Smith Bulkhead Repair

Site-Specific Impact Analysis Report

July 8, 2020

Prepared for:
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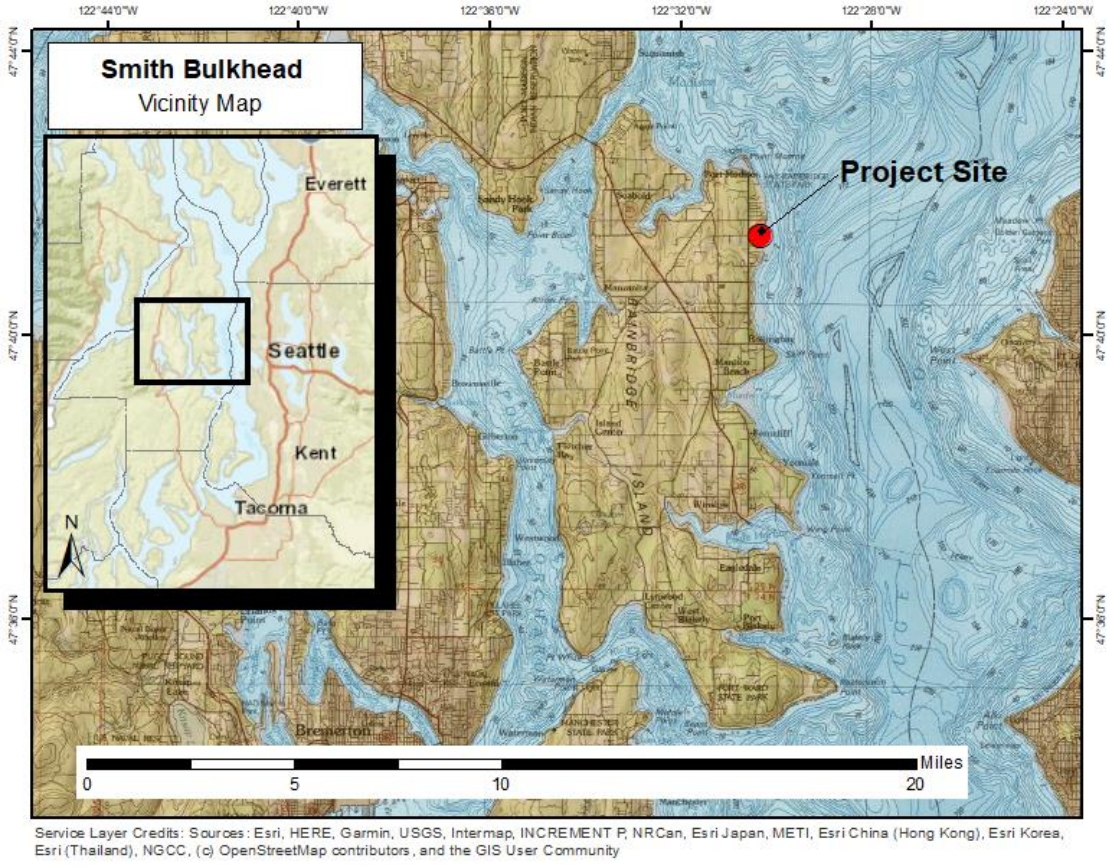
All shoreline development within the City of Bainbridge Island, regardless of whether a permit is required, must result in no net loss of ecological functions and processes necessary to sustain shoreline resources. To demonstrate that the no net loss standard is met, this project includes a Site-Specific Impact Analysis (SSIA). This analysis report describes existing conditions and ecological functions; the proposed project, mitigation sequencing and avoidance measures; and potential impacts from the project.

The project is a gravity rock bulkhead repair located at 10654 NE Manor Lane, Bainbridge Island, WA 98110 on the northeast shoreline of Bainbridge Island (Kitsap County Parcel Number 022502-1-035-2000).

Figure 1. Smith Bulkhead Vicinity Map



1 Project description

An existing gravity rock bulkhead has partially collapsed with rocks from the upper two rows fallen onto the beach just seaward of the bulkhead (Figures 5 & 6). The bulkhead is located along the MHHW mark, with MHHW (11.36 ft MLLW) approximately 8 ft seaward off the face of the bulkhead (Figure 3). The original height of the rock bulkhead was about 8 ft tall and currently stands about 4 to 6 feet in height. The project proposes 50% repair to an existing rock bulkhead by rebuilding the original 8-ft height using rocks that have fallen from the bulkhead out onto the beach.

The rocks will simply be placed back into place on top of the bulkhead. There will be no increase in footprint from original structure and no encroachment onto the beach. New rock will only be added as needed if the larger rocks break about when moving. No man-made material placed, including mortar or cement. Large wood and other vegetation will be left in place. Some trees and branches that have fallen from the bluff are scattered behind and along the bulkhead (Figure 5) but will be left in place.

Access to the site will be by barge. A tugboat will be used to push a barge up on the beach at a high tide to avoid prop impacts from the tugboat. A barge plan (Figure 4) illustrates the area where the barge will be landed. An excavator will be transported to the site on the barge and will be used from the beach to move the rocks back onto the bulkhead. The barge (90’ long x 35’ wide) will be positioned perpendicular to the beach to allow for the machine to get on and off as needed and as high up on the beach as possible. The closest the barge will likely be able to get to the bulkhead will be +/-50 ft.

The excavator will be stored on the barge when not in use. The barge will remain on site until work is completed and be securely anchored for rising tides. Depending on the tide elevations and windows of opportunity to work, the work is expected to take only a couple of days.

1.1 Action Area

The action area of the project includes the project footprint and any areas where staging, equipment, and storage may occur, including the barge operational area. The action area would also include any areas outside the work zone that could experience elevated noise levels (in air or water) or increased turbidity of marine waters. In-water noise will not be elevated by this project as all work will be done at low tides. In-air noise and suspended sediment in nearshore waters may travel a short distance and a conservative proposed action area to include these potential impacts is ¼ mile from the bulkhead footprint and barge operational area.

1.2 Site Description

The site is located along the northeastern shoreline of Bainbridge Island, on Puget Sound. The shoreline is exposed to wind generated waves with a maximum fetch overwater of 20 miles to the NE and SE (Aspect 2020).

1.3 Project Schedule

This work is proposed for August 2020 over one week. There is about a 6-hour work window each day with the tides.

1.4 Project Implementation

The current contractor in place to perform the project is:

Sealevel Bulkhead Builders, Inc.
PO Box 375
Kingston, WA 98346
(360) 297-2401 Office
(360) 297-2308 Fax
Jenny@sealevelbb.com
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2 Baseline environmental conditions

2.1 Site survey description and findings

An intertidal survey was performed on June 5, 2020 by Marine Surveys & Assessments (MSA) (Figure 7). The substrate was found to be primarily sand, cobble, and gravel with more shell hash and cobble at the seaward extent of the survey area. Areas of macroalgae were observed with the following percent cover: *Ulva* up to 100%, *Porphyra* up to 20%, *Mastocarpus* 1%, and foliose reds 1-5%. Aggregate anemones and one unattached stipe of *Saccharina* was observed (Appendix A). Eelgrass (*Z. marina*) was observed at the site 375 feet from the baseline (beyond the survey area) (Figure 7). The intertidal zone is relatively flat with very little slope. Elevations were not collected but the water's edge was recorded at -0.6 ft MLLW 900 feet seaward of the bulkhead. Large woody debris in the form of fallen trees and branches are scattered behind and along the bulkhead.

The site is characterized by accretion in summer and erosion with storms and wind-generated waves in winter. The long-term site trend is erosional with beach degradation and lowering over time (Aspect 2020). An earlier site visit by Aspect Consulting (January 2, 2020) described the beach was 50 ft wide at a +5 tide. The beach at the site was described as erosional with sediment transported northward; the drift cell traveling right to left (south to north) (Ecology 2003). The property to the north does not have a bulkhead and the bluff there is actively eroding (Aspect 2020).

2.2 Local Species & Habitats

The site is located on a shoreline designated as Shoreline Residential Conservancy by the City of Bainbridge Island (CoBI) Official Shoreline Designation Map (November 18, 2014). The area of the site directly adjacent to the intertidal zone is characterized by the CoBI Critical Areas Web Application as a Class U Erosion Hazard area and FEMA Special Flood Hazard Area (SFHA)

with high flood risk (CoBI 2020). According to the Washington State Gap Analysis from The Nature Mapping Foundation, several species of amphibians, birds, and mammals are present and/or breeding in Kitsap County that are used to identify areas of high conservation priority. The full list can be found in Appendix C.

2.3 State Species & Habitats

The marine waters directly adjacent to the site are designated as a WDFW Priority Habitat Estuarine and Marine Wetland. Several other Priority Habitats & Species (PHS) occur within ½ mile of the site and can be seen in Table 1.

Table 1. WDFW PHS within 1/2 mile of the site

Common Name	Species	Use of Area
Coho	*Oncorhynchus kisutch*	Occurrence/Migration
Surf Smelt	*Hypomesus pretiosus*	Breeding Area
Cutthroat	*Oncorhynchus clarki*	Occurrence
Coho	*Oncorhynchus kisutch*	Occurrence
Surf Smelt	*Hypomesus pretiosus*	Breeding Area
Resident Coastal Cutthroat	*Oncorhynchus clarki*	Occurrence/Migration
Pacific geoduck	*Panopea abrupta*	Presence
Little Brown Bat	*Myotis lucifugus*	Breeding Area (within Township)
Pacific geoduck	*Panopea abrupta*	Presence
Pacific Herring (Georgia Basin DPS)	*Clupea pallasi*	Breeding Area
Estuarine and Marine Wetland		Aquatic Habitat

Geoduck presence is also documented just offshore of the project location in the Shellfish and Invertebrates spatial database from WDFW Fish Program, WA Dept of Natural Resources, Puget Sound Nearshore Ecosystem Restoration Project (PSNERP 2019).

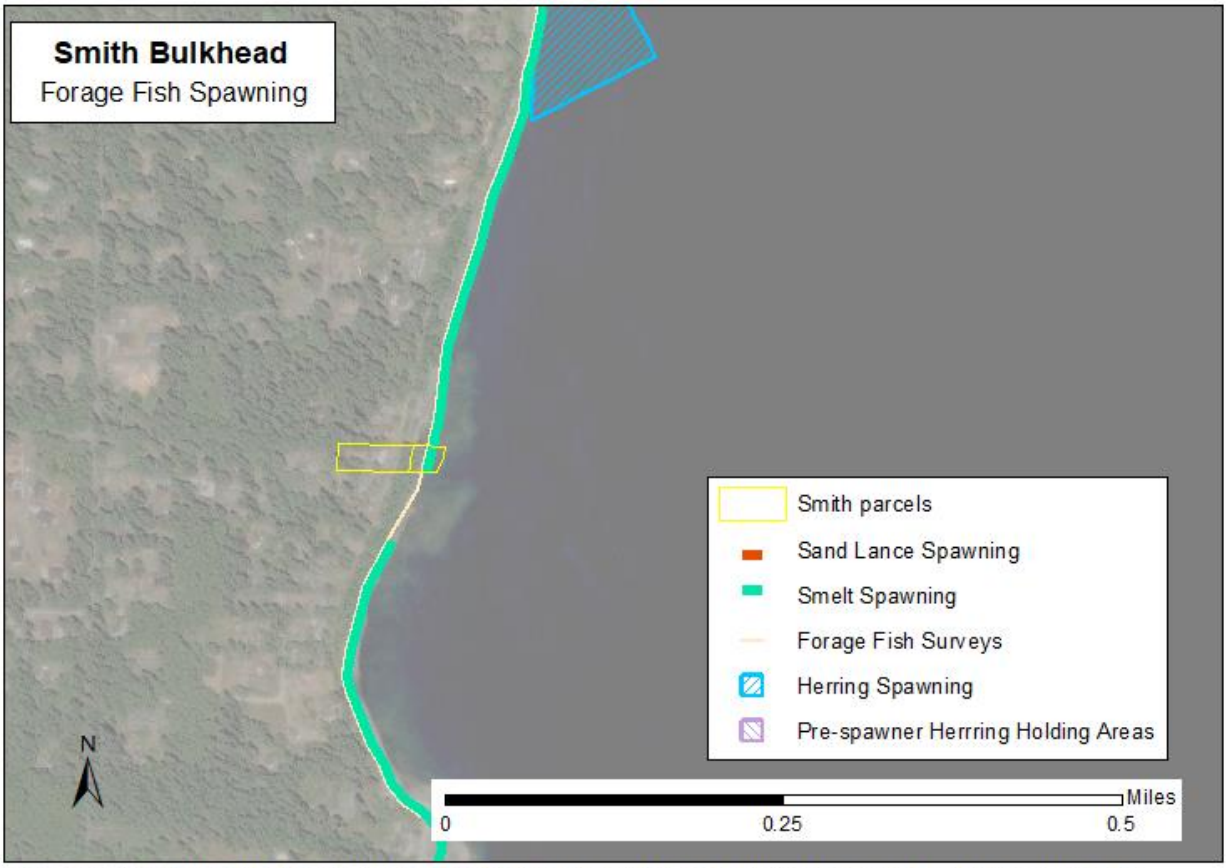
The Washington Department of Natural Resources (WA DNR) Shorezone Inventory indicates that there has been documented patchy eelgrass along this intertidal area, but there was no documented kelp, surfgrass, or salt marsh vegetation (WA DNR 2001). The area has not been surveyed by WA DNR annual monitoring under the Submerged Vegetation Monitoring Program in Central Puget Sound (WA DNR, 2012). During the site visit by MSA, dense eelgrass beds and patches were observed along the shore, starting 375 ft from the project site (Figure 8).

Based on an indication of surf smelt spawning documented in a WDFW forage fish survey performed 4/11/2017 (Figure 2), 1,000 linear ft of beach adjacent to the project site is designated as documented surf smelt spawning habitat (WDFW 2019). A pre-spawn herring holding area has been documented 1,500 feet (0.28 miles) north of the site. Because the project adjacent to

potential forage fish spawning habitat, an evaluation has been done for suitability of forage fish spawning at the site (Appendix A).

The WDFW Salmonid Stock Inventory (SaSI) documents presence of Coho in a small stream 0.3 miles south of the site (WDFW 2020). No other salmonid streams are documented near the site.

Figure 2. WDFW Forage Fish Spawning Habitat



2.4 Federal Species & Habitats

For each listed species with the *potential to be in the project action area*, the listing status, distribution of species, and relevant life history traits are presented in the sections below. Salmon species that utilize streams adjacent to the project site will also be included as they may migrate past the project site. National Oceanic and Atmospheric Administration (NOAA) Environmental Responses Management Application (ERMA) spatial data indicates the project and/or action area is within the critical habitat for the ESA species indicated in **Error! Reference source not found.** below.

Table 2. NMFS/USFWS Critical Habitat

NMFS/USFWS Critical Habitat	Action Area	Project Footprint
Final Nearshore Rockfish Critical Habitat (NMFS, 2014)	Y	Y
Final Deepwater Rockfish Critical Habitat (NMFS, 2014)	Y	N
Chum Salmon Critical Habitat (NMFS, 2005)	N	N
Marine Critical Habitat for Puget Sound Chinook Salmon (NMFS, 2005)	Y	Y
Freshwater Chinook Salmon Critical Habitat (NMFS, 2005)	N	N
Final Critical Habitat for Puget Sound Steelhead (NOAA, 2016)	N	N
Marine Critical Habitat Hood Canal Summer-run Chum Salmon (NMFS, 2005)	N	N
Southern Resident Killer Whale Critical Habitat (NMFS, 2006)	Y	Y
Steelhead Trout Critical Habitat (NMFS, 2005)	N	N
Bull Trout Final Critical Habitat (USFWS, 2010)	N	N
Marbled Murrelet (USFWS, 2016)	N	N
Leatherback Sea Turtle Critical Habitat (NMFS, 2012)	N	N
Green Sturgeon Critical Habitat (NMFS, 2009)	N	N
Southern Eulachon (NMFS, 2011)	N	N
Proposed Humpback Whale Critical Habitat (NMFS, 2019)	N	N

2.5 Status of Relevant Federally-listed species

For each listed species with the potential to be in the project action area, the listing status, distribution of species, and relevant life history traits of are presented below.

2.5.1 Puget Sound Chinook

The Puget Sound Chinook (*Oncorhynchus tshawytscha*) is listed under the Endangered Species Act (ESA) as threatened according to the National Marine Fisheries Service (NMFS) (Vol. 70, No. 123 / Tuesday, June 28, 2005 / Rules and Regulations). In addition, NMFS has designated critical habitat for 12 Evolutionarily Significant Units (ESUs) of West Coast salmon, including the Puget Sound Chinook Salmon ESU. The portion of the project footprint below the line of extreme high water is in an area designated as critical habitat for the Puget Sound Chinook ESU (70 FR 37160; June 28, 2005).

No Chinook-bearing streams are identified in the vicinity of the project according to queries of the Salmonid Stock Inventory (SaSI) data (WDFW 2020). However, Chinook may migrate and forage along the shoreline of Bainbridge Island.

Relevant life history: Puget Sound Chinook, also called king salmon, are distinguished from all other Pacific salmon by their large size. Most chinook in the Puget Sound are "ocean-type" and migrate to the marine environment during their first year (Myers, et al., 2000). They may enter estuaries immediately after emergence as fry from March to May at a length of 40 mm or they may enter the estuaries as fingerling smolts during May and June of their first year at a length of 60-80 mm (Healey, 1982). Chinook fry in Washington estuaries feed on emergent insects and epibenthic crustaceans (gammarid amphipods, mysids, and cumaceans). As they grow and move into neritic habitats, they feed on decapod larvae, larval and juvenile fish, drift insects, and euphausiids (Simenstad, Fresh, & Salo, 1982). These ocean-type chinook use estuaries as rearing areas and are the most dependent of all salmon species on estuaries for survival.

2.5.2 Puget Sound Steelhead

NMFS has listed the Puget Sound steelhead (*Oncorhynchus mykiss*) as a threatened species under the ESA (72 FR 26722; May 11, 2007). Critical habitat has been finalized for the Puget Sound steelhead distinct population segment (81 FR 9252; February 24, 2016).

No steelhead-bearing streams or critical habitat are identified in the vicinity of the project according to queries of the NOAA Critical Habitat spatial data and the Salmonid Stock Inventory (SaSI) data (NOAA ERMA 2020, WDFW 2020).

Relevant life history: steelhead is the name given to the anadromous form of the species O. mykiss. The freshwater residents are called Rainbow trout. Steelhead can return to the ocean after spawning and migrate to freshwater to spawn again, unlike Pacific salmon. Steelhead fry can spend one to two years in freshwater before heading to the open ocean, where they may stay for two to four years before returning to Washington streams.

2.5.3 Hood Canal Summer-run Chum

NMFS has listed the Hood Canal summer run chum ESU (*Oncorhynchus keta*) as threatened under the ESA (70 FR 37160; June 28, 2005). The project footprint is not located in designated as critical habitat for the Hood Canal summer run chum ESU (70 FR 52739; September 2, 2005), however the possibility of species presence must still be evaluated.

No Hood Canal chum-bearing streams were identified in the vicinity of the project according to queries of the Salmonid Stock Inventory (SaSI) data (WDFW 2020).

Relevant life history: In Puget Sound, chum spawning grounds are situated near coastal rivers and lowland streams. In Hood Canal, the summer-run stocks spawn from early-September to mid-October (WSCC 2002). Chum (along with ocean-type Chinook) spend more time in the estuarine environment than other species of salmon (Healey, 1982). Residence time in the Hood Canal ranges from 4 to 32 days with an average residence of 24 days (Simenstad, Fresh, & Salo, 1982). Juvenile chum consume benthic organisms found in and around eelgrass beds (harpacticoid copepods, gammarid amphipods and isopods), but change their diet to drift insects and plankton such as calanoid copepods, larvaceans, and hyperiid amphipods as their size

increases to 50 - 60 mm (Simenstad, Fresh, & Salo, 1982). Summer chum escapements in Hood Canal have generally experienced a continuous decline for the past 30 years. However, beginning in 2003, escapements began to increase. In 2004, the escapements were the highest recorded during the period that total spawner numbers have been estimated (1974-2004) (WDFW, 2005).

2.5.4 Bull Trout

All populations of bull trout (*Salvelinus confluentus*), including the Coastal-Puget Sound populations, were listed as threatened by the United States Fish and Wildlife Service (USFWS) in 1999 (64 FR 58910; November 1, 1999). USFWS designated critical habitat for bull trout in 2010 (75 FR 63898; October 18, 2010).

No bull trout presence or spawning/rearing streams have been identified in the action area and there are no current or historic records of presence in WRIA 15 (WDFW 2020). USFWS has not designated critical habitat for bull trout near the action area (75 FR 63898; October 18, 2010).

Relevant life history: coastal Puget Sound bull trout have ranged geographically from northern California (at present they are extinct in California) to the Bering Sea coast of Alaska, and northwest along the Pacific Rim to northern Japan and Korea. Bull trout are members of the char subgroup of the salmon family. Spawning occurs typically from August to November in streams and migration to the open sea (for anadromous populations) takes place in the spring. Eggs and juveniles require extremely cold water for survival. Temperatures in excess of about 15 degrees C are thought to limit bull trout distribution (Rieman & McIntyre, 1993). They live both in fresh and marine waters. Some migrate to larger rivers (fluvial), lakes (adfluvial), or saltwater (anadromous) before returning to smaller streams to spawn. Others (resident bull trout) complete all of their life in the streams where they were reared. Habitat degradation, dams and diversions, and predation by non-native fish threaten the Coastal Puget Sound population (Federal Register / Vol. 64, No. 210, 1999).

2.5.5 Rockfish

NOAA has listed the distinct population segments (DPSs) of yelloweye (*Sebastes ruberrimus*) as threatened species under the ESA and listed the Georgia Basin DPS of bocaccio rockfish (*Sebastes paucispinis*) as endangered (75 FR 22276; April 28, 2010). The Georgia Basin refers to all of Puget Sound, including the area around the San Juan Islands, and the Strait of Georgia, north to the mouth of the Campbell River in British Columbia. The western boundary of the Georgia Basin runs from east of Port Angeles to Victoria in the Strait of Juan de Fuca. Critical habitat for both species was designated in 2014 (79 FR 68042; November 13, 2014).

The subtidal zone of the project area is primarily sand, cobble, and gravel with more shell hash and cobble at the seaward extent of the survey area. Shallow, intertidal, nearshore subtidal waters in rocky, cobble and sand substrates (with or without kelp) can provide suitable substrate for juvenile (3-6 month old) bocaccio rockfish. However, the highest densities of juvenile rockfish

are found in areas with floating or submerged kelp species. No attached kelp was identified within the project area during the MSA habitat survey.

Relevant life history: bocaccio and yelloweye rockfish remain close to the surface as larvae and pelagic juveniles. As juveniles they settle to benthic environment. They prefer to settle in rocky reefs, kelp beds, low rock and cobble areas (Love, Yoklavich, & Thorsteinson, 2002). As both species grow larger they move into deeper waters. Adults are found around rocky reefs and coarse habitats. Adult yelloweye and bocaccio rockfish generally inhabit depths from approximately 90' to 1400' (Love, Yoklavich, & Thorsteinson, 2002). Both species are opportunistic feeders, with their prey dependent on their life stage.

2.5.6 Green Sturgeon

On April 7, 2006, NMFS determined that the Southern Distinct Population Segment of North American green sturgeon (*Acipenser medirostris*; hereafter, "Southern DPS") is at risk of extinction in the foreseeable future throughout all or a significant portion of its range and listed the species as threatened under the Endangered Species Act (ESA) (71 FR 17757). Southern DPS green sturgeon occupy coastal bays and estuaries from Monterey Bay, CA, to Puget Sound, WA and observations of green sturgeon in Puget Sound are much less common compared to the other estuaries in Washington. In 2006, two Southern DPS green sturgeon tagged in San Pablo Bay were detected near Scatchet Head, south of Whidbey Island. Activities of concern for green sturgeon occurring in Puget Sound include dredging and capping that could affect benthic habitats and alter water flow and water quality. However, the project action area and adjoining floodplain are well outside Southern DPS green sturgeon critical habitat and likelihood of this species in the action area is very low.

2.5.7 Marbled Murrelet

Marbled murrelets have been listed as threatened by the USFWS since 1992 (57 FR 45328; October 1, 1992). Critical habitat was designated by USFWS in 1996, revised in 2011, and reviewed again in 2016 to determine if the ESA definition of critical habitat was being met (81 FR 51348; August 4, 2016).

Relevant life history: marbled murrelets are small marine birds in the Alcidae family. They spend most of their time at sea and only use old growth areas for nesting. In the critical nesting areas, fragmentation and loss of old growth forest has a significant impact on the survival and conservation of the species (WDFW, 1993). Adult birds are found within or adjacent to the marine environment where they dive for sand lance, sea perch, Pacific herring, surf smelt, other small schooling fish and invertebrates.

2.5.8 Humpback Whale

NMFS has listed the humpback whale (*Megaptera novaeangliae*) as an endangered species (81 FR 62260; September 8, 2016) that may occur in Puget Sound and designated critical habitat for humpback whales has recently been proposed in Washington state in the Strait of Juan de Fuca

and Pacific (84 FR 54354; October 9, 2019). The project area is not within the proposed critical habitat. Humpback whales have been spotted in Puget Sound, but not in harbors or bays around Bainbridge Island (Orca Network, 2020).

Relevant life history: Due to excessive whaling practices, southern British Columbia and northern Washington State humpback whale population s significantly declined and were rarely seen in Puget Sound in the recent past (Angell & Balcomb III, 1982). However, sightings of humpback whales in Puget Sound have been rising over the past few years, particularly May through June (Orca Network, 2020).

2.5.9 Leatherback Sea Turtle

NMFS has listed the Pacific leatherback turtle (*Dermochelys coriacea*) as an endangered species that may occur in Puget Sound. There is designated critical habitat for Pacific leatherback turtles along the outer coast of Washington State, but there is no critical habitat within Puget Sound at this time.

Relevant life history: There is no breeding habitat for these sea turtles in Washington, even though they are occasionally seen along the coast (Bowlby, Green, & Bonnel, 1994). They are rarely seen in Puget Sound and it is highly unlikely that these turtles would be found near the project site or in the action area.

2.5.10 Southern Resident Killer Whales

On November 15, 2005 NMFS listed the Southern Resident killer whale (SRKW) (*Orcinus orca*) as endangered under the ESA (70 FR 69903; November 18, 2005). NMFS has designated critical habitat for killer whales: "Critical habitat includes waters deeper than 20 ft relative to a contiguous shoreline delimited by the line of extreme high water." (71 FR 69054; November 29, 2006).

Southern Resident killer whale critical habitat begins at water depths of 20’ in Puget Sound. The project site is in the high-intertidal zone and the beach slope at the site is extremely flat (0 ft MLLW is 900 feet from the shoreline), putting the bulkhead project at least ¼ mile from SRKW critical habitat.

3 Impact Avoidance and Minimization Measures

Mitigation sequencing, including the steps taken during project planning and implementation, are described in the project description as BMP’s and below as additional avoidance, minimization, and (if needed) rectification measures.

- The beach adjacent to the project site is designated as documented surf smelt spawning habitat (WDFW 2019). In Tidal Reference Area 5 (Seattle), where the project is located, the established work window for surf smelt is April 1 – August 31. Work will be performed during the work window to prevent impacts to any potential smelt spawning.

- There are several fallen trees and branches on and around the bulkhead (Figure 5). Because large wood debris provides an important ecological function along shorelines in Puget Sound (Holsman 2007), contractors will work around fallen trees as much as possible and leave them hanging over the bulkhead/on top of the bulkhead.
- Areas of macroalgae were observed adjacent to the bulkhead repair footprint: *Ulva* up to 100%, *Porphyra* up to 20%, *Mastocarpus* 1%, and foliose reds 1-5%. Eelgrass (*Z. marina*) was observed at the site 375 feet from the baseline (beyond the survey area). A barge plan has been developed to prevent impacts to *Z. marina*.
- Noise: Normal workdays will be scheduled Monday through Friday from 7 am – 7 pm to comply with the noise limitations outlined in Section 16.16.025 of the Bainbridge Island Municipal Code.

Best Management Practices (BMP's) will be implemented to avoid, reduce, or eliminate adverse impacts to the shoreline environment:

- Contact with all wildlife, nesting birds, and intertidal organisms should be avoided.
- Disturbance or removal of natural sediment, organic, matter, and vegetation is not required to access site and will not be needed for replacement of rock onto bulkhead.
- The excavator and any materials deployed for repairs will be removed from the intertidal zone onto the barge at the conclusion of operations each day before the tide rises.
- The excavator to be used on the beach uses biodegradable grease and vegetable-based hydraulic fluid. Spill kits will also be available on the barge.

The BMP's and the avoidance, minimization, and rectification measures above have been developed as effective measures to prevent permanent project-related impacts to shoreline ecological functions and values and have been developed in order to achieve City of Bainbridge Island No Net Loss criteria.

4 Impacts of Project

Potential impacts are presented and evaluated here in the context of the City of Bainbridge Island Shoreline Master Program, Federal and State listed species, and Priority Habitats. City of Bainbridge Island Site Specific Analysis guidelines require identification of any impacts from the proposed action including but not limited to dust, noise, vegetation removal or disturbance, additional impervious surface, placement of fill below the OHWM, aquatic habitat disturbance, and the interruption of nearshore sediment supply and beach formation. While permanent impacts to ecological function will be avoided through BMP's and management measures described in previous sections, some minor temporary impacts are likely to occur.

Habitat Complexity: Large wood debris contributes to habitat complexity, fish refuge, forage fish spawning habitat temperature and moisture moderation, and shoreline stabilization along

Puget Sound shorelines (Pentilla 2001, Holsman 2007). Armored beaches are associated with a reduction of large wood along the shoreline (Sobocinski 2010, Higgins et al. 2005).

This site includes large wood debris from fallen trees along the bluff. This large wood will be retained, and movement or removal will be avoided during the bulkhead restoration.

Submerged Aquatic Vegetation: *Ulva* and *Porphyra*, along with traces of *Mastocarpus* and foliose red algae have been identified in the area adjacent to the bulkhead repair. These species may be impacted during barge grounding, repair work, and transit by heavy equipment. The majority of aquatic vegetation here is *Ulva* (up to 100% cover) which is an abundant, ephemeral, and opportunistic species that can survive attached or unattached; there may be short-term impacts but *Ulva* it is not expected to be negatively impacted long-term. The barge will be in place for only a few days and anchored securely to prevent it drifting during high tides. Eelgrass (*Z. marina*) occurs offshore from the site with a bed beginning approximately 375 ft from shore. A barge management plan (Figure 4) will be in place that designates the barge landing zone to avoid and minimize impacts to *Z. marina*.

Benthic communities: Macrofauna was not observed during the habitat survey, but some crushing or smothering of benthic meiofauna may occur while moving large rocks during bulkhead rebuilding. The impacts will be relatively small in area and short in duration. These communities have been shown to recover quickly after more extensive sediment disturbances. For instance, most studies indicate that benthic prey resources are impacted temporarily by shellfish harvesting (Hall & Harding 1997; Hauton, Atkinson, & Moore 2004; VanBlaricom et al. 2015) but recovery of sediment structure and benthic invertebrate infaunal community is expected to occur rapidly (within 12 months) (Price 2011, Hall & Harding 1997, Spencer, Kaiser, & Edwards 1998).

Water quality: Short term impacts to water quality may include increased turbidity, primarily from loose sediment in areas where large rock has been moved. Increased turbidity can have adverse effects on salmonids and juvenile rockfish; the impact level depends on duration of exposure, concentration of turbidity, the life stage during the increased exposure and the options available for the fish to avoid the plumes. For this project, the impacts are expected to be localized and brief and fish would likely avoid any areas of increased turbidity. Juvenile rockfish have a strong association with kelp and rocky substrate which is not present within the project area and, thus, these fish species are not expected to be impacted. Due to the shallow project footprint and action area, it is highly unlikely that Southern Resident Killer Whales, humpback whales, or leatherback sea turtles would come into contact with any suspended sediments related to the project.

Noise: Air noise levels will be increased during barge and equipment use and may have temporary behavioral impacts to birds and other wildlife, primarily avoidance of the area. In-water noise levels will not be significantly affected.

5 No Net Loss Statement

Compensatory mitigation is not being proposed for the project since project-specific BMP's and mitigation sequencing (avoidance, minimization, and rectification measures) have been developed to address the impacts that could result in a loss of ecological function. Temporary impacts such as increased turbidity and noise and benthic disturbance will be minor and extremely brief; temporary impacts are expected to be offset by the long-term benefit of removal of introduced hard substrate (bulkhead rocks) from documented intertidal forage fish habitat adjacent to the shoreline at the site. Through the mitigation sequencing measures described herein, the proposed bulkhead repair will achieve No Net Loss criteria for the City of Bainbridge Island.

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Figure 3. Site plan and profile drawing of proposed bulkhead repairs.

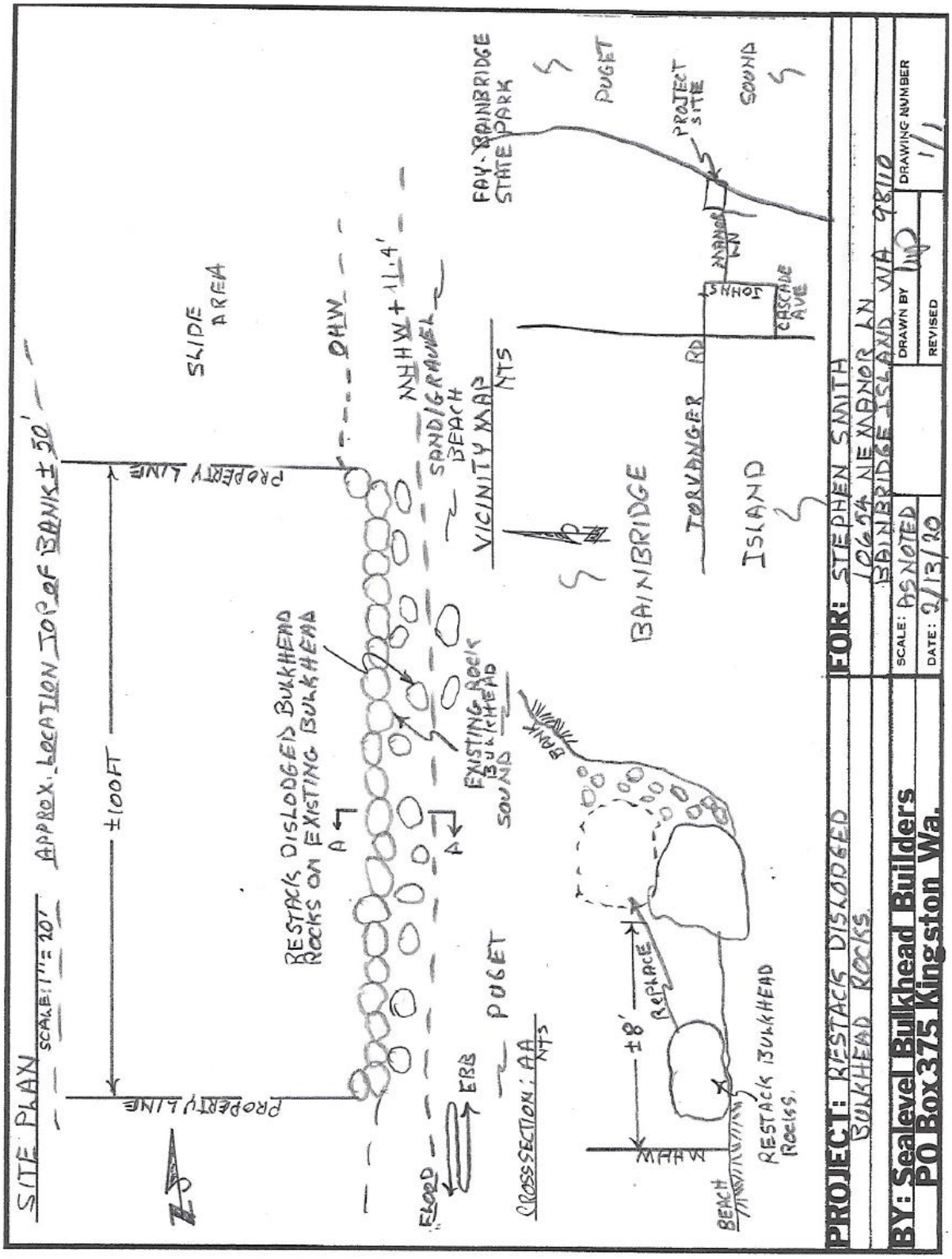


Figure 4. Barge Plan – Landing Area.

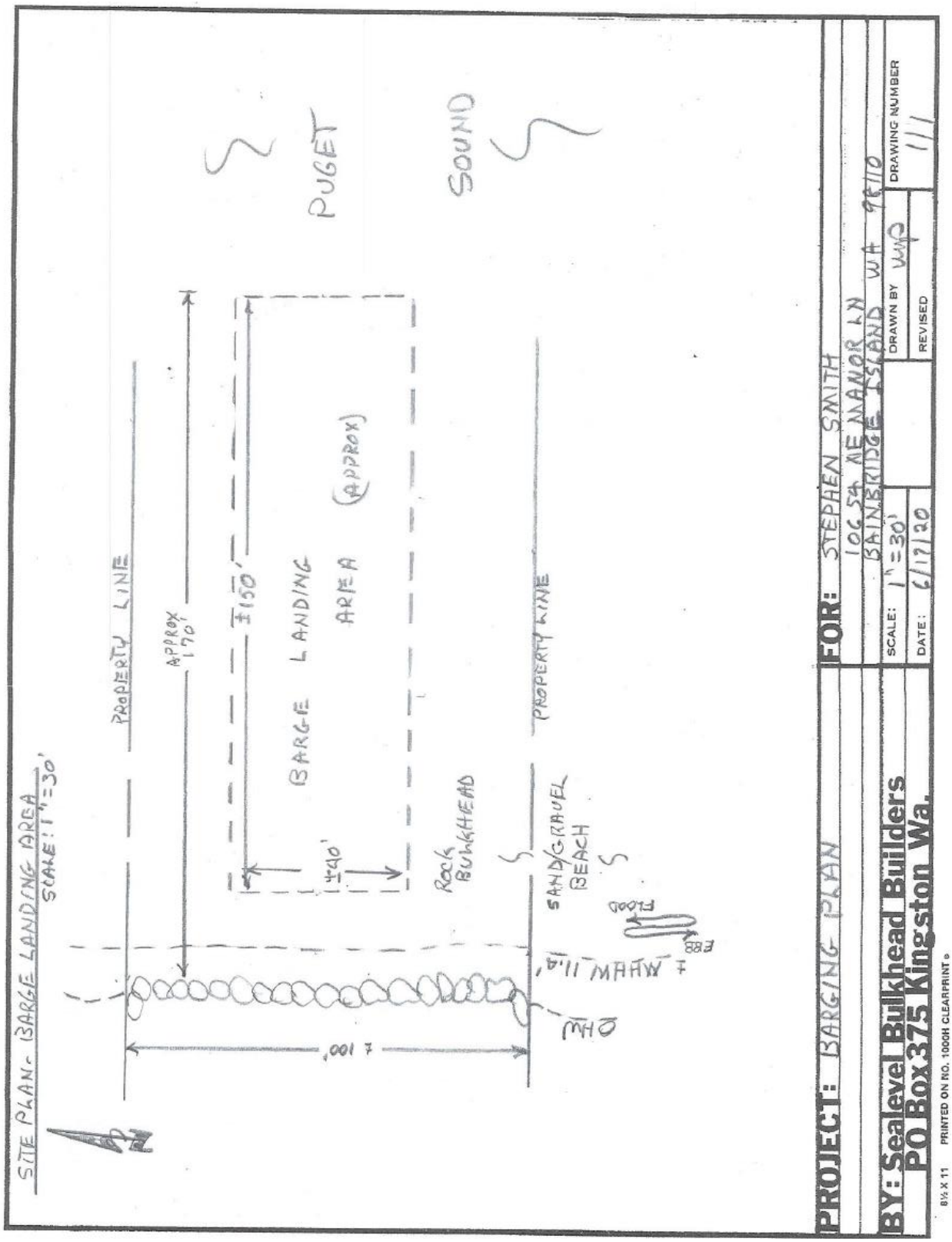
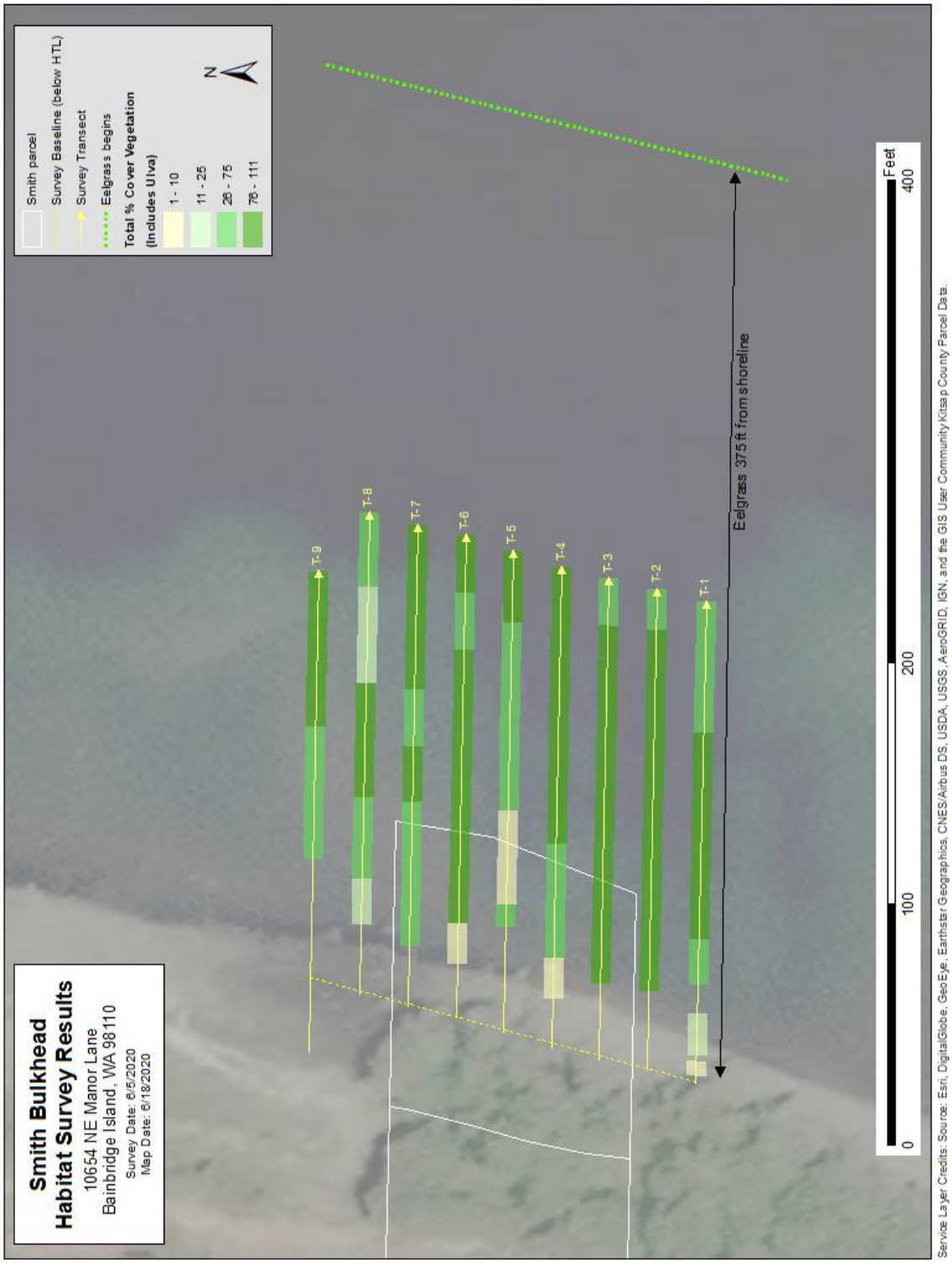


Figure 5. Looking north, upper intertidal zone and bulkhead repair area.

Figure 6. Looking south along upper intertidal zone and bulkhead.

Figure 7. Looking west at bulkhead repair area from mid-intertidal zone.
(red lines are approximate property boundaries)

Figure 8. Habitat Survey Results Map



Appendix A. Forage Fish Assessment

Because the project is adjacent to documented forage fish spawning habitat, an evaluation has been done for suitability of forage fish spawning at the site. A pre-spawn herring holding area has been documented 1,500 feet (0.28 miles) north of the site.

Based on an indication of surf smelt spawning documented in a WDFW forage fish survey performed 4/11/2017 (**Error! Reference source not found.**), 1,000 linear ft of beach adjacent to the project site is designated as documented surf smelt spawning habitat. Other surveys at this location have not found indications of forage fish spawning (Table 3).

Table 3. WDFW Forage Fish Survey Results at the Project Site

Survey Date	Station #	Smelt Indicator	Sand Lance Indicator	Latitude	Longitude
3/5/1992	6	Null	Null	47.68856	-122.50594
5/12/2016	4	Null	Null	47.68894	-122.50586
12/6/2006	24	Null	Null	47.69075	-122.50505

These fish are an important food source for a variety of consumers such as migrating salmon and bald eagles. Surf smelt do not have Federal or State concerned, threatened, or endangered status, while Pacific herring are a Federal Species of Concern and a State Candidate species.

Substrate/Elevation:

The substrate at the site above +7 ft MLLW, where surf smelt are known to spawn, is primarily sand, cobble, and gravel and could be suitable habitat for surf smelt.

In Tidal Reference Area 5 (Seattle), where the project is located, the established work window for surf smelt is April 1 – August 31. Work is proposed for August 2020 and will be performed during the work window to prevent impacts to any potential smelt spawning.

If, for any reason, work needs to be conducted in the intertidal zone at the site outside the surf smelt work window, MSA would recommend forage fish surveys be conducted once every two during construction activities.

Appendix B. Smith Bulkhead Habitat Survey Data

360-385-4073
msa@marinesurveysandassessments.com

380 Jefferson Street
Port Townsend WA 98368

Smith Bulkhead Repair Habitat Report
(to accompany Map dated 6/18/2020)

An intertidal survey was performed on June 5, 2020 (cloudy) from approximately 11:30 am to 1:30 pm at the project site located at 10654 NE Manor Lane, Bainbridge Island, WA 98110. Kimberly McClurg and Ioana Bociu from Marine Surveys & Assessments surveyed 9 transects in the area of a bulkhead repair to identify flora, fauna, substrate types and other qualitative information (Figure 7).

The survey transect baseline was seaward of the MHHW and (High Tide Line) HTL (which are located along the top of or behind the bulkhead that runs the shoreline at the site). Nine transects were surveyed from the baseline and transects were oriented perpendicular to the bulkhead. Transects were each 200 ft long and arranged from south to north, or when looking at the water from shore, from right to left (T1 to T9). Transects were separated from each other by 20 ft. The baseline for T9 was shifted inland by 20 feet because the shoreline recedes on the neighboring parcel where there is no bulkhead.

The substrate is primarily sand, cobble, and gravel with more shell hash and cobble at the seaward extent of the survey area.

Areas of macroalgae were observed with the following percent cover: *Ulva* up to 100%, *Porphyra* up to 20%, *Mastocarpus* 1%, and foliose reds 1-5%. Aggregate anemones and one unattached stipe of *Saccharina* was observed.

Eelgrass (*Z. marina*) was observed at the site 375 feet from the baseline (beyond the survey area).

The intertidal zone is relatively flat with very little slope. Elevations were not collected but the water's edge was recorded at -0.6 ft MLLW 900 feet seaward of the bulkhead.

Transect 1

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	sand	Barren
3	sand, cobble, gravel	*Ulva* 2%.
9	sand	Barren
12	cobble, gravel, sand	*Ulva* 20%; *Porphyra* 1%.
29	pebble, cobble, some sand	Barren

41	gravel, pea gravel, cobble	*Ulva* 50%.
60	gravel, cobble, some sand	*Ulva* 80%; *Porphyra* 2%; foliose reds 1%.
146	shell hash, gravel, cobble	*Ulva* 70%; *Porphyra* 3%; foliose reds 2%.
200	shell hash, gravel, cobble	*Ulva* 70%; *Porphyra* 3%; foliose reds 2%.

Transect 2

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	gravel, sand, pea gravel	Barren
26	small cobble, gravel	Barren
33	sand, gravel	*Ulva* 90%; *Porphyra* 5%.
64	small cobble, gravel	*Ulva* 90%; *Porphyra* 5%.
100	sand, scattered cobble	*Ulva* 90%; *Porphyra* 1%; foliose reds 1%.
132	cobble, shell hash	*Ulva* 100%; *Porphyra* 5%; *Mastocarpus* 1%; foliose reds 5%.
167	cobble, shell hash	*Ulva* 75%; *Porphyra* 10%.
183	cobble, shell hash	*Ulva* 20%; *Porphyra* 20%.
200	cobble, shell hash	*Ulva* 20%; *Porphyra* 20%.

Transect 3

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	gravel, sand, pea gravel	Barren
24	small cobble, gravel	Barren
32	sand, scattered cobble	*Ulva* 90%.
54	cobble, gravel, sand	*Ulva* 90%; *Porphyra* 5%.
109	sand, scattered cobble	*Ulva* 90%; *Porphyra* 1%; foliose reds 1%.
135	cobble, shell hash	*Ulva* 100%; *Porphyra* 5%.
167	cobble, shell hash	*Ulva* 75%; *Porphyra* 5%.
180	cobble, shell hash	*Ulva* 20%; *Porphyra* 20%.
200	cobble, shell hash	*Ulva* 20%; *Porphyra* 20%.

Transect 4

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	sand, pebble	Barren
2	cobble, gravel, pea gravel	Barren
21	cobble, gravel, pea gravel	*Ulva* 1%.
38	sand, cobble, shell hash	*Ulva* 40%; *Porphyra* 4%; *Mastocarpus* 1%.
85	cobble, shell hash, gravel, some sand	*Ulva* 90%; *Porphyra* 3%.
115	cobble, shell hash, gravel, some sand	*Ulva* 90%; *Porphyra* 2%.
200	cobble, shell hash, gravel, some sand	*Ulva* 90%; *Porphyra* 2%.

Transect 5

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	cobble, gravel, pea gravel, boulder	Barren
20	cobble, pea gravel, boulder	Barren
44	sand, shell hash, boulder	*Ulva* 30%.
53	sand	*Ulva* 10%.
92	sand, gravel, shell hash, some cobble	*Ulva* 50%.
116	sand, shell hash, cobble	*Ulva* 40%; *Porphyra* 0.5%; foliose reds 0.5%.
131	sand, cobble, shell hash	*Ulva* 60%; *Porphyra* 0.5%.
200	sand, cobble, shell hash	*Ulva* 60%; *Porphyra* 0.5%.
170	cobble, shell hash	*Ulva* 80%; *Porphyra* 0.5%; foliose reds 1%.

Transect 6

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	cobble, gravel, sand, pea gravel	Barren
22	cobble, gravel, sand, pea gravel	*Mastocarpus* 1%.
39	sand, gravel	*Ulva* 75%; foliose reds 1%.
54	small cobble, gravel	*Ulva* 90%; *Porphyra* 5%.
101	sand, small cobble	*Ulva* 90%; *Porphyra* 1%; foliose reds 1%.

152	sand	*Ulva* 50%; *Porphyra* 1%.
200	sand	*Ulva* 50%; *Porphyra* 1%.
176	cobble	*Ulva* 100%; *Porphyra* 1%.

Transect 7

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	sand, pea gravel	Barren
15	cobble, gravel, pea gravel	Barren
25	sand, scattered cobble	*Ulva* 25%; *Porphyra* 5%.
45	sand, gravel	*Ulva* 50%.
85	cobble, sand	*Ulva* 100%; *Porphyra* 1%; foliose reds 1%.
108	sand	*Ulva* 50%.
132	cobble, sand	*Ulva* 90%; *Porphyra* 1%.
200	cobble, sand	*Ulva* 90%; *Porphyra* 1%.

Transect 8

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	gravel, cobble, boulder	Barren
4	gravel, sand, some boulder	Barren
21	cobble, gravel, boulder	Barren
29	sand, cobble, boulder	*Ulva* 20%.
48	sand,boulder	*Ulva* 60%.
63	cobble, sand	*Ulva* 60%.
82	shell hash	*Ulva* 80%; *Porphyra* 10%.
129	sand, some shell hash	*Ulva* 20%.
169	sand, cobble, some shell hash	*Ulva* 60%.
182	shell hash, cobble, some sand	*Ulva* 70%.
200	shell hash, cobble, some sand	*Ulva* 70%.

Transect 9

Distance (Ft) along transect from baseline	Substrate and Other Features Noted	Macroalgae % Cover
0	sand, shell hash, pea gravel	Barren
14	large rock, sand, small cobble	Barren
37	sand	Barren
48	cobble, sand, gravel	Barren
81	sand	*Ulva* 50%.
110	sand, cobble, gravel	*Ulva* 20%; *Porphyra* 20%.
136	cobble, gravel	*Ulva* 90%; *Porphyra* 1%.
200	cobble, gravel	*Ulva* 90%; *Porphyra* 1%.

Appendix C. Washington Gap Analysis Project Species Predicted or Breeding in Kitsap County

184 Species Predicted or Breeding in:
Kitsap County

CODE	COMMON NAME	
	Amphibians	
RACAT	Bullfrog	
ENES	Ensatina	
AMMA	Long-toed salamander	
AMGR	Northwestern salamander	
PSRE	Pacific treefrog (Chorus frog)	
RAAU	Red-legged frog	
TAGR	Roughskin newt	
ASTR	Tailed frog	
PLVE	Western redback salamander	
BUBO	Western toad	
	Birds	
BOLE	American bittern	
FUAM	American coot	
COBR	American crow	
CIME	American dipper	
CATR	American goldfinch	
FASP	American kestrel	
TUMI	American robin	
HALE	Bald eagle	
COFA	Band-tailed pigeon	
HIRU	Barn swallow	
STVA	Barred owl	
CEAL	Belted kingfisher	
THBE	Bewick's wren	
PAAT	Black-capped chickadee	
PHME	Black-headed grosbeak	
DENI	Black-throated gray warbler	
DEOB	Blue grouse	
EUCY	Brewer's blackbird	
CEAM	Brown creeper	
MOAT	Brown-headed cowbird	
PSMI	Bushtit	
CACAL	California quail	
BRCA	Canada goose	
VISO	Cassin's vireo (Solitary vireo)	
BOCE	Cedar waxwing	
PARU	Chestnut-backed chickadee	
SPPA	Chipping sparrow	
ANCY	Cinnamon teal	
HIPY	Cliff swallow	
TYAL	Common barn-owl	
MERME	Common merganser	
CHMI	Common nighthawk	
COCOR	Common raven	

GAGA	Common snipe	
GETR	Common yellowthroat	
ACCO	Cooper's hawk	
JUHY	Dark-eyed (Oregon) junco	
PIPU	Downy woodpecker	
STVU	European starling	
COVE	Evening grosbeak	
ANST	Gadwall	
LAGL	Glaucous-winged gull	
AQCH	Golden eagle	
RESA	Golden-crowned kinglet	
PECA	Gray jay	
ARHE	Great blue heron	
BUVI	Great horned owl	
BUST	Green heron (Green-backed heron)	
PIVI	Hairy woodpecker	
EMHA	Hammond's flycatcher	
DEOC	Hermit warbler	
LOCUC	Hooded merganser	
ERAL	Horned lark	
CARME	House finch	
PADO	House sparrow	
TRAE	House wren	
VIHU	Hutton's vireo	
CHVO	Killdeer	
OPTO	Macgillivray's warbler	
ANPL	Mallard	
CIPA	Marsh wren	
ORPI	Mountain quail	
ZEMA	Mourning dove	
COVI	Northern bobwhite	
COAU	Northern flicker	
ACGE	Northern goshawk	
CICY	Northern harrier	
GLGN	Northern pygmy-owl	
STSE	Northern rough-winged swallow	
AEAC	Northern saw-whet owl	
COBO	Olive-sided flycatcher	
VECE	Orange-crowned warbler	
PAHA	Osprey	
EMDI	Pacific slope flycatcher (Western)	
PHPEL	Pelagic cormorant	
POPO	Pied-billed grebe	
CECO	Pigeon guillemot	
DRPI	Pileated woodpecker	
CAPI	Pine siskin	
CARPU	Purple finch	
PRSU	Purple martin	
LOXCU	Red crossbill	
SITCA	Red-breasted nuthatch	
SPRU	Red-breasted sapsucker	

BUJA	Red-tailed hawk	
AGPH	Red-winged blackbird	
AYCO	Ring-necked duck	
PHCO	Ring-necked pheasant	
COLI	Rock dove	
BOUM	Ruffed grouse	
SERUF	Rufous hummingbird	
PASA	Savannah sparrow	
ACST	Sharp-shinned hawk	
MELME	Song sparrow	
PORCA	Sora	
ACMA	Spotted sandpiper	
PIER	Spotted towhee (Rufous-sided)	
CYST	Steller's jay	
CAUS	Swainson's thrush	
DETO	Townsend's warbler	
TABI	Tree swallow	
CAAUR	Turkey vulture	
CHVA	Vaux's swift	
TATH	Violet-green swallow	
RALI	Virginia rail	
VIGI	Warbling vireo	
OTKE	Western screech-owl	
PILU	Western tanager	
COSO	Western wood-pewee	
ZOLE	White-crowned sparrow	
EMTR	Willow flycatcher	
WIPU	Wilson's warbler	
TRTR	Winter wren	
AISP	Wood duck	
DEPE	Yellow warbler	
DECOR	Yellow-rumped warbler	
	Mammals	
CASCAN	Beaver	
EPFU	Big brown bat	
URAM	Black bear	
RARA	Black rat	
LYRU	Bobcat	
NECI	Bushy-tailed woodrat	
MYOCA	California myotis	
SCOR	Coast mole	
CALAT	Coyote	
MIOR	Creeping vole	
PEMA	Deer mouse	
TADO	Douglas' squirrel	
CEEL	Elk	
MUER	Ermine	
MAPE	Fisher	
LACI	Hoary bat	
MUMU	House mouse	

MYKE	Keen's myotis	
MYLU	Little brown myotis	
MYEV	Long-eared myotis	
MYVO	Long-legged myotis	
MILO	Long-tailed vole	
MUFR	Long-tailed weasel	
SOME	Merriam's shrew	
MUVI	Mink	
APRU	Mountain beaver	
FECO	Mountain lion	
ODHEH	Mule deer	
ONZI	Muskrat	
GLSA	Northern flying squirrel	
RANO	Norway rat	
MYCO	Nutria	
ZATR	Pacific jumping mouse	
ERDO	Porcupine	
PRLO	Raccoon	
VUVU	Red fox	
LUCA	River otter	
NEGI	Shrew-mole	
LANO	Silver-haired bat	
LEAM	Snowshoe hare	
SPGR	Spotted skunk	
MEMEP	Striped skunk	
PLTOT	Townsend's big-eared bat	
TATO	Townsend's chipmunk	
SCTO	Townsend's mole	
MITO	Townsend's vole	
SOTRO	Trowbridge's shrew	
SOVA	Vagrant shrew	
DIVI	Virginia opossum	
CLCA	Western red-backed vole	
MYYU	Yuma myotis	
	Reptiles	
THSI	Common garter snake	
ELCO	Northern alligator lizard	
THOR	Northwestern garter snake	
CHPI	Painted turtle	
PSSC	Pond slider	
CHBO	Rubber boa	
THEL	Western terrestrial garter snake	