

NO NET LOSS AND FLOODPLAIN HABITAT ASSESSMENT REPORT

Manlowe Bulkhead Replacement Project



Prepared for

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1.0 INTRODUCTION

This report includes a combined analysis to address several permitting requirements. The City of Bainbridge Island and the Washington Department of Ecology require preparation of a floodplain habitat assessment for shoreline bulkhead reconstruction or modification. The City of Bainbridge Island also requires a No Net Loss Report. This report was prepared to satisfy both of these requirements.

This document follows Floodplain Habitat Assessment and Mitigation Regional Guidance (2013) to meet the requirements and criteria of the Endangered Species Act (ESA) as clarified in the Biological Opinion issued by the National Marine Fisheries Service (NMFS) on September 22, 2008. It also follows the City of Bainbridge Island Guidance for a Site Specific Analysis (2015) to meet the City of Bainbridge Island No Net Loss Standard (Bainbridge Island Municipal Code § 16.12.030(B)(2)). This No Net Loss and Floodplain Habitat Assessment Report describes the project area, project area's habitat, assess potential impacts and proposes mitigation. The analyses provided in this report demonstrate that the proposed project will not result in significant adverse effects or a net loss to the shoreline ecosystem functions at the project location. In fact, the project, as proposed, would result in a net increase of upper intertidal beach habitat relative to existing conditions.

The proposed Manlowe Replacement Bulkhead Project is located at 10750 NE Broomgerrie Rd, Bainbridge Island, Washington 98110. The subject property is approximately 0.25 acres (approx. 10,890 sq. ft.) and includes 115 linear feet of shoreline along the western shoreline of Murden Cove. The shoreline along both the project parcel and the general vicinity is heavily disturbed. The existing upland vegetation on the project site is composed predominantly of artificial turf and ornamental plant species at the top of the bluff with a mix of native and invasive vegetation on the bluff. Native vegetation includes thimbleberry, ferns, and some creeping blackberry. Invasive species include blackberry, morning glory, a large scotch broom, and English ivy. There are two existing paths that lead from the top of the bluff to the top of the bulkhead. Beach access stairs inset in the rock bulkhead currently allow access to the beach. The existing bulkhead is required to protect the residential structure located on the parcel.

The entire shoreline on the property is stabilized by an existing bulkhead, which was built over 50 years ago to protect the property and associated residence. Most of the shoreline is protected by an approximately 100-foot long deteriorating rock bulkhead that transitions to an approximately 10-foot long treated-wood bulkhead on the north end of the property. This section of treated-wood bulkhead connects to a concrete bulkhead that protects approximately 5 feet of the Manlowe property's shoreline and extends across to the neighboring property to the north. The south end of the bulkhead is contiguous with the neighboring rock bulkhead that protects the adjacent property to the south. The existing rock bulkhead recently sustained significant damage due to unanticipated conditions and is in a state of accelerating failure. While general bulkhead deterioration from age was anticipated, the rate and degree of the recent failure and deterioration were unanticipated. The purpose of this project is to replace the existing, damaged bulkhead with an angular rock bulkhead before the existing structure collapses from wave- and tidal-driven scour and undermining. The geotechnical engineer determined that collapse of the bulkhead would most certainly cause progressive failure of the high bank slope behind the bulkhead and would likely result in significant impacts to the upland residence, creating an immediate and imminent threat to the property and the upland residential home (Earth Solutions NW, LLC, 2019). The structural engineer determined that a progressive failure of the existing rock bulkhead is presently occurring, and that failure of

large sections of the bulkhead is possible during this current winter storm season, and agrees with the geotechnical engineer that bulkhead failure is imminent (Ellisport Engineering, Inc., 2019).

During the initial site visit performed on May 30, 2019, the beach waterward of the existing bulkhead was observed to consist of sand, shell hash, gravel, and cobble with some small boulders in the lower intertidal. By December 19, 2019, the structural engineer reported that the beach elevation had dropped by approximately 2-feet, observing a beach composition of gravel and cobble with much less sand than observed previously. As of March 2020, all sand has been eroded from the upper intertidal elevation adjacent to the existing bulkhead, where a cobble surface remains (see cover page image). There is also a large amount of angular stone on the upper portion of the beach adjacent to the bulkhead from recent damage to the bulkhead. Below OHW, attached green algae and apparent fringe eelgrass was observed in the lower intertidal area (+3.35 and -15.78 ft MLLW) at the time of the May 2019 site visit, and eelgrass beds have been reported out in deeper subtidal areas (approximately 165 ft from the project boundary, as reported by DNR's eelgrass mapping application). The eelgrass beds are reported outside the project area and deeper than would be affected by barge transit and observations. No wetland (attached, vascular) vegetation was observed at or adjacent to the project site. There was no large woody material present at any of the times site visits were performed.

The shoreline adjacent to the project site is high bank (approximately 30 feet tall) and composed of Harstine gravelly ashy sandy loam, 15 to 30 percent slopes, soils. The soils at and adjacent to the project site are identified as unstable-old slide by the Washington Department of Ecology's Coastal Atlas. The geotechnical engineer identified indicators of unstable soils on the project site, including several dislodged large boulders from the bulkhead and localized areas of downset on the bluff.

The Manlowe family reported in March 2020 that the bulkhead has "dropped" and "pulled away from the land further" and that shrubs and bushes on the bluff now "lean and drop further" than recent prior conditions. To protect the existing upland home from the imminent threat of slope failure predicted by the geotechnical engineer that would be triggered by the rapid and catastrophic failure of the existing bulkhead predicted by the structural engineer, the proposed project will replace the existing, rapidly deteriorating bulkhead with an angular rock bulkhead before the existing structure collapses from wave- and tidal-driven scour and undermining and further stabilize the steep bluff by improving the pathways and vegetation on the slope. A planting candidate list consistent with the City of Bainbridge Shoreline Master Program (SMP) marine buffer requirements was prepared by a licensed landscape architect for upland work. The plantings will include salt-spray tolerant native shrub, trees, and groundcovers to improve buffer function and help prevent soil erosion. When complete, the replacement bulkhead will continue to protect the toe of the marine shoreline in a similar fashion as the original bulkhead. If built as designed, the proposed replacement bulkhead configuration will result in a net increase in intertidal habitat due to a net landward setback of the replacement bulkhead relative to the existing footprint.

1.1 Project Description

What: Manlowe Replacement Bulkhead Project

Where: 10750 NE Broomgerrie Rd
Bainbridge Island, WA 98110
Township 25, Range 2E, Section 23 SE ¼
47.64110117° N lat. / -122.50442073° W long.
Riparian Buffer Zone 1 and Zone 2.

When: Construction will begin as soon as permits are obtained and work is authorized. The project is expected to take 3-4 weeks to complete.

Who: Sound Bulkhead, Inc. is the contractor selected by the project proponent to build the project.

How: Equipment and material will be brought in by barge. The replacement bulkhead will be built in segments that can be completed while the project area is in the dry. Large rocks for bulkhead construction will be staged on the beach to minimize the construction timeline and associated short term impacts. All other materials will be staged on the barge on in the upland section of the property. No soils that contain clays or fine materials will be placed below OHW. Any existing LWM will be temporarily stockpiled and placed back in their previous general location once the bulkhead is replaced. Clearing of vegetation will be minimal and will mostly include non-native and invasive species. Bulkhead construction will begin with removal of the existing bulkhead material. Unstable soils will be removed in order to embed large bulkhead toe rock a minimum of 2 feet below grade on a stable footing in suitable material. Suitable soil excavated for placement of the toe rock that contains native coarse sand and gravels will be replaced on the beach, as allowed by WDFW. The remainder of the replacement bulkhead will be stacked/placed according to the engineered project plans. Equipment used for the upland bluff stabilization measures will be operated from the uplands or from the base of the bluff. Most landscaping work is expected to occur from the uplands using small equipment. If required, ramps placed on a small (30-foot x 60-foot) platform barge will be used to elevate a long-reach excavator for some upland landscaping work. Geotextile, coir fabric, or other stabilization BMPs implemented by the contractor will be used, as necessary, to stabilize the bank and prevent erosion. Once bulkhead replacement and upland landscaping is complete, beach nourishment material will be placed according to Washington Department of Fish and Wildlife specifications. After completion of work, man-made debris will be removed from the beach.

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2.0 PROJECT AREA

2.1 Project Location

The proposed project is located at 10750 NE Broomgerrie Rd, Kitsap County, Washington. The site is located in the SE quarter of Township 25, Range 2E, Section 23, W.M. and includes the shoreline adjacent to Kitsap County Tax Parcel 4199-000-007-0501. The project area is located in Water Resource Inventory Area (WRIA) 15 Kitsap watershed.

Access to the site from the Bainbridge Ferry Terminal, continue straight onto WA-305 N/Olympic Dr SE. Turn right onto High School Rd NE. Turn left onto Ferncliff Ave NE. Turn right onto Byron Dr. Turn left onto Grand Ave NE. Turn right onto Broomgerrie Rd.

2.2 Project Area Description

The project or “Action Area” consists of one (1) private residential property located along the western shoreline of Murden Cove (Figure 1). The upland portion of the property is comprised of a single-family residence; a detached carport; a driveway; stone and concrete paver steps, trails, rockeries and treated-wood retaining walls, and wood steps on the bluff above the existing bulkhead; drain pipes; a septic system; and a well. The shoreline of the parcel is armored with a damaged marine basalt bulkhead with concrete stairs, a small section of treated-wood bulkhead capped with a concrete rim, and a concrete bulkhead that adjoins the treated-wood bulkhead near the northern property line.

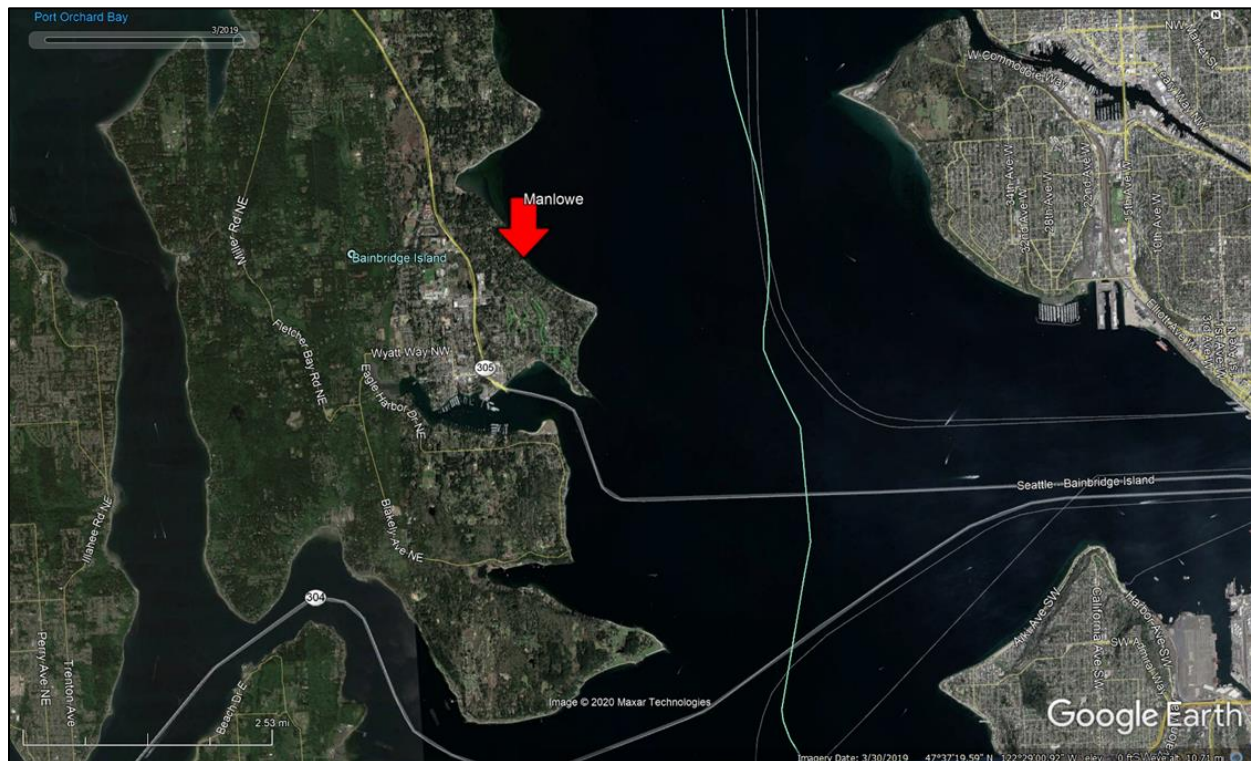


Figure 1. Vicinity map identifying the Manlowe Replacement Bulkhead Project site's location (red arrow).

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3.0 PROJECT AREA'S HABITAT

3.1 Background Research

3.1.1 Primary Data Source and Supporting Information

1. City of Bainbridge Island GIS (<https://cityofbi.maps.arcgis.com/home/index.html>)
2. Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) data for the property and adjacent areas (<http://apps.wdfw.wa.gov/phsontheweb/>)
3. WDFW SalmonScape data for property and adjacent areas (<http://apps.wdfw.wa.gov/salmonscape/map.html>)
4. Washington Natural Heritage Program (WNHP) data for sensitive or State- or ESA-listed plant species on the property and adjacent areas
5. Washington Department of Ecology (WDOE) Coastal Atlas data for the property and adjacent areas (WDOE <https://fortress.wa.gov/ecy/coastalatlas2001/viewer.htm>)
6. Aerial photograph and topographic map of the site
7. National Marine Fisheries Service critical habitat maps (www.nmfs.noaa.gov/species/criticalhabitat.htm)
8. US Fish and Wildlife Service critical area maps (<http://criticalhabitat.fws.gov/>)
9. US Fish and Wildlife Service National Wetland Inventory maps (www.fws.gov/wetlands/)
10. US Fish and Wildlife Service habitat recovery plans (www.fws.gov/pacific)
11. National Marine Fisheries Service habitat recovery plans (www.nwr.noaa.gov)
12. US Department of Agriculture, Natural Resource Conservation Service soil survey maps (<http://websoilsurvey.nrcs.usda.gov/app/>)
13. Washington State Department of Ecology Water Quality Assessment (www.ecy.wa.gov/programs/wq/303d/2008/index.html)

3.2 Protected Species Identification

The following species list (Table 1) is based on data acquired from the US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS) and Washington Department of Fish and Wildlife (WDFW) websites and publications. A number of species present in Western Washington and Kitsap County are listed as federally endangered or threatened under the Endangered Species Act (ESA). This section includes a discussion of listed species with the potential to be within the Project Area and possible impacts due to the proposed project activities.

Table 1. Species listed under the Endangered Species Act and potentially found in the vicinity of Murden Cove.

Common Name	Scientific Name	Listing Status	Critical Habitat Designated?
Bull Trout	<i>Salvelinus confluentus</i>	Threatened	Yes
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Threatened	Yes
Steelhead Trout	<i>Oncorhynchus mykiss</i>	Threatened	Yes
Bocaccio Rockfish	<i>Sebastes paucispiniss</i>	Endangered	Yes
Yelloweye Rockfish	<i>Sebastes ruberrimus</i>	Threatened	Yes
Southern Resident Killer Whale	<i>Orcinus orca</i>	Endangered	Yes
Marbled Murrelet	<i>Brachyrhampus marmoratus</i>	Threatened	Not designated in marine waters

Several species listed and protected by ESA are found in Washington but are not found in or near the vicinity of the project area and will not be addressed in the Effects Determination section of this assessment. The proposed project area is surrounded by developed residential areas and it is highly unlikely that particular plants and animals will be found in the vicinity of the project area. The ESA-listed species not affected (No Effect) by proposed project activities include: Northern spotted owl, leatherback sea turtle, humpback whale, Short-tailed albatross, Grizzly Bear, Canada Lynx, Green Sturgeon, Oregon silverspot butterfly, Spalding's Catchfly, Nelson's checkermellow, Kincaid's Lupine, golden paintbrush and Showy stickseed (USFWS, 2020; NOAA Fisheries, 2020).

Bull Trout

Salvelinus confluentus – Threatened, listed 1999
Critical habitat designated October 2010 (75 FR 63898)

Bull trout occur in less than half of their historic range, with fragmented and isolated populations occurring throughout British Columbia, Washington, Oregon, Idaho, and Montana. Four life-history forms are recognized for Bull Trout, resident (non-migratory), adfluvial (lake dwelling), fluvial (migratory stream and river dwelling), and anadromous fish (saltwater migratory). The Coastal-Puget Sound population segment of Bull Trout is unique in that it contains the only amphidromous form of Bull Trout within the coterminous United States (USFWS, 2005). Anadromous life history forms migrate through large rivers to spawn in cold, clear tributaries. Spawning occurs from late August through November for Coastal and Puget Sound populations. Fry emerge from late winter to early spring. Marine waters and estuaries are used for growth and maturation.

Four distinct stocks of Bull Trout have been identified within the Southern Puget Sound. They are the Puyallup River, Puyallup/Carbon River, Puyallup/White, and Nisqually River Bull Trout stocks. These stocks, although rare, are known to occur in the nearshore habitat throughout the year.

Puget Sound Chinook Salmon

Oncorhynchus tshawytscha – Threatened, listed (reaffirmed) June 2005 (70FR37160)

Critical habitat designated September 2005

Chinook Salmon use the nearshore of Puget Sound for feeding, rearing and migration. Juvenile Chinook Salmon use estuary areas for feeding, rearing and physiological smoltification during spring, summer, and fall, depending on their life history strategy. Stream-type Chinook Salmon spend limited time in estuaries, while ocean-type Chinook can spend many months feeding and growing there. Juvenile Chinook prefer estuary and marine habitats with adequate water quality, temperatures, food, and depths. In addition to these basic requirements, Chinook also require cover in the form of overhanging shoreline vegetation, woody material, and marine vegetation such as macroalgae or eelgrass.

Puget Sound Steelhead

Oncorhynchus mykiss – Threatened, listed May 2007

Critical habitat designated September 2005 (70FR52630)

Fifteen distinct population segments (DPS) of steelhead trout have been identified in Washington, Oregon and California. Within these DPSs, steelhead trout exhibit two reproductive ecotypes. Summer or winter ecotypes are based on the duration of spawning migration and state of sexual maturity at time of river entry. There are numerous Puget Sound tributaries that supports populations of winter steelhead trout.

Steelhead trout, like other salmonids, heavily utilized nearshore areas to complete their life history. After spawning in streams and rivers, juvenile steelhead migrate into estuary areas for growth and osmoregulation. Juveniles and adults use the nearshore area throughout the year for forage, migration and growth. It is likely that steelhead trout may utilize parts of Liberty Bay when migrating to and from local creeks.

Bocaccio Rockfish

Sebastes paucispiniss – Endangered, listed July 2010

Bocaccio Rockfish distribution ranges from northern British Columbia to central Baja California. Spawning (hatching) occurs from December through April. The live larval young drift over large areas in the surface waters. Larval and juvenile Bocaccio may passively drift for several months before settling in deeper habitats. These fish were once quite common on steep walls of the Puget Sound. However, due to declining numbers and increased rarity they were listed as endangered on April 28, 2010 (FR 2010a).

Adults generally occupy water 50 - 250 meters in depth over rocky outcroppings, boulder fields, and sloping walls and will school with both conspecifics and other species of rock fish. Juveniles are found in much shallower waters over rocky substrate with various understory kelps and/or sandy bottoms with eelgrass. Approximately one month after settling juveniles will start to school. Adults and large juveniles feed on small fish and squid, whereas larvae and small juveniles feed on copepods, krill, diatoms, dinoflagellates and various larvae (Love *et al.*, 2002).

Yelloweye Rockfish

Sebastes ruberrimus – Threatened, listed July 2010

Yelloweye Rockfish, once a common species found from the eastern portions of the Aleutian Islands to Northern California. Like other members of the scorpion fish family, Yelloweye Rockfish are extremely long-lived reaching ages of up 118 years. Due to declining numbers and increased rarity they were listed as threatened on April 28, 2010 (FR 2010a).

Little is known about the larval stage of Yelloweye Rockfish, but it is most likely similar to the drift larval stages of Bocaccio and canary rockfish. Young juveniles migrate to vertical walls with cloud sponges and anemones at depths greater than 15 meters. Adults and subadults occupy rocky areas with crevices, caves, and boulder where they feed on small fish, shrimp, crab, and lingcod eggs (Love *et al.*, 2002).

Southern Resident Killer Whale

Orcinus orca – Endangered, listed November 2005

Critical habitat designated November 2006

Killer Whales are found in open oceans and coastal waters. Southern Resident Killer Whales may be found spring through fall in Strait of Juan de Fuca, Strait of Georgia and Puget Sound. Movements into the Puget Sound usually coincide with migration of salmonids into the region (NMFS, 2008a). The Puget Sound contains designated habitat for Southern Resident Killer Whale.

Marbled Murrelet

Brachyrhampus marmoratus – Threatened, listed 1992

Critical habitat designated May 1996 (50 CFR Part 17.11)

Marbled Murrelets are seabirds of the Alcidae family. They occur from the Aleutian Islands, Alaska to central California. Marbled Murrelets may winters as far south as southern California. In Washington, the highest densities of Marbled Murrelets are found along the coastal waters of the Olympic Peninsula. Murrelets nest and roost in mature and old growth coastal forests. Nesting may occur from April to September (WDFW, 1991). They mainly feed from 500 ft to 1.2 miles off shore in waters less than 100 ft deep. Preferred prey are forage fish including Sand Lance (*Ammodytes hexapterus*), Pacific Herring (*Clupea harengus pallasii*) and Surf Smelt (*Hypomesus pretiosus*), and crustaceans. Designated Critical habitat occurs in Oregon and California, but critical habitat has not been designated in the project area or elsewhere in Washington waters.

3.3 Site Investigation

A site visit was performed May 30, 2019. Conditions were mostly cloudy with moderate fog and little to no wind. The site visit was performed during low tide and took approximately two and a half hours. The overall condition of the beach and shoreline were examined, including general soil and vegetation characterization, potential critical habitats were identified, and the presence of species of concern were investigated.

The site visit was performed by Michelle Bahnick, professional biologist with 8 years of experience in the Northwest. Ms. Bahnick holds four-year and advanced degrees in biological science. Her areas of expertise include marine and nearshore ecology, salmon biology, wetland science, and forage fish ecology. In addition to formal training at accredited universities, she has

received training by the Pacific States Marine Fisheries Commission, Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Natural Resources, and U.S. Army Corps of Engineers.

3.4 Habitat Narrative

The proposed project is located in Murden Cove of central Puget Sound, northwest of Elliott Bay, south of Port Madison and west of West Point. The Ferncliff neighborhood where the project site is located is a moderately developed area consisting of residential development. All of the waterside parcels appear to be fully developed with homes, garages and other residential infrastructure including retaining walls, bulkheads, and beach access trails. There are no fish bearing drainages on or adjacent to the Edgecliff parcels or the Action Area.

A small portion of the project activity area is located within the Puget Sound floodplain (Ecology, 2020a). According to Ecology, the area adjacent to the project area is in the 1% annual chance Floodplain (Figure 2). Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) identify the project area as Zone AE with a base elevation of 14 feet.

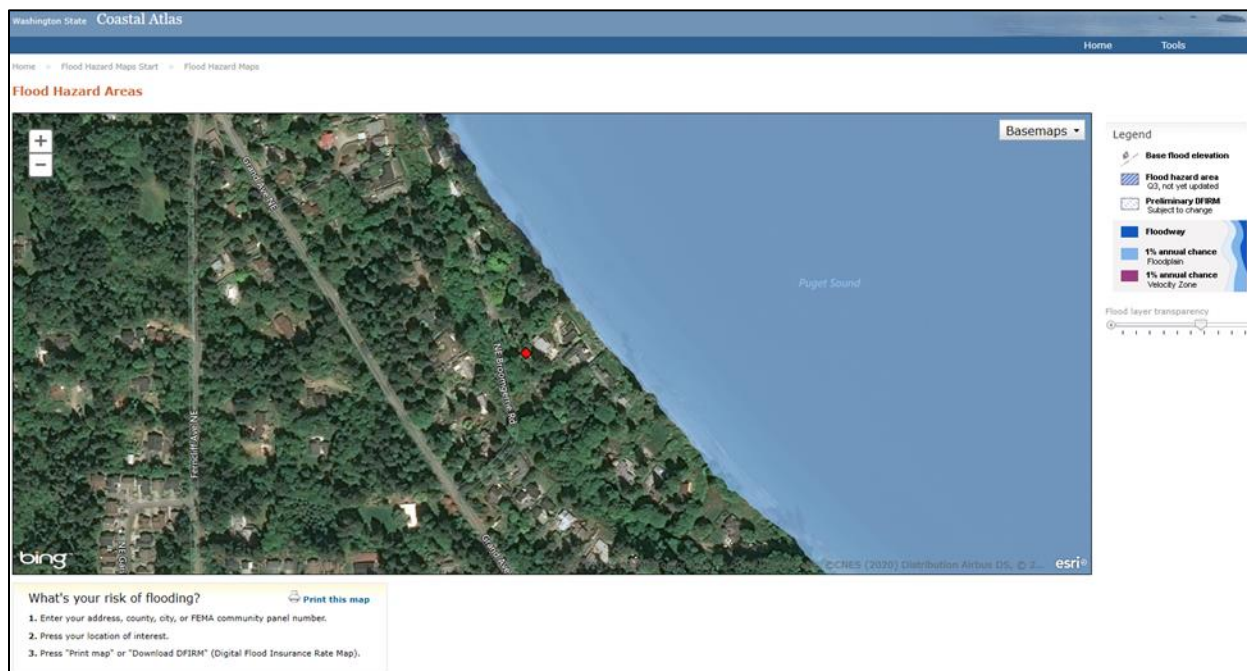


Figure 2. Washington Department of Ecology Flood Hazard Map for Murden Cove, Puget Sound. Project area (red square) is surrounded by a 1% chance of flood annually (WDOE, 2020b).

There are no salmonid spawning areas in or near the proposed project area. The nearest stream is over 5,000 ft to the north. It is likely the area is used for migration corridor and foraging. Nearby rivers and streams support runs of Chum Salmon (*Oncorhynchus keta*), Coho Salmon (*O. kisutch*), steelhead (*O. mykiss*), Chinook Salmon (*O. tshawytscha*), Sockeye Salmon (*O. nerka*), Pink Salmon (*O. gorbuscha*), cutthroat trout (*O. clarki*), and Bull Trout (*Salvelinus confluentus*) (WDFW 2014a).

During the initial site visit in May 2019, sandy substrate with the potential for Sand Lance spawning was identified along shoreline. At the time, the beach substrate between OHW and

approximately +6 ft was composed of predominantly sand, shell hash, gravel, and cobble (Figure 3). However, all sand was removed from the beach between December 2019 and April 2020. It is unknown whether and to what degree suitable Sand Lance spawning substrate will return. The upper intertidal zone is not shaded with overhanging vegetation. According to WDFW Forage Fish Spawning Map (2020) and Priority Habitat and Species Map (2017) websites, no forage fish spawn within or adjacent to the proposed project area (Figure 4).



Figure 3. Project site looking west (WDOE, 2020c).

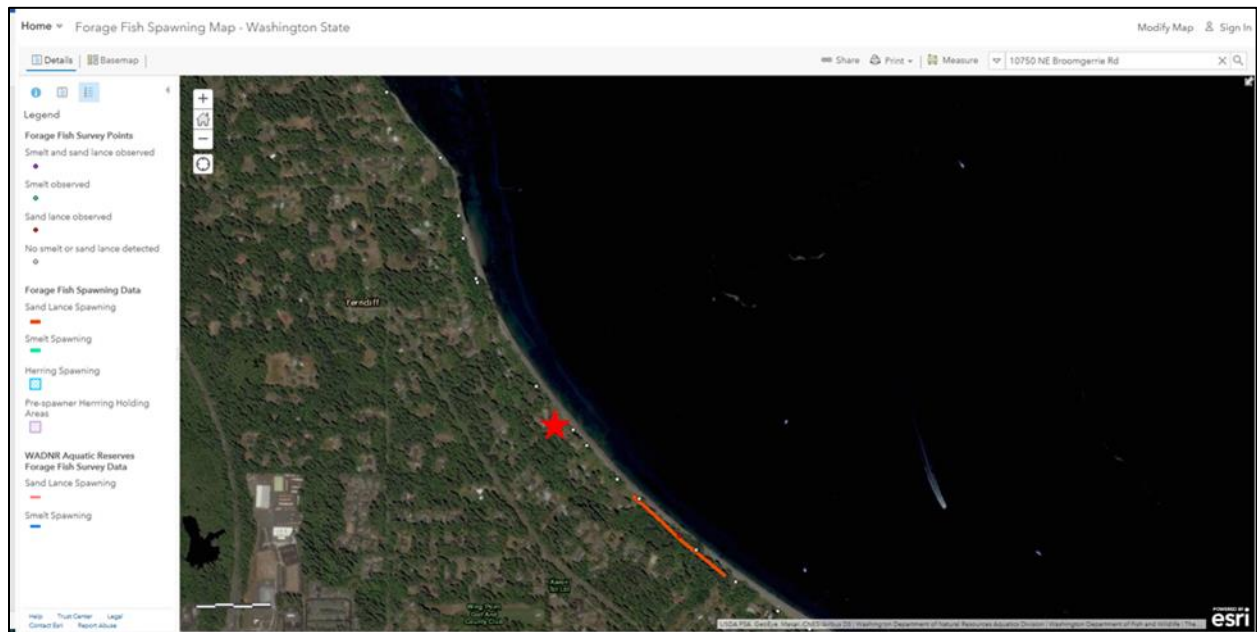


Figure 4. Forage fish survey points at and adjacent to the project area (red star). Documented sand lance habitat near the project area (WDFW, 2020).

Murden Cove, and the Ferncliff neighborhood, provides habitat for a variety of wildlife species common to southern Puget Sound. Benthic macrofauna include crustacean and bivalve species. Several bird species were observed adjacent to the project area. These bird species include Glaucous-Winged Gulls (*Larus glaucescens*), Northwest Crow (*Corvus caurinus*) and Great Blue Heron (*Ardea Herodias*). A previous No Net Loss Report prepared by BGE Environmental, LLC (2013) also identified Purple Martin (*Progne subis*) breeding approximately 1000 feet to the south along the shoreline; however, PHS does not currently show the area of Purple Martin breeding. No mammals were observed at the project area. WDFW Priority Habitat and Species maps identified estuarine intertidal wetlands adjacent to the proposed project site as well as Dungeness crab and Pacific geoduck presence near the site by PHS (WDFW, 2017).

3.4.1 Surrounding Land/Water Uses

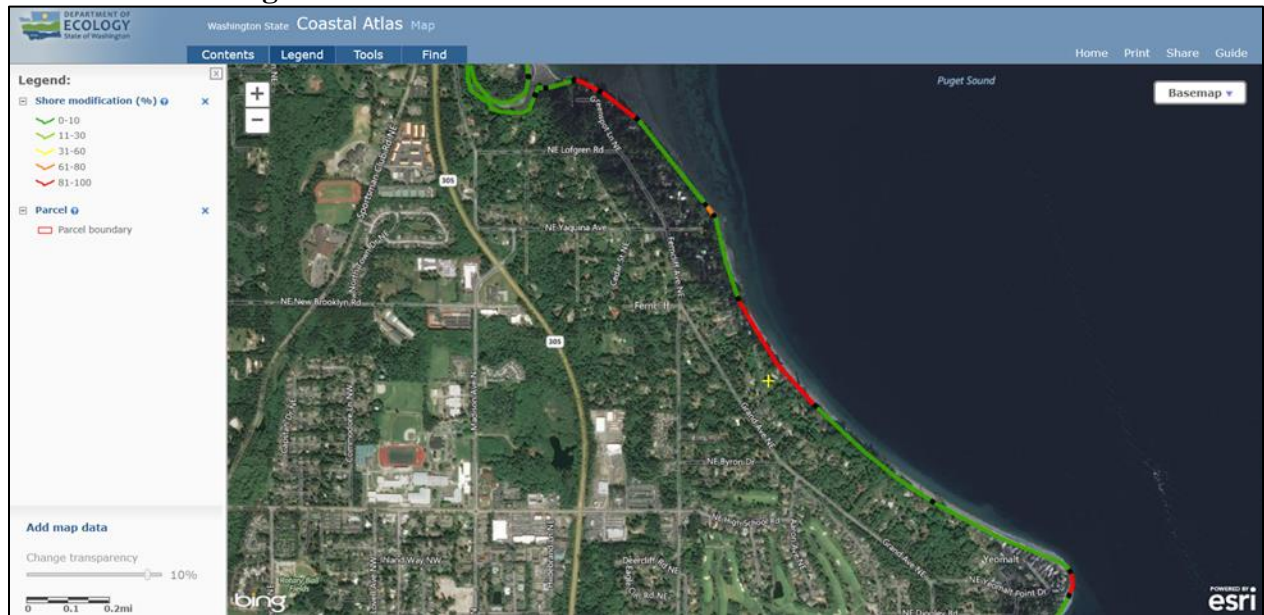


Figure 5. Washington Department of Ecology Shoreline Atlas illustrating shore modification (armoring) at and adjacent to the project area (yellow plus) (WDOE, 2020a).

The project area is located along the western shoreline of Murden Cove on Bainbridge Island. The Ferncliff neighborhood is surrounded by residential development. The shoreline is heavily armored (Figure 5) and is listed as unstable (recent slide; Figure 6) (WDOE, 2020a).

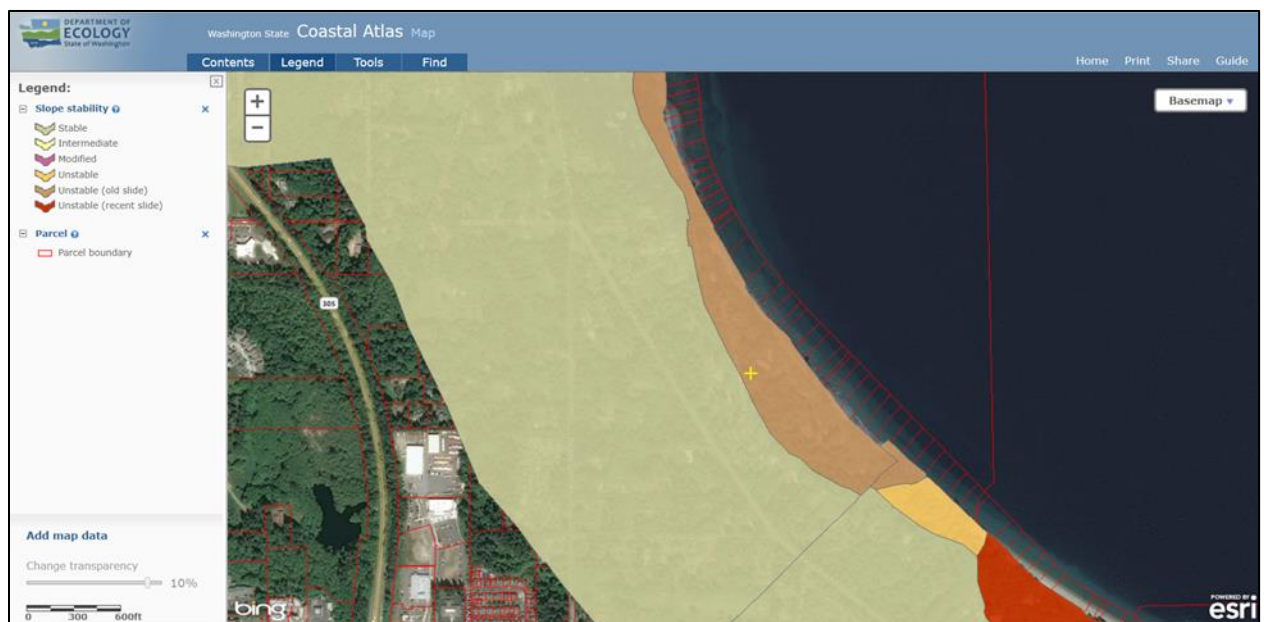


Figure 6. Washington Department of Ecology Shoreline Atlas illustrating slope stability at and adjacent to the project area (yellow plus). Ecology lists the project area as stable.

3.4.2 Shoreline Vegetation and Habitat Features

The project area is vegetated with a mixture of native and invasive species above MHHW. On the coastal bluff, non-native vegetation includes Himalayan blackberry, morning glory, English ivy, and Scotch broom. Native vegetation includes ferns, thimbleberry, and creeping blackberry. No large woody debris (LWD) was seen along the toe of the existing bulkhead during the site visit.

3.4.3 Aquatic Substrate and Vegetation

During the May 2019 site visit, the beach substrate adjacent to the existing and proposed bulkhead was predominately sand over patches of cobble and small boulders (Figure 7). The beach is currently starved of any sand, leaving a surface of primarily cobbles. There were very small patches of rockweed (*Fucus spp.*) attached to bulkhead rock during the site visit; there was no other attached, rooted aquatic vegetation, eelgrass (*Zostera marina*) or kelp growing within the project area. The closest eelgrass observed was a fringe patch located in a low intertidal area approximately 60 feet waterward of the existing bulkhead during the site visit. No salt marsh vegetation is present at or adjacent to the project site. The Ecology Coastal Atlas (2020a) showed eelgrass fringe located near the project site. The Washington Department of Natural Resources eelgrass mapping application showed eelgrass beds out in deeper subtidal areas approximately 165 ft from the project boundary (WDNR, 2019).

3.4.4 Water and Sediment Quality

Murden Cove has no locations included on Ecology's 303(d) list of impaired water or sediment). The water and sediment at and directly adjacent to the project area have not been identified as containing detrimental substances (WDOE, 2020d).

3.5 Habitat Area Map

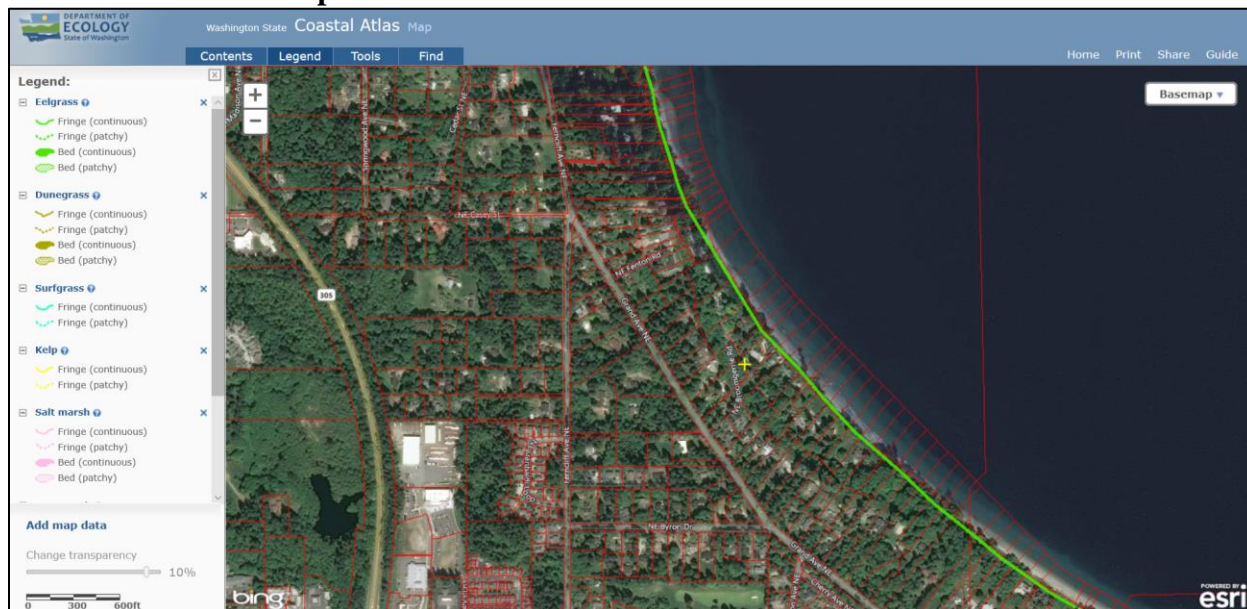


Figure 7. Habitat area map of project area depicting existing vegetation (WDOE, 2020a).

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4.0 PROJECT DESCRIPTION

The proposed project includes the replacement of approximately 110 linear feet of existing bulkhead with angular rock shoreline protection and the placement of beach nourishment material, as required by WDFW. The upper bluff area will also be stabilized with landscaping and native vegetation. This follow section expands on the descriptions found in Part 6-Project Description of the Washington State Joint Aquatic Resources Permit Application (JARPA).

4.1 Final Project

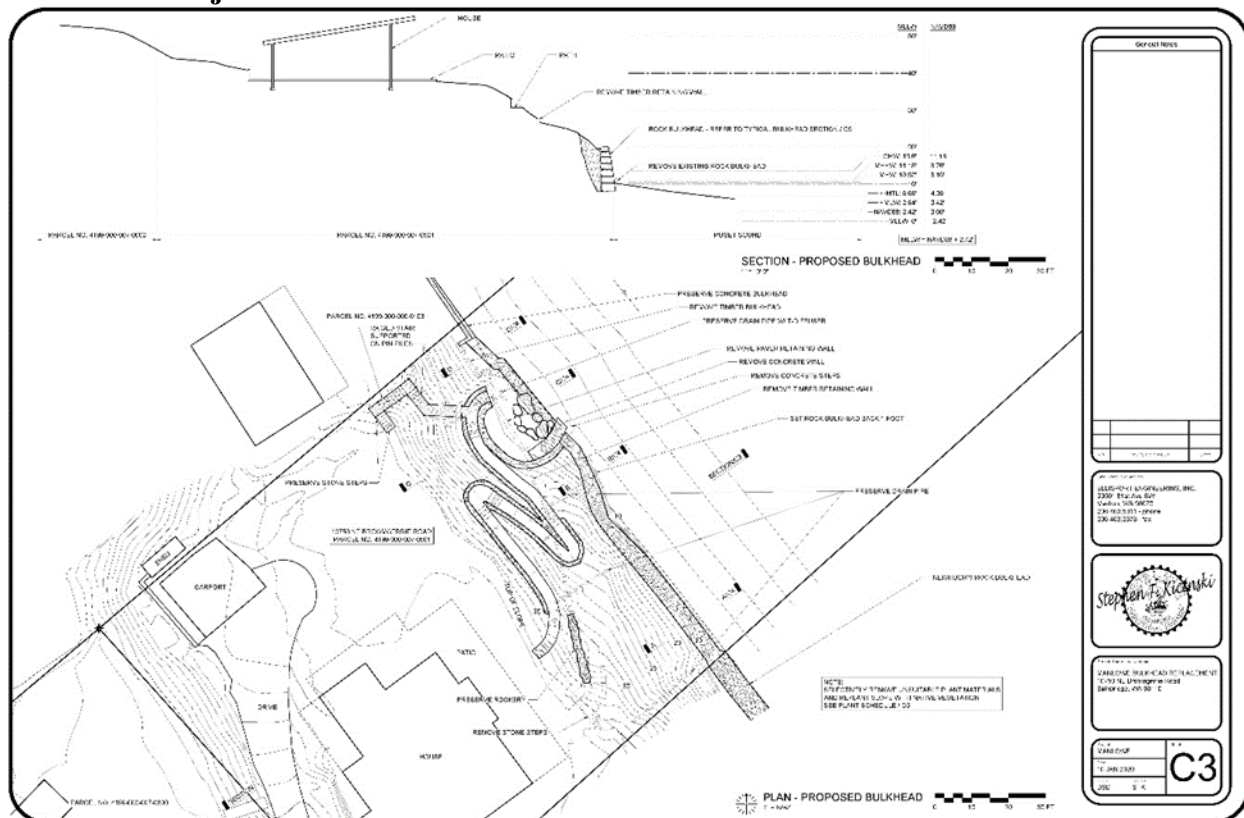


Figure 8. Plans depicting the proposed final project design.

Replacement of the existing bulkhead with an angular rock bulkhead built in a net landward location will result in the creation of new, upper intertidal beach habitat in areas that are currently landscaped upland. After construction, the project area should recover and look and function similarly or better than existing conditions (Figure 8). In addition to the replacement rock bulkhead, the beach will be nourished with material that meets WDFW's specification for forage fish spawning substrate and the steep bluff will be further stabilized by improving the pathways and vegetation on the slope. A planting candidate list consistent with the City of Bainbridge Shoreline Master Program (SMP) marine buffer requirements was prepared by a licensed landscape architect for upland work (Table 2). The plantings will include salt-spray tolerant native shrub, trees, and groundcovers to improve buffer function and help prevent soil erosion. Post-construction, the site will continue to be used as a single-family residence. There will be no increase in traffic, stormwater runoff, noise or change in air quality. Once the project is complete, the area should recover quickly from short term construction impacts and over time benefit from the newly-created upper intertidal beach, removal of treated-wood, and beach nourishment.

Table 2. Candidate planting list for the Manlowe Replacement Bulkhead Project.
Plants listed may be included, but not limited to.

Scientific Name	Common Name
Trees	
<i>Acer glabrum</i> var. <i>douglasii</i>	Douglas maple
<i>Arbutus menziesii</i>	Pacific madrone
<i>Pinus contorta</i> var. <i>contorta</i>	Shorepine
Shrubs	
<i>Amelanchier alnifolia</i>	Serviceberry
<i>Corylus cornuta</i>	Beaked hazelnut
<i>Gaultheria shallon</i>	Salal
<i>Holodiscus discolor</i>	Ocean spray
<i>Rosa gymnocarpa</i>	Baldhip rose
<i>Rosa nutkana</i>	Nootka rose
<i>Ribes sanguineum</i>	Red-flowering currant
<i>Symphoricarpos albus</i>	Snowberry
Grasses & Groundcovers	
<i>Armeria maritima</i>	Seapink
<i>Aster subspicatus</i>	Douglas aster
<i>Deschampsia cespitosa</i>	Tufted hairgrass
<i>Leymus mollis</i>	American dunegrass
<i>Fragaria chiloensis</i>	Coastal strawberry
<i>Mahonia nervosa</i>	Low Oregon grape
<i>Polystichum munitum</i>	Sword fern
<i>Potentilla anserina</i> var. <i>pacifica</i>	Silverweed

4.2 Construction Process

Equipment and material will be brought in by barge. The replacement bulkhead will be built in segments that can be completed while the project area is in the dry. Large rocks for bulkhead construction will be staged on the beach to minimize the construction timeline and associated short term impacts. All other materials will be staged on the barge on in the upland section of the property. No soils that contain clays or fine materials will be placed below OHW. Any existing LWM will be temporarily stockpiled and placed back in their previous general location once the bulkhead is replaced. Clearing of vegetation will be minimal and will mostly include non-native and invasive species. Bulkhead construction will begin with removal of the existing bulkhead material. Unstable soils will be removed in order to embed large bulkhead toe rock a minimum of 2 feet below grade on a stable footing in suitable material. Suitable soil excavated for placement of the toe rock that contains native coarse sand and gravels will be replaced on the beach, as allowed by WDFW. The remainder of the replacement bulkhead will be stacked/placed according to the engineered project plans. Equipment used for the upland bluff stabilization measures will be operated from the uplands or from the base of the bluff. Most landscaping work is expected to occur from the upland using small equipment. If required, ramps placed on a small (30-foot x 60-foot) platform barge will be used to elevate a long-reach excavator for some upland landscaping work. Geotextile, coir fabric, or other stabilization BMPs implemented by the contractor will be used, as necessary, to stabilize the bank and prevent erosion. Once bulkhead replacement and upland landscaping is complete, beach nourishment material will be placed according to

Washington Department of Fish and Wildlife specifications. After completion of work, man-made debris will be removed from the beach.

Unless emergency action is required, bulkhead construction will occur during the allowed federal and state fish work windows. No work will occur when the area is tidally inundated. Materials and equipment will be brought in by barge and will operate within 25-ft of the existing rock bulkhead. Existing stormwater tightlines, if present, will be intergraded into the replacement shoreline protection and dissipated through tee-diffusers.

4.3 Construction Schedule

Construction activities will occur during daylight hours. In-water construction will take place during the low tide period when the project area is not inundated. Unless emergency action is required, in-water work will be conducted between August 1 - February 15, within the prescribed work windows as determined by WDFW and ACOE for juvenile salmon and forage fish species. All work will be completed within three to four weeks.

4.4 Impact Avoidance and Mitigation Measures

4.4.1 Avoidance Measures

Both the geotechnical and structural engineers provided opinions that immediate action is required to protect the primary residence before catastrophic failure of the bulkhead occurs. As such, avoiding the impact altogether by not replacing the bulkhead will further risk the safety of the residential home and its occupants. The geotechnical and structural engineers concluded that avoiding part of the impact by only repairing sections of the existing bulkhead would not alleviate the imminent risk of rapid and complete bulkhead failure (Earth Solutions NW, LLC, 2019; Ellisport Engineering, Inc., 2019), which would leave the residential home and its occupants in jeopardy.

4.4.2 Minimization Measures

The following protection and conservation measures will be followed by the bulkhead contractor. Any additional measures imposed by regulatory agencies will also be strictly followed.

- Unless emergency action is required, work below the ordinary high water line will not occur from August 1 - February 15 of any year for the protection of migrating juvenile salmon.
- Project activities below MHHW will not occur when the project area, including the work corridor, is inundated by tidal waters.
- The waterward face of the rock bulkhead will be located as far landward as possible and will follow the natural sinuosity of the shoreline as much as possible while providing structural integrity.
- All trenches, depressions, or holes created in the beach area will be backfilled prior to inundation by tidal waters. Trenches excavated for base rocks may remain open during construction. However, fish shall be prevented from entering such trenches.

- All waste material such as construction debris, silt, excess dirt or overburden resulting from this project will be deposited above the limits of flood water in an approved upland disposal site.
- All manmade debris on the beach will be removed and disposed of upland such that it does not enter waters of the state.
- All natural habitat features on the beach larger than 12 inches in diameter, including trees, stumps, logs, and large rocks, will be retained on the beach following construction. These habitat features may be moved during construction if necessary.
- Project activities will be conducted to minimize siltation of the beach area and bed.
- Extreme care will be taken to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the beach or water.
- Project activities shall not degrade water quality to the detriment of fish life.

4.4.3 Rectification Measures

The project will not cause any long-term negative impacts that require rectification by repairing, rehabilitating, or restoring the affected environment. The project will replace an existing structure and result in a net increase in intertidal habitat.

4.4.4 Reduction or Elimination Measures

The project does not require measures to reduce or eliminate the impact over time by preservation and maintenance operations. The project will add native vegetation, replace an existing structure, remove treated-wood, convert upland habitat into intertidal habitat, and add beach nourishment material.

4.4.5 Compensation Measures

Compensatory mitigation is not required because there are no long-term negative impacts and the project is self-mitigating for short-term impacts through the removal of treated-wood, conversion of existing upland area into intertidal habitat, addition of beach nourishment material, and improvements to upland riparian habitat and vegetation along the coastal bluff.

4.4.6 Monitoring Measures

No monitoring is required because there are no long-term impacts and the project is self-mitigating for short-term impacts through the conversion of existing impervious area into intertidal habitat.

5.0 IMPACTS OF SITE DEVELOPMENT

5.1 Types of Impacts

5.1.1 Direct Effects

Bulkheads and bank protection can have numerous direct and indirect impacts on critical fish and wildlife habitat and species of concern. Directs effects are those impacts resulting from the proposed action. Direct impacts include elimination of habitat and disturbance to fish and wildlife caused by noise and water quality issues. The proposed action for this project is the replacement of approximately 115 linear feet of angular rock bulkhead. The proposed action includes both short- and long-term direct effects. Short term direct impacts include impacts from the construction activities. These impacts include minor removal of mostly non-native and invasive vegetation (above OHW) associated with excavating the toe of the slope, operating the excavator within the authorized work corridor, and the temporary grounding of the barge.

Long term direct effects include the placement of 4- to 6-man rock on the beach. This will not introduce any new impacts, but will continue previous impacts to habitat by replacing the existing almost 60-year-old bulkhead with a new bulkhead constructed in a net-landward location, relative to the existing structure. The replacement bulkhead design is as close to the OHWM as technically feasible, and as an integrated whole is proposed landward of OHWM. As described above, a small sub-section of bulkhead to be replaced waterward of the existing structure is necessary to meet structural and stability requirements, and is more than offset by the net landward replacement of the existing bulkhead relative to its existing location. If built as proposed, this project will reduce impacts to upper intertidal habitat relative to existing conditions by reestablishing 15 ft² of upper intertidal beach in areas that are currently residential landscaped uplands. Much of the area that will be impacted by moving the bulkhead landward is currently covered by non-native and invasive species.

5.1.2 Indirect Effects

Indirect impacts include potential changes to natural nearshore processes, such as sediment recruitment and transportation. The shoreline adjacent to the bulkhead project is mapped as a feeder bluff; however, it does not provide a significant amount of sediment into the drift cell due to the existing bulkhead. The previous No Net Loss Report conducted at the property observed that the presence of the original rock bulkhead has compromised the ecological function of the high marine bluff for nearly 60 years (BGE Environmental, LLC, 2013). Building the replacement bulkhead landward of the existing bulkhead and removing treated-wood will reduce impacts to natural shoreline processes relative to the existing structure. Additionally, the proposed beach nourishment and native plantings will provide additional environmental lift over existing conditions.

5.1.3 Interdependent and Interrelated Actions

Interdependent actions are those actions having independent utility apart from the proposed replacement shoreline protection. There are no known interdependent actions.

Interrelated actions are those actions that are part of a larger action and depend on the larger action for its justification. Interrelated actions include stabilization of the post-construction site, further stabilizing the steep bluff by improving the pathways and vegetation on the slope, and placement of “fish mix” material, as recommended by WDFW. A planting candidate list consistent with the

City of Bainbridge Shoreline Master Program (SMP) marine buffer requirements was prepared by a licensed landscape architect for upland work. The plantings will include salt-spray tolerant native shrub, trees, and groundcovers to improve buffer function and help prevent soil erosion.

5.1.4 Cumulative Effects

Cumulative effects include the effects of unrelated future activities that are reasonably certain to occur within the project area. Future activities that are usually evaluated include residential development, bulkhead, docks, and other structures. Future residential development is unlikely, being that the properties are already developed and are not likely to be subdivided further. Remodeling of existing structures is likely to occur in the distant future. According to Ecology's shoreline atlas, the area at and adjacent to the project area contain 81-100% shoreline armoring. The property to the south of the project is already protected by a rock bulkhead. Likewise, the property north of the site property is protected by a concrete bulkhead that extends into the subject property. There are currently no docks and piers on the project site or adjacent properties. Because of the shallow depths, fast currents, wakes from large container ship and other commercial and recreational boat traffic, and direct exposure to a significant fetch, it is unlikely that docks would be allowed at this location. Small structures, like picnic tables or gazebos, may be built above MHHW and would likely have little to no effect on the shoreline environment.

5.2 Effects Determination

Table 3. Species listed as Threatened or Endangered under the Endangered Species Act and determination of effects from project activities

Common Name	Scientific Name	Effects on Listed Species	Effect on Designated Critical Habitat
Bull Trout	<i>Salvelinus confluentus</i>	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
Steelhead Trout	<i>Oncorhynchus mykiss</i>	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
Bocaccio Rockfish	<i>Sebastes paucispiniss</i>	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
Yelloweye Rockfish	<i>Sebastes ruberrimus</i>	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
Southern Resident Killer Whale	<i>Orcinus orca</i>	May Affect, Not Likely to Adversely Affect	May Affect, Not Likely to Adversely Affect
Marbled Murrelet	<i>Brachyrhampus marmoratus</i>	May Affect, Not Likely to Adversely Affect	No Effect on designated critical habitat

5.2.1 Bull Trout – Coastal/Puget Sound Distinct Population Segment

5.2.1.1 Occurrence in the Project Area

The current distribution of Bull Trout within Puget Sound marine waters is not well understood. They have been documented to occur from the Canadian border to at least the Nisqually River delta. Bull Trout migrate throughout the inner bays and nearshore of Puget Sound from Possession Sound, to the Nisqually Delta. Bull Trout are typically found in snowmelt-dominated streams like

the Puyallup and Nisqually Rivers that maintain cold water temperatures year-round in headwater reaches (WDFW, 2002). Although there is no record of historical Bull Trout presence in Murden Cove or the project area, it is likely that they migrate through the area.

Adult or sub-adults from this population may occasionally use the shoreline near the project area when feeding on out-migrating juvenile Chinook Salmon. Although adult or juvenile Bull Trout may be present in nearshore waters year-round, the likelihood of encountering Bull Trout in the project area during the construction work window is extremely low.

5.2.1.2 Effects of the Action

Proposed project activities are likely to cause temporary and localized increases in turbidity. Although Bull Trout are unlikely to be in the project area, potential foraging habitat may be temporarily unavailable because of turbidity. Prey items important to Bull Trout are not likely to be affected by project activities. Like Bull Trout, the prey items, such as Chinook Salmon, will temporarily avoid the project area. In-water noise will not be increased by project activities. Noises produced by construction equipment will be terrestrial and similar to surrounding residential noise levels.

Conservation measures described in Section 4.4, particularly avoidance of the juvenile salmon migration period, are expected to prevent adverse short-term effects to Bull Trout during shoreline protection activities. The temporary loss of the benthic organisms during the construction of the shoreline protection is expected to have a negligible effect on long-term habitat quality within the project area. Overall, the effects of the proposed action would be insignificant and discountable due to the temporary duration of the proposed project actions and the implementation of the proposed conservation measures to minimize the potential for Bull Trout to be within the project area.

5.2.1.3 Critical Habitat

The following primary constituent elements (PCEs) were given for Bull Trout in the Federal Register (October 18, 2010) in the re-designation of critical habitat.

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

Springs, seeps, and groundwater sources are not located within or near the project area.

2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

The proposed actions may have a temporary effect on migrating adult salmonids, primarily in the form of temporary elevation of turbidity and noise levels, which are considered to be insignificant. No permanent barriers to migration would result from shoreline protection activities. By relocating the bulkhead in a net-landward direction relative to its existing location, the proposed project should reduce permanent barriers to migration.

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

Other than temporary disruption of benthic and epibenthic food sources, the shoreline protection project would have an insignificant effect on the food base in Murden Cove. Long-term, the proposed beach nourishment to benefit forage fish and native shoreline plantings should increase the amount of forage fish, epibenthic macroinvertebrates and terrestrial organisms.

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

The shoreline protection project is occurring in a marine shoreline aquatic environment. The majority of the shoreline in this area is bulkheaded or armored. The proposed project will stabilize the marine shoreline and reduce current impacts by relocating the overall structure landward of the existing structure and by removing treated-wood.

5. Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on Bull Trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

The project area is located within an area that is moderately stratified compared to most other Puget Sound basins because no major river systems flow into Murden Cove. Although surface temperatures near the Murden Cove can reach 14-15 °C in summer, the temperatures of subsurface waters generally range from 10-13 °C in summer and 8-10 °C in winter (WDOE, 1999). The shoreline protection project will not alter or increase water temperature beyond the current average temperatures.

6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to Bull Trout will likely vary from system to system.

Murden Cove and the project area are not utilized by Bull Trout for spawning or rearing; this PCE would not be affected by the proposed project.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

The proposed shoreline protection project would not alter the hydrograph or tidal exchange. This PCE would not be affected by the proposed project.

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

The proposed shoreline protection project will not alter the quantity of water in Murden Cove or the project area. The proposed project would have a temporary, insignificant effect on turbidity.

9. Sufficiently low levels of occurrence of nonnative predatory (e.g., Lake Trout, Walleye, Northern Pike, Smallmouth Bass); interbreeding (e.g., Brook Trout); or competing (e.g., Brown Trout) species that, if present, are adequately temporally and spatially isolated from Bull Trout.

The presence of such predatory, interbreeding, or competing species would not occur in the project area. Predation by terrestrial or marine aquatic species would not be affected by the proposed shoreline protection project.

In summary, the Project Area may serve as migratory or feeding habitat for coastal/Puget Sound Bull Trout heading to or from the Duwamish, Puyallup or Nisqually Rivers. As in most of the Puget Sound nearshore locations, the PCEs in the project area have been significantly altered and are not likely to be heavily used by Bull Trout. Shoreline protection activities may result in temporary impacts to substrates, water quality and noise. As discussed in previous paragraphs, these impacts are minor, temporary, and discountable, and do not interfere with movements or feeding of Bull Trout.

5.2.1.4 Determination of Effect

For the reasons described above, no significant cumulative, interrelated or interdependent effects on Bull Trout are expected from the proposed shoreline protection project or activities. Overall, due to the low likelihood of an individual Bull Trout being within the project area, the effects of the proposed action on Coastal/Puget Sound Bull Trout would be insignificant and discountable. Therefore, the proposed shoreline protection activities **May Affect, but is Not Likely to Adversely Affect** Coastal/Puget Sound Bull Trout or its designated critical habitat.

5.2.2 Puget Sound Chinook Salmon

5.2.2.1 Occurrence in Project Area

Chinook Salmon in the Duwamish and Puyallup watershed are of “mixed” hatchery and native stocks. Adult Chinook enter rivers from mid-June through the fall. Chinook Salmon may be present or migrating through south Puget Sound and the marine waters adjacent to the project area from mid-May through October. Out-migrating juvenile Chinook Salmon could potentially use the waters in and around the project area from March until mid-July.

As with much of the Puget Sound nearshore, the habitat in the project area has been significantly altered. Spawning opportunities for Chinook Salmon do not occur in within the action area or the project area. The nearest area with potential spawning habitat is the Lake Washington Ship Canal,

nearly 5 miles to the northeast across Puget Sound (WDFW, 2014a). No rivers or streams occur within the project area.

Murden Cove and the project area likely serves as feeding and migratory habitat for Puget Sound Chinook. Chinook Salmon migrating up the shoreline could find refuge from strong shoreline currents and feeding opportunities. Ocean-type Chinook utilize estuaries and coastal areas more extensively for rearing than stream-type juveniles (Healey, 1991). Both life history strategies of juveniles Chinook could move into marine waters in and around the project area to feed on drifting insects and small nektonic organisms (calanoid copepods, crab larvae, larval and juvenile fish, and euphausiids) (Simenstad *et al.*, 1982; Healey, 1991).

5.2.2.2 Effects of the Action

This project will not result in long-term, permanent impacts to Puget Sound Chinook Salmon. Scheduling construction to occur during approved work windows and during periods when the tide is below the work area will minimize impacts to all salmon and other fish species. Construction activities that will occur below ordinary high water will likely have short-term impacts on salmonids that may be present in the project area during that time. However, project impacts are likely to be insignificant because of their localized and temporary nature and the existing impacted environmental conditions of the site (i.e., lack of aquatic vegetation and habitat complexity). These impacts will be minimized by conservation measures included in the construction section 4.3 and mitigated by the proposed mitigation activities. Placing beach nourishment material and creating new upper intertidal beach habitat will benefit forage fish and epibenthic invertebrates.

5.2.2.3 Critical Habitat

Critical habitat, as defined in the ESA, identifies specific areas that have the physical and biological features that are essential to the conservation of a listed species, and that may require special management consideration or protection (50 CFR Part 17). Designated critical habitat for Puget Sound Chinook Salmon includes all naturally spawned populations from rivers and streams flowing into Puget Sound (50 CFR Part 226). Critical habitat is designated for areas containing the physical and biological habitat features, or primary constituent elements (PCEs) essential for the conservation of the species or that require special management consideration. PCEs include sites that are essential to supporting one or more life stages of the evolutionarily significant unit (ESU) and that contain physical or biological features essential to the conservation of the ESU.

Specific sites and features designated for Puget Sound Chinook Salmon include:

1. Freshwater spawning sites with water quantity, water quality, and substrate conditions that support spawning incubation and larval development.

The project area does not contain freshwater spawning sites; this PCE would not be affected by the proposed project.

2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality, natural cover, and forage that support juvenile development.

The project area does not contain freshwater rearing sites; this PCE would not be affected by the proposed project.

3. Freshwater migration corridors free of obstruction, with water quantity, water quality, and natural cover conditions that support juvenile and adult mobility and survival.

The project area does not contain freshwater migration corridors; this PCE would not be affected by the proposed project.

4. Estuarine areas free of obstruction, with water quantity, water quality, and salinity conditions supporting juvenile and adult physiological transitions between fresh and salt water, as well as natural cover and forage supporting juvenile and adult survival and growth.

The project area does not contain estuarine areas; this PCE would not be affected by the proposed project.

5. Nearshore marine areas free of obstruction, with water quantity, water quality, natural cover, and forage supporting survival and growth.

The proposed shoreline protection project will not alter water quantity, quality or forage of water in Murden Cove or the project area permanently.

6. Offshore marine areas with water-quality conditions and forage **supporting** survival and growth.

The proposed shoreline protection project will not alter offshore marine areas with water-quality conditions and forage supporting survival and growth; this PCE would not be affected by the proposed project.

5.2.2.4 Determination of Effect

Adult, sub-adult, and juvenile Chinook Salmon utilize the nearshore of the Puget Sound for at least some stage of their life history. The proposed shoreline protection project may affect the threatened Puget Sound Chinook Salmon; however, any Chinook Salmon present would experience negligible effects from the proposed shoreline protection. In the long term, beach nourishment and planting native, overhanging vegetation, and conversion of residential landscaped upland to new upper intertidal beach habitat will increase the amount and quality of available habitat in the project area.

Conservation measures including avoiding construction activities during the migration period of juvenile Chinook Salmon and other salmonids will reduce and prevent adverse short-term effects to Chinook Salmon during construction of the shoreline protection. Work along the unstable bank could result in temporary degradation of the water quality; these effects would be limited to the immediate project area. The construction work will occur during prescribed Army Corps of Engineers (ACOE) and WDFW “work windows” when Chinook Salmon are likely not present in the project area. The temporary loss of the benthic communities in the project areas would have only a negligible effect on Chinook Salmon habitat.

For the reasons described above, no significant cumulative, interrelated or interdependent effects on Puget Sound Chinook Salmon are expected from the proposed shoreline protection project

Overall, the effects of the proposed action on Puget Sound Chinook Salmon would be insignificant and discountable. Therefore, the proposed shoreline protection activities **May Affect, but is Not Likely to Adversely Affect** Puget Sound Chinook Salmon. Similarly, the proposed shoreline protection activities **May Affect, but is Not Likely to Adversely Affect** designated critical habitat for Puget Sound Chinook Salmon.

5.2.3 Puget Sound Steelhead

5.2.3.1 Occurrence in the Project Area

Winter populations of steelhead trout have been documented throughout the south Puget Sound area. There are no known spawning populations of steelhead trout near the project site (WDFW, 2014a). In locations that do support steelhead trout, they typically enter freshwater from December through mid-March and spawn from early February to early April (WSCC, 2003). Juveniles out-migrate from mid-March through mid-July. Adult and juvenile steelhead trout most likely use the area in the vicinity of the project area for migration and feeding.

5.2.3.2 Effects of Action

Potential direct and indirect effects to Puget Sound steelhead from the project are similar to Puget Sound Chinook Salmon. Although the impacts of terrestrial noise and temporary turbidity would be short-term and localized, there is still the potential to affect steelhead trout. Potential impacts of the project action include physiological responses such as elevated stress levels due to noise, gill injury due to temporary exposure to increased turbidity levels, and behavioral responses, such as reduced feeding opportunities and avoiding the work area. The substrate in the project area contain gravel and courser sandy substrate and therefore is expected to settle out quickly.

Since steelhead typically utilize deeper marine water habitat, they would likely be present in low numbers or would not be present at the project area. This project will not result in long-term, permanent impacts to Puget Sound steelhead. These temporary impacts will be minimized by following all mitigation and conservation measures and working when juvenile steelhead trout are less likely to be in the area. There would be longer-term enhancements of water quality and habitat by placing beneficial beach nourishment material. Therefore, impacts are expected to be minimal and discountable.

5.2.3.3 Critical Habitat

The following primary constituent elements (PCEs) were given for steelhead trout in the Federal Register (September 5, 2005) in the designation of critical habitat:

- Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;

The project area does not contain freshwater spawning sites; this PCE would not be affected by the proposed project.

- Freshwater rearing sites with: (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) Water quality and forage supporting juvenile development; and (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

The project area does not contain freshwater rearing sites; this PCE would not be affected by the proposed project.

- Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;

The project area does not contain freshwater migration corridors; this PCE would not be affected by the proposed project.

- Estuarine areas free of obstruction and excessive predation with: (i) Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; (ii) Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and (iii) Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

The project area does not contain estuarine areas; this PCE would not be affected by the proposed project.

- 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.

The proposed shoreline protection project will not alter water quantity, quality or forage of water in Murden Cove or the project area. Existing vegetation in the project area should not be impacted by the proposed project, other than by replacing invasive plants with native species.

- Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

The project area does not contain offshore marine areas and will not degrade water quality conditions or forage; this PCE would not be affected by the proposed project.

5.2.3.4 Determination of Effect

Due to the reduced presence of steelhead trout in the area, the timing of the proposed project actions, the localized and temporary nature of the turbidity, the proposed project actions **May Affect, but is Not Likely to Adversely Affect** Puget Sound steelhead or steelhead Critical Habitat.

5.2.4 Bocaccio Rockfish

5.2.4.1 Action Effects

It is very unlikely that any adult Bocaccio Rockfish would occur in project area as they tend to inhabit deeper water with rocky substrate. Bocaccios have not been documented in the Puget

Sound since 2001 (NMFS, 2008a). Historically, they were seen as bycatch in the south Puget Sound near Point Defiance and Tacoma Narrows (Palsson *et al.*, 2009). The substrate in Murden Cove is soft sediment (mud, sand, and mixed fines) and does not support essential rock fish habitat (NOAA, 2013). Based on the shallow nature of the project area (Figure 9) and the lack of suitable habitat it is extremely unlikely that adult Bocaccio Rockfish would be present.

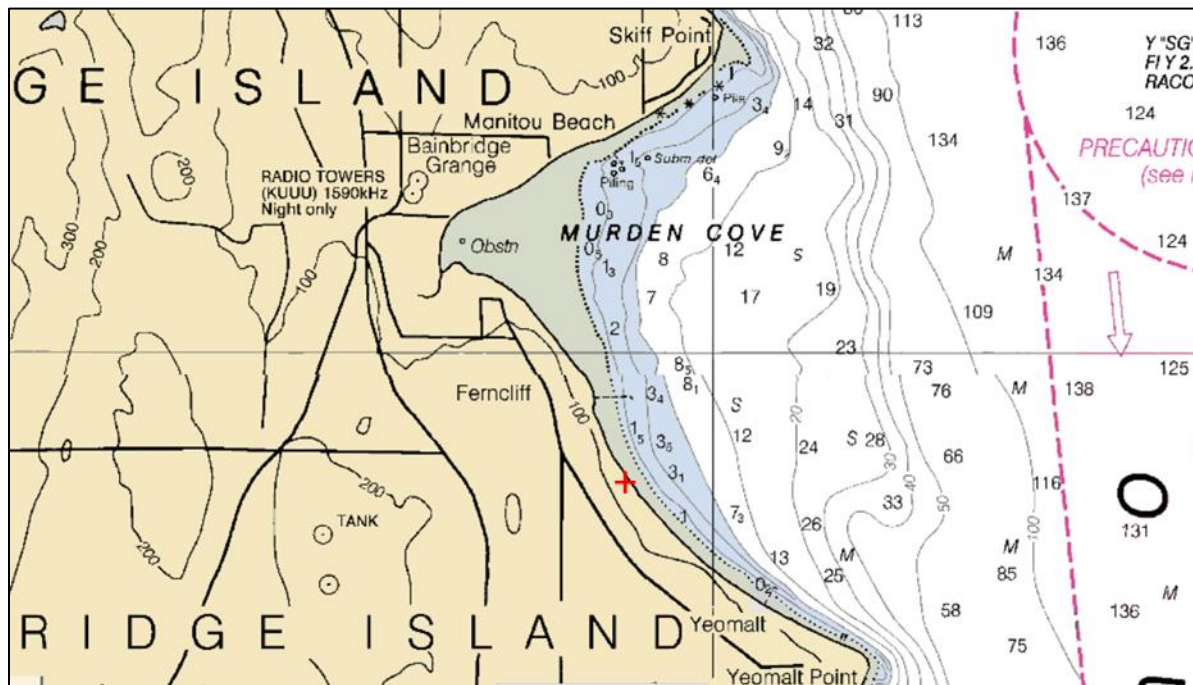


Figure 9. Nautical map of south Puget Sound. Depths range from 0 to 3 fathom near the project site (red plus sign).

Although juveniles are present in shallower water, they are also associated with rocky areas with kelp cover and sandy areas with eelgrass beds. According to Ecology, eelgrass beds and sandy areas are present offshore but not within the project area. The probability of the larval stage or juvenile Bocaccio to be present in the project area is very low because the shallow, unvegetated nature of the upper intertidal area. Furthermore, all work will be done when the work corridor is not inundated by tidal waters, removing the chance of juvenile Bocaccio presence.

5.2.4.2 Determination of Effect

Although juveniles are present in shallower water, they are also associated with rocky areas with kelp cover and sandy areas with eelgrass beds. According to Ecology, eelgrass beds and sandy areas are present offshore but not within the project area. The probability of the larval stage or juvenile Bocaccio to be present in the project area is very low because the shallow, unvegetated nature of the upper intertidal area. Furthermore, all work will be done when the work corridor is not inundated by tidal waters, removing the chance of juvenile Bocaccio presence. Due to the lack of presence of Bocaccio Rockfish and Bocaccio Rockfish habitat in the project area the proposed action **May Affect, but is Not Likely to Adversely Affect** on this species or critical habitat.

5.2.5 Yelloweye Rockfish

5.2.5.1 Action Effects

Yelloweye Rockfish are somewhat rare in the south Puget Sound (NMFS, 2008b). They are encountered more frequently in the north Puget Sound and Hood Canal (Miller and Borton, 1980). It is very unlikely that adult Yelloweye Rockfish will be present in the project area as they inhabit deep water with rocky substrate that provides refuge space and feeding opportunities. This type of habitat is not present within the project area. Juvenile Yelloweye Rockfish are also not likely to be found near the project area as they prefer shallow areas with rocky substrate (NMFS, 2008b). The soft sediment of project area does not contain rock crevices or other habitat requirements of juvenile Yelloweye Rockfish.

5.2.5.2 Determination of Effect

Due to the lack of presence of Yelloweye Rockfish and Yelloweye Rockfish habitat in the project area the proposed action **May Affect, but is Not Likely to Adversely Affect** on this species or critical habitat.

5.2.6 Southern Resident Killer Whales

5.2.6.1 Action Effects

It is highly unlikely that a Southern Resident Killer Whales would enter the project area because the shallow depth would likely limit their presence. Killer Whales require open water with no restrictions (NOAA, 2008). Also, during the proposed project window Southern Resident Killer Whales are typically not present in the Puget Sound as they tend to open water habitats with feeding opportunities during the summer months.

5.2.6.2 Critical Habitat

The PCEs for Southern Residents include the following: (1) water quality to support growth and development; (2) prey species of sufficient quantity, quality and availability to support individual growth, reproduction and development, as well as overall population growth; and (3) passage conditions to allow for migration, resting, and foraging.

The action area includes critical habitat for southern resident killer whale (shoreline of Puget Sound). However, the action addressed in this report does not directly affect the critical habitat, as the shoreline protection project occurs in the upper intertidal zone. As discussed in previous paragraphs, impacts to water quality, prey base, and passage for other species are discountable. Effects to killer whale critical habitat are not anticipated.

5.2.6.3 Determination of Effect

Due to the lack of suitable water depths and critical habitat within the project area and the absence of Southern Resident Killer Whales during the project construction window, the proposed action **May Affect, but is Not Likely to Adversely Affect** southern resident killer whales and their designated critical habitat.

5.2.7 Marbled Murrelet

5.2.7.1 Occurrence in the Project Area

Marbled Murrelet sightings are rare in the central and southern Puget Sound. Historically, limited sightings were made in King and Kittitas Counties (Seattle Audubon, 2006). The closest nesting areas to Murden Cove and the project area were located east in the Cascade Mountains, east of Lake Stevens and north of Sultan and west in the Olympic Mountains, west of Port Hadlock and Port Townsend (WDFW, 2008).

5.2.7.2 Effects of the Action

Potential effects of the proposed shoreline protection project on Marbled Murrelets primarily include disturbance and increased turbidity during excavation of the rock wall toe trench that may inhibit foraging or result in temporarily reduced food availability and reduced visibility/detectability of prey. Noise from construction equipment and temporary increases in turbidity during excavation will likely cause prey fish to avoid the immediate area of the proposed project. Consequently, in the unlikely event that a Marbled Murrelet was present within the immediate vicinity of the project area, they would be expected to temporarily avoid the immediate area and forage elsewhere until construction activities are completed.

The addition of the construction noise in the localized area of the project area should not appreciably add to disturbance noise for Marbled Murrelets. Any construction noise will be short-term and confined to the project area. No underwater noise will be produced by our project, since the work will be performed in the dry at low tides. Any terrestrial noise will blend in to the ambient background noise before it can disturb locations outside of the Action Area. Marbled Murrelets, in the unlikely chance they are in the area, will stay away from the project area, and the sound generated during construction will not cause changes in behavior of these animals as they are likely to have become somewhat habituated to vessels and urban noise.

5.2.7.3 Determination of Effect

Proposed shoreline protection and mitigation activities will not result in any long-term degradation of habitat or other significant adverse effects on Marbled Murrelets. Short-term effects such as noise disturbance and reduced prey availability will either not occur or will be very small in magnitude, as discussed above. Temporary disturbance to foraging activities are expected to be insignificant and discountable. The survival or reproductive success of Marbled Murrelets in the project vicinity would not be affected. Therefore, the proposed shoreline protection project activities will have **No Effect** on Marbled Murrelet. The proposed project will have **No Effect** on designated critical habitat for Marbled Murrelet since none is present in the vicinity of the project.

5.3 Assessment Report Conclusion

One purpose of the preceding No Net Loss and Floodplain Habitat Assessment Report is to document that the proposed project meets the requirements and criteria of the Endangered Species Act (ESA) as clarified in the Biological Opinion issued by the National Marine Fisheries Service (NMFS) on September 22, 2008. This No Net Loss and Floodplain Habitat Assessment Report concludes, that with avoidance, minimization and conservation measurements, the following:

- **No Affect or May Affect, but is Not Likely to Adversely Affect** Endangered Species.

An additional purpose of this report is to document that the proposed project will result in no net loss of critical habitat or ecological function. As described above, the project meets this standard:

- The proposed replacement bulkhead will be constructed in a net landward location, relative to the existing structure, resulting in reestablishing at least 15 ft² of upper intertidal beach in areas that are currently residential landscaped uplands;
- The proposed project will remove treated-wood from upper intertidal beach habitat;
- The proposed project will remove non-native, invasive vegetation and introduce native, riparian plantings; and
- The proposed project will place beach nourishment material along the upper intertidal beach.

The proposed project will have no long term effect on water quality, flood storage, conveyance and attenuation of flood waters, groundwater recharge or discharge. The proposed project will not increase the amount of impervious surface or otherwise affect stormwater. Instead, the proposed project will improve fish and wildlife habitat and ecological function relative to existing conditions through the replacement of non-native vegetation with native riparian vegetation, reestablishment of upper intertidal beach habitat, removal of treated-wood, and placement of beach nourishment material.

This No Net Loss and Floodplain Habitat Assessment Report concludes, that with avoidance, minimization and conservation measurements, the following:

- **No Net Loss of critical area or ecological function will result from the proposed project.**

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