

X. Marine SMA

Summary: The Marina SMA is 928.8 acres in size and includes a wide variety of land uses. Industrial and commercial uses dominate the central portion of the SMA; whereas the other areas are predominately residential. This SMA currently is functioning at range of levels for ecological function. The industrial and commercially dominated areas have limited habitat for both aquatic and terrestrial wildlife species. The northern and southern ends of the Marine SMA provide high to moderate level ecological functions. The SMA has received an extensive amount of review from a variety of studies. There is significant documentation addressing suggested enhancement, restoration and areas of proposed preservation within this SMA.

X.1 Watershed Analysis

X.1.1 Landscape Setting

Bellingham Bay was formed by glaciations between 14,000 and 18,000 years ago. The resulting geology includes continental sedimentary deposits and bedrock represented in the Chuckanut Formation dominated the eastern shore of Bellingham Bay from Governor's Point north to Whatcom Creek. Glacial outwash and marine drift are evident from the mouth of Whatcom Creek to the edge of the Nooksack delta. Artificial fill and a variety of land modifications currently dominate the Bellingham Bay shoreline from the Mount Baker Plywood site south and east to the south end of the Cornwall Landfill and again in the vicinity of the Ferry Terminal and Industrial area in Fairhaven (Anchor Environmental 2000). Soils originating from marine drift are very impermeable with little to no water infiltration. Glacial outwash material is highly permeable with moderate to rapid water infiltration.

Bellingham Bay is approximately twelve miles long and three miles wide, with its opening to the south and southwest. Bellingham Bay exchanges water with Rosario Straits via a system of interconnected bays. Marine water enters Bellingham Bay from Rosario Straight and Bellingham Channel. A lesser exchange of water occurs via Hale Passage. Data indicates bottom currents a net southward flow. Within inner Bellingham Bay, deep currents vary with tidal fluctuation (Anchor Environmental 2000).

Major tributaries to the Bay are the Nooksack River, Squalicum Creek, Whatcom Creek, Padden Creek and Chuckanut Creek. Silver Creek drains areas in the northern part of the City and is a tributary to the Nooksack River. The mouth of the Nooksack River was diverted from north of the Lummi Peninsula to its current outlet into Bellingham Bay in

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Steep Slopes of 20 to 50% surround most of the Bay. The toe of the slope marks the original high water line prior to shoreline modifications. The slopes on the northern portion of the bay are composed of glacial marine drift. There these bluffs have retained contact with the marine system, they provide source of sediment to the marine system.

Slopes south of the Cornwall landfill are indicated to be sedimentary and bedrock and are less susceptible to erosion.

X.1.2 Land Use

Land Use: The current shoreline of Bellingham Bay is result of combined efforts of the original geologic and oceanographic processes and human changes. Historical conditions of Bellingham Bay included large tidal flats at the mouths of Squalicum, Whatcom and Padden Creeks. Beginning in the late 1800's the construction of three waterways (Whatcom, I&J, and Squalicum Creek) were approved by the federal government. Periodic episodes of filling surrounding tide lands occurred up thorough the 1960's. The shoreline along the industrial portions of the bay has also been modified by rip-rap and bulks (Anchor Environmental 2000).

Current land use within Bellingham Bay includes public parkland, marinas, heavy industrial, commercial and residential uses. The northern extent of the marine SMA is relatively undisturbed (Segment A). Segment B is highly modified and dominated by the Port of Bellingham marina, industrial and water dependent activities. Public access, city owned shoreline areas dominate Segment C and 13. Shorelines south of Marine Park, Segments G-K) are relatively undisturbed.

Transportation and Utilities: The dominant transportation feature within the Marine SMA is the Burlington Northern/Santa Fe (BNSF) railway line which follows the high tide line along nearly the entire length of the SMA, with the exception of Segment A. Major arterials within the Marine SMA includes Squalicum Parkway, Holly Street, South State. The remaining roads are secondary feeder roads.

The City of Bellingham sewer treatment plant is located in Segment 13. Sanitary sewer mains and lines are in many areas of this SMA. Twenty City of Bellingham storm sewer outfalls and eleven other point and non-point sources are documented to discharge directly into the marine system along the SMA. No retention or water quality systems are recorded to be present within the Marine SMA area (Anchor Environmental 2000).

Public Access: Public access is provided in a variety of locations along the Marine SMA. Public parks include Squalicum Park, Zuanich Park, Boulevard Park, Taylor Street boardwalk, Marine Park, a small restoration site in Padden Lagoon, and an unnamed park at Chuckanut Bay. Other areas of public access include the Port of Bellingham marina, a beach access at the end of Cornwall Ave., and Post Point. These areas do not have official access but are regularly used by the public. Other small pocket beaches along the shoreline are also used regularly by the public.

Shoreline Modifications: The railed has had a profound influence on the shoreline processes by reducing backshore habitat, stabilizing bluffs, affecting nearshore oceanic

processes. Approximately ninety percent of the SMA has been armored by rip-rap or bulkheads. The only SMA reaches that do not have significant shoreline alterations are 1, 2, 15 and 16. Reaches 3-7 and 11 have extensive numbers of docks, piers and other in-water structures. The Squalicum marina dominates Reaches 3 and 4. Segments B and E have the greatest percentage of impervious surface area; whereas Segment A and J have the lowest percentage of amount of pervious area.

X.1.3 Critical Areas

Wetlands/ Regulated Streams: Little Squalicum, Squalicum, Whatcom, and Padden Creeks are all mapped streams entering the marine SMA. Wetland areas are limited within the SMA. One wetland is located in association with Little Squalicum Creek in Reach 2 and another small wetland is located north of the Taylor Street Dock in Reach 9.

FEMA: The entire marine shoreline occurs within the FEMA floodplain, but is restricted to the immediate shoreline area. The only Floodways are associated with incoming streams.

Slopes: Steep slopes are associated with a bluff system that rings most of the entire bay. In some locations the bluffs are back from the shoreline, which resulted from historic fill and mark the original shoreline location. The Whatcom County Geohazard maps indicate "Landslide Hazard" areas along some areas. They also indicate possible "Seismic Hazard" for areas with artificial fill.

Potential PHS/TSE Species: The following species may occur within the Marine Shoreline SMA. This data originates from US Fish and Wildlife Service. This data is regional in nature not all species listed below have been recorded within Bellingham Bay or their occurrence is very rare (i.e. Steller's sea-lion and gray whale).

Common Name	Scientific Name	Federal Status	State Status
Puget Sound bull trout	<i>Salvelinus confluentus</i>	Listed Threatened	Candidate
Puget Sound chinook	<i>Oncorhynchus tshawytscha</i>	Listed Threatened	Candidate
Puget Sound coho	<i>Oncorhynchus kisutch</i>	Candidate for listing	None
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Listed Threatened	Threatened
Peregrine Falcon	<i>Falco Peregrinus</i>	Species of concern	Sensitive
Marbled murrelet	<i>Brachyramphus marmoratus</i>	Listed Threatened	Threatened
Steller sea-lion	<i>Eumetopias jubatus</i>	Listed Threatened	Threatened
Gray Whale	<i>Eschrichtius Robustus</i>	None	Sensitive

X.1.4 Ecological Functions

Overall the Marine SMA is providing ecological functions at a range of levels. Several limitations to ecological function have been identified for the Marine SMA particularly reduced intertidal habitat and habitat shelters for out-migrating salmonids.

Past studies performed by the DOE and others in the 1970's showed that water quality within inner Bellingham Bay was historically degraded as the result of direct discharge of municipal wastes, pulp and paper mill process water, and other point and non-point discharges to the Bay. Efforts to address contamination issues in Bellingham Bay have been ongoing since the 1970's, resulting in reductions in the levels of contaminants discharged to the bay and corresponding improvements to water quality (Anchor Environmental 2000).

Bellingham Bay is currently classified as a 'Class A' water (excellent). However excursions from water quality standards were identified in DOE's 1998 Section 303(d) listing of surface water for Fecal coliform and pH, in addition to sediment impairments. The Bellingham Bay Comprehensive Strategy final environmental impact statement indicates 40 waterfront surface water discharge source locations are present in the bay and could potentially affect water and/or sediment quality in localized areas in the Bay (Anchor Environmental 2000).

Groundwater flows into Bellingham Bay from the surrounding uplands where it discharges both vertically and laterally. As it moves through contaminated upland soils it transfers these contaminants in concentrated levels to the marine system. In Bellingham Bay, five areas are known to be sources for local groundwater contamination and focused cleanup investigations have and are being performed at these sites. These areas are: G-P log pond; R.G. Haley site, Cornwall Ave. landfill, Roeder Ave. landfill, and the Chevron Bulk Fuels facility. Bellingham Bay Comprehensive Strategy final environmental impact statement provides a summary of each site, its contaminants and actions being taken (Anchor Environmental 2000).

Identified sediment contamination sites include: six sites in the Whatcom Waterway, the Cornwall Ave. Landfill, the Harris Avenue Shipyard, G-P Outfall, Olivine Nearshore Area, Taylor Avenue Dock, Squalicum Harbor Inner Boat Basin, and Weldcraft Steel and Marine. Bellingham Bay Comprehensive Strategy final environmental impact statement provides a summary of each site, its contaminants and actions being taken (Anchor Environmental 2000).

Intertidal substrate has been well mapped, but foreshore and backshore substrate and habitat features have not been characterized for most areas of the Marine SMA.

Riparian vegetation along Segments B - G is absent or dominated by non-native species. Segments A, H-K have moderate to high quality shoreline vegetation. Invasive plant species control is recommended in most areas of the Marine SMA.

The Marine SMA provides moderate to high quality habitat for fish and wildlife species associated with deepwater habitats. Habitat for species dependent on shallow and intertidal habitats is limited in Segments B-G and good within Segments A, H-K. Connectivity and shoreline habitat for terrestrial associated wildlife species is limited in most areas along the Marine SMA, but excellent shoreline habitat and connectivity to other high quality habitats persists for Segments J and K in the vicinity of Clark's Point and Chuckanut Bay.

X.2 Reach Analysis: Segment A (Reach Marine 1 and 2)

X.2.1 Landscape Setting

This segment extends from the City limits northwest of Bellingham southeast to the west side of the Bellingham Plywood site. This segment has a total size of 133.7 acres with 54.9 acres occurring on land. This segment is located on glacial marine drift with areas of continental outwash. The marine bluffs range from 75 feet to 120 feet from the mean low water. Soils are upland soils in Drainage Class D or C, which have moderate to high runoff rates. The risk of erosion within the reach soils ranges from slight to severe. The marine shoreline along this segment has been categorized as partially enclosed and receives fairly high energy waves. Drift movement within Reach 1 is indicated to be northwesterly and southeasterly for Reach 2 within this segment.

X.2.2 Land Use

Land Use: The overlaying zoning for this segment includes 50.1 acres of residential, 18.8 acres of industrial, 2.7 acres as public and 0.2 as heliport. Current land use includes low to moderate density single family residential at the top of the marine bluff with interspersed undeveloped forested or agricultural property. An inactive cement plant is located in this segment. This area is not served by City sewer and the houses are on private septic systems. Thirty-one buildings are mapped for this segment. Current zoning and platted lots indicate the potential for greater density in this segment.

Transportation: No roads intersect this segment. The BNSF tracks touch the SMA area at the top of the bluff in a couple of locations. The railway does not occur below the bluff at any point along this reach. No utility mains are documented for this reach.

Public Access: Little Squalicum Beach is a public beach at the eastern edge of this segment. Informal beach use occurs along the entire segment during low tides.

Shoreline Modifications: The shoreline is unarmored along the length, except for a small rip-rapped area adjacent to the Bellingham Plywood site at the eastern edge of

Reach 2. Two in-water structures are located at the interface of Reach 1 and 2. An overwater line from the cement plant and the Cement Plant Pier off the west end of Squalicum Beach. Both structures are supported with creosote piles. Average ground cover for this segment is calculated at 32% impervious, 33% semi-pervious and 35% is pervious. Pervious ground cover is predominately native shrub and forest cover on the marine bluffs.

X.2.3 Critical Areas

Wetlands/ Regulated Streams: A palustrine scrub-shrub/forested/emergent wetland is located at the mouth of Little Squalicum Creek in Reach 2. The outflow of the wetlands seeps through the backshore substrate and discharges directly into the Bay. Little Squalicum Creek discharges in the same location and manner. A variety of seeps are located on the bluff face along this segment.

FEMA: 110.2 acres of this segment are mapped within the FEMA Floodplain. No Floodway is mapped for this segment.

Slopes: slopes on the marine bluff are mapped at 20% to 100% and mapped on the Whatcom County Geohazard Maps as "Landslide Hazard Areas". Upland areas at the top of bank are mapped as a seismic hazard geological unit.

Potential PHS/TSE Species: Bull trout presence is possible and presence is based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook and Puget Sound coho salmon may occur seasonally within this segment. Puget Sound chinook is Federally listed as a threatened species. Puget Sound coho salmon are a candidate species for Federal listing. Marbled Murrelets may occur seasonally offshore along this segment. Marbled Murrelets are Federally listed threatened species.

X.2.4 Ecological Functions

Water Quality: No specific data was located on water quality for this segment.

Vegetation: The bluffs range from heavily vegetated with native shrubs and/or invasive ground cover such as Himalayan blackberry to unvegetated. Mapped aquatic vegetation includes 2.5 acres of eelgrass, 16.1 acres of green algae, 0.1 acres of mixed algae and 1.1 acres of salt marsh. These numbers may not include eelgrass and algae populations occurring greater than 200 feet from shore. The non-native eelgrass species *Zostera japonica* is mapped at the northwest edge of this segment. This species typically occurs at higher tidal elevations than the native *Z. marina*.

Wildlife: This segment provides documented spawning habitat for both sand lance and surf smelt. These species both spawn at high tide coarse sand and fine gravels of the upper beach areas. The old cement plant pier is a significant roost area for Double-

crested cormorants (Wahl 1995). The tidelands serve as a winter foraging area for Bald Eagles (Wahl 1995). Trees along the shoreline can serve as perches for bald eagles. The Whatcom County Fish and Wildlife Folio indicates the intertidal area at the western edge of this segment is a concentration area for swans. Additionally, the segment includes seabird nesting sites, seasonal foraging habitat for dabbling ducks and soft sediment shorebird concentrations and high diving bird concentrations in the winter.

Habitat: This segment provides high quality habitat and ecological function and provides multiple resources for a variety of fish and wildlife species. Intertidal substrate has a diverse distribution of substrate sizes which are optimal for spawning of sand lance and surf smelt and intertidal algae and eelgrass establishment. Bathymetry is fairly shallow with a mean depth of minus five feet. GIS data indicates that 9.1 acres of beach area are present between high and low tides within this reach. Little Squalicum Creek is documented to have a variety of pollutants originating from sediments and groundwater contamination. Creosote supports on the Cement Plant pier may present a potential water quality hazard. No specific water quality limitations are indicated for the marine environment in this segment.

X.2.5 Opportunities

Preservation

- None indicated

Enhancement or Restoration Opportunities

- Removal of creosote piles on Cement Plant Pier (however this could impact cormorant roost on pier).

Ongoing and/or Proposed Restoration Actions

- None indicated

X.3 Reach Analysis: Segment B (Reaches Marine 3-7)

X.3.1 Landscape Setting

This segment extends from the Bellingham Plywood, south to end of the Cornwall landfill. The segment covers 352.5 acres, of which 142.01 is land. This segment is located predominately on artificial fill or modified land. The majority of the soils are upland soils that are in Drainage Class D with very slow infiltration rates. The erosion risk for most soils in this segment is severe. Areas outside of breakwaters are classified as being partially enclosed and exposed to moderate to heavy wave action. Areas inside the marina and breakwaters are classified as a lagoon or channel with low exposure to wave action. Drift cell movement is indicated to be north on the north side of the Whatcom Waterway and south on the south side of the Waterway.

X.3.2 Land Use

Land Use: The current zoning overlaying this segment is predominately commercial and industrial with a small portion of public space at Pete Zuanich Park. Current land use is consistent with the zoned uses. One hundred twenty-one buildings covering 18.4 acres are mapped for this reach.

Transportation: Roeder Avenue is the primary arterial serving this segment. Numerous secondary roads provide access to Bellingham Cold Storage, the Marina and Tom Glenn spit. The Burlington Northern-Santa Fe rails follow the base of the bluffs east of Roeder Avenue. Three marine waterways are located in this segment including: Squalicum, I/J and Whatcom.

Public Access: Public access is provided via Pete Zuanich Park and associated trails and less formally via the Port of Bellingham Marine docks. Informal public use occurs at the beach area at the end of the I/J Waterway. A small undeveloped beach is located at the west end of Cornwall Ave.

Shoreline Modification: The shoreline has been extensively modified throughout this reach. Modifications include artificial fill, bulkheads, rip-rap, docks and jetties. Nearly all of the shoreline along this segment has been armored. The segment has average ground cover as follows: 81% is impervious, 15% is semi-pervious and 3% is pervious. Areas with pervious cover are predominately weedy herbaceous cover.

X.3.3 Critical Areas

Wetlands/Regulated Streams: No wetlands are recorded for this segment. Squalicum and Whatcom Creeks both enter the marine system in this segment. Whatcom Creek still retains a partially functioning estuary; whereas little of the Squalicum estuary remains.

FEMA: Localized areas lay within the 100 year floodplain with a small area in the vicinity of Squalicum and Whatcom Creeks within the Floodway.

Slopes: Artificial fill material is located under portions of the marina, GP and Cornwall landfill. These areas are mapped as “seismic hazard areas” on the Whatcom County Geohazard Maps.

Potential PHS/TSE Species: Bull trout presence is possible and presence is based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook and Puget Sound coho salmon may occur seasonally within this segment. Puget Sound chinook are Federally listed as a threatened species. Puget Sound coho salmon are a candidate species for Federal listing. Marbled Murrelets may occur

seasonally offshore along this segment. Marbled Murrelets are Federally listed threatened species.

X.3.4 Ecological Functions

Water Quality: This segment has been listed by the WA Dept. of Ecology as a Category 2 “Water of Concern” for 1,2,4- Trichlorobenzene and mercury in samples taken in 1996 and 1997. Documented toxic sites and land fills are located within this segment including the Mount Baker Product site, the Weldcraft Steel and Marine site, the Squalicum Harbor site, the Harbor Marine fuel site, the Whatcom Waterway site, the Roeder Avenue landfill, the Georgia Pacific Log Pond site, the Georgia Pacific Bio-Treatment Lagoon, the Colony Warf site, the Burlington Northern Site, the Cornwall Landfill and the Haley International Corp. site.

Vegetation: Aquatic marine vegetation has been mapped for this segment. The primary vegetation communities are green algae beds and mixed algae beds. Two small eelgrass beds are mapped for this segment: one located near the I/J waterway and the other offshore of the Cornwall Landfill site. A large historical colony of eelgrass is documented in the vicinity of the current Port of Bellingham Marina. No significant terrestrial shoreline vegetation is present.

Wildlife: Potential mustelid and pinniped habitat may occur along the entire shoreline of this segment. There is documented regular harbor seal use of logs for haul outs off the Georgia Pacific site and along the outer rock bulkhead of the marina and GP lagoon. California sealion use of a dock in the I/J waterway is recorded and confirmed by NES staff.

Caspian terns and Glaucous-winged gulls are documented to use the roof of the Bellingham Cold Storage and Marina buildings. High winter concentrations of diving birds occur in the marine waters along this segment.

Surf smelt spawning beach is recorded within the marina inner harbor along the eastern beach and the north side of the I/J Waterway. Low to moderate populations of crab and pandalid shrimp are documented offshore of this segment.

Habitat: This SMA segment is located within heavy industrial and commercial uses and has poor connections to other non-marine habitats. Primary connections to other habitat are limited to the Squalicum and Whatcom Creek riparian corridors. Nearshore habitat in this segment has been manipulated and is dominated by rip-rap, bulkheads, docks and other structures. Beach areas are limited to pocket beaches located at the eastern end of the I/J waterway, pockets within the Whatcom Waterway, the GP log pond site and small beaches adjacent to the Cornwall Landfill.

Marine substrates within this segment are mapped predominately as artificial substrate (i.e. rip-rap) or mixed fine substrates. Mixed fines are primarily located in the small pocket beaches within the segment. A fairly large sandy substrate area is located on the south side of the I/J Waterway. The average depth of water within 200 feet of the shoreline is 29 feet. The greatest water depth is located in Reach 3 and is 43 feet below MLLW; whereas the shallowest water is located in Reach 7 with a depth of 14 feet.

X.3.5 Opportunities

Recommendations within this section originate from the Final Workshop Report: Opportunities and Ideas for Habitat Restoration and Water Access on Urban Bellingham Bay (Anchor Environmental and Coastal Geologic Services 2004). For more details regarding this options please refer to the above documents. Only recommendations relating to habitat restoration were included in this review. The report also addresses public access.

Preservation

- Protect eelgrass and algal beds
- Conservation of existing mudflat area on the Bay side of the Roeder Bridge.
- Conservation of extensive riparian plantings on south side of Whatcom Creek.

Enhancement or Restoration Opportunities

- Beach nourishment of the I/J Waterway beach in enhance forage fish spawning habitat;
- Consideration of forage fish substrate should be given to GP Log Pond, Cornwall Avenue beach and Cornwall Landfill;
- Restoration of the Squalicum Creek Delta site via estuarine marsh and mudflat restoration (would involve relocating Mt. Baker Plywood, and create an estuarine habitat northwest of the existing navigation channel;
- Estuarine marsh and mudflat restoration at the GP Aeration and Settlement pond, GP log pond, Citizens dock/Roeder Bridge mudflat, Holly Street landfill/Whatcom Creek Estuary.
- Jetty removal at southeast tip of Mt. Baker Plywood site;
- Creation of salmon habitat benches to aid in salmon migration- listed as an early action priority if monitoring demonstrates the feasibility of using Squalicum Waterway dredge material (see reports for detailed locations);
- Addition of shoreline riparian vegetation to beaches at Roeder bridge, GP Log Pond, Cornwall Avenue Beach, Cornwall landfill north and south, and between the north bank of the Whatcom Waterway and Holly Street and the Roeder Street Bridge;
- Stormwater drain outfall day lighting and water quality treatment with pocket marshes;
- Remove over-water structures and creosote pilings. (Roeder Bridge area, Squalicum delta area, and

- Restoration of the Cornwall landfill is recommended to address scattered landfill debris mixed with eelgrass bed.

Ongoing and/or Proposed Restoration Actions

- Removal of creosote pilings in the Squalicum Creek delta associated with removal of one wood pier and adjacent in-water wood structures. A new pier is propose to be rebuilt with new non-toxic material and connect to the Bellingham Cold Storage wharf;
- Shoreline riparian plantings are proposed for the GP Log Pond site.
- An environmental cleanup and estuary restoration project is underway at the City owned Sash and Door property.
- Riparian plantings and removal of in-water surface landfill debris is proposed for the Cornwall landfill site.
- Widening of the Whatcom Creek Estuary is proposed at the Holly Street Bridge in conjunction with bridge replacement.
- Removal of creosote pilings between the Cornwall Landfill and the terminus of Cornwall Avenue. One existing pier and over-water building on the GP Log Pond is proposed to be removed.

X.4 Reach Analysis: Segment C (Reach Marine 8 and 9)

X.4.1 Landscape Setting

This segment extends from the southern edge of the Cornwall Landfill to south of the Taylor Street dock and includes two reaches. The segment is 56.5 acres in size of which 25 acres are terrestrial. This SMA is located in continental sedimentary deposits and bedrock. The soils are upland soils that are in Drainage Class B or C. The erosion risk for soils in this reach is either slight or severe. Both reaches are located in areas of moderate to high exposure to wave energy. The general drift cell direction for this segment is south.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach is 37% in a public designation, 8% in residential and 2% in commercial zoning. Current land use is dominated by Boulevard Park and associated Greenways Trails. Residential use is located on the bluff northeast of Boulevard Park. The Chrysalis Inn is the primary existing commercial uses. Current zoning and platted lots indicate the potential for greater density in the residentially zoned portions of the segment, but the majority of the segment is retained as City Park property.

Transportation: South State Street (12th Street) is the primary arterial serving this segment. Secondary roads provide access to Boulevard Park and residential and

commercial areas. The Burlington Northern-Santa Fe rails follow the shoreline along the entire segment.

Public Access: Boulevard Park, associated Greenways trails and the Talyor Street Dock are all public access points to the marine system in this segment.

Shoreline Modification: The majority of the shoreline along the segment has been rip-rapped to protect the BNSF railed. Areas that have not been rip-rapped are exposed bedrock. In water structures along this segment include a dock at the north end of Boulevard Park and boardwalk at the south end. A concrete retaining wall is located at the south end of the Boulevard Park. Another board walk connects the recently restored Taylor Street Dock with the Boulevard Park trail system. Numerous old pilings are dotted along this segment. The segment has average ground cover as follows: 38% is impervious, 42% is semi-pervious and 21% is pervious. Areas with pervious cover include grass areas, mixed shrub and forested cover and localized weedy herbaceous cover.

X.4.3 Critical Areas

Wetlands/ Regulated Streams: One small wetland is located north of the Taylor Street dock, landward of the BNSF tracks. No streams are recorded for this segment.

FEMA: No areas within this segment are identified on FEMA maps.

Slopes: Artificial fill material under portions of Boulevard Park is mapped as “seismic hazard areas” on the Whatcom County Geohazard Maps.

Potential PHS/TSE Species: Bull trout presence is possible and presence is based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook and Puget Sound coho salmon may occur seasonally within this segment. Puget Sound chinook are Federally listed as a threatened species. Puget Sound coho salmon are a candidate species for Federal listing. Marbled Murrelets may occur seasonally offshore along this segment. Marbled Murrelets are Federally listed threatened species. The area is designated as an area of importance and vulnerability for water birds (high concentrations of diving birds in winter). Gray whales have occurred offshore or this segment.

X.4.4 Ecological Functions

Water Quality: Documented toxic sites include the offshore Starr Rock Site, a site off Boulevard Park, the upland Exxon Mobil Oil Corp. site and the Taylor Avenue Dock site.

Vegetation: Aquatic marine vegetation has been mapped for this segment. Both green algae beds and eelgrass beds are mapped for this segment. The eelgrass beds are

scattered small colonies along this segment. Upland vegetation is a mix of native shrub and tree species at the northern end of the segment, shifting to lawns through Boulevard Park. The upland vegetation includes native trees, shrubs and weedy herbaceous species south of Boulevard Park. Himalayan Blackberry is well established on the upland slopes above the railed.

Wildlife: Potential mustelid and pinneped habitat may occur along the entire shoreline of this segment. Vulnerable concentrations of winter diving birds occur along this segment. Gray whales have been recorded offshore of this segment, but this is a rare occasion. Records of pigeon guillemot nesting occur for this segment (Taylor Street Dock).

Surf smelt and sand lance spawning beaches are recorded midway along this segment. Low to moderate populations of demersal groundfish and pandalid shrimp are documented offshore of this segment.

Habitat: This SMA segment is dominated by public uses and includes a mix of native mixed forest/shrub communities and extensive landscaped area dominated by lawns. Primary connections to other habitats are limited to the adjacent shoreline habitats. There is no significant upland connection to other significant habitat types from this segment. Nearshore habitat in this segment has been modified by the BNSF rail bed, separating the marine system from native soils, except where bedrock outcrops occur. The shoreline along Boulevard Park has been reinforced with rip-rap and concrete bulkheads. No significant backshore occurs through the main portion of the part. Pocket beaches are located the north end of Boulevard Park and adjacent to the two boardwalks.

Mapped marine substrates provide a moderately diverse variety of substrate types including mixed coarse, mixed fines, gravels and artificial. This provides a range of habitat opportunities for marine flora and fauna. The average depth of water within 200 feet of the shoreline is 14 feet. The greatest water depth is -24 feet below MLLW; whereas the shallowest water is -3 feet.

X.4.5 Opportunities

Recommendations within this section originate from the Final Workshop Report: Opportunities and Ideas for Habitat Restoration and Water Access on Urban Bellingham Bay (Anchor Environmental and Coastal Geologic Services 2004). For more details regarding this options please refer to the above documents. Only recommendations relating to habitat restoration were included in this review. The report also addresses public access.

Preservation

- This segment contains a portion of the largest eelgrass beds in the City's waterfront. This eelgrass bed should get priority protection.

Enhancement or Restoration Opportunities

- Beach nourishment to forage fish spawning areas.
- Boulevard Park enhanced beaches should be considered for suitable forage fish spawning substrate.
- Shoreline riparian vegetation should be included to beaches at Boulevard Park.
- Day-lighting and enhancement of stormwater outfall north of Taylor Street Dock.
- Removal of concrete debris from the shoreline of Boulevard Park and rebuild more natural beach shorelines.

Ongoing and/or Proposed Restoration Actions

- An extensive beach nourishment and debris removal is proposed along the railroad tracks at the north end of Boulevard Park.
- Creosote pilings are proposed to be removed at the north end of Boulevard Park.

X.4 Reach Analysis: Segment D (Reach Marine 10)

X.4.1 Landscape Setting

This segment extends south of Taylor Street Dock to the north end of the Fairhaven Boatyards. It is 9.8 acres in size, of which 4.5 acres are land. This SMA is located in continental sedimentary deposits and bedrock. The soils are upland soils that are in Drainage Class B. The erosion risk for soils in this segment are either slight or severe. This segment is indicated to receive moderate to heavy wave action.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach is 23% industrial, 21% commercial and <1% in a public designation. Current land use is predominately undeveloped land. Reid Boiler Works is located midway along this segment located at the top of bluff. Current zoning and platted lots indicate the potential for greater density and alteration within this segment.

Transportation: 10th Street and an access road to the Fairhaven Boatyards is the only road within the SMP designation. The BNSF railroad is located along the shoreline and parallels the entire segment.

Public Access: No public access is provided to properties within this reach. Informal access the beach is utilized by the public at low tides.

Shoreline Modification: The majority of the shoreline along the segment has been riprapped to protect the BNSF railed. The segment has average ground cover as follows: 50% is impervious, 40% is semi-pervious and 9% is pervious. Areas with pervious cover are predominately covered with Himalayan blackberry.

X.4.3 Critical Areas

Wetlands/ Regulated Streams: No regulated wetlands or streams are indicated for this segment.

FEMA: No areas within this segment are identified on FEMA maps.

Slopes: Artificial fill material under portions of Boulevard Park are mapped as “seismic hazard areas” on the Whatcom County Geohazard Maps.

Potential PHS/TSE Species: Bull trout presence is possible and presence is based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook and Puget Sound coho salmon may occur seasonally within this segment. Puget Sound chinook are Federally listed as a threatened species. Puget Sound coho salmon are a candidate species for Federal listing. Marbled Murrelets may occur seasonally offshore along this segment. Marbled Murrelets are Federally listed threatened species. The area is designated as an area of importance and vulnerability for water birds (high concentrations of diving birds in winter). Gray whales have occurred offshore of this segment.

X.4.4 Ecological Functions

Water Quality: The only documented toxic site is the Exxon Mobil Oil Corp site at 908 10th Street.

Vegetation: Aquatic marine vegetation has been mapped for this segment. Green algae beds are mapped for this segment. Upland vegetation is predominately Himalayan blackberry intermixed with native shrub and trees.

Wildlife: Potential pinneped habitat may occur along the entire shoreline of this segment. Harbor seal haul outs are indicated on offshore logs. Vulnerable concentrations of winter diving birds occur along this segment.

Sand lance spawning habitat is documented along this entire segment. Low to moderate populations of demersal groundfish and pandalid shrimp are documented offshore of this segment.

Habitat: This SMA segment is dominated by Himalayan blackberry and interspersed patches of native shrubs. Primary connections to other habitats are limited to the adjacent shoreline habitats. There is no significant upland connection to other significant habitat types from this segment, although a limited corridor exists along the South Bay trail. Nearshore habitat in this segment has been modified by the BNSF rail bed, separating the marine system from native soils, except where bedrock outcrops occur. The shoreline along Boulevard Park has been reinforced with rip-rap and concrete

bulkheads. No significant backshore occurs through the main portion of the part. Several small pocket beaches are present at low tide.

Mapped marine substrates provide a moderately diverse variety of substrate types including mixed coarse and mixed fines. This provides a range of habitat opportunities for marine flora and fauna. The water depth is -11 feet below MLLW.

X.4.5 Opportunities

Recommendations within this section originate from the Final Workshop Report: Opportunities and Ideas for Habitat Restoration and Water Access on Urban Bellingham Bay (Anchor Environmental and Coastal Geologic Services 2004). For more details regarding this options please refer to the above documents. Only recommendations relating to habitat restoration were included in this review. The report also addresses public access.

Preservation

- This segment contains a portion of the largest eelgrass beds in the City's waterfront. This eelgrass bed should get priority protection.

Enhancement or Restoration Opportunities

- Enhancement of shoreline vegetation with native trees and shrubs.

Ongoing and/or Proposed Restoration Actions

- None identified.

X.4 Reach Analysis: Segment E – Fairhaven Marina/Ferry Terminal (Reach Marine 11)

X.4.1 Landscape Setting

This segment extends along the industrial marine area around the Fairhaven Marina and Alaskan Ferry Terminal south to the north end of Marine Park. The segment is 27.9 acre in size, of which 11.7 is land. This SMA is located in continental sedimentary deposits and bedrock. The Ferry Terminal vicinity is constructed on artificial fill. The soils are upland soils that are in Drainage Class D. The erosion risk for soils in this reach is severe. The segment is located in an area with moderate exposure to wave action.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach includes 12.2 acres of industrial and 0.5 acres public. Current land use is predominately marine dependent industrial intermixed with ferry and marina uses. At total of 32 buildings are mapped for this reach.

Transportation: Harris Avenue is primary arterial within the SMP designation. Access roads and parking for waterfront businesses are present. The BNSF railroad is located along the water at the north side of the segment and crosses inland near the Bellingham Cruise Terminal.

Public Access: Public access areas include a public boat ramp and the Bellingham Cruise Terminal.

Shoreline Modification: Extensive shoreline modifications are present in this segment. The entire shoreline of this segment has been rip-rapped or protected with bulkheads. A large number of in-water structures are located in this reach including docks and pilings. Impervious surface is calculated to be at 96% of reach and 4% of the reach groundcover is semi-pervious and 0% is pervious and 44% is water (channel).

X.4.3 Critical Areas

Wetlands/ Regulated Streams: No wetlands or streams are identified for this reach.

FEMA: Portions of this reach are identified on FEMA maps as occurring in the floodplain.

Slopes: Artificial fill material under portions of Fairhaven Cruise Terminal and associated industrial areas are mapped as “seismic hazard areas” on the Whatcom County Geohazard Maps.

Potential PHS/TSE Species: Bull trout presence is possible and presence is based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook and Puget Sound coho salmon may occur seasonally within this segment. Puget Sound chinook are Federally listed as a threatened species. Puget Sound coho salmon are a candidate species for Federal listing. Marbled Murrelets may occur seasonally offshore along this segment. Marbled Murrelets are Federally listed threatened species. The offshore area is designated as an area of importance and vulnerability for water birds (high concentrations of diving birds in winter).

X.4.4 Ecological Functions

Water Quality: There is no documentation of degraded water quality within the inner bay within this segment. DOE 303(d) data indicates the outer bay is designated as a Category 5 for dissolved oxygen, Category 2 for pH and Category 1 for fecal coliform, pH and temperature. No toxic sites or landfills are documented for this segment.

Vegetation: Aquatic marine vegetation has been mapped for this segment. Green algae beds are mapped for this segment along with a small patch of eelgrass at the mouth of Padden Lagoon. Little upland vegetation is present.

Wildlife: Potential pinniped and mustelid habitat may occur along the entire shoreline of this segment. Vulnerable concentrations of winter diving birds occur along this segment. Pigeon guillemot nesting has been documented on old piers in this area. Large numbers of European starlings are nesting under the docks of the Fairhaven Cruise Terminal. Sand lance spawning habitat is documented along the northwest edge of this segment.

Habitat: Little terrestrial vegetation is present through this segment. Connections to other habitats (either marine or terrestrial) are limited due to upland and in water modifications. There is no significant upland or marine connection to other significant habitat types from this segment. The shoreline has been reinforced with rip-rap and concrete bulkheads. No significant backshore occurs through the main portion of the part. A small pocket beaches is present at low tide west of the Bellingham Cruise Terminal.

Mapped marine substrates provide limited diversity most of the area is artificial fill with areas of mixed fines and small areas of coarse gravel. The mean water depth is -6.5 feet below MLLW.

X.4.5 Opportunities

Preservation

- None identified

Enhancement or Restoration Opportunities

- None identified

Ongoing and/or Proposed Restoration Actions

- None identified

X.4 Reach Analysis: Segment F- Padden Lagoon (Reach Marine 12)

X.4.1 Landscape Setting

This segment extends around Padden Lagoon. The segment is 13.1 acre in size, of which 9.17 is land. This SMA is located in continental sedimentary deposits and bedrock. The soils are upland soils that are in Drainage Class D with very slow infiltration rates. The erosion risk for soils in this reach is severe.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach includes 9.4 acres of industrial, 0.1 acres commercial and 0.1 acres public. Current land use is predominately marine dependent industrial intermixed with ferry and marina uses. At total of 6 buildings are

mapped for this reach. Current zoning and platted lots indicate the potential for greater density in the residentially zoned portions of the segment, south of Harris Avenue.

Transportation: Harris Avenue is primary arterial within the SMP designation. Access roads and parking for waterfront businesses are present. The BNSF railroad is located along the water at the north side of the segment, separating this segment from the open marine system.

Public Access: Public access areas include the easement area of Harris Avenue and Port of Bellingham owned property on the west side of the segment.

Shoreline Modification: Extensive shoreline modifications are present in this segment. The entire shoreline of this segment has been rip-raped. In water structures include a dock on the east side of the lagoon, old pilings and the BNSF rail crossing at the outlet of the lagoon. Impervious surface is calculated to be at 77% of reach and 23% of the reach groundcover is semi-pervious and 0% is pervious and 31% is water (channel).

X.4.3 Critical Areas

Wetlands/ Regulated Streams: No wetlands are identified for this reach. Padden Creek enters the lagoon in the southeast corner and exits under the BNSF tracks.

FEMA: Portions of this reach are identified on FEMA maps as occurring in both the floodplain and floodway.

Slopes: Artificial fill material around portions of Padden Lagoon are mapped as “seismic hazard areas” on the Whatcom County Geohazard Maps.

Potential PHS/TSE Species: Bull trout presence is possible and presence is based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook salmon may occur seasonally within this segment. Puget Sound chinook are Federally listed as a threatened species. The segment includes WDFW priority estuarine and riparian habitat.

X.4.4 Ecological Functions

Water Quality: There is no documentation of degraded water quality within the inner bay within this segment. DOE 303(d) data indicates the outer bay is designated as a Category 5 for dissolved oxygen, Category 2 for pH and Category 1 for fecal coliform, pH and temperature. Documented toxic sites include the Tolly Craft Yachts Corps is just outside this segment. This site includes suspected contaminated sediments and confirmed contaminated groundwater.

Vegetation: Aquatic marine vegetation has been mapped for this segment. Green algae beds and salt marsh vegetation are mapped for this segment. Salt marsh vegetation is

located on the western and southern shores of the lagoon. Little upland vegetation is present along the northern and eastern sides of the lagoon, but a narrow backshore supports a mix of native and non-native terrestrial plant species on the southern and western sides of the lagoon. An intensive native planting project was installed by the City along the western edge of the lagoon.

Wildlife: Potential mustelid habitat may occur along the entire shoreline of this segment. Purple martin houses have been installed in the lagoon. This species is a historic resident of this area. The lagoon provides important estuarine habitat to juvenile salmon entering the marine system from Padden Creek.

Habitat: Little terrestrial vegetation is present through this segment except in a narrow strip on the south and west sides of the lagoon. Connections to other habitats are available for both the marine and terrestrial habitats. The segment connects to the riparian corridor associated with Padden Creek. Limited backshore is present in this segment.

Mapped marine substrates are predominately mud and mixed fines.

X.4.5 Opportunities

Recommendations within this section originate from the Final Workshop Report: Opportunities and Ideas for Habitat Restoration and Water Access on Urban Bellingham Bay (Anchor Environmental and Coastal Geologic Services 2004). For more details regarding this options please refer to the above documents. Only recommendations relating to habitat restoration were included in this review. The report also addresses public access.

Preservation

- This segment contains a one of the largest estuarine marsh habitats on the City's waterfront and should get priority protection.

Enhancement or Restoration Opportunities

- Enhancement of shoreline vegetation with native trees and shrubs.
- Restoration of estuarine marsh and mudflats in Padden Creek Lagoon. Removal of fill along the eastern edge of the lagoon to expand the estuary and allow a more natural channel to form.
- Beach nourishment of the intertidal areas between Padden Creek Lagoon and Boulevard Park to restore forage fish spawning habitat.
- Day-lighting of a stormwater outflow northeast of Padden Creek Lagoon.
- Removal of an old wood pier north of Padden Lagoon, and a dock within the lagoon.

Ongoing and/or Proposed Restoration Actions

- Padden Creek Estuary planting on the southwest portion of the segment was installed by the City of Bellingham.

X.4 Reach Analysis: Segment G- Marine Park (Reach Marine 13)

X.4.1 Landscape Setting

This segment extends along Marine Park, south of the property fronting the City of Bellingham sewer treatment plant. This SMA is located in continental sedimentary deposits and bedrock. The soils are upland soils that are in Drainage Class B and D. The erosion risk for soils in this reach is slight to severe. Most slopes in the reach are less than 20%, but slopes of 20% to 50% are present at the south end of the segment.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach includes 12.9 acres of public and 0.3 acres of residential and 0.2 acres of industrial. Current land use is predominately public park with residential uses at the south end of the segment. Industrial uses is limited to the an area north of the sewer treatment use. At total of 8 buildings are mapped for this reach. Current zoning and platted lots indicate the area is near its maximum density.

Transportation: No significant roads are located in this segment. The BNSF railroad is located along this entire segment.

Public Access: Extensive public access is provided in this segment via Marine Park and public access provided around the City sewer treatment plant.

Shoreline Modification: The entire segment has been rip-rapped for the BNSF railroad. Impervious surface is calculated to be at 51% of reach and 45% of the reach groundcover is semi-pervious and 4% is pervious and 51% is water.

X.4.3 Critical Areas

Wetlands/ Regulated Streams: The Bellingham Wetland Inventory indicates the lagoon area to be a estuarine subtidal and intertidal wetland that includes aquatic bed and emergent vegetation classes. No streams are documented for this segment.

FEMA: No areas within this segment are identified on FEMA maps.

Slopes: Slopes at the south end of this segment have slopes ranging from 20% to 50%. Slopes in this reach are mapped on the Whatcom County Geohazard Maps as "Landslide Hazard Areas".

Potential PHS/TSE Species: Bull trout presence is presumed based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Surf smelt and sand lance spawning habitat is documented for the area fronting Marine Park. A great blue heron colony is located in forested area immediately outside of the south end of the segment.

X.4.4 Ecological Functions

Water Quality: There is no documentation of degraded water quality within the inner bay within this segment. DOE 303(d) data indicates the outer bay is designated as a Category 5 for dissolved oxygen, Category 2 for pH and Category 1 for fecal coliform, pH and temperature. Documented toxic sites include the Port of Bellingham Harris Avenue Shipyard site. This site includes confirmed contaminated sediments and suspected contaminated groundwater.

Vegetation: Aquatic marine vegetation has been mapped for this segment. A large eelgrass bed is mapped along this reach. Other marine vegetation includes green and mixed algae beds and salt marsh vegetation. Terrestrial vegetation ranges from lawns in Marine Park to native deciduous forest along the marine bluff at the south end of the segment. Significant vegetation is lacking around much of the lagoon.

Wildlife: Potential mustelid and pinniped habitat may occur along the entire outer shoreline of this segment. The lagoon may provide important estuarine habitat to juvenile salmon out migrating from local streams. Offshore pandalid shrimp and crab populations are documented for this segment. A great blue heron colony is located immediately outside the SMA near the southern end of this segment.

Habitat: Terrestrial vegetation is well developed at the southern portion of the segment, providing a moderate corridor along the southern shoreline. Diverse aquatic vegetation and substrate provide good cover for a variety of marine species. Mapped marine substrates include mixed coarse, mixed fines, sand and artificial substrate (rip-rap). Limited backshore is present in this segment due to the BNSF tracks.

X.4.5 Opportunities

Preservation

- Preservation of eel grass beds of Marine Park and the Post Point Lagoon.
- Preservation of a great blue heron rookery just outside the SMA.
- Maintain canopy cover and forested buffer.
- Place a high priority on best management practices that control erosion and protect native soils.

Enhancement or Restoration Opportunities

- Restoration of the Post Point Lagoon, including removal of fill along the southern side to allow for expansion of the marsh; reducing the size of the dog off-leash area and limiting dog access to the area southeast the sewage treatment plant.
- Day-lighting of a stormwater outfall near the Post Point Lagoon.

Ongoing and/or Proposed Restoration Actions

- Beach enhancement in Marine Park.
- Education of dog owners regarding pick up of droppings.

X.4 Reach Analysis: Segment H (Reaches Marine 14, 16)

X.4.1 Landscape Setting

This segment includes two reaches that are located south of the sewer treatment plant and north of Clark's Point. The reaches have been grouped together based on their physical similarities (lack lagoons). The total segment size is 39.8 acres in size, of which 17 acres is land. This SMA is located in continental sedimentary deposits and bedrock. The soils are upland soils that are in Drainage Class B or D. The erosion risk for soils in this reach is slight to severe. Marine bluff slopes along this segment are mapped at 20% to 70%.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach includes 19.6 acres of residential use. Current land use is consistent with the overlaying zoning. A total of 6 buildings are mapped for this reach. Current zoning and platted lots indicate the segment is near its maximum density, based on current zoning and neighborhood place limitations.

Transportation: No roads are located within the SMP designation. The BNSF railroad parallels the base of the bluff along the entire segment.

Public Access: No formal public access is provided in this segment, but informal use of the Marine Point area occurs. The BNSF rail line limits formal access.

Shoreline Modification: The entire segment has been rip-rapped for the BNSF railroad, except in a small area at Post Point where bedrock abuts the marine shoreline. Average impervious surface for this segment is calculated to be at 35% of reach and 40% of the reach groundcover is semi-pervious and 25% is pervious and 55% is water.

X.4.3 Critical Areas

Wetlands/ Regulated Streams: No City regulated wetlands or streams are documented for this segment.

FEMA: No areas within this segment are identified on FEMA maps.

Slopes: Slopes at the south end of this segment have slopes ranging from 20% to 50%. Slopes in this reach are mapped on the Whatcom County Geohazard Maps as “Landslide Hazard Areas”.

Potential PHS/TSE Species: Bull trout presence is presumed based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook salmon may occur seasonally within this segment. Puget Sound Chinook are Federally listed as a threatened species. This segment occurs in a documented harlequin duck and rock substrate concentration areas.

X.4.4 Ecological Functions

Water Quality: The DOE 303 (d) data does not indicate any water quality limitations for this segment. No documentation of toxic sites or landfills were located for this segment.

Vegetation: Aquatic marine vegetation has been mapped for this segment. A diverse complex of aquatic algae communities occurs in this segment and includes eelgrass, brown algae beds, green algae beds, mixed algae beds. The marine bluffs are dominated by predominately native shrubs, intermixed with non-native Himalayan blackberry and English ivy. The top of bank is predominately lawns and ornamental gardens. Little vegetation inhabits the base of slope due to the railroad ballast. Native plant communities dominate areas on Post Point and include Nookta rose, Sitka alder and serviceberry.

Wildlife: Potential mustelid and pinneped habitat may occur along the entire outer shoreline of this segment. Seasonal concentrations of harlequin duck and rocky substrate shorebird occur along this segment. High offshore densities of pandalid shrimp and crab densities recorded near this segment.

Habitat: Terrestrial vegetation along the marine bluff provides a corridor with moderate connections to other habitats along the shoreline. This corridor is best developed for bird movement. Trees are lacking in most areas. Diverse aquatic vegetation and substrate provide good cover for a variety of aquatic marine species. Mapped marine substrates include mixed coarse, mixed fines, sand and artificial substrate (rip-rap). Limited backshore is present in this segment due to the BNSF tracks. A small sand and gravel beach is located immediately north of Post point.

X.4.5 Opportunities

Preservation

- Maintain canopy cover and forested buffer.
- Place a high priority on best management practices that control erosion and protect native soils.

Enhancement or Restoration Opportunities

- Control noxious weeds within reach with a high priority given to Scott's broom and ivy control.
- Add canopy species to bluff areas.

Ongoing and/or Proposed Restoration Actions

- None documented

X.4 Reach Analysis: Segment I – Lagoons (Reaches Marine 15, 17)

X.4.1 Landscape Setting

This segment includes two reaches that are located south of the sewer treatment plant and north of Clark's Point. The reaches have been grouped together based on their physical similarities (lagoons present). The total segment size is 40.3 acres in size, of which 11.7 acres is land. This SMA is located in continental sedimentary deposits and bedrock. The soils are upland soils that are in Drainage Class B, C or D. The erosion risk for soils in this reach is slight to severe. Marine bluffs along this segment are mapped at 20% to 70% slope.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach includes 25.0 acres of residential use. Current land use is consistent with the overlaying zoning. A total of 17 buildings are mapped for this reach. Based on current zoning and neighborhood place limitations, current zoning and platted lots indicate the segment is near its maximum density. However, a new development is being constructed immediately outside Reach 17 in this segment.

Transportation: No roads are located within the SMP designation. The BNSF railroad parallels the base of the bluff along the entire segment.

Public Access: No formal public access is provided in this segment, but informal and private use occurs along the shoreline. The BNSF rail line limits formal access.

Shoreline Modification: The entire segment has been rip-rapped for the BNSF railroad, except in a small area at the north part of Reach 17 where bedrock abuts the marine shoreline. Average impervious surface for this segment is calculated to be at 28% of reach and 47% of the reach groundcover is semi-pervious and 27% is pervious and 54% is water.

X.4.3 Critical Areas

Wetlands/ Regulated Streams: The City of Bellingham Wetland Inventory indicates two lagoons described as intertidal flats and salt marsh habitats. No city regulated streams are documented for this segment.

FEMA: No areas within this segment are identified on FEMA maps.

Slopes: Bluffs at the south end of this segment have slopes ranging from 20% to 50%. Slopes in this reach are mapped on the Whatcom County Geohazard Maps as “Landslide Hazard Areas”.

Potential PHS/TSE Species: Bull trout presence is presumed based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook salmon may occur seasonally within this segment. Puget Sound Chinook are Federally listed as a threatened species. This segment occurs in a documented harlequin duck and rock substrate concentration areas.

X.4.4 Ecological Functions

Water Quality: The DOE 303 (d) data does not indicate any water quality limitations for this segment. No documentation of toxic sites or landfills were located for this segment.

Vegetation: Aquatic marine vegetation has been mapped for this segment. A diverse complex of aquatic algae communities occurs in this segment and includes eelgrass, brown algae beds, green algae beds, mixed algae beds. The marine bluffs are dominated by predominately native shrubs, intermixed with non-native Himalayan blackberry and English ivy. The top of bank is predominately lawns and ornamental gardens. Little vegetation inhabits the base of slope due to the railroad ballast. Salt marsh communities are located in the two lagoons. The dominant plant species recorded is pickleweed (*Salicornia virginica*).

Wildlife: Potential mustelid and pinniped habitat may occur along the entire outer shoreline of this segment. Seasonal concentrations of harlequin duck and rocky substrate shorebird occur along this segment. High offshore densities of pandalid shrimp and crab densities recorded near this segment.

Habitat: Terrestrial vegetation along the marine bluff provides a corridor with moderate connections to other habitats along the shoreline. This corridor is best developed for bird movement. Trees are lacking in most areas. Diverse aquatic vegetation and substrate provide good cover for a variety of aquatic marine species. Mapped marine substrates include mixed coarse, mixed fines, sand and artificial substrate (rip-rap). Limited backshore is present in this segment due to the BNSF tracks. The estuarine habitat located in the lagoons may serve as important refugia for out-migrating juvenile salmon.

X.4.5 Opportunities

Preservation

- Maintain canopy cover and forested buffer.

- Place a high priority on best management practices that control erosion and protect native soils.

Enhancement or Restoration Opportunities

- Control noxious weeds within reach with a high priority given to Scott's broom and ivy control.
- Add canopy species to bluff area.
- Increase size of openings under railroad.

Ongoing and/or Proposed Restoration Actions

- None documented.

X.4 Reach Analysis: Segment J – Clark's Point (Reach Marine 18/20)

X.4.1 Landscape Setting

This segment is located on Clark's Point and immediately south of Chuckanut Bay in Reach 46. The segment 91.5 acres in size, of which 40.9 is land. This SMA is located in continental sedimentary deposits and bedrock. Most of the shoreline is exposed bedrock. The soils are upland soils that are in Drainage Class B or C. The erosion risk for soils in this reach is slight to severe. Shoreline slopes are mapped at 20% or greater.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach includes 45.0 acres of residential and 1.7 acres in public use. Current land use includes several single family residence on the point and a recently purchased City park property across the bay. The entire point has been put in conservancy. A total of 3 buildings are mapped for this segment. Current zoning and an overlaying conservation easement prohibits further development on this Point.

Transportation: A private road accesses the point, but is outside the SMA area. The BNSF rail line touches the northern edge of this segment.

Public Access: No formal public access is provided in this segment.

Shoreline Modification: Most of the shoreline is natural bedrock. Two private docks and a small jetty are located at the southern end of the point. Impervious surface for this segment is calculated to be at 6% of reach and 58% of the reach groundcover is semi-pervious and 55% is pervious.

X.4.3 Critical Areas

Wetlands/ Regulated Streams: The City of Bellingham Wetland Inventory indicates a small palustrine forested wetland near the south end of the point. No city regulated streams are documented for this segment.

FEMA: No areas within this segment are identified on FEMA maps.

Slopes: Slopes at the south end of this segment have slopes ranging from 20% to 100%. Slopes in this reach are mapped on the Whatcom County Geohazard Maps as "Landslide Hazard Areas".

Potential PHS/TSE Species: Bull trout presence is presumed based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook salmon may occur seasonally within this segment. Puget Sound Chinook are Federally listed as a threatened species. This segment occurs in a documented harlequin duck and rock substrate concentration areas. Seasonal diving bird concentrations recorded on the southwest side of Clark's Point. A bald eagle nesting territory is documented for the east side of Clark's Point (no nest recorded in this segment). Shallows on the east side of the point support documented intertidal hard-shell clam beds.

X.4.4 Ecological Functions

Water Quality: The DOE 303 (d) data does not indicate any water quality limitations for this segment. No documentation of toxic sites or landfills were located for this segment.

Vegetation: Aquatic marine vegetation has been mapped for this segment. A diverse complex of aquatic algae communities occurs in this segment and includes eelgrass, brown algae beds, green algae beds, mixed algae beds. The marine bluffs are dominated by predominately native coniferous forest and shrubs. Remnant bald communities are interspersed along the shoreline of this segment.

Wildlife: Potential mustelid and pinniped habitat may occur along the entire shoreline of this segment. Seasonal concentrations of harlequin duck, rocky substrate shorebird, and diving birds occur along this segment. A bald eagle nesting territory is listed for this segment. High offshore densities of pandalid shrimp and crab densities recorded near this segment.

Habitat: This segment is dominated by native plant communities. A well developed coniferous forest dominates interspersed with "bald communities" along the shoreline. This segment provides high value habitat for a wide variety of wildlife species. It is a large tract contiguous with other habitats associated with Chuckanut Bay, Chuckanut Creek and Chuckanut Mountain. Diverse aquatic vegetation and substrate provide good cover for a variety of aquatic marine species. Mapped marine substrates include

bedrock, boulders, mixed fines and sand. Limited backshore is present in this segment due to the bedrock geology. A small pocket beaches are interspersed in coves along the point.

X.4.5 Opportunities

Preservation

- Maintain canopy cover and forested buffer.
- Place a high priority on best management practices that control erosion and protect native soils.

Enhancement or Restoration Opportunities

- None identified.

Ongoing and/or Proposed Restoration Actions

- None documented.

X.4 Reach Analysis: Segment K – Chuckanut Bay (Reach Marine 19)

X.4.1 Landscape Setting

This segment is located within Chuckanut Bay. The BNSF rail trestle is the western edge of this segment. The segment size is 132.3 acres in size of which 40.1 is land. This SMA is located in continental sedimentary deposits and bedrock. The soils are upland soils that are in Drainage Class B, C or D. The erosion risk for soils in this reach is slight to severe. Steep slopes are located on the northern and southern side of the Bay. The slopes range from 20% to 100% are present in these locations.

X.4.2 Land Use

Land Use: The current zoning overlaying this reach includes 41.4 acres of residential and 11.4 acres of public use. Current land use is consistent with the overlaying zoning. At total of 26 buildings are mapped for this reach. Current zoning and platted lots indicate the segment has the potential for additional infill, particularly on the northern side of the segment.

Transportation: Only secondary roads are located within this SMP designation. The BNSF rail trestle crosses the mouth of Chuckanut Bay.

Public Access: Public access is provided an undeveloped park at the east side of Chuckanut Bay. Additional public property is located in the SMA on the southern side of the bay. These areas are currently in the planning stages for public access.

Shoreline Modification: The BNFS trestle crosses the mouth of the bay. The trestle is constructed of fill reinforced with rip-rap. The trestle has a single opening. The interior shoreline of the bay is mostly unmodified. There are several in water structures including docks, jetties and old buildings near the mouth of Chuckanut Creek. A poorly maintained boat ramp and a number of old creosote pilings at the end of Fairhaven Avenue. A boathouse is located at the base of the bluff in the southwestern portion of the segment. Average impervious surface for this segment is calculated to be at 26% of reach and 42% of the reach groundcover is semi-pervious and 32% is pervious.

X.4.3 Critical Areas

Wetlands/ Regulated Streams: The City of Bellingham Wetland Inventory indicates four wetlands within this segment. All of the wetlands include forested, emergent and estuarine community types and are located on the eastern or southern part of the segment. Chuckanut Creek enters the eastern portion of this segment.

FEMA: No areas within this segment are identified on FEMA maps.

Slopes: Slopes on the north and south sides of this segment have slopes ranging from 20% to 100%. Slopes in this reach are mapped on the Whatcom County Geohazard Maps as "Landslide Hazard Areas".

Potential PHS/TSE Species: Bull trout presence is presumed based on suitable habitat and prey. Bull trout are Federally listed as a threatened species. Puget Sound Chinook and coho salmon may occur seasonally within this segment. Puget Sound Chinook are Federally listed as a threatened species Puget Sound coho salmon are a Federal candidate species for listing. This segment is indicated to have seasonal high concentration of dabbling ducks. Portions of this segment are located in a documented bald eagle nesting territory.

X.4.4 Ecological Functions

Water Quality: The DOE 303 (d) data does not indicate any water quality limitations for this segment. No documentation of toxic sites or landfills were located for this segment, however failing septic systems have been an issue in this segment in the past.

Vegetation: Aquatic marine vegetation has been mapped for this segment. Aquatic algae communities documented within this segment include eelgrass and green algae beds. The eelgrass beds are mapped in the northwest portion of the bay. The largest documented estuarine communities within the City limits are located in this segment. Remnant "bald communities" are scattered along the marine bluffs. Invasive plant species in this segment include Scott's broom on bluffs; Japanese knotweed and yellow-flag iris in the wetland at the base of Fairhaven Avenue. The marine bluffs are vegetated by predominately native trees and shrubs.

Wildlife: Potential pinneped habitat may occur along on the west side of the trestle. Mustelid habitat occurs throughout the segment. Seasonal concentrations of dappling ducks occur along this segment. Chuckanut bay supports a intertidal hard-shell clam beds. Portions of the segment occur in a bald eagle nesting territory. The bay may provide important habitat to out migrating salmons exiting Chuckanut creek including coho and chum salmon and sea-run cutthroat and steelhead.

Habitat: This segment is dominated by native plant communities in most areas. A well developed coniferous forest dominates interspersed with wetland, riparian and bald communities along the shoreline. This segment provides high value habitat for a wide variety of wildlife species. It is a large tract contiguous with other habitats associated with Clark's Point, Chuckanut Creek and Chuckanut Mountain. Diverse aquatic vegetation and substrate provide good cover for a variety of aquatic marine species. Mapped marine substrates are predominately mud interspersed with mixed fines, mixed coarse, sand, boulders and bedrock. Artificial substrate is provided by the rip-rap on the rail trestle. Moderate backshore is present in this segment, mostly at the eastern end of the segment. This segment has extensive intertidal habitat.

X.4.5 Opportunities

Preservation

- Maintain canopy cover and forested buffer.
- Place a high priority on best management practices that control erosion and protect native soils.

Enhancement or Restoration Opportunities

- Repair none functioning septic fields in this segment.
- Control noxious weeds within reach with a high priority given to Scott's broom, knotweed and yellow flag iris control.
- Removal of in water creosote structures.

Ongoing and/or Proposed Restoration Actions

- The Washington Native Plant Society has performed some removal of yellow flag iris – results have not been determined.
- Some invasive plant control planned for Inspiration Point property.
- No other documented actions.