action area, therefore there would be no effect to rockfish.

During dredging, suspension of anoxic sediment may result in reduced dissolved oxygen (D.O.) in the water column as the sediments oxidize, but any reduction in D.O. beyond background is expected to be limited and temporary. Based on a review of four studies on the effects of dredging on D.O. levels, LaSalle (1988), and 15 years of water quality monitoring by Hart Crowser during dredging in the Lower Columbia River, there was no measurable reduction in D.O. around dredging operations. In addition, impacts on listed fish due to any potential D.O. depletion around dredging activities is expected to be minimal for several reasons (LaSalle 1988; Simenstad 1988):

- The relatively low levels of suspended material generated by dredging operations.
- Counterbalancing factors in the area, such as tidal or current flushing.
- D.O. depletion typically occurs low in the water column.
- High sediment biological oxygen demand created by suspended sediment in the water column is uncommon.

Based on this information, dredging is not expected to result in a change in sediment oxygen demand (and resulting D.O. reduction) during transport through the water column. There may be minor resuspension of sediments at the point of impact of the placed materials; however, this condition is expected to be temporary and localized. Based on the above information, D.O. is not expected to drop to a level that will be significant to fish that may occur in the area.

There is a chance that other short-term water quality effects could occur related to fuel or contaminant spills; however, BMPs will be in place to avoid and minimize the potential for these to occur and protect listed salmonids if they do occur. These effects are therefore expected to be insignificant.

Indirect Effects. Given the short term and highly localized nature of turbidity, no indirect effects on ESA-listed fish, bird, or marine mammal species are anticipated.

4.2.2 Long-Term Effects on ESA-Listed Species

Long-term direct and indirect effects on water quality are expected to be insignificant or beneficial. We anticipate that Dredged Material Management Office sediment characterization will indicate that sediments are suitable for offshore open water disposal. Direct effects from resuspended sediment will be discussed in Section 4.3 and effects on benthic and other sessile sediment dwelling organisms will be discussed in Section 4.4.

The potential indirect and long-term effect of this maintenance action is beneficial and provides continued safe navigation and moorage space for local vessels. Without access to the transient docks and slips, and

other properly maintained marine facilities, the risk of local boat users seeking informal moorage rises and, with it, the chance of improper vessel storage. Grounded or derelict vessels and gear are often abandoned in the nearshore zone and can create a problematic environmental hazard such as leaking fuels, oils, fluids, and flakes of anti-fouling paint. By maintaining the existing marina, anthropogenic impacts from improperly moored vessels may be avoided.

4.2.3 Net Effects

Short-term effects resulting from increased turbidity and sediment resuspension may be expected during dredging activities but are expected to be minor and temporary. Therefore, the net effects of dredging will be to maintain water quality in the project and action area (Table 4).

4.3 Sediment Disturbances

4.3.1 Short-Term Effects on ESA-Listed Species

Physical resuspension of sediments will occur during dredging. Sediment characterization will determine the presence of contaminants of concern and suitability for offshore disposal. Given previous exploration, it is anticipated that results will indicate suitability for offshore disposal. The results of DMMP sediment testing conducted in 2016 determined a low risk of both toxicity and bioaccumulation to aquatic life. Dredging would also occur during an in-water work window when few juvenile salmon would be present, further minimizing exposure. The proposed dredge footprint does not contain the deep high relief habitats used by ESA-listed rockfish adults, nor are there shallow habitats with eelgrass, kelp, or other areas of marine macrovegetation most often used by juvenile rockfish.

These data and analyses indicate that the potential effects of sediment resuspension on ESA-listed fish, marbled murrelet, and marine mammals will be insignificant.

4.3.2 Long-Term Effects on ESA-Listed Species

Long-term direct and indirect effects of proposed dredging are expected to be insignificant. Sediments are uncontaminated and resuspension will be temporary and highly localized. Benthic and epibenthic communities that reside in or on the sediment surface, would quickly recolonize.

4.3.3 Net Effects

Short-term effects resulting from increased turbidity and sediment resuspension may be expected during dredging activities but are expected to be minor and temporary. Therefore, the net effects of dredging will be to maintain water quality in the project and action area (Table 4).

4.4 Habitat and Biota Disturbances

4.4.1 Short-Term Effects on ESA-Listed Species

Direct Effects. Approximately 103,675 cubic yards of material will be dredged over an area of approximately 9.2 acres, all within the existing North Marina basin, to a design dredge depth of -14 feet MLLW with 2 feet of overdredge. Current bathymetry data indicate that depths range from a few shoals between -5 to -9 feet MLLW, to most areas between -9 and -12 feet MLLW. The area is an active marina

periodically dredged to maintain navigational access and provides very little ecologically valuable shallow water habitat. All dredging will occur subtidally; no intertidal habitats will be dredged.

Given that no natural intertidal habitats will be altered, and no natural shallow littoral habitats will be converted to deep water habitats, the potential effects on listed juvenile salmonids in the dredged area will be discountable and unmeasurable. It is also highly unlikely that rockfish, Pacific Eulachon, or Green Sturgeon use the highly altered habitat in the action area; therefore, no effects are anticipated to these species.

Dredging will remove benthic and epibenthic assemblages from up to 8.25 acres of the dredge footprint. This perturbation of the benthic community will be short term in duration because the community is expected to recover rapidly after dredging, based on the results of multiple studies in other areas (Ellis 2006, McCauley et al. 1977; Swartz et al. 1980; Albright and Borithilette 1981; Romberg et al. 1995; Wilson and Romberg 1996). For example, Romberg et al. (1995), studying a subtidal sand cap placed to isolate contaminated sediments in Elliott Bay, identified 139 species of invertebrates 5 months after placement of the cap. The benthic community reached its peak population and biomass approximately 2.5 years after placement of the cap, then decreased, while the number of species increased to 200 as long-lived species recruited to the population (Wilson and Romberg 1996). For these reasons it is anticipated that the impacts on the prey community from the proposed action, and any subsequent effects on ESA-listed fish, will be discountable.

Mechanical dredging has very low likelihood to entrain or kill fish. Pressure waves created as the bucket descends will forewarn fish present within the area, allowing individuals time to avoid these mechanisms, and the waves will physically push smaller fish and invertebrates away from the bucket. In addition, during dredging, the clamshell jaws will be open during descent which should reduce the likelihood of entrapping or containing fish (NMFS 2003). The USACE conducted extensive sampling within the Columbia River in 1985 through 1988, and no juvenile salmon were entrained (Larson and Moehl 1990). McGraw and Armstrong (1988) examined fish entrainment rates during hydraulic dredging outside of peak migration times in Grays Harbor from 1978 to 1989 and found that one juvenile salmon was entrained.

Indirect Effects. Indirect short-term effects, such as a reduction of prey species to ESA-listed salmonids, are expected to be insignificant since recovery of the benthic community is expected to occur quickly.

4.4.2 Long-Term Effects on ESA-Listed Species

Direct Effects. Long-term direct effects at the Everett Marina are expected to be insignificant. Removal of sediments will not result in the loss of valuable littoral habitat. After dredging is completed, rapid recolonization is expected to return the benthic and epibenthic communities to the same levels as prior to dredging. The project area was dredged in 2005-2006 and resulted in the deepening of some 10.24 acres of shallow littoral habitat to -12 to -14 feet MLLW. To offset the perceived loss of shallow water marine habitat function, the Port provided an equivalent acreage of newly created intertidal estuarine habitat at the Union Slough Salt Marsh Restoration site.

Indirect Effects. As with Section 4.2.2, a potential indirect long-term effect of the project action is an overall benefit from providing moorage space for local vessels. Without access to accommodating guest

docks, facilities, and boat launch, the risk of local boat users seeking informal moorage rises and, with it, the chance of improper vessel storage in undisturbed habitat. Grounded or derelict vessels and gear are often abandoned and occupy the benthic habitat and leave flakes of anti-fouling paint behind, deterring epibenthic or encrusting biota. By maintaining the existing marina, anthropogenic impacts from improperly moored vessels may be deterred.

4.4.3 Net Effects

Net effects on biota and listed salmonid habitats are expected to be insignificant or discountable (Table 4). Turbidity resulting from dredge operations will be temporary and no long-term loss of littoral habitat will occur. The loss of the benthic community as the result of dredging and sediment placement will be temporary; multiple studies of dredged areas show a relatively rapid recolonization of the community from adjacent areas.

4.5 Net Effects

The net effect of the proposed dredging action in the project action area will be to maintain overall habitat quality for ESA-listed fish, marbled murrelet, and SRKW relative to current conditions. Short-term, localized water quality degradation during dredging will not impact habitat for juvenile salmonids because of the short-term nature of the effects and because of seasonal work restrictions; thus, current water quality conditions will be maintained in the long term. Dredging will not occur in intertidal habitats, only in previously dredged subtidal areas within the existing marina footprint; hence, no conversion of valuable and natural shallow water habitat to deep water will occur for which mitigation has not already been provided as part of the original project permit.

No long-term effects from dredging are expected beyond the existing baseline condition.

4.6 Critical Habitat

As described in Section 3.3, critical habitat has been designated for Puget Sound Chinook Salmon, Puget Sound steelhead trout, and Coastal Puget Sound bull trout. Designated and proposed critical habitat for the action area includes one our more PCEs. The potential effects are summarized in Tables 5 and 6 for Chinook Salmon/steelhead trout and bull trout, respectively. The term “PCE” has been removed from critical habitat regulations and replaced with “physical or biological features (PBF)”. Critical habitat designations for ESA-listed species that occupy the project action area are designated using the older term, PCE, since there have been no updates to their critical habitats since the change in terminology.

Designated critical habitat for rockfish and SRKW is not present within the action area of the lower Snohomish River.

Table 5 – Potential Effects on Critical Habitat PCEs for Chinook Salmon/Steelhead.

Habitat	PCE	Effect from Proposed Action
Nearshore Estuarine Habitat	Free of obstruction	Avoidance behavior may occur within the action area by turbidity from dredging activities; project effects will be limited to the duration of in-water work. This will occur only during the proposed in-water work period between mid-July and mid-February. This is within the in-water work window when few, if any, juvenile Chinook Salmon and steelhead are expected to be present.
	Water quality and estuarine salinity	Short-term effects on water quality will occur related to dredging, but turbidity is expected to be limited, short-term, and localized and is not expected to result in any long-term effects. Resuspension of sediments may occur during dredging, but the project will comply with the timing restrictions specified in the in-water work window when juvenile Chinook Salmon and steelhead are not expected to be present in high numbers. It is unlikely that dredging would result in water column contaminant concentrations that would pose a risk to listed fish species, since DMMP sediment characterization results indicate that sediments are suitable for offshore disposal. Dredging activities will have no effects on the estuarine salinity ranges normally found within the lower Snohomish basin; no effects on the physiological transition between fresh and marine water will occur.
	Natural cover	Natural cover, such as large woody debris, aquatic vegetation, boulders, and side-channels are absent in the project and action areas; dredging activities will have no effect on the availability of natural cover.
	Juvenile and adult forage	The invertebrate community within the proposed dredge prism is likely suppressed because the area is an active marina. Sediments and associated invertebrates are exposed to frequent propeller scour from vessels. Dredging will temporarily disturb/remove existing epibenthic organisms and habitat from the dredge footprint, reducing juvenile forage species. However, reduction in invertebrate productivity will be temporary; the recolonization of benthic and epibenthic communities will occur quickly. Recolonization may occur at higher densities with the new dredge depths since they would be less exposed to prop wash and scour. Dredging will not occur in valuable intertidal areas and will be limited to the previously authorized footprint. Dredging activities will not adversely affect adult forage. No herring or other forage fish spawning habitat is present within the action area.

Table 6 – Potential Effects on Critical Habitat PCEs for Bull Trout.

Habitat	PCE	Effect from Proposed Action
Migration and Estuary/Marine Habitat	Physical, biological, or water quality; and foraging and habitat barriers	Short-term effects on water quality will occur related to dredging, but turbidity is expected to be temporary and localized. Resuspension of sediments may occur during in-water work, when bull trout are not expected to be present in large numbers. Additionally, if present, they would not experience substantial effects since sediments have passed DMMP criteria and are suitable for offshore open water disposal. In-water work for the project is proposed to occur from mid-July through mid-February which complies with the timing restrictions specified in the in-water work window when bull trout are not expected to be present in large numbers.
	Abundant food base	The invertebrate community within the proposed dredge prism is likely suppressed because the area is an active marina. Sediments and associated invertebrates are exposed to frequent propeller scour. Dredging will temporarily disturb/remove existing epibenthic organisms and habitat from the dredge footprint, reducing juvenile forage species. However, reduction in invertebrate productivity will be temporary; the recolonization of benthic and epibenthic communities will occur quickly. Recolonization may occur at higher densities with the new dredge depths since they would be less exposed to prop wash and scour. Dredging will not in valuable intertidal habitats and be limited to the previously authorized footprint. Dredging activities will not occur in adversely affect adult forage. No herring or other forage fish spawning habitat is present within the action area. The entire project action area is composed of marina fairways with adjacent impervious parking areas and overwater structures. No riparian habitat is present within the project action area to contribute terrestrial prey.
	Habitat features	Ecologically valuable habitat features are absent in the dredge area; no effect will occur.
	Water temperatures	Dredging activities will have no effect on ambient water temperatures.
	Water quantity and non-native species	Dredging will have no effect on water quantities, volumes, or current patterns within the lower river. No non-native species are present that could compete or interbreed with bull trout.

4.6.1 Summary of Potential Effects on Critical Habitat

Based on the analyses provided above, and in the BE, it can be seen that the proposed project has the potential to affect only one of the six PCEs for Chinook Salmon and steelhead: estuarine habitat. As many as six of the nine PCEs for bull trout may be affected (Sections 3.3.1 and 3.3.2).

The analyses provided in Tables 5 and 6 lead to the conclusion that the proposed project will result in no net degradation of these PCEs; therefore, existing critical habitat for Chinook Salmon, steelhead, and bull trout will remain fully functional to serve the conservation needs of the species.

4.7 Essential Fish Habitat

4.7.1 Adverse Effects on EFH for Groundfish

Dredging activities will result in localized increases in turbidity that will not persist beyond the dredging season of mid-July through mid-February. Dredging may displace bottom dwelling groundfish from the dredge footprint, but this will be temporary. The quality of groundfish EFH is likely to be quite marginal within the marina with all of the active vessel traffic. DMMP sediment characterization also indicates that dredge materials are suitable for offshore open water disposal, so no exposure to contaminated sediments will occur. The removal of sediments within the marina basin will have insignificant effects on EFH for groundfish species.

The proposed dredge prism will be at -14 feet MLLW; therefore, preserving valuable littoral habitats within the project action area.

It is expected that most all benthic invertebrates within the proposed dredge prism will be eliminated by dredging, removing a potential prey source for groundfish. However, multiple studies in Puget Sound indicate that this will be temporary, and the recolonization of the benthic community will be rapid. (see Section 4.4). The baseline invertebrate community in the area to be dredged is also likely degraded by propeller scour from active marina traffic in the proposed dredge prism. Recolonization would be expected to result in higher prey densities with the new dredge depths since they would be less exposed to propeller wash and scour.

4.7.2 Adverse Effects on EFH for Salmonids and Coastal Pelagic Species

Dredging activities will result in localized increases in turbidity that will not persist beyond the dredging season of mid-July through mid-February. All dredging will also take place during agency-approved work windows when few juvenile salmon are expected to be present and potentially displaced from EFH.

It is expected that most all epibenthic invertebrates that form the base of juvenile salmon prey resources will be eliminated within the previously authorized dredge footprint. Multiple studies in Puget Sound indicate that this will be temporary, and the recolonization of the community will be rapid (see Section 4.4). This temporary loss of epibenthic production at the project site has been permanently offset by similar or greater epibenthic production at the Port's Union Slough Salt Marsh restoration site.

DMMP sediment characterization indicates that dredge materials are suitable for offshore open water disposal, so no exposure to contaminated sediments will occur.

4.8 Cumulative Effects and Interdependent and Interrelated Actions

Interrelated actions are those "that are part of a larger action and depend on the larger action for their justification". Interdependent actions are defined as those "with no independent utility apart from the proposed action". Cumulative impacts as defined by rule "are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation" (50 CFR § 402.02). No interrelated or interdependent actions have been identified. Cumulative effects within the action area include the additional efforts performed by the Port that are intended to improve habitat conditions. These include:

- Restriction of log raft storage areas along the southeast (Snohomish River) shoreline of Jetty Island (1994 to 1996).
- Removal of unnecessary pilings along the Jetty Island shoreline downstream of the dock (2004).
- Construction of the Jetty Island berm (1990) that created a productive 15-acre embayment, including nearly 2 acres of fringing marsh.
- Multiple beneficial placements of dredged materials on the west side of Jetty Island to maintain the berm and embayment, extend the island shoreline to the south, offset erosion on the west side of the island, increase the amount of wetland marsh habitats.
- Upgrading of containment and treatment of runoff from maintenance areas.
- Upgrading of water quality treatment of stormwater runoff from parking areas.
- Programs to educate marina users regarding proper means of disposal of liquid and solid wastes.
- Facilities to encourage marina users to reduce and properly dispose of liquid and solid wastes.
- Use of concrete materials in construction or repair of Port facilities, such as Pacific Terminal, the new transient moorage in the southeast corner of the marina, the 10th Street boat launch, and the Jetty Island Dock facility.
- Sediment cleanup and construction of the Pacific Terminal (completed in 1997).
- Replacement of damaged treated wood fender piles with steel at several marine terminal berths (ongoing).
- Construction of a new marina in the 12th Street Waterway that resulted in a loss of shallow water habitat (through the deepening of approximately 10.24 acres of existing degraded littoral habitat). This loss has been offset by creation of 10.24 new acres of littoral habitat in the expanded Union Slough Restoration Site.

- 14th Street (North Marina) Bulkhead Rebuild. The existing bulkhead along the north shore of the North Marina was replaced under a separate permitting action resulting in a net loss of approximately 0.3 acre of shallow (albeit shaded) marine habitat above approximate elevation +6 feet MLLW. The Port has mitigated for this loss at the Union Slough Restoration Site.
- Puget Sound Initiative Cleanups at Baywood, Everett Shipyard, and several upland sites along the waterfront have systematically removed potential sources of toxicant release to marine waters (ongoing).
- Ongoing cleanup of contaminated sediments at the Mill A Site between South and Pacific Terminals.
- North Marina Uplands Redevelopment. The North Marina Master Plan calls for redevelopment of properties on the uplands between the existing North Marina and the 12th Street Waterway into a coordinated mix use development. Any changes to marine shorelines that result from that redevelopment will be the subject of separate permitting actions.
- Shoreline cleanup and regrading along the southern shoreline of the Riverside Industrial Park.
- Continued shoreline cleanup and habitat restoration at the Bay Wood property at Preston Point (in progress).
- Transforming the former Kimberly-Clark mill site into "Norton Terminal" after cleaning and decommissioning exposed shoreline pipes, disposing of 12,000 tons of contaminated soils, and removing 180,000 to 200,000 tons of crushed material.
- Creating the Environmental Compliance Assessment Program to minimize environmental impacts by the Port and its tenants.

The Port is also preparing to initiate final phase of cleanup in the northeast Waterfront Place at the former Ameron-Hulbert manufacturing site. Work is anticipated to begin in early 2021.

4.9 Take Analysis

Section 3 of the ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct." The USFWS further defines harm as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavior patterns such as breeding, feeding, or sheltering." Harass is defined as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding or sheltering."

Therefore, the proposed action is not expected to result in the taking of Chinook Salmon, steelhead trout, bull trout, Bocaccio, Yelloweye Rockfish, marbled murrelet, SRKW, Pacific Eulachon, Green Sturgeon, humpback whale, Oregon spotted frog, or the four species of sea turtles.

5.0 DETERMINATION OF EFFECT

NMFS/USFWS guidelines for the preparation of BEs state that a conclusion of "may affect but is not likely to adversely affect" is the "…appropriate conclusion when the effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant. Beneficial effects have contemporaneous positive

effects without any adverse effects…." Insignificant effects, in the NMFS/USFWS definition, "relate to the size of the impacts and should never reach the size where take occurs…[One would not expect to]…be able to meaningfully measure, detect, or evaluate insignificant effects." Based on the analyses in this BE, the expected nature and level of the impacts of the proposed project follow.

5.1 Salmonids

Minor and temporary habitat disturbances in the form of increased turbidity during dredging and disposal activities will occur during a brief time period; all of which will occur after the bull trout and juvenile salmon outmigratory period. Loss of epibenthic prey will be temporary and has been previously offset. No long-term loss of intertidal or littoral habitat will occur. For these reasons, the project actions ***may affect, but is not likely to adversely affect*** juvenile Chinook Salmon, steelhead trout, or bull trout.

5.2 Southern Resident Killer Whale

Minor and temporary waterborne noises and turbidity may occur, all of which will be limited to the lower Snohomish River where SRKW are not expected to occur. For these reasons, the project action ***may affect, but is not likely to adversely affect*** SRKW.

5.3 Pacific Eulachon

Pacific Eulachon are anadromous fish that spawn in freshwater streams but are not documented in the Snohomish River channel or in Port Gardner. The conclusion of this BE is that the proposed dredging and sediment placement will have ***no effect*** on Pacific Eulachon.

5.4 Green Sturgeon

Green Sturgeon are documented along the Washington coast and Straits of Juan de Fuca, but are rarely seen east of Port Townsend, and are unlikely to enter the in-water action area. The conclusion of this BE is that the proposed dredging and sediment placement will have ***no effect*** on Green Sturgeon.

5.5 Georgia Basin Rockfish

Suitable rockfish habitat for either juveniles or adults does not occur in the action area. Rockfish are not known to occupy the action area. For these reasons, the project action will have ***no effect*** on Bocaccio and Yelloweye Rockfish.

5.6 Marbled Murrelets

Dredging will cause only minor increases in waterborne noise and will be limited to the lower Snohomish River, removed from areas of occasional use by marbled murrelets. Thus, the project action ***may affect, but is not likely to adversely affect*** marbled murrelets.

5.7 Essential Fish Habitat

Dredging will cause minor, short-term increases in turbidity and physical displacement of EFH species. No long-term loss of shallow littoral or intertidal habitats will occur. This project will have ***no adverse effect*** to groundfish, salmon, and coastal pelagic EFH.

5.8 Critical Habitat

Water quality, benthic and epibenthic forage for salmonid critical habitat will be temporarily degraded by the project. However, dredging will result in only temporary increases in turbidity and no loss of valuable shallow water habitats. The analyses provided above lead to the conclusion that dredging will result in no net degradation of the PCEs for Chinook Salmon, steelhead, and bull trout; therefore, existing critical habitat will remain fully functional to serve the conservation needs of the species. Therefore, the project action ***may affect, but is not likely to adversely affect*** critical habitat for Chinook Salmon, steelhead trout, and bull trout.

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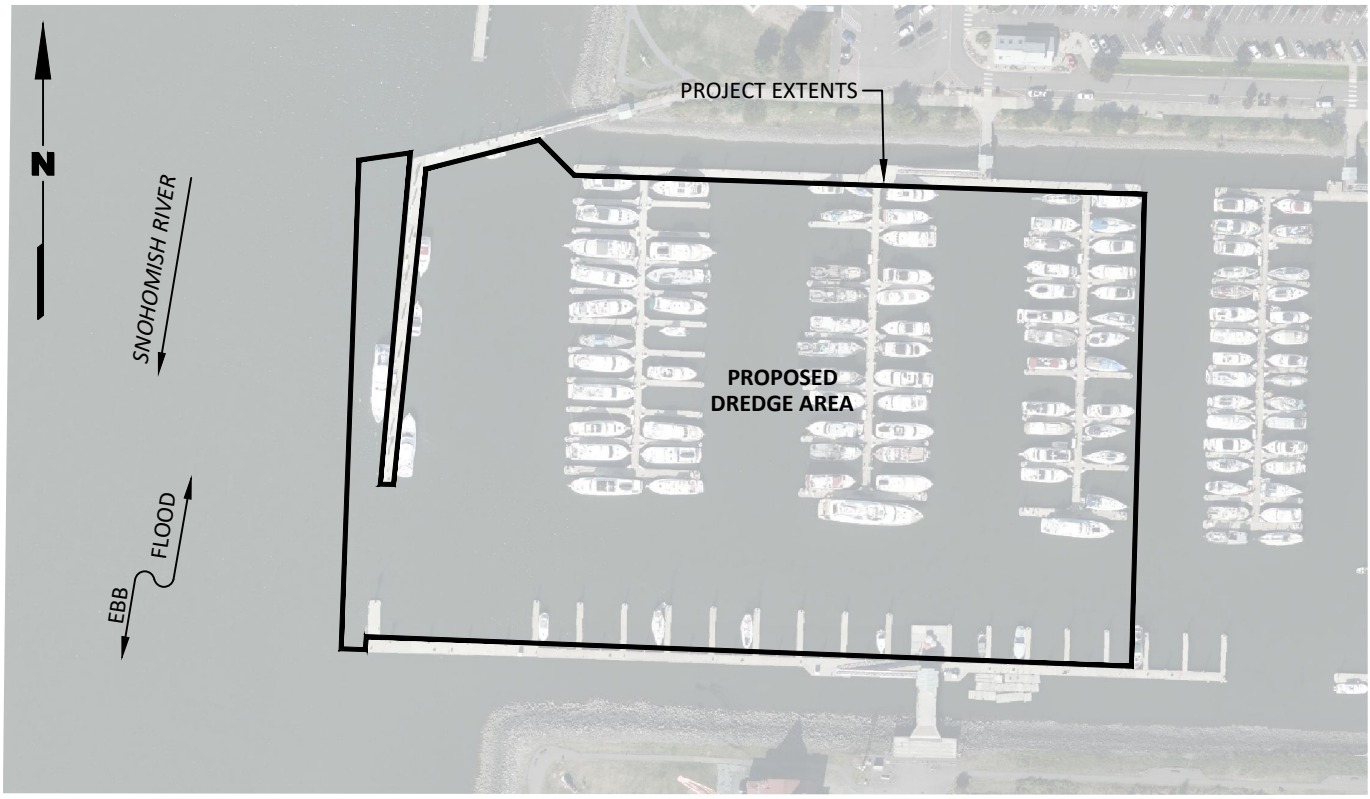
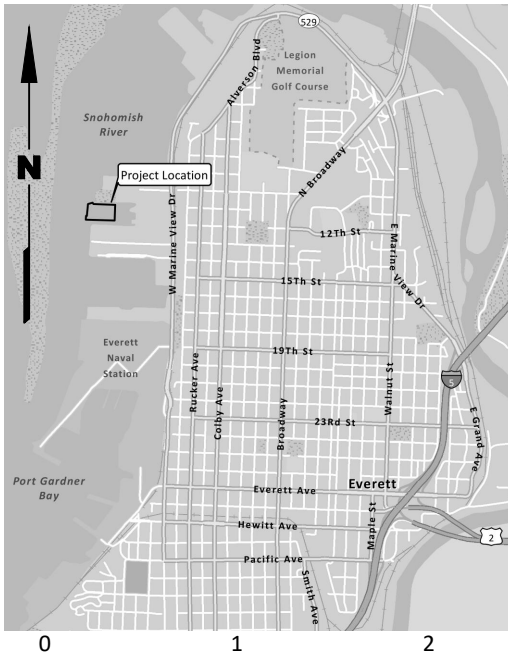
SHEETS





0 1 2

Scale in Miles

0 200 400

Scale in Feet

VERTICAL DATUM:

ELEVATION DATUM FOR THIS PROJECT IS 0.0' MEAN LOWER LOW WATER (MLLW)

BASED ON NOAA'S PUBLICATION SHEET (WASHINGTON 944-7659), DATED 05-27-2003, THE RELATIONSHIP BETWEEN NGVD 29 AND MLLW DATUM FOR EVERETT, POSSESSION SOUND, FOR THE TIDAL EPOCH 1983-2001 IS AS FOLLOWS:

MEAN HIGHER HIGH WATER (MHHW) = +11.09
MEAN HIGH WATER (MHW) = +10.21
MEAN LOW WATER (MLW) = +2.80
NAVD 1988 = +2.03
MEAN LOWER LOW WATER (MLLW) = 0.0
EXTREME LOW WATER = -4.5

PURPOSE:
MARINA MAINTENANCE DREDGING

DATUM: MLLW= 0.0'

TOWNSHIP/RANGE: SEC 18 TWP 29N RGE 5E

ADJACENT PROPERTY OWNERS:

1. WASHINGTON DEPARTMENT OF NATURAL RESOURCES

PORT OF EVERETT

NORTH MARINA
MAINTENANCE DREDGING

PORT OF EVERETT
1205 CRAFTSMAN WAY, SUITE 200
EVERETT, WASHINGTON 98021

PROJECT VICINITY

IN: PORT OF EVERETT NORTH MARINA, PORT GARDNER; ADJACENT TO THE SNOHOMISH RIVER CHANNEL

AT: PORT OF EVERETT

COUNTY OF: SNOHOMISH

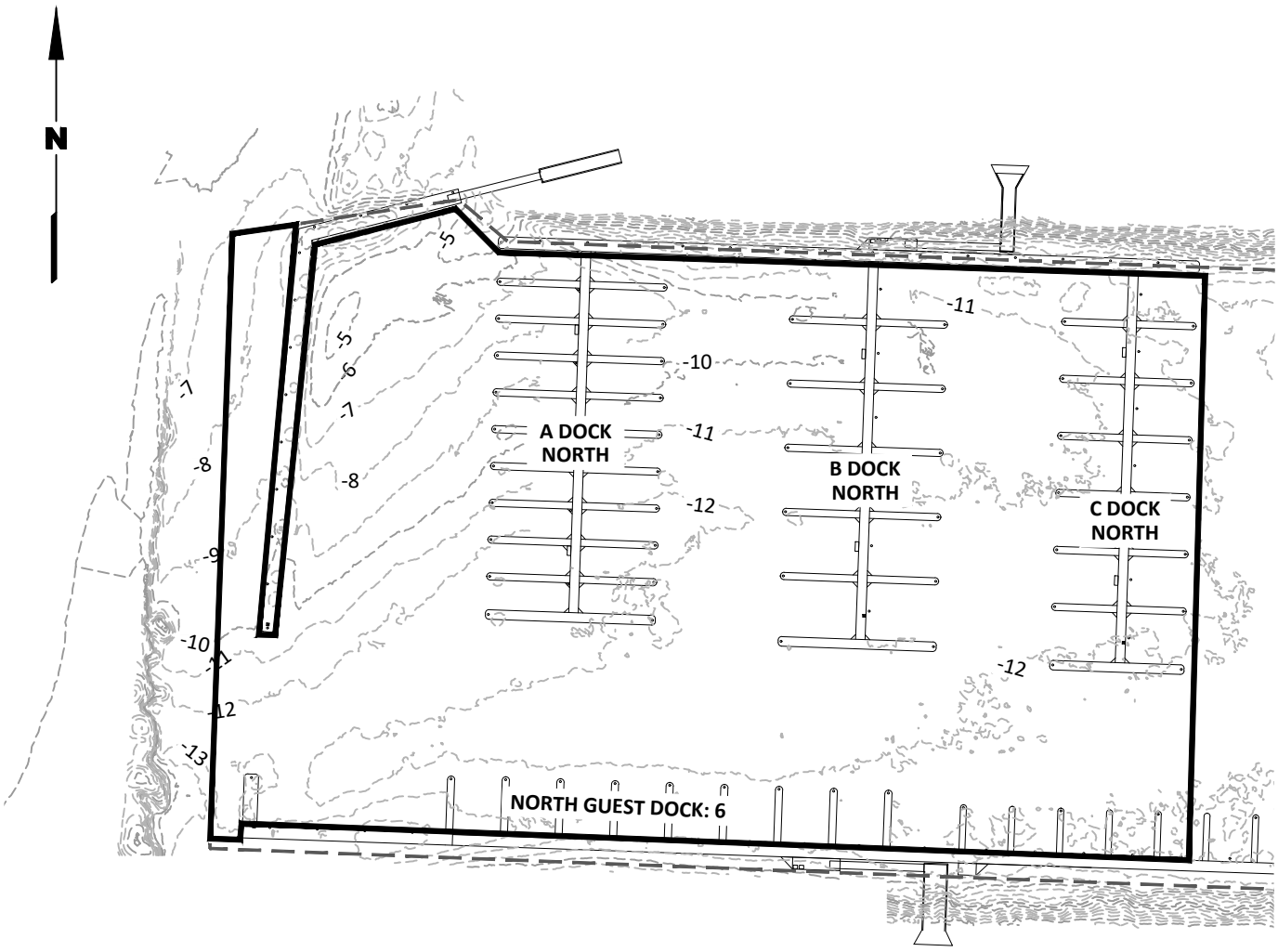
STATE OF: WASHINGTON

APPLICATION BY: PORT OF EVERETT

DATE: MAY 2021

SHEET: 1 OF 7

G:\PROJECTS\1921\001\020 NORTH MARINA\JARPA\J COVER.DWG | 5/5/2021 2:38 PM | ---



NOTES:

1. PRIOR TO DREDGING, VESSELS WILL BE REMOVED FROM AREA. VESSELS WILL BE RETURNED AFTER DREDGING IS COMPLETE.
2. EXISTING BATHYMETRIC SURVEY WAS COMPLETED BY PACIFIC GEOMATIC SERVICES, INC., AND OCCURRED ON JUNE 3RD AND SEPTEMBER 30TH, 2020
3. HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83). STATE PLANE COORDINATE SYSTEM (SPCS). WASHINGTON NORTH ZONE.

LEGEND

- DREDGING LIMIT
- LIMITS OF PREVIOUS DREDGING (2005)
- EXISTING BATHYMETRIC CONTOUR
- FLOATING DOCK

0 150 300

Scale in Feet

PURPOSE:
MARINA MAINTENANCE DREDGING

DATUM: MLLW= 0.0'

TOWNSHIP/RANGE: SEC 18 TWP 29N RGE 5E

ADJACENT PROPERTY OWNERS:

1. WASHINGTON DEPARTMENT OF NATURAL RESOURCES

PORT OF EVERETT

NORTH MARINA MAINTENANCE DREDGING

PORT OF EVERETT
1205 CRAFTSMAN WAY, SUITE 200
EVERETT, WASHINGTON 98021

EXISTING CONDITIONS

IN: PORT OF EVERETT NORTH MARINA, PORT GARDNER; ADJACENT TO THE SNOHOMISH RIVER CHANNEL

AT: PORT OF EVERETT

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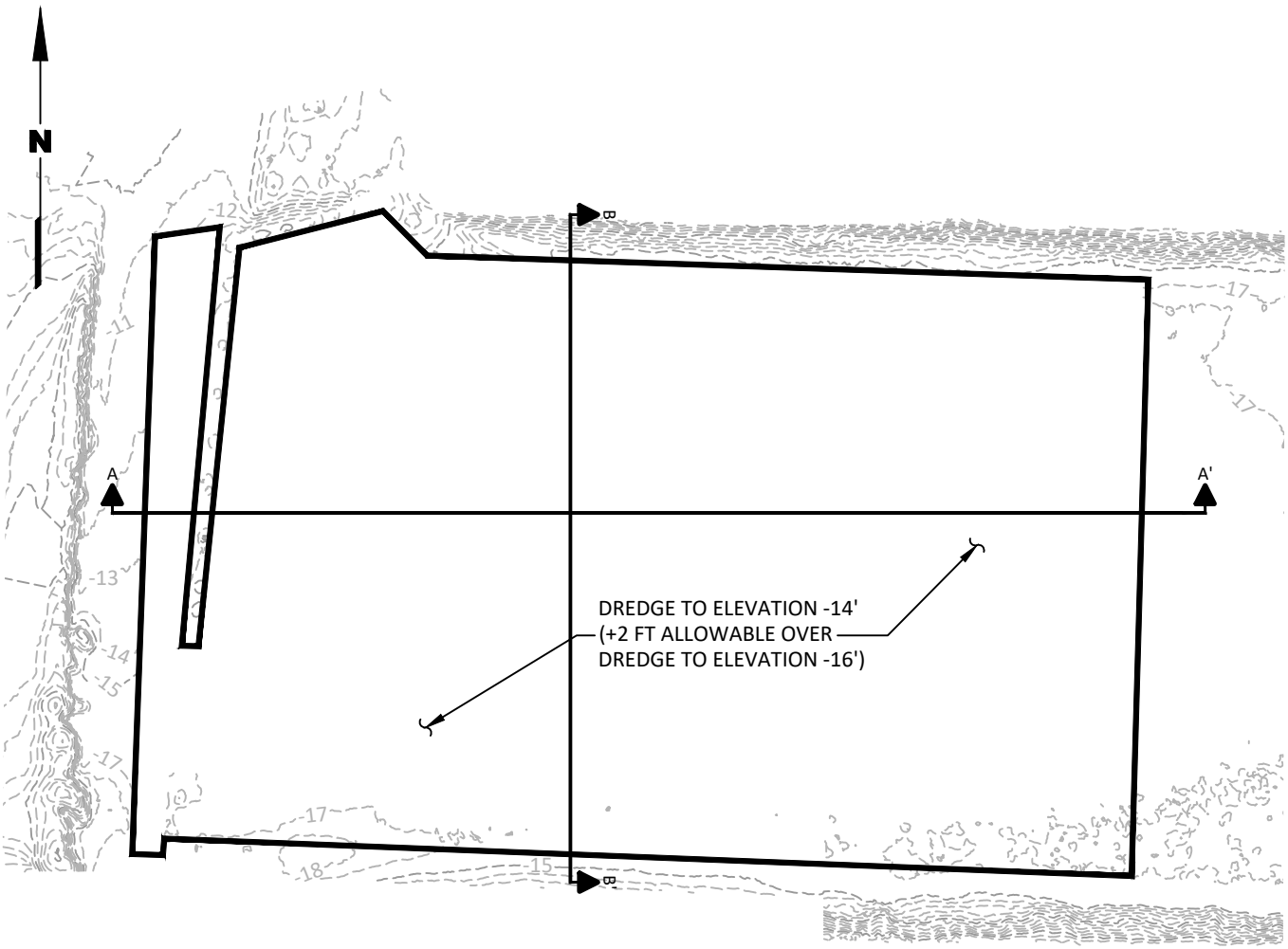
STATE OF: WASHINGTON

APPLICATION BY: PORT OF EVERETT

DATE: MAY 2021

SHEET: 2 OF 7

G:\PROJECTS\1921\001\020 NORTH MARINA\JARPA\J EXISTING.DWG | 5/5/2021 2:38 PM | ---



0 150 300

Scale in Feet

LEGEND

DREDGING LIMIT (1/6)

EXISTING BATHYMETRIC CONTOUR

A A' CROSS-SECTION

TOTAL DREDGE AREA = 400,520 SQUARE FEET
TOTAL DREDGE VOLUME = 103,675 CUBIC YARDS

PURPOSE:
MARINA MAINTENANCE DREDGING

DATUM: MLLW= 0.0'

TOWNSHIP/RANGE: SEC 18 TWP 29N RGE 5E

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PROPOSED DREDGING

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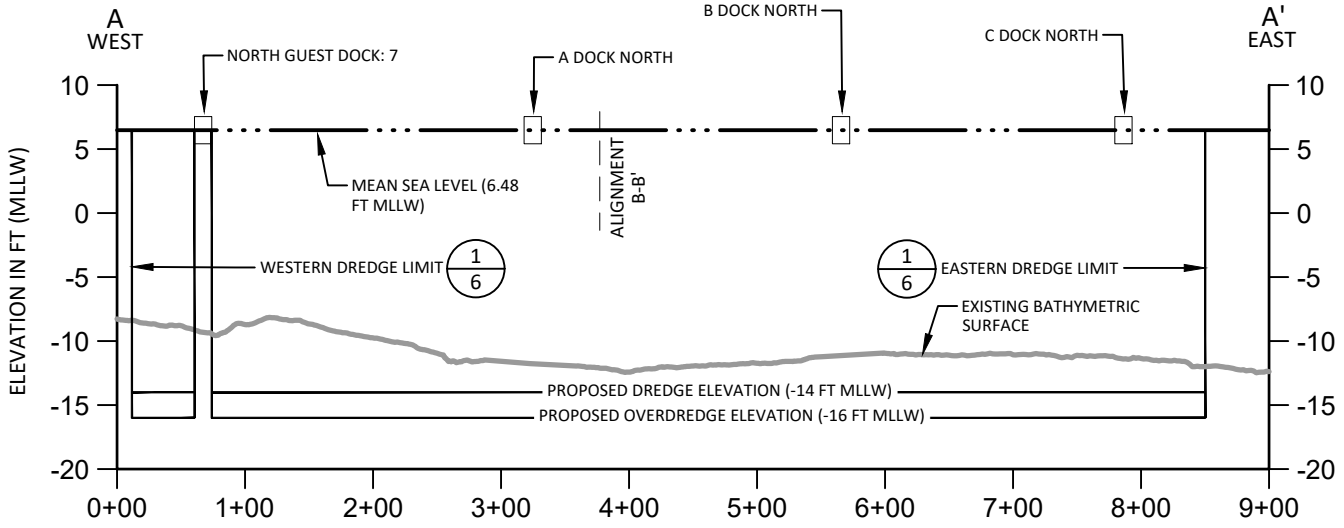
STATE OF: WASHINGTON

APPLICATION BY: PORT OF EVERETT

DATE: MAY 2021

SHEET: 3 OF 7

G:\PROJECTS\1921\001\020 NORTH MARINA\JARPA\J PROP DREDGE.DWG | 5/5/2021 2:38 PM | ---



Profile View: Alignment A-A'

Horizontal Scale in Feet: 1"=150'
Vertical Scale in Feet: 1" = 15'

PURPOSE:
MARINA MAINTENANCE DREDGING

DATUM: MLLW= 0.0'

TOWNSHIP/RANGE: SEC 18 TWP 29N RGE 5E

ADJACENT PROPERTY OWNERS:

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PORT OF EVERETT

NORTH MARINA MAINTENANCE DREDGING

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CROSS SECTION A-A'

IN: PORT OF EVERETT NORTH MARINA, PORT GARDNER; ADJACENT TO THE SNOHOMISH RIVER CHANNEL

AT: PORT OF EVERETT

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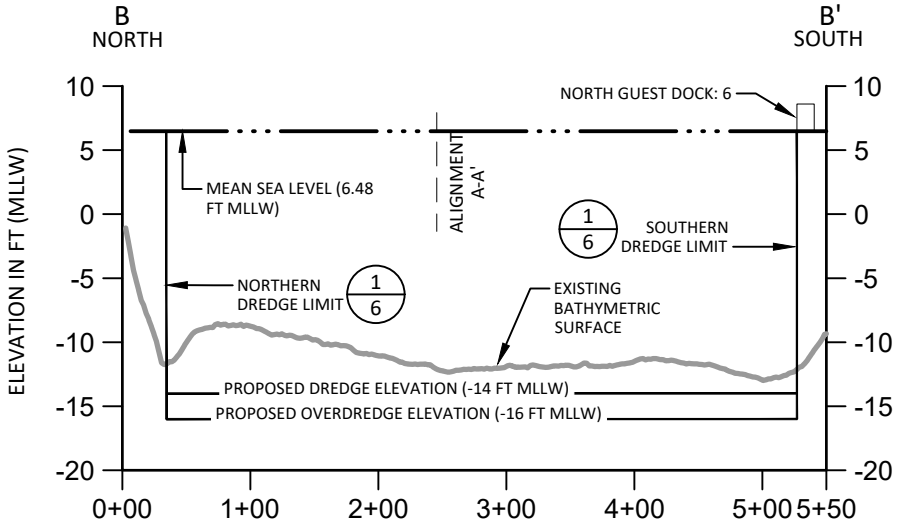
STATE OF: WASHINGTON

APPLICATION BY: PORT OF EVERETT

DATE: MAY 2021

SHEET: 4 OF 7

G:\PROJECTS\1921\001\020 NORTH MARINA\JARPA\J PROP DREDGE.DWG | 5/5/2021 2:38 PM | ---



Profile View: Alignment B-B'

Horizontal Scale in Feet: 1"=150'
Vertical Scale in Feet: 1" = 15'

PURPOSE:
MARINA MAINTENANCE DREDGING

DATUM: MLLW= 0.0'

TOWNSHIP/RANGE: SEC 18 TWP 29N RGE 5E

ADJACENT PROPERTY OWNERS:

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CROSS SECTION B-B'

IN: PORT OF EVERETT NORTH MARINA, PORT GARDNER; ADJACENT TO THE SNOHOMISH RIVER CHANNEL

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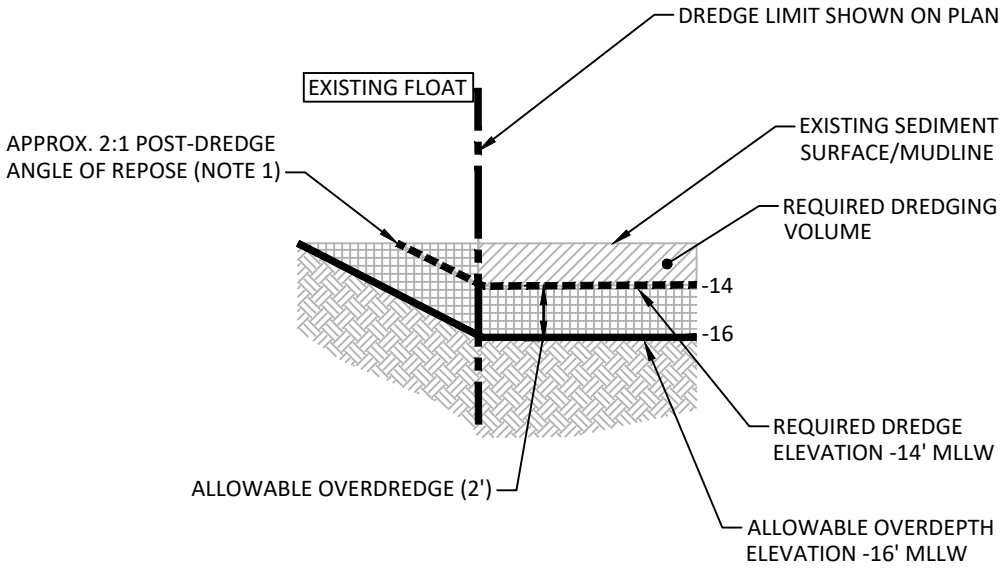

1/3 TYPICAL DREDGE DETAIL
NO SCALE

NOTE

1. ALTHOUGH NO DREDGING WILL OCCUR BEYOND LIMIT SHOWN ON PLAN, NATURAL SLOUGHING OF MATERIAL MAY OCCUR AS SHOWN. DREDGE VOLUME CALCULATIONS INCLUDE AN ALLOWANCE FOR REMOVAL OF SLOUGHED MATERIAL.

PURPOSE:
MARINA MAINTENANCE DREDGING

DATUM: MLLW= 0.0'

TOWNSHIP/RANGE: SEC 18 TWP 29N RGE 5E

ADJACENT PROPERTY OWNERS:

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PROPOSED DREDGING DETAIL

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APPLICATION BY: PORT OF EVERETT

DATE: MAY 2021

SHEET: 6 OF 7

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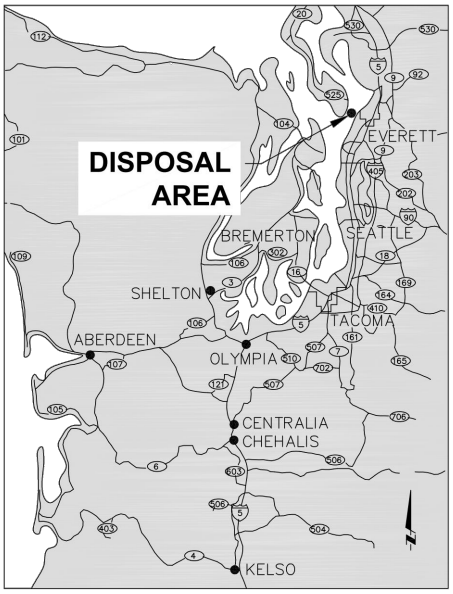
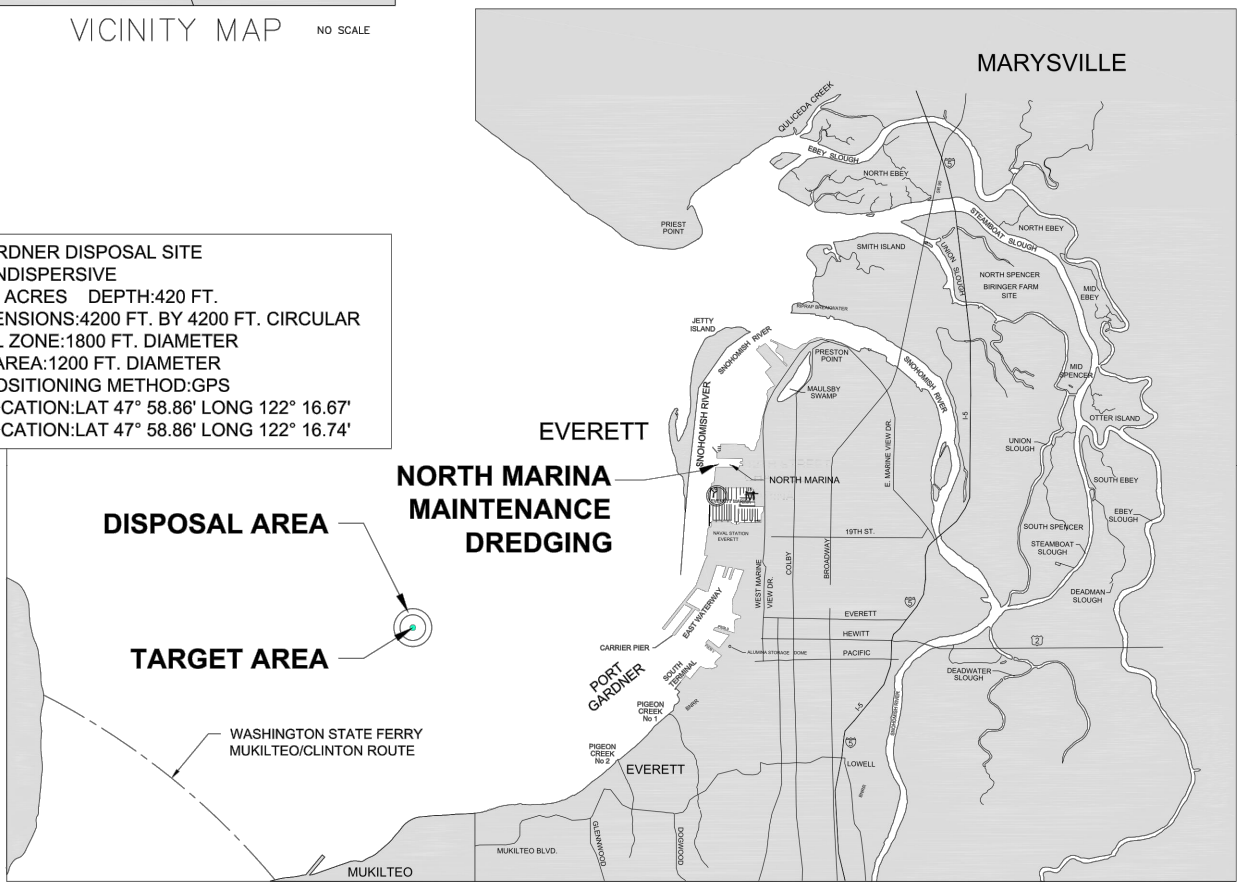


VICINITY MAP NO SCALE

Note

1. REPRINTED FROM PORT OF EVERETT MARINA MAINTENANCE DREDGING PHASE I RECORD DRAWING PLAN SET BY DALTON, OLMSTED & FUGLEVAND, INC. DATED APRIL 30, 2012

PORT GARDNER DISPOSAL SITE
TYPE:NONDISPERSIVE
AREA:318 ACRES DEPTH:420 FT.
SITE DIMENSIONS:4200 FT. BY 4200 FT. CIRCULAR
DISPOSAL ZONE:1800 FT. DIAMETER
TARGET AREA:1200 FT. DIAMETER
BARGE POSITIONING METHOD:GPS
NAD27 LOCATION:LAT 47° 58.86' LONG 122° 16.67'
NAD83 LOCATION:LAT 47° 58.86' LONG 122° 16.74'



VICINITY MAP NO SCALE

PURPOSE:
MARINA MAINTENANCE DREDGING

DATUM: MLLW= 0.0'

TOWNSHIP/RANGE: SEC 18 TWP 29N RGE 5E

ADJACENT PROPERTY OWNERS:

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PORT OF EVERETT

NORTH MARINA MAINTENANCE DREDGING

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OPEN WATER DISPOSAL SITE

IN: PORT OF EVERETT NORTH MARINA, PORT GARDNER; ADJACENT TO THE SNOHOMISH RIVER CHANNEL

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STATE OF: WASHINGTON

APPLICATION BY: PORT OF EVERETT

DATE: MAY 2021

SHEET: 7 OF 7

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