Northwest Maritime Center
Shoreline Storm Damage Repair

Biological Evaluation

September 17, 2021

For: Northwest Maritime Center
431 Water Street
Port Townsend, WA 98368

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1 Project Overview

1.1 Purpose

This Biological Evaluation (BE) has been prepared by Marine Surveys & Assessments (MSA) for the repair of the exposed foundation of a concrete pathway and beach stairs and to protect the first and second floor deck supports of the Northwest Maritime Center in Port Townsend WA. The shoreline has experienced chronic beach erosion during major storms over the last five years. This work will involve excavation and placement of fill below the High Tide Line (HTL) so it within U.S. Army Corps of Engineers (USACE) jurisdiction. The Endangered Species Act (ESA) requires preparation of this BE because it is a major construction project with a federal nexus.

Section 7(a)(2) requires Federal agencies to consult with the Services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or result in the destruction or adverse modification of designated critical habitat.

The purpose of this BE is to evaluate the potential effects of the proposed project on listed and proposed wildlife, fish, and plant species and designated or proposed critical habitats that are likely to occur in the vicinity of the project.

1.2 Applicant Information

Name: Northwest Maritime Center c/o Chris Hartley, facilities manager
Phone: (360) 385-3628 x 114
Mailing Address: 431 Water Street, Port Townsend, WA 98368

1.3 Project Location

Section 1, Township 30N, Range 1W

Site Address: 431 Water Street, Port Townsend, WA

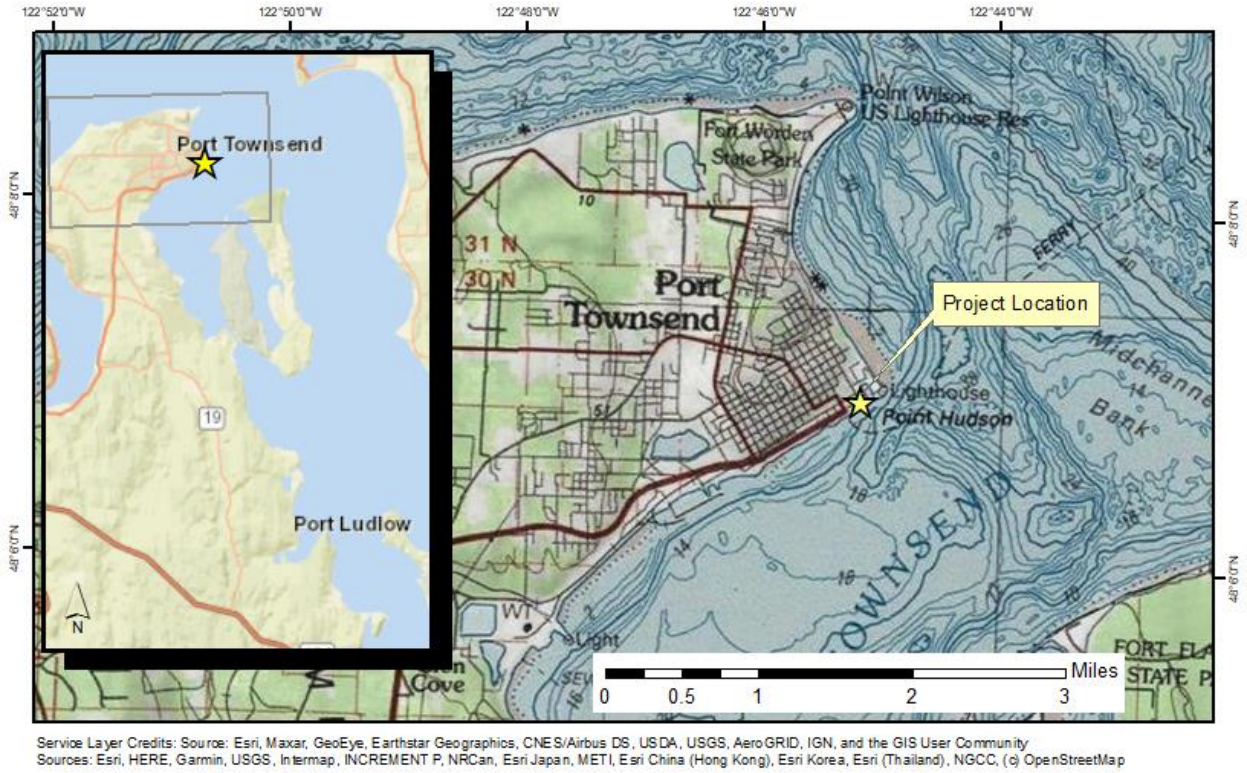
Parcel: 989700403 and 989700401 in Jefferson County

Latitude: 48.1158, Longitude: -122.7512

Waterbody: Port Townsend Bay

WRIA: 17 Quilcene-Snow

Figure 1. Vicinity map



1.4 Project Justification

As described in the project narrative prepared by Coastal Geologic Services:

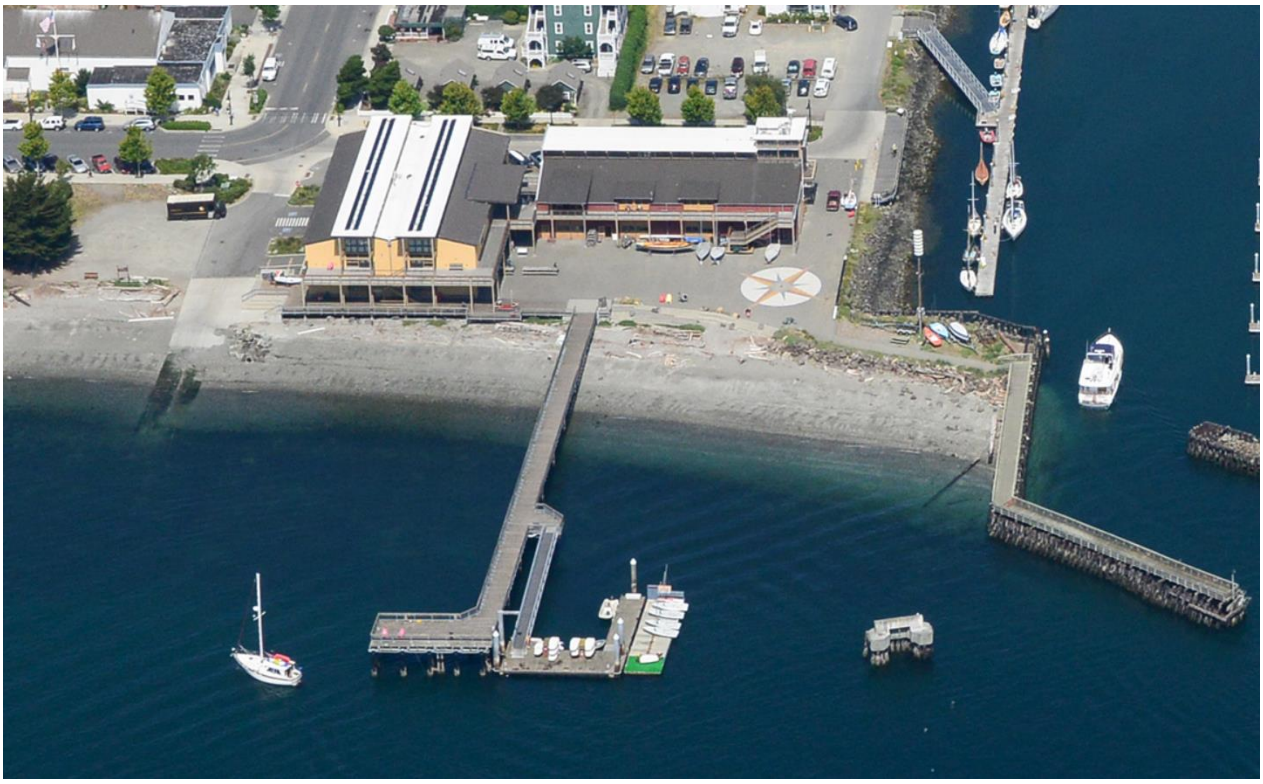
> The waterfront site is currently developed with a multi-purpose building and a hardscape staging area surfaced with pavers (Figure 2). A concrete stairway descends from the staging area to the beach. We understand that wave action during heavy storms has caused erosion around the stairway, and the base and sides of the structure are exposed and unsupported in some areas. Soil was also eroded from beneath the pavers in one area along the top of the stairway.
>
> The main observations and relevant information are summarized as follows:
>
> - Upper beach erosion and toe scour with exposure and loss of foundation base rocks was observed at the northeast end of the concrete pathway to the beach, which provides wheelchair beach access.
> - Toe line scour and base exposure were also observed along the toe of the concrete stairway leading to the North Beach. Similar toe line scour was seen at South Beach leading to the paved concrete boat ramp.

- Decorative landscaping boulders that had previously been integrated into the concrete structure were undermined and displaced due to toe scour beneath the boulders.
- At least one large log (we understand some were removed prior to 2018) that had been originally installed and anchored at the upper beach had been displaced. One approximately 40 ft-long log was found partially stuck under the porch deck. Evidence of impact and abrasion between the log and the metal truss (deck supporting member) was evident. Other large and small logs and wood pieces were scattered on the upper beach/backshore.
- The electric box and wire conduit (HDPE pipes) at the shore end of the pier on the beach side were broken and deformed, apparently damaged by debris impact during the recent storms.

The absence of regular, naturally-derived sediment supply from the surrounding shores to this site makes this site less resilient to erosive forces. The historical drift cell that ran for miles from the SW to NE to this site was interrupted by a number of large overwater structures in the downtown Port Townsend waterfront, virtually eliminating all-natural sediment supply. Unprotected beaches under current conditions at this site could continue to erode. To avoid the need to hard armor at the site over the intermediate-term, the buried, larger grain size sediment (cobble and gravel) upper portions of the upper beach through beach nourishment are included in the design. This should help dynamically maintain a slightly higher back beach elevation and help dissipate wave energy and reduce wave runup. Some maintenance in the form of re-nourishment would likely be needed over time.

As all previously installed protection logs were detached during storms and the beach has lowered, leaving the beach and the porch deck more exposed to storm wave attack. The upper beach elevation could be further lowered in a future storm which would allow more wave energy to reach the structures. Considering the limited under-deck clearance, future extreme high-water storms would put the porch/pier deck at the risk of under-deck wave impact (as occurs at the Cannery Building several blocks to the southwest). Therefore, a certain level of protection measures are warranted to reduce future risk potential. Purposely placed large boulders, scattered and in groups, should work effectively as debris barriers.

Figure 2. Close-up of Department of Ecology shoreline photo (dated 7/25/2016) to show project site



1.5 Project Description

As described in the project narrative prepared by Coastal Geologic Services:

> The project is to repair the exposed foundation of the concrete pathway and beach stairs at the plaza and to protect the first and second floor deck supports after chronic beach erosion during major storms in the last 5 years. The repair will involve excavating upper beach sand and gravel at the undermined concrete step foundations and placing deeply buried, small, angular rock (quarry spall) and pouring a new concrete footing (all below grade) to fill the voids and deepen the foundation to avoid re-exposure of the foundation.
>
> To prevent future toe scour and damage, existing upper beach sediment will be excavated, and cobble-gravel beach nourishment will be imported at the upper beach near the structure area to protect the structure against potential future toe scour. The cobble will extend as far waterward at elevation 7.7 ft MLLW, just above the MHHW line and be keyed below existing grade. Cobble will be placed starting 24 ft SW of the existing pier and 9 ft NE of the pier, for a total length of 128 ft. Most of the excavated sediment will be placed on top the imported cobble in a 0.5 ft thick surface layer.

Large boulders will be placed strategically as debris barriers to reduce wave and debris impact to deck and pier supports on the uppermost beach. A total of (8) 3-man, (14) 4-man, and (5) 5-man builders will be used. Boulders will be placed on buried quarry spall rock placed at least 1.0 ft below existing grade.

The displaced boulders and eroded upper beach have resulted in undermining the north bank adjacent to the concrete stairway shall be repaired by the excavation of existing beach sediment at the existing structure's toe and the placement quarry spall 9-21 inches below grade. Large boulders shall be placed scattered and in groups on beach grade.

To summarize the project actions:

1. **Concrete Foundation Repair**
    a. Excavate toe sand at the concrete foundation.
    b. Form a new concrete step/footing at the base of the existing footing.
    c. Deepen and widen the foundation toe line and fill the voids under the exposed parts of the concrete foundation with quarry spalls to avoid re-exposure of the foundation.

2. **Scour Control along Structure Toe Line on North Beach**
    a. Excavate existing beach approximately 1.75 ft below the existing grade.
    b. Introduce 1.5 ft minimum cobble-gravel beach nourishment at the upper beach near the structure. to raise the beach elevation and to protect the structure against toe line scour.
    c. Place 0.5 ft excavated beach sediment atop newly placed cobble.
    d. Place large boulders strategically as debris barriers to reduce wave and debris impact to structures.

3. **Revetment Repair at North Bank Adjacent to the Concrete Stairway**
    a. Place quarry spall 9-21 inches below grade.
    b. Place large boulders scattered and in groups on beach grade.

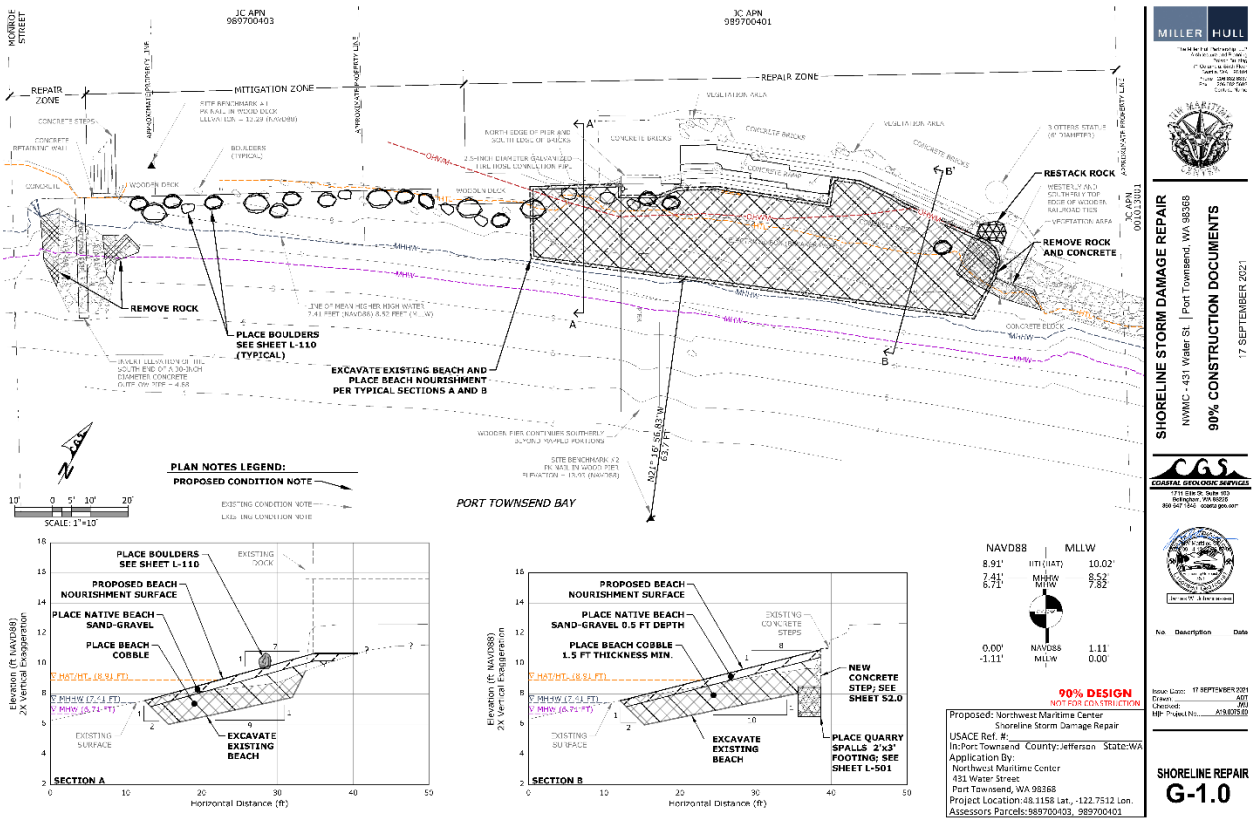
4. **Protection of Porch Deck at South Beach and Pier Deck at its Connection to Shore**
    a. Protect utility (water) pipes and supporting structural members beneath the porch deck, as well as the electric wire conduits beneath the pier.
    b. Place quarry spall 9-21 inches below grade.
    c. Place large boulders scattered and in groups on beach grade.

5. **South Stairs Repair**
    a. Remove existing scattered boulders from the beach surface.

b. Excavate sand at and the edge of the concrete.
c. Add concrete footing below existing paving.

Equipment and materials will access the site from the upland side of the project area, a barge will not be used. The contractor will complete the concrete work in the dry and will try to time the work so that it occurs during a low tide series in the summer to ensure wet concrete will not come in contact with seawater for at least seven days. If this is not possible, then plastic sheeting secured with sandbags may be used to keep the wet concrete from coming in contact with seawater while it cures for seven days. The proposed work can be seen in Figure 3.

Figure 3. Site plan of proposed shoreline repair



1.6 Action Area

The "project area" is the area where the work will occur. The project area also includes areas used for staging materials/equipment and accessing the site. The "action area" includes any areas with potential ecological effects from short-term construction activities or long-term habitat modification. This area includes potential turbidity and in-air noise effects from the use of large equipment during construction. The action area would likely extend no more than 0.25 mile to account for elevated noise from large equipment that will be used to move the boulders into position.

2 Baseline Environmental Conditions

The upper beach consists of gravel and shell hash on a sandy base with a narrow band of pea gravel and sand below MHHW (+8.52 ft MLLW) and a narrow band of sand above. Below approximately +6 ft MLLW, the substrate transitions into larger cobble. No attached submerged aquatic vegetation was found within the project area. There are a few large drift logs along the upper beach, next to the existing structures.

Figure 4. View of the beach on the north side of the pier

Figure 5. View of the beach on the south side of the pier

Washington State Department of Ecology's Coastal Atlas Map shows no appreciable drift along the shoreline and the slope stability is classified as "modified". The Coastal Atlas Map has also mapped the shoreline in front of the Northwest Maritime Center as an artificial pocket beach (Figure 6). Fringe (patchy) kelp and eelgrass is mapped along the project shoreline (WDNR 2001). The project site is not included in the Washington Department of Natural Resources' eelgrass monitoring data (WDNR); however, during a dive completed by MSA on September 9, 2021, eelgrass was observed over 200 ft from the OHWM, starting on the shoreward end of the L-shaped float as seen in Figure 2.

Figure 6. Artificial pocket beach at the project site

3 Species & Critical Habitat

3.1 State Priority Habitat & Species

Queries of the Washington State Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) data are summarized in

Table 1 below. Queries of WDFW's Salmonid Stock Inventory (SaSI) show no streams within the action area that are utilized by salmonids.

Table 1. WDFW PHS query results

Species or Habitat	Priority Area/Occurrence Type	Action Area	Project Footprint
Waterfowl concentrations-Port Townsend Shoreline	Regular concentration: Brant & Harlequin feeding areas	**Y**	**Y**
Estuarine and Marine Wetland	Aquatic habitat	**Y**	N
Pacific Sand Lance	Breeding area (~0.5 mi away)	N	N
Waterfowl concentrations-Hudson Point, Port Townsend	Regular concentration: waterfowl wintering & migration areas	**Y**	N
Purple martin (*Progne subis*)	Breeding area	**Y**	N

3.1.1 Forage Fish

Migrating salmon utilize baitfish such as Pacific herring (*Clupea harengus pallasi*), sand lance (*Ammodytes hexapterus*), and surf smelt (*Hypomesus pretiosus*) as prey resources. These forage fish form a very important trophic link between plankton resources and a wide variety of predatory marine organisms as well as providing food for marbled murrelets and bald eagles. According to WDFW, there is no documented forage fish spawning habitat along the shoreline at the project site; the nearest is sand lance spawning habitat approximately 0.5 mile southwest of the site (Figure 7).

Figure 7. WDFW documented forage fish spawning habitat

3.2 Federal ESA-listed Species & Critical Habitat

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. Species with critical habitat within the action area are summarized in Table 2 below and a detailed Assessment of Impacts to Critical Habitat is included with this report as an attachment for each species (see Attachments 2-4).

Table 2. National Marine Fisheries Service (NMFS) and U.S. Fish & Wildlife Service (USFWS) Designated 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)	**Y**	**Y**
Southern Resident Killer Whale Critical Habitat (NMFS, 2006)	**Y**	N
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

3.2.1 Puget Sound Chinook

Puget Sound Chinook (*Oncorhynchus tshawytscha*), also called the 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. 1998). 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 et al. 1982). These ocean-type Chinook use estuaries as rearing areas and are the most dependent of all salmon species on estuaries for survival.

The Puget Sound Chinook is listed under the Endangered Species Act (ESA) as threatened according to the National Marine Fisheries Service (NMFS) (70 FR 37160; June 28, 2005). 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 and action area below the line of extreme high water is in an area designated as critical habitat for the Puget Sound Chinook ESU (70 FR 52685; September 2, 2005).

The project site and action area are within Puget Sound Chinook critical habitat. There are no streams within the action area with documented Chinook presence (WDFW SaSI). The nearest stream with documented presence is the Dungeness River almost 20 miles to the west. However, since juvenile Chinook are very shoreline oriented, Chinook that utilize streams to the south in the Hood Canal may migrate and forage along the shoreline at the project site.

An "Assessment of Impacts to Critical Habitat" is provided in Attachment 2.

3.2.2 Hood Canal Summer-run Chum

In Puget Sound, chum spawning grounds are situated near coastal rivers and lowland streams. Puget Sound chum typically spawn from September to March (WSCC 2003). 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 et al. 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 et al. 1982). Chum move offshore and switch diets when presented with a lack of food supply (Simenstad et al. 1982).

NMFS has listed the Hood Canal summer-run chum ESU (*Oncorhynchus keta*) as threatened under the ESA (70 FR 37160; June 28, 2005). NMFS designated critical habitat for the Hood Canal summer-run chum ESU shortly after (70 FR 52739; September 2, 2005) and it includes the entire Hood Canal and contiguous shoreline north/northwest, ending past Dungeness Bay near Sequim.

The project site and action area are within Hood Canal summer-run chum critical habitat. There are no streams within the action area with documented summer chum presence; the nearest is Chimacum Creek almost 5 miles to the south (WDFW SaSI). Since juvenile chum are dependent on nearshore habitats, it is likely this species may migrate and forage along the shoreline at the project site.

An "Assessment of Impacts to Critical Habitat" is provided in Attachment 2.

3.2.3 Bull Trout

In the United States, Coastal-Puget Sound bull trout (*Salvelinus confluentus*) used to range from northern California (now extinct in California) to Alaska. In the salmon family, they are members of the char subgroup. Spawning occurs typically from August to November in streams and migration to the open sea (for anadromous populations) takes place in the spring. Very cold water is required for the survival of eggs and juveniles. 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 (64 FR 58910; November 1, 1999).

All populations of bull trout, 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).

The project site and action area are not within bull trout critical habitat. According to SaSI data, the nearest documented bull trout presence is in the Dungeness River almost 20 miles west of the project site (WDFW). There are streams in the Hood Canal that are utilized by bull trout so it is possible this species may migrate past the project site.

3.2.4 Puget Sound Steelhead

Steelhead is the name given to the anadromous form of the species *Oncorhynchus 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. The majority of juvenile steelhead downstream migration occurs in the spring and summer (WSCC 2003). Steelhead migrate quickly through Puget Sound and into the open sea as individuals or in small groups (PSEMP 2012). In one study, they were found to have a median residence time in the Hood Canal of eight days (Moore et al. 2010). Unlike Chinook, steelhead do not have a long-term feeding and growth period in Puget Sound nearshore areas (PSEMP 2012).

NMFS has listed the Puget Sound steelhead 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).

The project site and action area are not within Puget Sound steelhead critical habitat. The nearest critical habitat is in Chimacum Creek 5 miles south of the site where winter steelhead are documented (WDFW SaSI). Juvenile steelhead are less shoreline oriented than Chinook and chum and migrate rapidly to the Pacific Ocean, therefore, it does not seem likely that they will utilize the project shoreline.

3.2.5 Rockfish

Bocaccio (*Sebastes paucispinis*) and yelloweye (*Sebastes ruberrimus*) rockfish remain in the upper part of the water column as larvae and pelagic juveniles. Around 3 to 6 months old, bocaccio rockfish settle into intertidal, nearshore habitat; they prefer to settle in rocky reefs, kelp beds, low rock, and cobble areas (Love et al. 2002). Juvenile yelloweye rockfish are usually found in the upper extent of the adult depth range instead of in intertidal habitat (Studebaker et al. 2009). As both species grow larger, they move into deeper waters. Adults are found around rocky reefs and coarse habitats. Marine habitats high in complexity are associated with higher numbers of rockfish species (Young et al. 2010). Adult yelloweye and bocaccio rockfish generally inhabit depths from approximately 90 ft to 1,400 ft (Love et al. 2002). Both species are opportunistic feeders, with their prey dependent on their life stage. Predators of adult rockfish include marine mammals, salmon, other rockfish, lingcod, and sharks.

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 proposed project and action area falls within the nearshore rockfish critical habitat; deepwater rockfish critical habitat is present within the action area. Although these species have the potential to be present within the action area, the effects of this project are expected to be minimal, if at all. Adult rockfish are commonly found in deeper water than exists at the project site. Shallow, intertidal, nearshore 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. The proposed work is occurring high in the upper intertidal zone (which is devoid of any attached submerged aquatic vegetation) at low tide so it does not seem likely this species would be adversely affected.

An “Assessment of Impacts to Critical Habitat” is provided in Attachment 3.

3.2.6 Marbled Murrelets

Marbled murrelets (*Brachyramphus marmoratus*) 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 (WDW 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.

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).

There is no critical habitat mapped in or near the project site or action area. Marbled murrelets could potentially forage in the area when sand lance are spawning to the south, outside of the action area. However, there should be little, if any, impact to this species from the proposed project.

3.2.7 Humpback Whales

NMFS has listed the humpback whale (*Megaptera novaeangliae*) as an endangered species that may occur in Puget Sound (81 FR 62260; September 8, 2016). Critical habitat was designated by NMFS in 2021, but does not include the action area (86 FR 21082; April 21, 2021).

In the North Central Puget Sound sub-basin in the last two years, there have been 0-2 sightings in the summer with more sightings around the southern end of Whidbey Island in the fall. Since the furthest waterward extent of the action area is to account for in-air noise from construction equipment, it seems unlikely humpback whales would be adversely affected by this project since the work will be done in the dry in the upper intertidal zone, and therefore, no elevated in-water noise.

3.2.8 Southern Resident Killer Whales

The Southern Resident population consists of three pods: J, K and L. According to Wiles (2004), “While in inland waters during warmer months, all of the pods concentrate their activity in Haro Strait, Boundary Passage, the Southern Gulf Islands, the eastern end of the Strait of Juan de Fuca and several localities in the southern Georgia Strait.” During early autumn, these pods, especially J pod, extend their movements into Puget Sound to take advantage of the chum and Chinook salmon runs. Resident killer whales spend more time in deeper water and only occasionally enter water less than 5 meters deep (Baird 2001).

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).

Only the most waterward portion of the action area is in designated SRKW critical habitat. According to the Southern Resident Killer Whale Sighting 1990-2013 map (Olson 2014), in quadrant #387 (which encompasses the water east of Port Townsend) there were the following sightings:

- January: 10
- February: 9
- March: 8
- April: 0
- May: 2
- June: 1
- July: 2
- August: 2
- September: 6
- October: 22
- November: 22
- December: 26

Since the furthest waterward extent of the action area is to account for in-air noise from construction equipment, it seems unlikely SRKW would be adversely affected by this project since the work will be done in the dry and there will be no elevated in-water noise. Any other effects from the project are unlikely to extend into SRKW habitat since the project is occurring high on the shoreline.

An “Assessment of Impacts to Critical Habitat” is provided in Attachment 4.

3.2.9 Leatherback Sea Turtle

NMFS has listed the Pacific leatherback turtle (*Dermochelys coriacea*) as an endangered species that may occur in Puget Sound (35 FR 8491). There is no designated critical habitat for Pacific leatherback turtles in Puget Sound at this time; it is designated along the outer coast of Washington state (77 FR 4170; January 26, 2012).

Breeding habitat for leatherback sea turtles in Washington does not exist, even though they are occasionally seen along the coast (Bowlby et al. 1994). Leatherback sea turtles are rarely seen in

Puget Sound (McAllister, pers. comm.). It is highly unlikely leatherback turtles would be found near the project site.

4 Effects of the Action

When reviewing all the data, the direct and indirect effects of the project on the listed species and their critical habitat should be considered. Impacts to ESA-listed species and critical habitats are based on current baseline conditions versus historic pre-development conditions, where existing structures are considered an element of the environmental baseline at the time of a proposed action.

4.1 Direct Effects

When considering the direct effects of the proposed project, one must determine if the proposed project will immediately reduce or destroy the listed species and/or their habitat. The potential, direct effects caused by the construction process include noise and turbidity.

4.1.1 Water Quality

This project is in an area that already experiences somewhat degraded water quality. In the action area, Port Townsend Bay has water designated as Category 4c for impaired eelgrass beds at the Port Townsend Ferry Dock "due to inorganic nitrogen loading resulting in human-caused eutrophication" (ECY).

Increased turbidity caused by the disturbance of loose sediment on the beach during excavation could have adverse effects on salmon and bull trout. 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. The effects can be discussed in terms of lethal, sublethal or behavioral (Nightingale and Simenstad 2001).

Variations in suspended sediment concentration can also negatively impact species composition, biomass, algal growth and can affect secondary production as well (Newcombe and MacDonald 1991; Kahler et al. 2000). Filter feeders can have blockages in feeding structures which affects their feeding efficiency, in turn reducing growth rates, increasing stress or in some cases can result in death (Newcombe and MacDonald 1991). Suspended sediments can also impact salmonid fishes by increasing mortality rate, reducing growth rate and/or reducing resistance to disease, modifying natural movements, interfering with development, reducing prey abundance and fish catch methods (Newcombe and MacDonald 1991).

Another potential source of degraded water quality is the alteration of pH in marine waters exposed to uncured concrete (which is alkaline). Most fish species and many invertebrates have narrow ranges of pH tolerance with potential adverse health and fitness effects outside their optimal range (WDFW 2009). The Washington Department of Ecology water quality standards

for pH in marine waters is 7.0 to 8.5, with a strict threshold of human-caused variation of less than 0.2 units for the aquatic use category (WECY 2015). However, pH is unlikely to be significantly affected by the small area of concrete being poured in the high upper-intertidal zone (above the HTL) because this elevation rarely gets inundated (WDFW 2009, WECY 2015).

For this project, since the majority of the work (i.e. excavation and placement of beach nourishment) will be done in the high upper-intertidal zone (above MHHW) in the dry, turbidity effects are expected to be localized and brief, it at all. Any disturbed sediment that may become suspended on an incoming tide is not anticipated to stay suspended for more than one tidal cycle.

4.1.2 Noise

Work will occur in the dry at low tide so in-water noise levels are not expected to be affected. However, in-air noise levels will be increased during equipment use and may have temporary behavioral impacts to birds and other wildlife, such as avoidance of the area. Work will occur only during daylight hours to comply with local noise ordinances.

4.2 Indirect Effects

When considering the indirect effects of the proposed project on the listed species and their habitat, one must determine the effects that might occur later in time, after completion of the project.

4.2.1 Sediment Transport and Supply

Hard armoring, such as bulkheads, block sediment supply from entering the marine environment. Physical changes in beach structure, specifically beach narrowing and lowering, from reduced sediment input are also linked to biological effects. Most directly, forage fish spawning habitat in the upper intertidal zone may be degraded in both extent and quality (Penttila 2007). Surf smelt spawn in the intertidal zone of beaches comprised of mixed sand and gravel and spawning suitability can be impacted by nearshore development. Shoreline structures may reduce fine-grained spawning substrates, resulting in coarsening substrate that is unsuitable for spawning. Substrate on the beach was determined by MSA to be potentially suitable forage fish spawning habitat.

However, the project shoreline is not a feeder bluff and it is along a part of the shoreline that has “no appreciable drift” (ECY). As stated by Coastal Geologic Services:

> The absence of regular, naturally-derived sediment supply from the surrounding shores to this site makes this site less resilient to erosive forces. The historical drift cell that ran for miles from the SW to NE to this site was interrupted by a number of large overwater structures in the downtown Port Townsend waterfront, virtually eliminating all-natural sediment supply. Unprotected beaches under current conditions at this site could continue

to erode. To avoid the need to hard armor at the site over the intermediate-term, the buried, larger grain size sediment (cobble and gravel) upper portions of the upper beach through beach nourishment are included in the design. This should help dynamically maintain a slightly higher back beach elevation and help dissipate wave energy and reduce wave runup. Some maintenance in the form of re-nourishment would likely be needed over time.

Therefore, sediment supply and transport is not expected to be impacted by this project. This project should help retain sediment on the upper beach through beach nourishment and the strategic placement of large boulders to further help dissipate wave energy and act as debris barriers.

4.2.2 Riparian Vegetation

Surf smelt spawning habitat in the upper intertidal zone is impacted by the removal of riparian vegetation, which can reduce shade and result in increased egg mortality (Penttila 2007). Loss of riparian vegetation also alters allochthonous input (reduced inputs of leaf litter, woody debris, and terrestrial insects) and can result in a loss of large woody debris (LWD) in the marine environment (reducing complex intertidal habitat) (WDFW 2009).

The upland area of the project site is completely developed with paved surfaces and buildings. No riparian vegetation will be removed. A small planting plan can be installed if deemed necessary by the permitting agencies. This would involve the planting of a 356 ft^2 area with American dunegrass (*Elymus mollis*) on the north side of the existing pier, in front of the paved terrace.

4.2.3 Benthic Communities

Some disturbance, crushing, or smothering of benthic meiofauna in the extreme upper intertidal zone may occur while stockpiling materials and operating equipment in the intertidal work corridor. The impacts will be relatively short in duration and will occur within the recommended 25-ft work corridor in the upper intertidal zone.

No benthic macrofauna was noted in the upper intertidal zone of the project area. Invertebrate benthic 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 et al. 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 et al. 1998).

4.3 Cumulative Effects

Cumulative effects from future state, local, or private entities are reasonably certain to occur in the action area are anticipated for this project. The action area includes commercial shoreline properties (including a marina) within 0.25 mile of the project site. The proposed project would facilitate continued habitat alteration along the shoreline and may promote future maintenance activities. The influence of these activities cannot be quantified in this assessment, but with appropriate regulations in place, these activities are not anticipated to have an adverse effect on state and ESA-listed species and/or critical habitat.

4.4 Interrelated/Interdependent Effects

Completion of this project is not anticipated to promote future construction or other activities that would not otherwise occur without its completion. Therefore, no additional interrelated or interdependent actions that could affect species regulated under ESA are anticipated to occur because of this project.

5 Conservation Measures to Avoid & Minimize Impacts

Conservation measures presented here include avoidance and minimization measures that are intended to address both City of Port Townsend SMP criteria and FEMA requirements. The FEMA requirements pertain to marine critical habitat and ESA-listed species within the adjoining floodplain.

All shoreline development must be located, designed, constructed, and maintained in a manner that protects ecological functions and ecosystem-wide processes. This section describes the steps taken during project planning and implementation to find the least environmentally damaging practicable alternative to achieve the project goal.

The following mitigation sequencing steps, as described in WAC 173-26-201(2)(e), were considered during project development and site selection:

- **No action:** To avoid the adverse impact altogether by not taking a certain action or parts of an action.
    - The project purpose and need are described in more detail in the Project Description section. “No Action” would not achieve the project goal of repairing damage from erosion and preventing damage from future erosion.
- **Minimizing impacts** by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts.
    - Instead of using hard armoring along the shoreline, the proposal involves beach nourishment and the strategic placement of large boulders to help dissipate wave energy and act as debris barriers.

- **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment.
    - Beach nourishment will be placed to help replace substrate on the upper beach as well as to help prevent erosion around existing structures. It is also proposed to remove a portion of the armor rock on the intertidal beach surrounding the stormwater culvert along the SW end of the site, and to remove rock boulders from the upper beach just NE of the NE end of the concrete stairway near the plaza and move them to the eroded low bank immediately adjacent above elevation +11 ft MLLW (Figure 6).
- **Reducing or eliminating** the impact over time by preservation and maintenance operations.
    - Coastal Geologic Services estimates that there may need to be some maintenance in the form of beach re-nourishment over time.
- **Compensating** for the adverse impact by replacing, enhancing, or providing substitute resources or environments.
    - If needed, a planting plan may be installed which would include the planting of a 356 ft^2 area with American dunegrass (*Elymus mollis*) on the north side of the existing pier, in front of the paved terrace (Figure 7).
- **Monitoring** the impact and the compensation project and taking appropriate corrective measures.
    - If a planting plan is implemented, monitoring of installed vegetation for compensatory mitigation should occur over the next 5 years to ensure success.

In order to minimize potential impacts to listed species and habitat associated with this project, the following conservation measures are recommended by MSA for implementation at the site:

1. "Best Management Practices" (BMPs) will be exercised throughout this project
    a. Care will be taken to contain all construction debris.
    b. Training for all employees on emergency spill response and containment.
    c. Daily housekeeping to ensure debris does not enter the water/area adjacent to the work site.
    d. Equipment shall be operated in a way that minimizes turbidity, such as running equipment and stockpiling materials within a designated corridor on the beach.
    e. The concrete work will occur in the dry at low tide, preferably during a low tide series in the summer to allow the concrete to cure for at least seven days before it comes in contact with seawater. If this is not possible, then plastic sheeting secured with sandbags may be used to keep the wet concrete from coming in contact with seawater while it cures for seven days.
2. For work occurring outside of the established sand lance work window for Tidal Reference Area 10 (March 2 to October 14), a forage fish survey must be completed by a WDFW-certified biologist to determine presence/absence of eggs before any work begins.

An in-water work window is not being proposed for this project since the work will take place at low tide in the dry and to allow the contractor to take advantage of the best low tide cycles throughout the summer.

5.1 Potential Mitigation

To summarize, potential mitigation targets identified by Coastal Geologic Services on site include:

- Remove rock boulders from the upper beach just NE of the NE end of the concrete stairway near the plaza—move to the eroded low bank immediately adjacent above elevation +11 ft MLLW (Figure 8).
- Remove a portion of the armor rock on the intertidal surrounding the stormwater culvert along the SW end of the site (Figure 8).
- Install small 356 ft^2 planting area in uppermost beach/backshore. This would involve the planting of American dunegrass (*Elymus mollis*) on the north side of the existing pier, in front of the paved terrace (Figure 9).

Figure 8. Landscape site plan

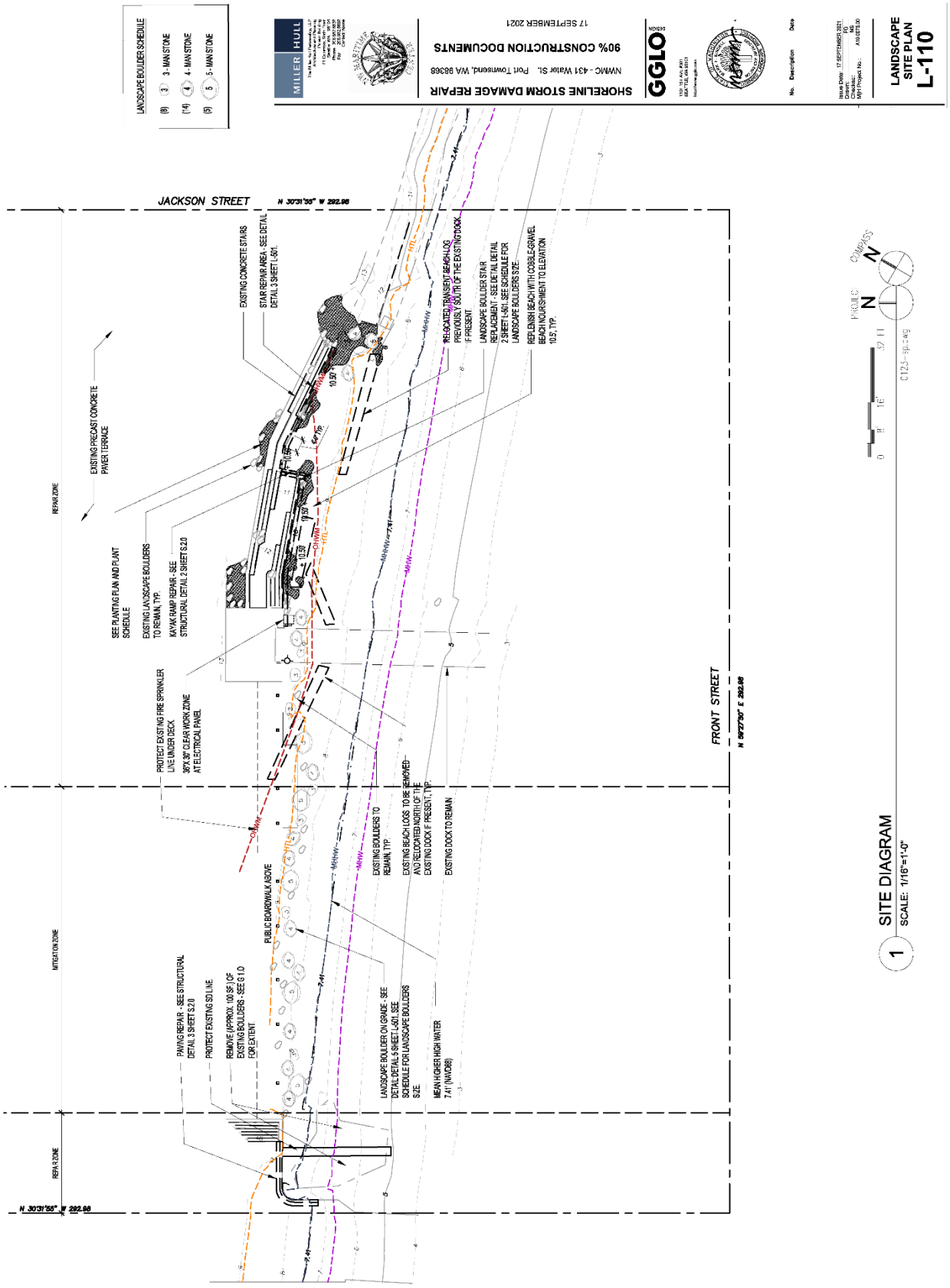
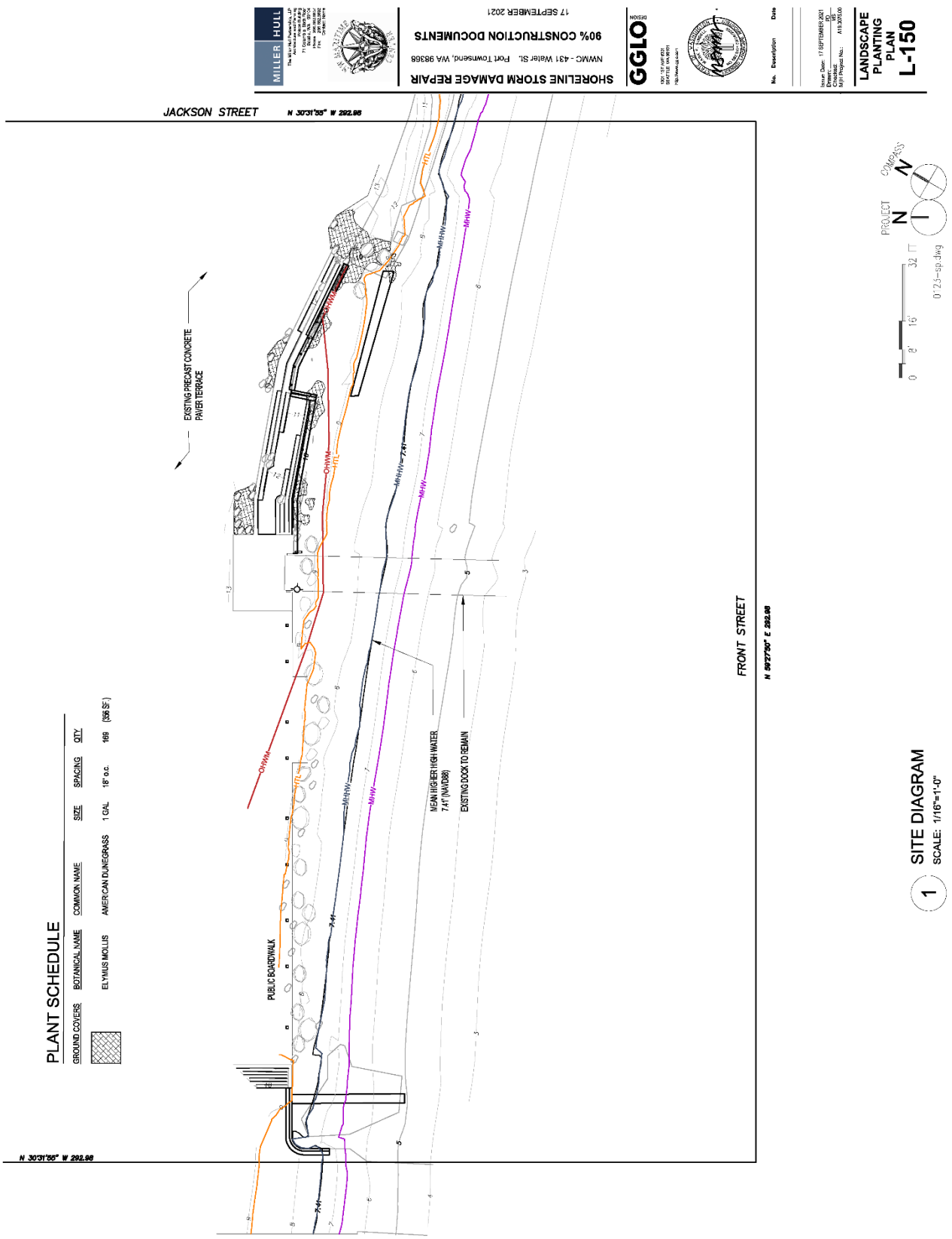


Figure 9. Landscape planting plan



6 Take Analysis

The ESA (Section 3) defines "take" as to "harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct." The USFWS further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering." It is likely that no "take" will result from this project.

7 Determination of Effect

ESA-listed species and critical habitat in the action area and FEMA Flood Hazard Area are evaluated below based on the following assessments:

- No effect (absolutely no effect whatsoever, either positive or negative);
- May affect, not likely to adversely affect (insignificant effects that never reach the level where take occurs, or effects are discountable and extremely unlikely to occur; or there would be an entirely beneficial effect); or,
- May affect, likely to adversely affect (measurable or significant effects are likely, and the project will require formal consultation).

This determination of effect for protected species is contingent upon implementation of the conservation and minimization measures and proposed compensatory mitigation described in section 5. In general, direct adverse effects to ESA-listed species (avoidance, behavior modification) will be short-term, but would not result in take, and would not contribute to an increased risk of extinction.

After reviewing the appropriate data, the determination of effect to each ESA-listed species within the action area is:

- **Puget Sound Chinook –** "May affect, not likely to adversely affect"
- **Hood Canal Summer-run chum –** "May affect, not likely to adversely affect"
- **Puget Sound Steelhead –** "May affect, not likely to adversely affect"
- **Bull trout –** "No effect"
- **Rockfish –** "May affect, not likely to adversely affect"
- **Marbled Murrelet –** "May affect, not likely to adversely affect"
- **Green sturgeon –** "No effect"
- **Southern Eulachon** – "No effect"
- **Humpback whale** – "No effect"
- **Leatherback sea turtle** – "No effect"
- **Southern Resident Killer Whale** – "May affect, not likely to adversely affect"

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Attachment 1. Essential Fish Habitat Assessment

A. Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public law 104-267), requires Federal agencies to consult with NMFS on activities that may adversely affect designated Essential Fish Habitat (EFH) for the relevant species. According to the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." For the Pacific West Coast, the Pacific Fisheries Management Council (Council) has designated EFH for federally managed groundfish (PFMC 1998a), coastal pelagic (PFMC 1998b) and Pacific salmon fisheries (PFMC 1999).

The purpose of the EFH Assessment is to determine the effects of the proposed project on the EFH for the relevant species and to recommend conservation measures to avoid, minimize of otherwise offset adverse effects on EFH.

B. Identification of EFH

The designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U. S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). The designated EFH in estuarine and marine areas for salmon species extends from the nearshore and tidal submerged environments within state territorial water out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC, 1999).

C. Proposed Action

The details of the proposed project are presented in **"Project Description"** section of the BE**.** The project involves repair of the exposed foundation of the concrete pathway and beach stairs at the plaza of the Northwest Maritime Center in downtown Port Townsend, WA and to protect the first and second floor deck supports after chronic beach erosion during major storms in the last 5 years. The proposed project will also help prevent future erosion at the site by placing beach nourishment and large boulders on the upper beach.

D. Effects of the Proposed Action

The effects of this project on designated EFH are likely to be similar to the effects described in detail in the "**Effects Analysis"** section of the attached BE. The project may have minor temporary adverse effects on EFH designated for Pacific coast salmon and groundfish due to turbidity that may result from sediment disturbed during excavation being suspended on an incoming tide.

E. EFH Conservation Measures

The conservation measures contained in the BE will be implemented to minimize any possible adverse effects to EFH.

F. Conclusion

The project may have temporary, intermittent adverse effects on EFH for groundfish and Pacific salmonids in the form of reduced water quality. Because the project is a repair high in the upper-intertidal zone, no new permanent adverse effects on EFH are anticipated to occur.

G. Additional References

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Attachment 2. Assessment of Impacts to Critical Habitat for Puget Sound Chinook and Hood Canal Summer-run Chum

Project description: shoreline storm damage repair
Applicant: Northwest Maritime Center
COE reference:
NMFS reference:

The Physical and Biological Features (PBFs) determined essential to the conservation of salmon are:

(1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation, and larval development.

Existing Conditions: Does not apply - the project is in the marine environment
Effects to PBF: None

(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 and forage supporting juvenile development; and 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.

Existing Conditions: Does not apply - the project is in the marine environment
Effects to PBF: None

(3) Freshwater migration corridors free of obstruction 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.

Existing Conditions: Does not apply - the project is in the marine environment
Effects to PBF: None

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

Existing Conditions: There is an existing pier, ramp, and floats on site. There is no large riparian vegetation along the shoreline. The area along the shoreline is highly developed with buildings and paved surfaces.
Effects to PBF: The project will create minor, temporary impacts during construction that may include localized increased turbidity and elevated in-air noise levels, which may cause short-term

avoidance of the area by these listed fish species. The proposed beach nourishment and boulders should actually help retain sediment on the beach and reduce erosion.

(5) Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulder and side channels.

Existing Conditions: See 4 above.
Effects to PBF: See 4 above.

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

Existing Conditions: Does not apply - the site is in a nearshore marine environment
Effects to PBF: None

Determination of Effect: "May affect, not likely to adversely affect"

Attachment 3. Assessment of Impacts to Critical Habitat for Puget Sound/Georgia Basin Bocaccio and Yelloweye Rockfish

The Physical and Biological Features (PBFs) determined essential to the conservation of Puget Sound/Georgia Basin Bocaccio and Yelloweye Rockfish are:

Adult Bocaccio and Adult/Juvenile Yelloweye Rockfish (for deepwater sites >30 meters)

(1) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.

Existing Conditions: This project is occurring high in the upper-intertidal zone, outside of critical habitat for adult rockfish. The most waterward extent of the action area is only to account for elevated in-air noise levels during construction.

Effects to PBF: No effect.

(2) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.

Existing Conditions: This project is occurring high in the upper-intertidal zone, outside of critical habitat for adult rockfish. The most waterward extent of the action area is only to account for elevated in-air noise levels during construction.

Effects to PBF: Water quality may be temporarily impacted by disturbed sediment that may become suspended on an incoming tide, but it is unlikely to last longer than one tidal cycle and therefore unlikely to extend deep enough into adult rockfish critical habitat.

(3) The type and amount of structure and rugosity that supports feeding opportunities and predator avoidance.

Existing Conditions: This project is occurring high in the upper-intertidal zone, outside of critical habitat for adult rockfish. The most waterward extent of the action area is only to account for elevated in-air noise levels during construction.

Effects to PBF: No effect.

Juvenile bocaccio rockfish (nearshore areas are contiguous with the shoreline from the line of extreme high water out to a depth no greater than 30 meters relative to MLLW)

(1) Nearshore juvenile rearing sites with sand, rock, and/or cobble to support forage and refuge.

Existing Conditions: There is existing sand, rock, and cobble at the site.

Effects to PBF: The proposed project aims to place beach nourishment and large boulders on the site to help retain sediment and reduce erosion from waves. This PBF is not anticipated to be adversely affected but might actually be enhanced.

(2) Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.

Existing Conditions: There is eelgrass offshore which may provide habitat for zooplankton (prey species for juvenile rockfish).

Effects to PBF: The project could have brief and temporary adverse impacts on zooplankton due to brief and localized turbidity. However, any suspended sediment is expected to subside after one tidal cycle.

(3) Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.

Existing Conditions: In the action area, Port Townsend Bay has water designated as Category 4c for impaired eelgrass beds at the Port Townsend Ferry Dock "due to inorganic nitrogen loading resulting in human-caused eutrophication" (ECY).

Effects to PBF: This PBF is not expected to be adversely affected in the long term. Any suspended sediment from excavation activities is expected to subside after one tidal cycle.

Determination of Effect: "May affect, not likely to adversely affect"

Attachment 4. Assessment of Impacts to Critical Habitat for Southern Resident Killer Whales

The Physical and Biological Features (PBFs) determined essential to the conservation of Southern Resident Killer Whales (SRKW) are:

(1) Water quality to support growth and development.

Existing Conditions: In the action area, Port Townsend Bay has water designated as Category 4c for impaired eelgrass beds at the Port Townsend Ferry Dock "due to inorganic nitrogen loading resulting in human-caused eutrophication" (ECY).
Effects to PBF: This PBF is not expected to be adversely affected in the long term. Any suspended sediment from excavation activities is expected to subside after one tidal cycle and should not extend deep enough into SRKW critical habitat.

(2) Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development as well as overall population growth.

Existing Conditions: Habitat on site for prey species is impacted by non-grated surfaces and creosote piles associated with overwater structures.
Effects to PBF: Some potential short-term and localized turbidity may be associated with excavation, but should subside after one tidal cycle and not adversely affected any salmon that may be present during construction.

(3) Passage conditions to allow for migration, resting, and foraging. NMFS is gathering data to assist it in evaluating sound as a potential PBF.

Existing Conditions: The project site is along a highly developed waterfront and adjacent to a marina. There can be a lot of boat traffic in Port Townsend Bay and the Port Townsend ferry frequently travels back and forth from Coupeville.
Effects to PBF: No effect, the project is occurring high on the beach outside of critical habitat.

Determination of Effect: "No effect"