City of Bremerton
Shoreline Master Program

Draft

Restoration Plan

Prepared for

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ACRONYMS AND ABBREVIATIONS

ALEA	Aquatic Lands Enhancement Account
BMC	Bremerton Municipal Code
BMP	best management practice
cfs	cubic feet per second
City	City of Bremerton
Ecology	Washington State Department of Ecology
ESRP	Estuary and Salmon Restoration Program
HWS	Habitat Work Schedule
LID	low impact development
LWCF	Land and Water Conservation Fund
LWD	large woody debris
NNL	no net loss
PAA	Potential Annexation Area
PHS	Priority Habitats and Species
PIC	Pollution Identification and Correction
Plan	Shoreline Restoration Plan
PSNERP	Puget Sound Nearshore Ecosystem Restoration Project
PSRF	Puget Sound Restoration Fund
RCW	Revised Code of Washington
SMA	Shoreline Management Act
SMP	Shoreline Master Program
SR	State Route
SSWM	Surface and Stormwater Management
UGA	Urban Growth Area
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WRIA	Water Resource Inventory Area

1. INTRODUCTION

1.1 PURPOSE

The City of Bremerton (City) is conducting a comprehensive Shoreline Master Program (SMP) update with the assistance of a grant administered by the Washington State Department of Ecology (Ecology) (Shoreline Management Act [SMA] Grant No. G1000007). Cities and counties are required to update their SMPs to be consistent with the state SMA, Revised Code of Washington (RCW) 90.58 and its implementing guidelines, and the shoreline management guidelines under Washington Administrative Code (WAC) 173-26.

Washington's SMA was passed by the State Legislature in 1971 and adopted by the public in a referendum in 1972. The SMA was created in response to growing concerns about the effects of unplanned and unregulated development on the state's shoreline resources. The overall goal of the SMA is "to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines."

The SMP Shoreline Restoration Plan (Plan) is intended to be coordinated with other existing plans in the area. This Plan evaluates additional potential projects based on opportunities identified in the SMP *Revised Shoreline Inventory and Analysis* (City of Bremerton 2010) and coordinated with SMP policies and regulations.

1.2 SMP RESTORATION PLAN GOALS

The goals of this Plan are:

- Continue to work collaboratively with other jurisdictions and stakeholders in Water Resource Inventory Area (WRIA) 15 to implement the Salmon Habitat Protection and Restoration Strategy.
- Use the scientific foundation and the identification of opportunities and constraints in the SMP *Revised Shoreline Inventory and Analysis*, together with other watershed, fish, and flood control plans, as resources to identify restoration strategies and projects.
- Use the comprehensive list of projects and other actions consistent with the Salmon Habitat Protection and other programs as sources of potential site-specific projects.
- Coordinate land use decisions, particularly mitigation required of development projects, with the comprehensive list of project actions for coordinated implementation of the most effective restoration strategy.
- Encourage voluntary restoration by homeowners and other shoreline property owners, in addition to agency-funded and project-related actions, as well as resource-friendly daily actions such as vegetation selection and management, pesticide/herbicide use, car washing, and other activities.
- Provide for management of City-owned parks and other facilities to provide for ecological restoration, along with recreation, flood control, and other goals.
- Seek funding for restoration actions and programs from a variety of sources and by working with other WRIA 15 stakeholders to obtain federal, state, grant, and other funding opportunities.

1.3 ROLE OF RESTORATION IN THE SMP UPDATE

The City of Bremerton's SMP applies to activities and uses within its area of SMA jurisdiction. Activities that produce adverse impacts on shoreline ecological functions must have associated mitigation measures to ensure no net loss of shoreline ecological functions. By law, development within the area of SMA jurisdiction is not required to improve the affected shoreline beyond the baseline condition at the time the activity takes place. How then can shoreline ecological functions be improved over time in areas where the baseline condition is marginally, or even severely, degraded?

The provisions of WAC 173-26-201(2)(f) address restoration as follows:

> Master programs shall include goals and policies that provide for restoration of such impaired ecological functions. These master program provisions shall identify existing policies and programs that contribute to planned restoration goals and identify any additional policies and programs that local government will implement to achieve its goals. These master program elements regarding restoration should make real and meaningful use of established or funded non-regulatory policies and programs that contribute to restoration of ecological functions, and should appropriately consider the direct or indirect effects of other regulatory or non-regulatory programs under other local, state, and federal laws, as well as any restoration effects that may flow indirectly from shoreline development regulations and mitigation standards.

Degraded shorelines are not exclusively a result of pre-SMP activities, but also of unregulated activities and exempt development. The new shoreline guidelines also require that, "Local master programs shall include regulations ensuring that exempt development in the aggregate will not cause a net loss of ecological functions of the shoreline" (WAC 173-26-186(8)(b)(ii)). While some actions within shoreline jurisdictions are exempt from a permit, the SMP should require that such developments must still comply with the SMA or the local master program.

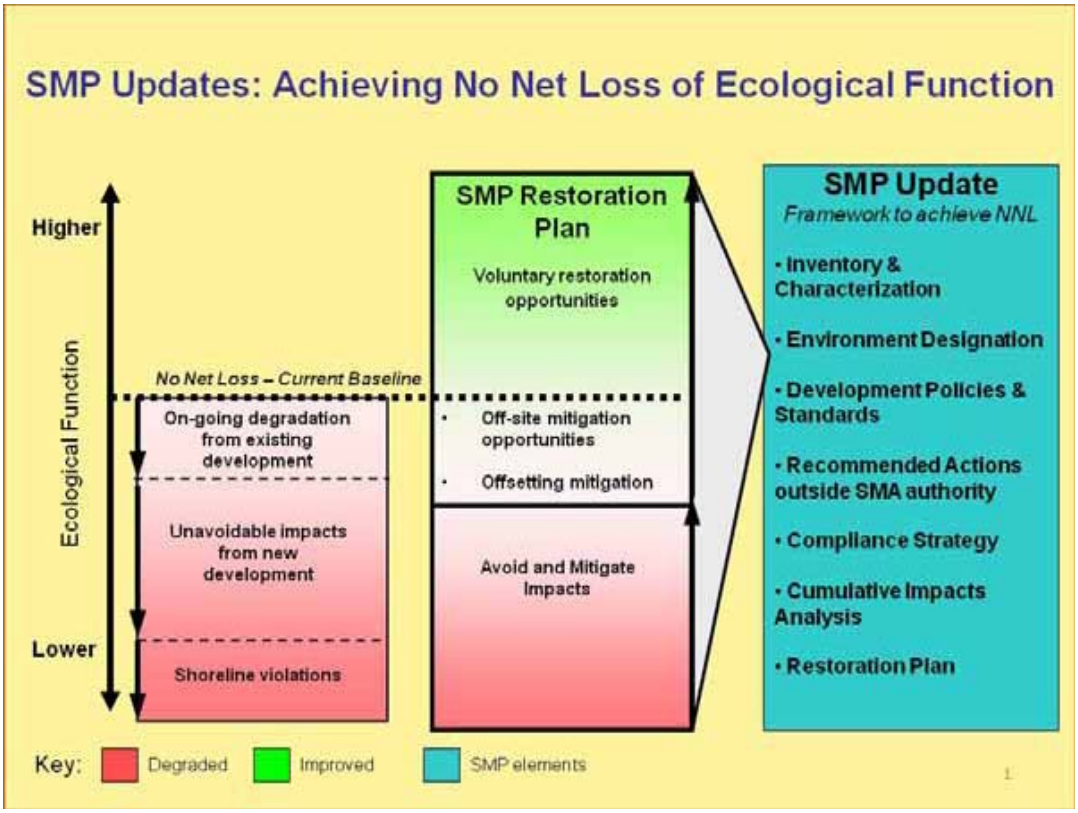
Because the shoreline environment is also affected by activities taking place outside of a specific local master program's jurisdiction (e.g., shoreline areas upstream of the city and otherwise outside of city limits), assembly of interlocal agreements, forums, programs, and policies can be essential for understanding how the city fits into the larger watershed framework. Watershed-wide goals and objectives are critical for the improvement of highly interconnected regional environments.

Based on the shoreline management guidelines, this Plan summarizes existing or baseline shoreline conditions, lists restoration objectives both regionally and locally, evaluates ongoing programs and restoration projects, provides potential restoration opportunities within the city of Bremerton, and sets standards and goals for implementation and monitoring. This Plan is also intended to support grant funding of restoration projects by the City and/or non-governmental organizations. Additionally, it can provide resources for public and/or non-governmental organizations interested in engaging in restoration activities with the City.

Regulatory programs and non-regulatory programs, such as voluntary restoration activities, contribute to environmental protection. However, regulatory programs are designed simply to achieve no net loss of ecological functions. Restoration activities undertaken by the public, private, and non-profit organizations are expected to be the primary sources of improvements to shoreline ecological functions. Many of the restoration opportunities noted in this Plan affect private property. This Plan does not require restoration on private property or to commit privately-owned land for restoration purposes without the willing cooperation and participation of the affected landowners. In addition, private landowners who are required to

provide mitigation for development-related impacts may wish to implement actions noted in this plan to meet their mitigation obligations on their own land or arrange with others to purchase rights for off-site mitigation.

The difference between the role of regulatory and non-regulatory programs in achieving no net loss and restoration of ecological functions is illustrated below in Figure 1-1.



Source: Washington State Department of Ecology

Figure 1-1. Role of the Restoration Plan in the SMP Update

1.4 ELEMENTS OF RESTORATION

WAC 173-26-020(27) defines restoration as "the reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be accomplished through measures including, but not limited to, revegetation, removal of intrusive shoreline structures and removal or treatment of toxic materials. Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions."

These guidelines require that "provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program." These definitions emphasize the repair of past damage to natural resources and habitats, but not necessarily re-creating pristine or historic conditions. In addition, addressing the ecosystem processes and functions—not simply recreating the habitat or structure—is important for successful restoration.

Therefore, this Plan emphasizes restoring impaired processes and protecting those that are currently functioning. In general, the restoration effort tends to exceed the requirements of the current regulations by taking steps to improve the existing conditions and resources of the shoreline.

Restoration may be non-regulatory, voluntary, and undertaken by public agencies, environmental stewardship groups, or local governments often in partnership with private landowners. The same actions may also be undertaken as mitigation required as part of a permit to achieve no net loss of ecological functions for new shoreline development.

There are a number of potential strategies for restoration (involving protection, preservation, and accompanying mitigation) in the SMP as outlined below.

Protection and Preservation is achieved through:

- Urban Conservancy-designated shorelines that are provided increased protection for existing ecological processes and functions.
- Performance standards for mitigation (SMP 20.16.730) that provide for protection and preservation as the first priority in mitigation of any adverse impacts.

Restoration and Mitigation is achieved through:

- Policies and development standards applied to individual, permitted projects.
- Mitigation, which is typically a required sequence of actions to offset impacts on ecological functions by taking steps to avoid and minimize project impacts prior to compensating for unavoidable losses.
- Compensatory mitigation projects, in which restoration is generally a component.

1.5 RESTORATION AND NO NET LOSS

WAC 173-26-186(8) directs SMPs to "include policies and regulations designed to achieve no net loss of those ecological functions." No net loss means that, over time, the existing condition of the shoreline ecological functions should remain the same as when the SMP update was adopted. The major component in achieving no net loss is through regulatory compliance.

Restoration planning is a separate mandate, which involves improving ecological conditions, and is designed to correct and compensate for past actions that have led to current levels of environmental degradation. Restoration is also needed to compensate for ongoing degradation from existing development or past actions.

2. BACKGROUND

2.1 PLANNING AREA

The city of Bremerton is located on the western side of Puget Sound, in the central portion of Kitsap County, about 15 miles west of Seattle as indicated in Figure 2-1. Jurisdictional shorelines in the city lie within Water Resource Inventory Area [WRIA] 15, which encompasses all of Kitsap County and portions of Mason, Pierce, and King counties (Vashon Island). Bremerton is located in the eastern portion of WRIA 15, or the East Kitsap watershed, and most of the area consists of numerous small drainages flowing directly into Puget Sound. The study area for freshwater shorelines includes drainage areas or sub-basins for the major streams and lakes, such as Gorst Creek, Kitsap Lake, and the Union Reservoir (Figure 2-2). Portions of the study area to the west and southwest of Gorst drain into the Union River and ultimately into Hood Canal.

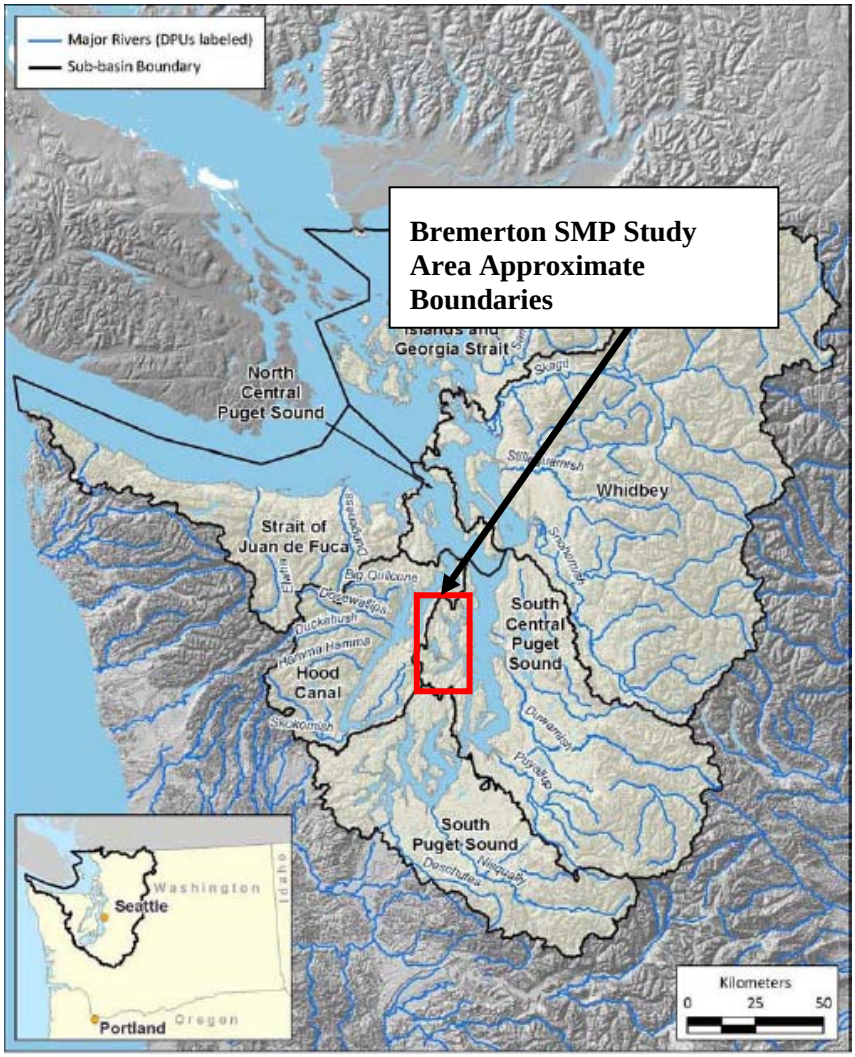


Figure 2-1. Puget Sound Context of Bremerton Shorelines

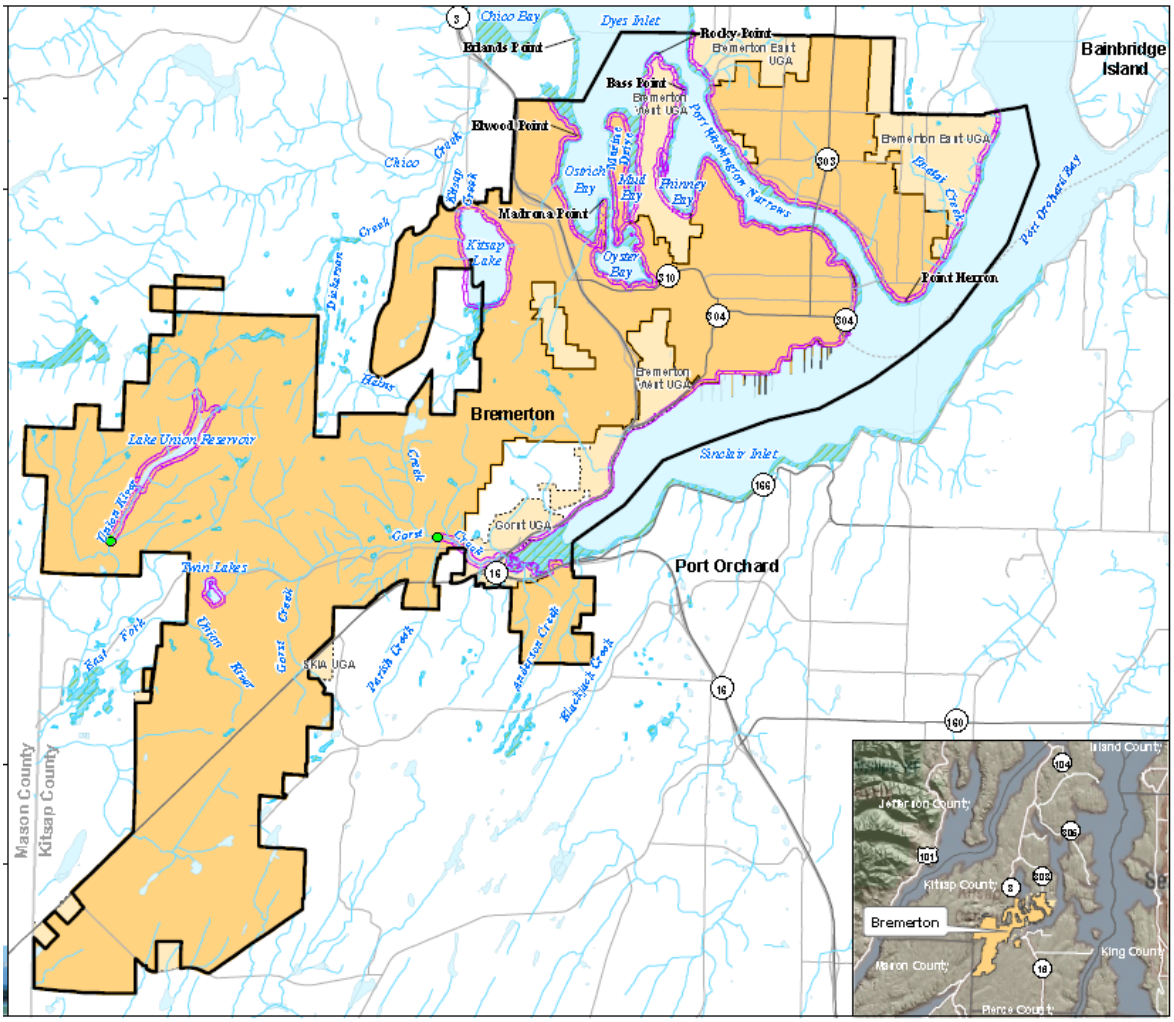


Figure 2-2. Study Area for the Ecosystem Characterization of Bremerton Shorelines

The marine waters of Puget Sound have been divided into sub-basins based on geography, oceanographic conditions (circulation, bathymetry, wave exposure), and common socio-economic issues and interests. Sub-basins, however, are classified differently by other studies. For this ecosystem-wide characterization, the study area for marine shorelines encompasses Dyes Inlet, Sinclair Inlet, and the Port Washington Narrows, which connects both inlets and a portion of Port Orchard Bay north of Sinclair Inlet. Table 2-1 provides additional details on the freshwater and marine shorelines in this planning area.

Table 2-1. City of Bremerton Shoreline Planning Area

Shoreline Water Body	East Kitsap Inventory Reach Numbers[a]	East Kitsap Inventory Unit ID Numbers	General Description	Approximate Size in acres[b] (shoreline length in feet)	Approximate Percentage of City's Shoreline (including PAA)
FRESHWATER SHORELINES					
Kitsap Lake	All	NA	Entire lake	54 (14,000)	2
Twin Lakes	All	NA	Twin Lakes shoreline	21 (3,800)	<1
Union	All	NA	Entire Union Reservoir	64	2

Table 2-1. City of Bremerton Shoreline Planning Area (continued)

Shoreline Water Body	East Kitsap Inventory Reach Numbers[a]	East Kitsap Inventory Unit ID Numbers	General Description	Approximate Size in acres[b] (shoreline length in feet)	Approximate Percentage of City's Shoreline (including PAA)
Reservoir			shoreline	(14,000)	
Union River	All	NA	Reach of the Union River downstream of the reservoir to McKenna Falls	17 (3,800)	<1
Lower Gorst Creek	All	NA	Reach of Gorst Creek upstream of the estuary to the point upstream where flows are below 20 cfs (within shoreline jurisdiction)	24 (5,250)	<1
MARINE SHORELINES					
Dyes Inlet					
Chico Bay		430, 431, 432, 433, 434	Chico Bay	188 (9,758)	In study area but outside city and PAA
Ostrich Bay Erlands Point	51, 89, 52, 53	424, 426, 427, 428, 429,	From embayment to Erland's Point and into east side of Chico Bay	211 (7,270)	Erlands Point
Ostrich Bay East	ALL	416, 417, 419, 420, 421, 422, 423[c]	Western shore of Ostrich Bay to embayment north of Elwood Point	242 (11,766)	6
Ostrich Bay Marine Drive	87	391, 392, 393, 394	Marine Drive Peninsula	113 (6,473)	4
Ostrich Bay Marine Drive North	86, 44	386, 387, 388, 389	Tip of Marine Drive Peninsula (between Mud Bay and Ostrich Bay)	99 (4,156)	2
Ostrich Bay Marine Drive	87	391, 392, 393, 394	Marine Drive Peninsula	113 (6,473)	4
Oyster Bay	All	396, 399, 400, 401, 403, 408, 409, 411, 412, 413, 414	Inner portion of Oyster Bay to Madrona Point	227 (14,725)	8
Mud Bay	42, 43	380, 382, 383, 385	Mud Bay	86 (7,385)	4
Sinclair Inlet					
Blackjack Creek	Blackjack Creek	Blackjack Creek	South side of Sinclair Inlet east of Gorst Creek	303 (14,752)	In study area but outside city and PAA
Gorst Estuary	Gorst Estuary	Gorst Estuary	Sinclair Inlet/Gorst Estuary to the Puget Sound Naval Shipyard	605 (28,605)	16
Puget Sound Naval Shipyard	Puget Sound Naval Shipyard	Puget Sound Naval Shipyard	Puget Sound Naval Shipyard	383 (32,914)	12
Phinney Bay	Phinney Bay	Phinney Bay	Phinney Bay	266 (14,889)	8
Port Washington Narrows					
Port Washington Narrows West	35, 149, 151, 150, 36	351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 509	West side of Port Washington Narrows, Bremerton Waterfront to Phinney Bay	315 (14,263)	9

Table 2-1. City of Bremerton Shoreline Planning Area (continued)

Shoreline Water Body	East Kitsap Inventory Reach Numbers[a]	East Kitsap Inventory Unit ID Numbers	General Description	Approximate Size in acres[b] (shoreline length in feet)	Approximate Percentage of City's Shoreline (including PAA)
Port Washington Narrows Phinney Bay	37, 38, 85, 39	365, 366, 367, 368, 369, 370, 371, 372	Phinney Bay	266 (14,889)	8
Port Washington Narrows East	137, 108, 135, 107	459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 470[d], 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 228	Windy Point to Point Herron on east shore of Port Washington Narrows	634 (29,250)	17
Port Orchard Bay, Point Herron	55, 56A	229, 230	Point Herron to current city limits	140 (4,388)	2
Port Orchard Bay	56B	231, 232, 507, 233, 234, 235[e], 236, 237, 239, 240	Shorelines along Bremerton side of Port Orchard Bay	247 (8,704)	6
Sinclair Inlet					
Downtown Bremerton	35	200, 202, 203, 502, 204, 504, 205, 503	South side of Sinclair Inlet east of Puget Sound Naval Shipyard	303 (14,752)	9
Puget Sound Naval Shipyard	34A	221, 222, 223, 224, 225	Puget Sound Naval Shipyard	383 (32,914)	18
Gorst Estuary	34B	206, 505, 207, 208, 209[f], 210, 211, 212, 213, 506, 214, 215, 216, 217, 218, 219, 220	Sinclair Inlet/Gorst Estuary to the Puget Sound Naval Shipyard	605 (28,605)	16
Blackjack Creek	34C	200, 202, 203, 502, 204, 504, 205, 503	South side of Sinclair Inlet east of Gorst Creek	303 (14,752)	In study area but outside city and PAA

[a] Reach numbers for marine shorelines correspond to drift cell numbers used in the East Kitsap County Nearshore Habitat Assessment.
[b] Nearshore areas based on assessment units defined in the East Kitsap Nearshore Habitat Assessment. These areas are larger than the area within shoreline jurisdiction. The freshwater area includes floodways and floodplains within 200 feet of floodways based on existing mapping sources.
[c] Northern limit of planning area.
[d] Start of planning area limit.
[e] End of planning area limit.
[f] Approximate eastern limit of planning area; just to west of Anderson Creek.
PAA = Potential Annexation Area; cfs = cubic feet per second

2.2 PLANNING AREA CHARACTERISTICS

The following is a summary from the SMP *Revised Shoreline Inventory and Analysis*; see this document for additional details and the sources referenced in the discussion (City of Bremerton 2010).

Climate: Bremerton's climate is influenced by the temperate maritime patterns that define the overall climate of the Puget Sound lowlands (Mass 2009). In general, the climate is characterized by mild, wet winters, and warm, dry summers.

Precipitation is strongly seasonal, with about two-thirds of the precipitation falling as rain between November and March. Precipitation typically occurs as frequent, low-intensity, and long-duration storms. Annual precipitation in the Puget Sound lowlands typically ranges from 32 to 37 inches. Bremerton precipitation averages about 39 inches per year, with higher precipitation (about 50 inches per year) falling at Green Mountain (Haring 2000). Snow is rare at the relatively low elevations within the study area.

Geology: The East Kitsap watershed is geologically and topographically similar to other areas in the Puget Sound region, reflecting the influences of mountain building and glacial activity. During the Eocene Epoch (approximately 38 to 55 million years ago), the East Kitsap watershed was located at the western edge of the North American continent. Sediments were deposited in the coastal environment to the west of North America.

The Pleistocene Epoch (or Ice Age), which began about 2 million years ago, formed most of the geologic features present in the watershed today. Cordilleran ice sheets, which originated in the coast and insular mountains of British Columbia, moved south to the southern end of the Puget Sound basin near Olympia. Up to 3,500 feet of glacial ice covered the Kitsap Peninsula. Geologic units from at least five major and several minor glacial advances have been identified in the Puget Sound basin, although only three are exposed (visible) in Kitsap County.

Surface geology in the study area is a complex mix of glacial deposits, which include unconsolidated silts, sands, and gravels and typically cover a hardpan lying just below the surface. In the study area watersheds (Chico Creek, Gorst Creek, Union River), bedrock underlies the upper sections of watershed tributaries whereas the lower areas are underlain by glacial till, recessional outwash, and advance outwash deposited during the last ice-sheet advance. Following the final retreat of the Fraser Glaciation, more recent alluvial deposits from weathering, erosion, and sedimentation have continued to shape the landscape (Sossa 2003). Bluffs along the Puget Sound are being eroded and re-deposited as beaches and spits. Streams are eroding their banks and then depositing sediments in floodplains, wetlands, and bays. Soils in the region were formed from the complex deposits of the most recent glaciation and are relatively young.

Seismic Activity: The Puget Sound region as a whole is in an area of active plate tectonics and seismic activity. Puget Sound is part of the Cascadia subduction zone, where the Juan de Fuca plate is moving under the North American plate. Several fault lines cross Puget Sound and are associated with seismic activity. Movement along the quaternary fault lines that cross Bremerton or other seismic events could cause liquefaction of the relatively loose soils that are commonly present along river and stream channels, lakes, stream deltas, and some marine shorelines. Soil liquefaction is a phenomenon in which pore pressure in loose, saturated, granular soils increases during ground shaking resulting in a reduction of shear strength of the soil (a quicksand-like condition).

Topography, Bathymetry, and Geomorphology: Most of the upland and freshwater portions of the study area consist of low, rolling hills with moderate slopes. Higher areas occur in the upper watershed of Sinclair Inlet to the west of Bremerton with some steep slopes (>50 percent slopes). The highest point is Green Mountain at about 1,500 feet. The most dramatic feature of the study area is the long marine shoreline of Puget Sound, formed by several inlets and many smaller bays.

Puget Sound itself is a large, fjord-like estuary where freshwater from numerous rivers mixes with saltwater from the Pacific Ocean. The Sound contains many sub-estuaries where larger

rivers and small streams enter the Sound and create a mix of tidal freshwater, brackish, and salt marsh wetlands. As is typical of fjord-like estuaries elsewhere, Puget Sound is characterized by relatively deep basins that drop off steeply from a narrow fringe of shallow nearshore areas adjacent to the shoreline. Most of the Puget Sound shoreline in the study area has moderate to low banks, although higher, steep sloping bluffs occur along Port Washington Narrows.

Major upland and freshwater landforms in the study area include (Montgomery and Buffington 1998; Buffington et al. 2003):

- Rolling uplands;
- Stream valleys with typical pool-riffle morphology, channel migration zones, and small floodplains;
- Wetlands in topographic depressions, on lakeshores, and on slopes; and
- Lakes with deeper open water and shallow littoral zones.

Hydrology: The East Kitsap watershed lies between the backbones of the Kitsap Peninsula and Bainbridge Island, resulting in a narrow strip of land with many short streams that drain to the west side of Central Puget Sound. Streams in the study area are typical lowland type streams with generally moderate gradients. Upper reaches of streams are typical Puget Sound lowland headwater streams with low gradients that originate with perched groundwater in lakes and wetlands on upland plateaus and hills. Numerous wetlands occur in the study area. Considerable deciduous growth, interspersed with stands of conifers, farmland, and urban/suburban development, is common on all streams. None of the streams is supported by snow runoff, because the maximum elevation in the East Kitsap watershed is less than 1,650 feet.

Stream power is generally low, limiting the ability of streams to transport sediment. Where streams flow off the higher rolling hills and plateaus down to the shore of the Sound, steeper ravines can create confined channels with greater sediment transport capacity. Because of the small size of most streams, large, extensive floodplains are not found in the study area. Water can be transported to storage areas via hyporheic (i.e., flow through streambeds and soils near stream channels) and overbank flow.

Alternatively, precipitation can infiltrate the soil to recharge groundwater. Water is lost by flowing out of the watershed into the adjacent watershed or marine waters, as well as through evapotranspiration. In addition, water directly evaporates from the surface of lakes and marine waters. Plants pull water up from the soil through their roots and transpire large amounts of water vapor back into the atmosphere during photosynthesis.

3. IDENTIFICATION OF SITES AND PROGRAMS WITH RESTORATION POTENTIAL

In general, evaluating the functional importance of protection and restoration depends on land use and the degree to which the area supports ecosystem-wide processes (Figure 3-1). These two criteria for rating ecological functions result in three general categories:

1. Suitability for Protection: Areas with a moderate to high importance for processes and moderate to low levels of alteration—These areas have the highest priority for protection and preservation, as well as allowing the processes to continue with minimal change in existing conditions.
2. Suitability for Restoration: Areas for restoration with a range of importance for processes and a range for alteration—Figure 3-1 indicates that priority is generally based on the importance of the process rather than the extent of alteration. Some areas of high alteration may have high potential for restoration if the affected processes are important.
3. Suitability for Development: Areas with low importance for processes and high levels of alteration—These areas generally have the greatest suitability for human use development, which typically entails loss of ecological processes.

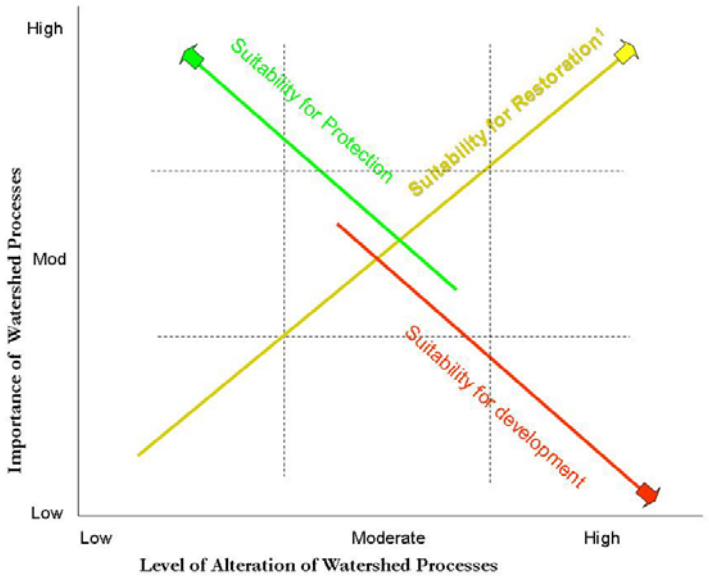


Figure 3-1. Rating of Priority Areas for Process-based Protection and Restoration

Sections 3.1 to 3.3 list the resources that have been used for identifying restoration opportunities in this Plan, and which may be used to identify and prioritize future restoration projects.

3.1 MARINE PROJECT REFERENCES

Primary sources that could be used to identify degraded areas and areas with restoration and protection potential for the marine and estuarine shorelines include:

- *East Kitsap County Nearshore Habitat Assessment and Restoration Prioritization Framework and West Kitsap Addendum* (Battelle 2009). Nearshore Assessment Units (sub-drift cell units of shoreline) were scored as being best suited for Protection, Restoration, Enhancement, Creation, or Restoration of site processes, depending on the likelihood of success based on current ecosystem processes and functions.
- *Priority Habitats and Species (Washington Department of Fish and Wildlife [WDFW]).* This dataset is updated periodically to identify where important and unique habitats are located and where species of federal, state, and local importance may be found. These areas should be restored and protected to the greatest extent feasible.
- *Priority Shoreline Conservation Areas, Kitsap Alternative Futures (2011).* This document, which includes the most ecologically intact or important areas, is a compilation of regional assessments, Priority Habitats and Species (PHS) data, nearshore assessment scores, and other local studies. These areas should be restored and protected to the greatest extent feasible.
- *Habitat Work Schedule (HWS).* This is an online database, organized according to Lead Entity Region (West Sound and Hood Canal), which includes identified, proposed, and ongoing restoration and protection projects. Projects seeking salmon restoration funds will often first need to be identified in HWS. Projects on the Lead Entity's state-mandated Three-Year Work Plan, which are reviewed and scored by a Technical Advisory Group, are also listed in HWS.
- *Kitsap County Transportation Improvement Plan and Stormwater Improvement Plans.* These annually updated improvement plans identify and prioritize projects such as replacement or repair of undersized culverts or fish-passage barriers, implementation of low impact development (LID) retrofits, or restoration of floodplains for storage and habitat improvements.

3.2 FRESHWATER PROJECT REFERENCES

Primary sources that could be used to identify degraded areas and areas with restoration /protection potential for the freshwater shoreline include:

- *PSNERP Puget Sound Watershed Characterization Project: Water Flow Processes* (Ecology 2010). This assessment produces a "watershed management" map showing where protection and restoration actions are more likely to succeed and would most benefit the water flow processes of the watershed. Habitat and other scored elements will be included in future updates.
- *Priority Habitats and Species (WDFW).* This dataset is updated periodically to identify where important and unique habitats are located and where species of federal, state, and local importance may be found. These areas should be restored and protected to the greatest extent feasible.
- *Habitat Limiting Factors Analyses* (Haring 2000; Kuttel 2003). These reports, done for each WRIA, identified the current riparian conditions, health, biological attributes, and the factors limiting the proper functioning of each mapped stream.

- *Habitat Work Schedule (HWS).* This is an online database, organized according to Lead Entity Region (West Sound and Hood Canal), which includes identified, proposed, and ongoing restoration and protection projects. The projects seeking salmon restoration funds will often need to be identified in HWS. Projects on the Lead Entity's state-mandated Three-Year Work Plan, which are reviewed and scored by a Technical Advisory Group, are also listed in HWS.
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3.3 IDENTIFIED RESTORATION AND PROTECTION PROJECTS

Tables 3-1 and 3-2 list specific restoration and protection projects, which have been identified in one of the above resources within the Bremerton SMP, or within water bodies that would contribute to overall ecologic functions in Dyes Inlet, Port Washington Narrows, Sinclair Inlet, Port Orchard Bay, and related water bodies, including upstream watersheds. These tables identify the general location, primary affected processes, functions or species; describe the identified project(s) addressing those impacts; and list the current plan for that project.

The marine and estuarine shoreline projects are a subset of projects identified on a WRIA 15 basis that relate to water bodies within or affected by Bremerton shorelines. Chapter 5 provides greater detail in identifying restoration strategies within specific watersheds and reach areas in Bremerton.

Table 3-1. Marine and Estuarine Shoreline Projects

Project Location	Affected Process/Function/Species	Project Description	Status/Priority
Chico Bay (Drift Cell 90)	Tidal erosion and fluvial deposition affected by pilings, armoring, and groins; Chinook, chum, coho, steelhead	Remove bulkhead at "Place of Salmon" park; remove invasive species/re-establish native vegetation; abandon/remove Kittyhawk Drive culvert; conduct estuary acquisitions	Kittyhawk Drive, 2012; Enhance
Anna Smith Park (Drift Cell 137)	Sediment source and transport affected by pilings and armoring	Remove bulkhead; restore shoreline and access	Parks; Enhance, Create and Restore site process
Mosher Creek (Drift Cell 137)	Fluvial deposition	Replace/remove culvert at Mosher Creek crossing	Not planned; Enhance
Gorst Estuary (Drift Cell 34)	Tidal erosion, fluvial deposition, sediment transport, water quality; forage fish, Chinook, chum, coho, steelhead, waterfowl/shorebirds, shellfish	Acquisitions/easements	Enhance, Create, and Restore site process
Retsil (Drift Cell 34) Sinclair Inlet	Wave deposition affected by pilings, armoring, and marinas; water quality; chum, coho, surf smelt, sand lance	Replace undersized culvert; restore natural shoreline processes near boat ramp	Enhance, Create and Restore site process

Table 3-1. Marine and Estuarine Shoreline Projects (continued)

Project Location	Affected Process/Function/Species	Project Description	Status/Priority
Beach Drive (Drift Cell 84) Sinclair Inlet	Fluvial deposition (Nearshore Assessment Unit 486) affected by armoring; wave deposition/energy (Nearshore Assessment Unit 188) affected by armoring, pilings; chum, coho, surf smelt, sand lance, waterfowl concentrations	Replace culvert at Sacco Lane; fix Waterman dock and restore shoreline; evaluate culvert size at Waterman Point	Conserve and Restore site process
Illahee (Drift Cell 56)	Fluvial and wave deposition; critical aquifer recharge	Protect remaining salt marsh; implement Illahee regional stormwater treatment facility	Stormwater, 2016; Enhance
Illahee State Park/Enetai (Drift Cell 56)	Sediment source and transport affected by pilings and armoring	Investigate soft-bank armoring alternatives	Not planned; Create and Restore site process
Illahee (Drift Cell 56)	Fluvial and wave deposition; critical aquifer recharge	Protect remaining salt marsh; implement regional stormwater treatment facility	Stormwater, 2016; Enhance

An additional project in Oyster Bay implemented by the Puget Sound Restoration Fund (PSRF) was designed to augment the existing native Olympia oyster (Ostrea lurida) population and habitat on State and privately owned tideland property. The project involved installing additional seasoned Pacific oyster shell to increase the footprint of the existing native oyster habitat area with the objective of increasing the abundance of the native oyster population in Oyster Bay.

The freshwater projects listed in Table 3-2 are a subset of projects identified on a WRIA 15 basis that relate to water bodies within or affected by Bremerton shorelines. Many of these projects relate to marine water bodies because freshwater inputs are a critical element of marine ecology. Chapter 5 provides greater detail in identifying restoration strategies within Bremerton.

Table 3-2. Freshwater Shoreline/Watershed Projects

Project Location	Affected Process/Function/Species	Project Description
Lower Chico Creek	High impairment of surface water storage, groundwater recharge and discharge; culverts are velocity barriers; weirs are low flow barriers	- Implement LID - Replace culverts at Kittyhawk Drive, State Route (SR) 3, and Golf Club Hill Road - Remove U.S. Department of Transportation trash rack after bridges in place - Improve riparian and channel conditions, especially at Erlands Point Park - Continue creating off-channel habitat for salmonid rearing and nesting - Implement other recommendations of the Chico Creek Alternative Futures Plan (including at Time Oil site) - Continue to monitor and remove knotweed and other invasive plants
Upper Chico Creek and Wetland		- Protect existing functions - Assess impacts of Seabeck Highway culverts and

Project Location	Affected Process/Function/Species	Project Description
		replace where needed - Decommission trails in sensitive areas at Newberry Heritage Park; add or improve other trails - Remove invasive plants/replant appropriate wetland shrubs or trees
Kitsap Lake and Wetland		- Implement LID retrofits
Union River		- Maintain riparian forest buffers and improve large woody debris (LWD) abundance - Re-establish natural cover - Retrofit existing structures with permeable pavement and rain gardens

3.4 PROGRAMMATIC RESTORATION ACTIONS

Certain restoration actions should be broadly and comprehensively implemented on a programmatic basis to help achieve restoration goals. The following programmatic actions are recommended for shorelines within Kitsap County as funding permits. The entities that will take the lead on these actions will be determined in the future. Kitsap County and its current and potential partners will continue to coordinate with each other on restoration activities. The funding mechanism for many of these actions has not yet been identified.

Education and Incentives

- Continue to educate shoreline property owners about shoreline processes, alternatives to armoring, benefits of native plants, etc. through various methods, including workshops, newsletters, websites and Beach Watchers/Stream Stewards classes.
- Identify feeder bluff locations and prioritize outreach on bulkhead removal or alternatives; provide support and incentives such as faster permitting or cost sharing.

Planning

- Develop and implement a planning-by-watershed approach, incorporating land use, LID, restoration, protection, and public access.
- Use the Kitsap Alternative Futures model to support decisions on code modifications, policy, and prioritization of protection, restoration, and development locations.

Infrastructure

- Continue to identify and replace undersized culverts or bridges for the passage of 100-year flood events, fish and wildlife, and nutrients, including LWD (average size tree from that watershed).
- Continue to identify and conduct LID stormwater retrofits.
- Remove and restore locations with state-identified leaking underground storage tanks, etc.

4. EXISTING PROGRAMS AND FUNDING SOURCES

4.1 GOVERNMENT AND NON-GOVERNMENTAL ORGANIZATION PROGRAMS

There are many existing government and private non-governmental organization programs and funding sources, which implement the Restoration and Enhancement goals and policies of this SMP update. Most restoration efforts are implemented because citizens, tribes, and non-governmental entities; and local, state, and federal resource agencies collaborate to solve problems and achieve shared goals. Continued collaboration at all levels is needed if the goals of this Plan are to be achieved.

Table 4-1 identifies existing governmental restoration programs; Table 4-2 identifies private and non-governmental organization restoration programs; and Table 4-3 identifies potential funding resources.

Table 4-1. Existing Governmental Restoration Programs

Organization and Program	Mission and Scope	Role in Future Restoration Efforts	Example of Restoration Projects
Kitsap County Department of Community Development	• To enable the development of quality, affordable, structurally safe, and environmentally sound communities • Environmental Programs Division combines permit review with long-range environmental planning and restoration grant administration	• Grant administration • Planning and prioritizing restoration and enhancement	• Chico Creek In-stream Restoration and Mainstem/Estuary acquisitions • Kitsap Nearshore Assessment and Restoration Prioritization Framework • Kitsap Regional Shoreline Restoration Demonstration Project
Kitsap County Health District (partial Surface and Stormwater Management [SSWM] funds)	• Striving to make Kitsap County the healthiest place on the planet to live, work and play • Environmental Health Division: identifies and prioritizes cleanup of surface water (marine and fresh) • Pollution Identification and Correction (PIC) Program • Review of appropriate on-site sewage system placement • Stream, lake, and marine (shellfish) health monitoring and reports	• Coordinate restoration projects with PIC priority areas to enhance public awareness and participation	• Dyes Inlet Restoration Project • Other PIC projects (Liberty Bay, Hood Canal, Yukon Harbor, etc.)
Kitsap Conservation District (partial SSWM funds)	• Farm Plans (best management practices [BMPs]) • Rain Garden Program • Backyard Habitat Grants (Stream and shoreline restoration funds for communities)	• Coordinate rain garden implementation with priority watersheds and projects • Prioritize habitat grants based on the priorities of this Plan	

Table 4-1. Existing Governmental Restoration Programs (continued)

Organization and Program	Mission and Scope	Role in Future Restoration Efforts	Example of Restoration Projects
Washington State University Kitsap Extension	• Beach Watchers/Stream Stewards • Noxious Weed Control Program	• Provide outreach to shoreline property owners that is non-regulatory • Provide project monitoring • Provide technical support to landowners	
University of Washington Sea Grant	• Research and education		• Geoduck aquaculture research • Public beach walks • State of the Oyster (shellfish sample analysis) • Educational materials
U.S. Navy	• ENVVEST		• U.S. Navy, Sinclair and Dyes Inlet studies to identify and demonstrate alternative, long-term, cost-effective strategies for protecting these water bodies
West Sound Watersheds Council	• East Kitsap Lead Entity for Salmon Recovery (Washington State Recreation and Conservation Office) • 3-Year Work Plan for Salmon Recovery		• Prioritizes state-funded salmon recovery and restoration projects carried out by other entities
Washington Department of Fish and Wildlife	• Habitat Work Schedule • Permitting	• Assist local jurisdictions in identifying local priority species • Provide technical assistance in project identification and prioritization	• PHS mapping and data collection • Conservation plans
Washington State Department of Ecology	• Grants • Permitting • Washington Conservation Corps		
Suquamish Tribe	*It is the mission of the Suquamish Fisheries Department to preserve, protect and enhance treaty reserved resources within the Tribal usual and accustomed grounds and stations for subsistence, cultural and commercial benefits for present and future generations of Suquamish Tribal Members.*		• Project lead or team for projects on Dogfish, Gorst, Salmonberry, Barker, Chico, Carpenter, and Cowling creeks

Table 4-1. Existing Governmental Restoration Programs (continued)

Organization and Program	Mission and Scope	Role in Future Restoration Efforts	Example of Restoration Projects
Port Gamble S'Klallam Tribe	The Hood Canal Coordinating Council prioritizes and disperses over $2 million dollars annually for salmon restoration across their planning area.		
Point No Point Treaty Council			• Riparian Vegetation Study (2010)

Note: Italics indicates direct quotations.

Table 4-2. Private and Non-Governmental Organization Restoration Programs

Organization and Program	Mission and Scope	Role in Future Restoration Efforts	Example of Restoration Projects
Great Peninsula Conservancy	*The Conservancy works in partnership with landowners, community groups and local governments, providing the tools and expertise to enable landowners to preserve forever the special landscapes of the Great Peninsula region. The Conservancy conserves land through donations of conservation easements or gifts of land, or by purchase with donated funds, and counsels property owners on preservation techniques available to them.*	• Manage protection and restoration easements and acquisitions • Work with communities to identify restoration or protection projects in their neighborhood	• Stewardship of shoreline easements and owner of acquisitions, including Indianola Waterfront Preserve and Clear Creek Trail • Conserved over 5,700 acres of land
The Mountaineers	*The premier Northwest outdoor recreation club, dedicated to the responsible enjoyment and protection of natural places*	• Host classes and field trips for Stream Stewards or other workshops/training • Partner in future acquisitions in Chico Creek watershed	• Preservation of thousands of acres of Chico Creek watershed • Education through Salmon Safari for youth outdoor programs
Mid Sound Fisheries Enhancement Group			
Fish America Foundation	*The conservation and research foundation of the American Sportfishing Association—keeping our nation's fish and waters healthy.* *FishAmerica provides grants to non-profits, conservation minded groups to enhance fish populations, restore fisheries habitat, improve water quality and advance fisheries research to improve sportfishing opportunities and success.*		
Wild Fish Conservancy			West Sound fish-typing surveys (North Kitsap)

Note: Italics indicate direct quotations

Table 4-3. Potential Funding Sources

Agency	Grant or Fee Name
Washington State Recreation and Conservation Office/WDFW	Estuary and Salmon Restoration Program (ESRP) Grants
Washington State Recreation and Conservation Office	Salmon Recovery Funding Board Grants
Washington State Recreation and Conservation Office	Land and Water Conservation Fund (LWCF)
Washington State Recreation and Conservation Office	Washington Wildlife Recreation Program
National Fish and Wildlife Foundation	Community Salmon Fund Grants
Washington Department of Fish and Wildlife	Aquatic Lands Enhancement Account (ALEA) Grants
Washington Department of Natural Resources	Family Forest Fish Passage Program
Kitsap Conservation District/SSWM	Backyard Habitat Grants/SSWM Fee
Washington State Department of Ecology	Coastal Protection Fund/Terry Husseman Grants
Burley Lagoon Shellfish Protection District	Shellfish Protection District Fee
Kitsap County Public Works—Roads	Property Tax (~13% to Roads), and State Gas Tax
U.S. Environmental Protection Agency	Puget Sound Watershed Management Assistance Program

4.2 CITY OF BREMERTON PROGRAMS

The City participates in West Sound Watersheds (East Kitsap), which covers the entire eastern portion of WRIA 15 and is the lead entity for salmon recovery.

Other agencies involved in the project include Kitsap County, tribes, non-profit groups, and the Cities of Poulsbo, Bainbridge Island, Gig Harbor, and Port Orchard. In addition, the City has a variety of programs administered by various departments that contribute to salmon recovery, which are further described below.

Public Works and Utilities Department, Surface and Stormwater Management Program

This program includes a variety of efforts that assist with restoration including:

- The City, along with its regional partner, the Kitsap Peninsula Clean Runoff Collaborative, has a regional education and outreach program that provides education and focuses on proper pet waste disposal, promotion of water quality hot lines, and promotion of the regional "Puget Sound Starts Here" campaign.
- The City participates in the Kitsap County Stormwater Management Advisory Committee, which consists of 18 members representing citizens, water-related public agencies, tribal governments, and the four Kitsap County cities. The committee advises on program direction and implementation to address stormwater control and quality issues, and to promote interagency and interjurisdictional coordination.

- The City has regulations and monitoring programs to prevent illegal discharge into the stormwater system.
- The City regulates stormwater in new development through adoption of the Stormwater Management Manual for Western Washington—the latest edition serves as the guiding criteria for the planning, design, and construction of stormwater facilities.
- The City encourages LID efforts through the *Low Impact Development (LID) Guidance Manual - A Practical Guide to LID Implementation in Kitsap County*—the guiding criteria for the planning, design, and construction of low impact development.
- The City reduces stormwater impacts associated with runoff from streets through participating in the Regional Road Maintenance Endangered Species Act Program.
- The City addresses application of fertilizer, pesticides, and herbicides through nutrient management and integrated pest management plans for all parks and other facilities.

The City's Public Works and Utilities Forestry and Natural Resources Division manages 8,300 acres of Water Utility forest lands for watershed protection, timber harvest, reforestation, biosolids utilization, and salmon restoration. The division also coordinates fishery and other environmental issues on Water Utility forest lands and provides education such as an annual salmon viewing and Kids' Fishing Day.

Park and Recreation Department

The City's *Parks, Recreation and Open Space Plan* includes a specific recommendation regarding the department's role in preservation and restoration of important natural areas:

> It is highly recommended that Bremerton identify potential natural area acquisitions and locate funding sources to help purchase additional natural area properties. Priority for natural land acquisitions may include undeveloped marine shoreline, second growth conifer forests (known habitat for eagles, osprey, great blue heron, harbor seals and harlequin ducks), parcels offering connectivity between protected upland habitat and bodies of water, and parcels that enlarge intact riparian buffer zones along creeks and streams to increase water quality for salmon. This proactive stance will ensure that additional natural areas are preserved to accommodate or offset partial development at the existing undeveloped parks and that the current ratio of natural areas and undeveloped parkland acres to population is kept intact as the number of people residing in the City increases.

Other relevant policies of the plan include:

> **Goal 3:** Protect and manage the City's natural resources, scenic areas, and environmentally sensitive lands to highlight their unique attributes.
>
> 3.1 Identify and inventory the City's scenic, natural resource and environmentally sensitive lands.
>
> 3.2 Develop a prioritized plan to protect and/or acquire the most valuable properties to provide access and passive recreation, as appropriate.
>
> 3.3 Manage vegetation in natural areas to enhance or maintain native plant species, habitat function and other ecological values. Remove and control nonnative or invasive plants as appropriate.

3.4 Develop management and restoration plans for significant community greenspaces and facilitate community-based volunteer restoration.

3.5 Develop forest management plans and contract with an arborist to improve the tree health in NAD, Forest Ridge, Sheridan, Stephenson Canyon, East Park and other forested parks.

Gorst Creek

A variety of programs have been implemented by the City in cooperation with other agencies for salmon recovery.

In 2001, the Gorst Creek Restoration Project replaced 750 feet of concrete channel with 1,000 feet of channel that replicates a more natural stream system and provides spawning, rearing, and riparian habitat for salmonid species, as well as other wildlife.

In 2010, the *Comprehensive Watershed Plan for Sustainable Development and Restoration of the Gorst Creek Watershed* was initiated with U.S. Environmental Protection Agency grant funding, as well as local funding. Project participants included the City and Kitsap County, with assistance from Ecology, WDFW, the Kitsap County Health District, and other stakeholders.

The project consisted of the following major tasks:

- Watershed Characterization Study and Comprehensive Watershed Plan;
- Land Use Plan and Development Regulations;
- Planned Action Environmental Impact Statement;
- Stormwater Plan;
- Capital Improvement and Corrective Action Plan, including an Engineering Evaluation/Cost Analysis for correction of the private landfill within a major tributary of Gorst Creek; and
- Outreach and Information Transfer program.

The current study is expected to be completed in 2012.

5. RESTORATION PRIORITIES

This Plan is intended to complement other plans, such as the salmon recovery plans, but not to replace them. The Plan is also designed to promote coordination efforts with other agencies through salmon recovery and other programs.

5.1 RESTORATION STRATEGY

The City's overall restoration strategy is to pursue restoration projects with multiple stakeholders that provide multiple benefits. Such programs have the greatest potential for cost-effective and successful restoration of ecological functions.

The City should pursue the following opportunities:

- Pursue water quality and habitat restoration opportunities as part of acquisitions and capital improvements for stormwater utility, transportation, parks, and other projects.
- Manage City assets such as the Union River and Reservoir, City parks, and other facilities for multiple uses, including restoration of ecologic functions where feasible.
- Cooperate with Kitsap County and other agencies in watershed-based restoration programs in recognition that ecologic functions cross jurisdictional boundaries.
- Partner with others in WRIA 15 to coordinate salmon recovery actions with mitigation efforts in future development when such development is required to incorporate ecologic enhancement as part of non-water-dependent development, or when development produces impacts that are most effectively addressed off-site.
- Make minor improvements to buffer areas and vegetation as properties undergo remodeling and redevelopment to address ongoing adverse impacts, such as from runoff that carries herbicides and pesticides into water bodies.

5.2 RESTORATION STRATEGY BY WATER BODY

This section summarizes potential restoration strategies by the individual water bodies identified in the SMP *Revised Shoreline Inventory and Analysis* (City of Bremerton 2010).

5.2.1 Dyes Inlet

Dyes Inlet is the marine embayment of west Puget Sound, which includes the northerly portion of the Bremerton Urban Growth Area (UGA).

The Dyes Inlet watershed drains an area of 30,289 acres, including the creeks that flow into the inlet. It has approximately 22 miles of marine shoreline and 90 stream miles that include ten named streams. Approximately 40 percent of the watershed is within the urban area (12,231 acres) designated by Kitsap County. Within the study area, about 16 miles of marine shoreline with contributing drainage areas occur in Dyes Inlet. Bremerton and Silverdale are the major urban areas, with smaller retail centers at Chico, Tracyton, and Kitsap Lake. The Jackson Park Naval Reservation, Camp Wesley Harris, and parts of the Bangor Naval Reservation are located within the watershed.

The Kitsap County Health District conducted the Dyes Inlet Restoration Project from 2005 to 2009. This project addressed fecal coliform contamination, which resulted in a substantial improvement in biological water quality due to identification and elimination of sources from on-site sewage disposal, sewer systems, and stormwater. As a result of the program, the State

Department of Health reclassified Chico Bay from "restricted" to "conditionally approved" for commercial shellfish harvest due to water quality improvements.

Specific subareas considered in this Plan include:

- Ostrich Bay (with several subareas),
- Oyster Bay, and
- Mud Bay.

5.2.1.1 Ostrich Bay

Ostrich Bay is a large embayment in Dyes Inlet that supports coho and chum salmon, as well as cutthroat trout. A concentration of surf smelt spawning areas is mapped around Elwood Point. Patchy eelgrass and salt marsh occur at a few scattered locations in Ostrich Bay. Bald eagle nests and foraging areas are associated with much of the Ostrich Bay shoreline.

Land cover use surrounding Ostrich Bay is a mix of high-intensity residential, low-intensity residential, mixed forest, evergreen and deciduous forest, urban grasses, and small areas of commercial/industrial. Land cover is mostly developed (66 to 80 percent) and impervious surface is relatively high; impervious surface is 30 percent or above over most of the contributing area.

Shoreline modifications include tidal barriers (3 percent of shoreline length), armoring (57 percent of shoreline area, roads (13 percent of shoreline area), and nearshore fill (2 percent of shoreline area). Overwater structures are concentrated in a few locations and cover less than 1 percent of the shoreline area.

Ecology maintains a Clean Water Act Section 303(d) list of water quality impaired marine and fresh water bodies. Ostrich Bay is listed as having impaired water quality because of fecal coliform, mercury, and low dissolved oxygen levels. Most of Ostrich Bay is a Prohibited Shellfish Growing Area.

5.2.1.2 Ostrich Bay North

Ostrich Bay North includes the small embayment north of Elwood Point and the east and north side of Erlands Point, just into Chico Bay. The southern half of the embayment is the limit of the City's planning area, but the entire reach is described here. Chico Creek is the most important source of freshwater inputs to this area, including the entire west and south portions of Ostrich Bay.

The predominant land use in the area is single-family residential. There is U.S. Navy and public ownership of the south side of the Chico Creek Estuary.

Restoration Strategy

Chico Creek and estuary restoration activities are likely to contribute to a number of processes relative to the marine environment, including freshwater inputs and sediment inputs. Efforts that directly affect the marine shoreline include the Chico Estuary Restoration Project, which involves driveway and roadway culvert removal and channel restoration, as well as future acquisitions and restoration in the estuary. Other restoration activities would include improvement of riparian conditions, especially at Erlands Point Park. Kitsap County is the lead agency for Chico Creek restoration.

Ownership of a large portion of this area by the U.S. Navy provides the potential for enhancement and successful restoration of much of the marine nearshore and upland areas.

5.2.1.3 Ostrich Bay South

Ostrich Bay South includes the portion of the bay within the City. The primary land uses are the U.S. Navy Hospital, the Navy's Jackson Park residential community, the City's NAD Marine Park, and residential use.

Ostrich Bay Creek enters at the south end of the bay. It has a watershed area of about 450 acres in developed urban land uses. There is a pocket estuary at the delta of the stream. This stream supports coho and chum salmon and cutthroat trout. Fish passage barriers occur at Kitsap Way, SR 3, and Price Road. The Kitsap Health District placed the stream on a Public Advisory informing the public to avoid contact with the waters due to the fecal coliform bacteria levels in the stream.

A seal and sea lion haulout area, as well as a concentration of surf smelt spawning areas, is mapped at Elwood Point. Patchy eelgrass and salt marsh occur at a few scattered locations in Ostrich Bay. Bald eagle nests and foraging areas are associated with much of the Ostrich Bay shoreline.

Restoration Strategy

Chico Creek and estuary restoration activities are likely to contribute to a number of processes relative to the marine environment, including freshwater inputs and sediment inputs as the largest tributary on the west side of Dyes Inlet.

The City may contribute to better water quality in the south Ostrich Bay area through incremental improvements in the storm drainage system and by public education in order to reduce the discharge of nutrients and toxins into the system. This is especially the case for the tributary area of Oyster Bay Creek, which currently has bacterial and other contaminant issues.

Efforts that directly affect the marine shoreline include improvement of riparian conditions, especially at Erlands Point Park. Ownership by the U.S. Navy and the City of a large portion of this area provides the potential for enhancement of the marine nearshore and upland areas. The City's NAD Marine Park is planned for largely passive use and would likely continue to provide a range of positive inputs to the nearshore.

U.S. Navy lands can be enhanced primarily by expansion of the buffer areas and management responsibility to develop mature native vegetation along the marine frontage of the hospital, the park, and the residential area. Removal or reduction in size of the inactive munitions pier would reduce impacts of overwater structures.

The developed area, with primarily single-family residences, has mostly lawn and ornamental vegetation at the shoreline. The runoff discharged from this area has ongoing adverse impacts because the discharge contains sediment and toxins from pesticides and herbicides. Public education is likely the most effective means of changing these existing practices.

The addition of native vegetation buffers adjacent to the water to provide filtering and uptake of pollutants, as well as providing shade to reduce desiccation of the nearshore area, may be addressed by educational efforts and voluntary planting of buffers. As individual properties undergo major remodeling or redevelopment, minimal buffers on the shoreline would be required. Cumulatively, these efforts are likely to benefit both water quality and nearshore habitat.

Existing docks and moorage facilities are limited, but would require enhancement such as adding grating to docks and piers for light penetration, and less surface coverage as they reach the end of their useful life, which would require major repair or replacement.

5.2.1.4 `East Ostrich Bay

East Ostrich Bay includes Madrona Point, Marine Drive Point, and the westerly portion of Rocky Point above Mud Bay. Rocky Point is currently outside of the Bremerton city limits but in the UGA. This is a generally an older residential area. The areas not on city sewer were platted and developed prior to existing on-site sewage system regulations. The natural physical conditions of the area, primarily the surface, groundwater conditions, and the soil types and depths are not conducive for the utilization of "standard gravity" on-site sewage systems. Development patterns along the shoreline and adjacent uplands include land cover, which is about 40 to 48 percent natural and 55 to 60 percent developed, with some mixed forest, deciduous forest, and urban grasses. Impervious surfaces are mostly below 30 percent in the contributing drainage.

Restoration Strategy

The developed single-family areas on Madrona Point and along Marine Drive provide primarily lawn and ornamental vegetation at the shoreline. The runoff discharged from this area has ongoing adverse impacts because the discharge contains sediment and toxins from pesticides and herbicides. Public education is likely the most effective means of changing these existing practices.

The addition of native vegetation buffers adjacent to the water to provide filtering and uptake of pollutants, as well as providing shade to reduce desiccation of the nearshore area, may be addressed by educational efforts and voluntary planting of buffers. As individual properties undergo major remodeling or redevelopment, minimal buffers on the shoreline would be required. Cumulatively, these efforts are likely to benefit both water quality and nearshore habitat.

Existing docks and moorage facilities are limited in number, but would require enhancement such as adding grating to docks and piers for light penetration, and less surface coverage as they reach the end of their useful life, which would require major repair or replacement.

The City may contribute to water quality in the bay through incremental improvements in the storm drainage system and in public education in order to reduce the discharge of nutrients and toxins into the system.

5.2.1.5 Oyster Bay

Oyster Bay is a shallow protected embayment with a relatively narrow opening to Ostrich Bay. Oyster Bay has no significant tributary streams. The tributary area from which surface water flows into the bay is relatively small but also is highly urbanized. Most water is from runoff from a relatively narrow area surrounding the bay and from tidal flows. Oyster Bay has shallow habitat areas supporting high primary productivity for marine life and a diverse assemblage of benthic invertebrates and fish. The bay also provides the potential for habitats, such as for eelgrass.

Oyster Bay has a low water exchange environment that is particularly vulnerable to alterations that affect water quality including excess nutrients, pathogens, and toxins that tend to accumulate or have longer residence times due to limited flushing. Oyster Bay is listed on Ecology's 303(d) list with impaired water quality due to fecal coliform, mercury, and low dissolved oxygen levels. All of Oyster Bay is a Prohibited Shellfish Growing Area.

The majority of land in the bay is single-family residential with a small commercial area at the south end. Land cover is mostly developed urban area (about 70 percent developed and 30 percent natural), with most of the contributing area having high levels of impervious surface (>50 percent impervious surface). The south shore of Oyster Bay has the highest level of development and impervious surface. Shoreline modifications include significant alteration to

tidal action (11 percent of shoreline length with tidal barriers), moderate to high levels of armoring (50 percent of shoreline length), roads affecting the shoreline (13 percent of shoreline area), and relatively low levels of nearshore fill and overwater structures (less than 1 percent of shoreline area).

Restoration Strategy

The commercial area near the south end of the bay has the potential for some restoration of the shoreline as part of future non-water-dependent development, which requires shoreline restoration and public access. The existing development in this area is not water-dependent and it is doubtful that water-dependent uses would be appropriate given the shallow nature of the bay and the proposed "Aquatic Conservancy" designation.

The developed area, with primarily single-family residences, has mostly lawn and ornamental vegetation at the shoreline. The runoff discharged from this area has ongoing adverse impacts due to the runoff containing sediment and toxins from pesticides and herbicides. Public education is likely the most effective means of changing these existing practices.

The addition of native vegetation buffers adjacent to the water to provide filtering and uptake of pollutants, as well as providing shade to reduce desiccation of the nearshore, may be addressed by educational efforts and voluntary planting of buffers. As individual properties undergo major remodeling or redevelopment, minimal buffers on the shoreline would be required. Cumulatively, these efforts are likely to benefit both water quality and nearshore habitat.

Although existing docks and moorage facilities are limited, they would require enhancement. Such actions would include grating for light penetration and less surface coverage as they reach the end of their useful life, which would require major repair or replacement. New overwater and inwater structures would be limited by the proposed "Aquatic Conservancy" designation.

There is little public land in this reach and therefore little opportunity for public enhancement projects on the shoreline.

The Puget Sound Restoration Fund (PSRF) has augmented the existing native Olympia oyster (*Ostrea lurida*) population and habitat on State and privately owned tideland property by installing additional seasoned Pacific oyster shell to increase the footprint of the existing native oyster habitat area. The objective is to increase the abundance of the native oyster population in Oyster Bay. Such efforts should be monitored and possibly expanded if effective.

Redevelopment of the 83-acre Bay Vista site (the Bremerton Housing Authority Westpark Community) is likely to result in improved water quality discharge to Oyster Bay through current stormwater management practices; however, the redevelopment area is only a part of the tributary watershed draining into the bay.

The City may contribute to improved water quality in the bay by incrementally upgrading the storm drainage system, as well as educating the public, in order to reduce the discharge of nutrients and toxins into the system.

5.2.1.6 Mud Bay

The east side of Mud Bay is currently outside of the Bremerton city limits but in the UGA. It is surrounded by relatively large residential lots.

Mud Bay completely empties at lower tides and supports a mud flat with high primary productivity for marine life that contributes a diverse assemblage of benthic invertebrates to the food chain. It is a low water exchange environment that is particularly vulnerable to

alterations that affect water quality, including excess nutrients, pathogens, and toxins that tend to accumulate or have longer residence times due to limited flushing. Most parcels were platted and developed prior to existing on-site sewage system regulations. The natural physical conditions of the area, primarily the surface and groundwater conditions, soil types, and depths, are not conducive for implementing "standard gravity" on-site sewage systems leading to potential high nutrient levels.

Land cover use is about 40 to 50 percent natural and 50 to 60 percent developed, with some mixed forest, deciduous forest, and urban grasses. The contributing drainage area is very small. Shoreline modifications are limited, as one would expect in a low energy environment. The area has a moderate to high amount of shoreline armoring (55 percent of shoreline length), some barriers to tidal flow (2 percent of shoreline length), and roads (8 percent of the shoreline area). In addition, numerous overhanging docks and piers, including pilings, are scattered along the shoreline. However, this reach lacks large overwater structures and the low energy areas in Mud Bay are generally not armored. Riparian vegetation is lacking for most of the shoreline, but areas along the eastern shore of Mud Bay and some areas along Rocky Point have intact riparian vegetation.

Restoration Strategy

The developed single-family area provides a variety of buffer conditions varying from wide buffers of native trees to lawn and ornamental vegetation. Where ornamental vegetation predominate, the adverse impacts from runoff discharge containing sediment and toxins from pesticides and herbicides, which are likely to be most effectively addressed by public education.

Many lots have the potential for subdivisions to be developed when urban services such as sewers are provided. The SMP buffer requirements are likely to preserve existing buffers and enhance those buffers that are not currently maintained. In addition, the City will require detention and treatment of stormwater that would where certain criteria are met. Larger developments would be encouraged to use low-impact development techniques.

The addition or enhancement of native vegetation buffers adjacent to the water (to provide filtering and uptake of pollutants and provide shading to reduce desiccation of the nearshore) may be addressed by educational efforts and voluntary planting of buffers. As non-subdividable properties undergo major remodeling or redevelopment, minimal buffers on the shoreline would be required. Cumulatively, these efforts are likely to benefit both water quality and nearshore habitat.

Existing docks and moorage facilities are limited in number and size, but would require enhancement such as adding grating to docks and piers for light penetration and less surface coverage as they reach the end of their useful life, which would require major repair or replacement. New overwater and inwater structures are limited by the proposed "Aquatic Conservancy" designation.

5.2.2 Port Washington Narrows

Port Washington Narrows is a tidal strait connecting Port Orchard Bay with Dyes Inlet. Tidal currents attain velocities in excess of 4 knots at times. The formal boundaries are Rocky Point to the northeast, Point Turner to the southwest, and Point Herron to the southeast. For the purpose of this discussion, the Tracyton Beach area is considered within Dyes Inlet, and will be included in the discussion of the east side of the Narrows.

5.2.2.1 Phinney Bay

Phinney Bay is a large embayment at the western end of Port Washington Narrows and eastern end of Dyes Inlet and extends from Rocky Point to North Lafayette Avenue.

Phinney Bay has some high bank areas on the eastern shore, but it mostly consists of low bank and/or marsh lagoon shoreforms dominated by mud, sand, and gravel substrates. One surf smelt spawning location is mapped on the northeast side of Phinney Bay. Non-floating kelp occurs along the northeastern side, with continuous eelgrass habitat along most of the bay shoreline. Patchy salt marsh occurs at the southern end and in the lagoon on the western side of the bay. Eelgrass also is mapped in continuous distribution along the south and west shores of Phinney Bay. Some oyster beds occur at the north end of the bay, although Phinney Bay is currently classified as a Prohibited Shellfish Growing area. Water quality issues include fecal coliform and possibly low dissolved oxygen. The Kitsap Health District listed Phinney Creek on a Public Advisory alerting the public to avoid contact with the waters. The bay has a large number of stormwater outfalls, especially on the western side.

The eastern side of Phinney Bay (to Corbet Drive NW) is currently outside of the Bremerton city limits but in the UGA. The primary land use is single-family residential, but there is one marina, the Bremerton Yacht Club, on the eastern shore. About 30 percent of the drainage area contributing to Phinney Bay has impervious surfaces greater than 50 percent, but a relatively large portion of the drainage area (55 percent) is covered by less than 10 percent impervious surface. This is due to the mostly natural land cover, low-intensity residential use, and the mixed forest.

Shoreline modifications include moderately high levels of shoreline armoring (64 percent of shoreline length), roads affecting the shoreline (8 percent of shoreline area), and overwater structures (5 percent of shoreline area). The Bremerton Yacht Club marina comprises most of the overwater structure in the area.

Restoration Strategy

The east side of the bay (currently unincorporated Kitsap County) contains large single-family lots with a variety of buffer conditions varying from wide buffers of native trees to lawn and ornamental vegetation. On the west side of the bay, smaller urban lots generally have a limited buffer although lawn and ornamental vegetation predominates. Where non-native vegetation predominates, adverse impacts from runoff discharge containing sediment and toxins from pesticides and herbicides can likely be most effectively addressed by public education.

Many lots on the east side have the potential for subdivision development when urban services such as sewers are provided. The SMP buffer requirements would likely preserve the existing buffers and provide enhancement where buffers are not currently present. For existing lots, the addition or enhancement of native vegetation buffers adjacent to the water may be addressed by educational efforts and voluntary planting of buffers. As non-subdividable properties undergo major remodeling or redevelopment, minimal buffers on the shoreline would be required. Cumulatively, these efforts are likely to benefit both water quality and nearshore habitat by providing filtering and uptake of pollutants, as well as providing shade to reduce desiccation of the nearshore.

Existing docks and moorage facilities will require enhancement such as adding grating to docks and piers for light penetration and less surface coverage as they reach the end of their useful life, which would require major repair or replacement. New overwater and inwater structures in the far south end of the bay are limited by the proposed "Aquatic Conservancy" designation.

The City may contribute to improved water quality in the bay by incrementally upgrading the storm drainage system and educating the public in order to reduce the discharge of nutrients and toxins into the system.

5.2.2.2 Port Washington Narrows West

This area extends from North Lafayette Avenue to Point Turner (which for convenience will be considered at 6th Street in downtown Bremerton). This area has complex urban land uses including single-family and multi-family residential, industrial, and parkland. A few locations for surf smelt spawning are mapped along this reach. Continuous non-floating kelp is distributed along most of the shoreline, but no eelgrass or marsh vegetation is found here. Hardshell clam areas occur along the Narrows, but are mostly associated with the eastern shore. Waterfowl concentrations occur at the entrance to the Narrows, between the ferry docks and Evergreen Park. High waterfowl concentrations also occur opposite Lions Park. There is a large pelagic cormorant roost under the Warren Avenue Bridge, as well as a peregrine falcon nest.

Shoreline modifications include heavily armored shorelines (80 percent shoreline length), numerous roads (12 percent of shoreline area), and fill within the nearshore (2 percent of the area). In addition, numerous overhanging structures; piers, docks, and floats; and old pilings occur along the Narrows shoreline.

Impervious surfaces along the shoreline are mostly above 50 percent, with 90 to 100 percent at some locations including along the Bremerton waterfront, where the Warren Avenue Bridge crosses the Narrows, and just east of Anderson Cove. Land cover is predominantly high-intensity residential or commercial/industrial, with small areas of low-intensity residential.

Restoration Strategy

Single-family lots in this area generally have little or no native vegetation buffer. Public education is the primary means of influencing individuals to change vegetation management to include more native vegetation along the shoreline and it has the potential to influence a much greater proportion of the shoreline. As single-family properties undergo major remodeling or redevelopment, minimal buffers on the shoreline would be required. Cumulatively, education and regulatory requirements are likely to benefit both water quality and nearshore habitat by providing native vegetation that contributes filtering and uptake of pollutants and providing shade to reduce desiccation of the nearshore.

Existing docks and moorage facilities will require enhancement such as adding grating to docks and piers for light penetration and less surface coverage as they reach the end of their useful life, which would require major repair or replacement.

There are very limited areas of industrial and multi-family zoning, which may provide opportunities for enhancement of the shoreline upon redevelopment. The industrial area near Pennsylvania Avenue has the potential for some restoration of the shoreline as part of future non-water-dependent development, which requires shoreline restoration and public access. The extent of restoration required would depend on the extent of water-dependent development and the extent that mitigation may be required to meet the criteria for no net loss of ecological functions.

The multi-family area within the downtown subarea will be redeveloped with medium- to high-density residential with a strong relationship to the street. The high bank waterfront limits other than visual access to the water in most cases. As part of redevelopment, buffer areas will be augmented and feeder bluff functions enhanced.

Public parks provide a variety of opportunities for enhancement of native riparian vegetation depending on topography and other conditions implemented as part of ongoing park management. Enhancement opportunities, however, must be balanced with the goals of providing public visual and physical access to the shoreline.

The City may contribute to better water quality in the bay through incremental improvements in the storm drainage system and public education in order to reduce discharge of nutrients and toxins into the system.

5.2.2.3 Port Washington Narrows East

The far north easterly portion of Port Washington Narrows is characterized by large-lot rural development in the area north of Sheridan Road, which is in unincorporated Kitsap County and within the UGA. The remainder of the reach is single-family, multi-family, commercial, and park use. For convenience, the area south of Manette Bridge on Point Herron is considered in the discussion of Port Orchard Bay.

Three streams discharge into this area, but most of the natural conveyances have been covered and are contained in culverts. Parmann and Moser creeks north of Tracyton Beach Road still have continuous vegetation along much of the riparian area.

A few locations for surf smelt spawning are mapped along this reach. Continuous non-floating kelp is distributed along most of the shoreline, but no eelgrass or marsh vegetation is found here. Hardshell clam areas occur along the eastern shore; however, the area is closed to shellfish harvest. Waterfowl concentrations occur at the entrance to the Narrows. Sheridan Park, Lions Park, and East Park occur along this reach.

Shoreline modifications include heavily armored shorelines (80 percent shoreline length), numerous roads (12 percent of shoreline area), and fill within the nearshore (2 percent of the area). In addition, numerous overhanging structures such as piers, docks, and floats, and old pilings occur along the Narrows shoreline.

Impervious surfaces along the shoreline are mostly above 50 percent, with 90 to 100 percent at some locations including where the Warren Avenue Bridge crosses the Narrows. Land cover is predominantly high-intensity residential or commercial/industrial, with small areas of low-intensity residential.

Restoration Strategy

Single-family lots with shoreline frontage predominate only in the currently unincorporated area north of Tracyton Beach Road. Most lots have no native vegetation at the shoreline with lawns and ornamental vegetation the primary ground cover. Many of these lots have the potential for subdivision development when urban services such as sewers are provided. The SMP buffer requirements implemented at subdivision are likely to result in provision and enhancement of native vegetation buffers. In addition, the City will require detention and treatment of any stormwater that would be discharged. Larger developments would be encouraged to use low-impact development techniques.

In the interim, and for properties not subdividable, educational efforts may result in some changes in vegetation management leading to voluntary establishment of limited buffers. Cumulatively, education and regulatory requirements are likely to benefit both water quality and nearshore habitat by providing native vegetation that contributes filtering and uptake of pollutants and providing shade to reduce desiccation of the nearshore.

There are extensive areas of commercial and multi-family zoning in this reach, which are likely to provide opportunities for enhancement of the shoreline upon redevelopment. The most extensive potential redevelopment area is the Bremerton Gardens multi-family

community between Magnuson Way and 16th Street, which would provide the opportunity for setbacks and buffers to allow feeder bluffs and adjacent areas to function more naturally. The commercial area along Campbell and Wheaton Way south of the Warren Avenue Bridge would likely redevelop incrementally. Because non-water-dependent development requires shoreline restoration and public access, buffer areas would be augmented and feeder bluff functions enhanced.

Existing docks and moorage facilities will require enhancement such as adding grating to docks and piers for light penetration and less surface coverage as they reach the end of their useful life, which would require major repair or replacement.

Public parks provide a variety of opportunities for enhancement of native riparian vegetation depending on topography and other conditions implemented as part of ongoing park management. Enhancement opportunities, however, must be balanced with the goals of providing public visual and physical access to the shoreline.

The extensive, but narrow corridor between the shoreline and Tracyton Beach Road may be enhanced by augmenting native vegetation.

The City may contribute to improved water quality by incrementally improving the storm drainage system and educating the public in order to reduce discharge of nutrients and toxins into the system.

5.2.3 Sinclair Inlet

Sinclair Inlet is the arm of Port Orchard Bay west of Port Washington Narrows. It includes downtown Bremerton, the Puget Sound Naval Shipyard, Gorst Estuary, and the city of Port Orchard on its south side.

The Sinclair Inlet watershed drains an area of 27,492 acres, including the creeks that flow into Sinclair Inlet (primarily along the southern shore) and the Beaver Creek watershed to the east. The watershed includes 57 miles of saltwater frontage, approximately 46 lakes with 9.7 miles of shoreline, and about 62 miles of streams. The watershed is characterized by many small streams that drain relatively small areas. Gorst and Blackjack creeks are the main dischargers of freshwater into the inlet. Estimates of freshwater runoff into Sinclair Inlet range from 335 cfs in January to 5 cfs in August. The contribution of groundwater flow to the inlet is unknown but thought to be substantial. The currents of Sinclair Inlet are relatively weak, at only 0.8 knots. The estimated total flushing time is approximately 14 days.

5.2.3.1 Downtown Bremerton

Most of the area from 6th Street to the Puget Sound Naval Shipyard within the downtown subarea has been redeveloped with an array of residential, office, and mixed uses with strong connections and views to the waterfront and only a few additional lots are available for development. This area has high bluffs along the waterfront that precludes water-dependent use. Because non-water-dependent development requires shoreline restoration and public access, buffer areas will be augmented and feeder bluff functions enhanced.

Restoration Strategy

Restoration potential in this reach is limited due to intense urban development.

Future development in the downtown will preserve and enhance steep slopes resulting in augmentation of vegetation and feeder bluff functions.

The City may contribute to water quality by incrementally improving the upstream storm drainage system and educating the public in order to reduce discharge of nutrients and toxins into the system.

5.2.3.2 Puget Sound Naval Shipyard

This reach is heavily modified by the development of the Puget Sound Naval Shipyard. Impervious surface along the shoreline is more than 80 percent and frequently more than 90 percent along the entire shoreline. More than 90 percent of the shoreline length is armored and overwater structures affect approximately 50 percent of the shoreline area.

Restoration Strategy

Restoration potential in this reach is limited due to intense development.

The major opportunity for enhancement is continuing efforts by the U.S. Navy to improve water quality through improvements in treating their process water and stormwater runoff.

5.2.3.3 Gorst Estuary and Gorst Creek

Gorst Estuary is the largest estuary in the planning area and provides significant shoreline functions to Sinclair Inlet and Puget Sound. The estuary receives freshwater flows from Gorst Creek, as well as several small independent drainages nearby. Wright Creek is about 1.2 miles long and enters Sinclair Inlet between Gorst and Bremerton. Tributary streams support a variety of species including coho, chum, cutthroat, and steelhead.

Gorst Estuary itself is shallow, with fringing marshes and mud flats that provide excellent production of prey for salmonids. Biological resources in the estuary include waterfowl concentrations at the mouth and along the north and south shorelines of Sinclair Inlet, and shorebird concentrations along the north shore. Continuous mixed marsh and patchy salt marsh occurs along the inner estuary and north and south shorelines of Sinclair Inlet. Patchy eelgrass occurs between the edge of the marsh vegetation and adjacent mud and sand flats. Surf smelt spawning areas are mapped along the north and south shore of Sinclair Inlet just east of the estuary. Bald eagle nests are associated with the estuary along the south shore of Sinclair Inlet with nest management and foraging areas within the entire estuary.

Shoreline modifications include significant alteration to tidal processes, with tidal barriers affecting 6 percent of the shoreline length. Shoreline armoring affects 88 percent of shoreline length, road density is high (18 percent of shoreline area), overwater structures affect 4 percent of the shoreline area, and nearshore fill affects 20 percent of the shoreline area. These modifications are reflected in the loss of habitats. Estimates of the loss of historic shoreforms include 100 percent of former barrier estuaries, 65 percent of coastal inlets, and more than 80 percent of tidal wetlands.

About 1,500 feet of estuarine shoreline on the north side of the inlet were rehabilitated in the early 2000s through grants from the Salmon Recovery Board and funding by local sources.

Restoration Strategy

The City is in the process of developing the Gorst Creek Watershed Comprehensive Plan, which will outline development, preservation, and enhancement opportunities. The plan is not yet final, but generally will:

- Identify portions of the watershed which should be conserved and managed to protect the City's water supply;
- Identify areas that should be preserved for enhancement of water supply to the watershed and estuary, including wetlands and other areas;
- Identify areas that should be preserved and enhanced for habitat value score and as salmon refugia; and

- Identify areas more appropriate for higher density development based on identification of areas with lower water resource and habitat value.

There are extensive areas of commercial development south of Gorst Creek that could be redeveloped in the future. Because non-water-dependent development requires shoreline restoration and public access, buffer areas will be augmented and proximity impacts to the estuary reduced.

The City may contribute to water quality through incremental improvements in the storm drainage system in developed portions of the estuary and in public education in order to reduce discharge of nutrients and toxins into the system.

5.2.4 Port Orchard Bay

5.2.4.1 Point Herron/Shore Drive

For purposes of this analysis, this reach extends from the Manette Bridge to the northeasterly end of Shore Drive. The northerly end of this reach is occupied by the Boat House Restaurant and multi-family development. The remainder of the reach comprises single-family lots about 50 feet wide and between 70 and 100 feet deep. The shoreline is more than 50 percent impervious surface. There is a large pier at the Boat House Restaurant and six marine 'railways' at single-family residences, although not all are currently functioning. Almost the entire shoreline is armored with riprap and concrete bulkheads. There are no trees along the shoreline, but in many places there are very narrow lawns or ornamental plantings.

Restoration Strategy

There are few opportunities for restoration in the reach.

The Boat Shed Restaurant is likely to retain its existing non-conforming status, even if other tenants occupy it. In the long term, the existing pier would be reconstructed, when major repair or replacement was required, to include adding grates for light penetration and less surface coverage, which would enhance nearshore ecological functions.

If the multi-family development were to be redeveloped, very minor buffers might be included.

The proposed provisions of the SMP to provide minimal buffers when residences undergo major renovation and replacement may reduce the discharge of nutrients and toxins from fertilizers and herbicides/pesticides, but the SMP would not require residents to provide trees for shading thus there would be no improvement to existing upper beach desiccation.

The City may contribute to better water quality through incremental improvements in the storm drainage system and in public education in order to reduce discharge of nutrients and toxins into the system.

5.2.4.2 Port Orchard Bay East

The area east of Shore Drive in Bremerton is characterized by large single-family lots with extensive forested uplands. Portions of the areas are within the city; the remainder is in the UGA. Percent impervious surface within 200 feet of the marine shoreline ranges from 8 to 17 percent, while forest cover within the 200-foot shoreline area averages less than 2 percent. Over 50 percent of the shoreline is armored, with 6 percent of the shoreline affected by roads.

A small independent creek (Dee/Enetai) enters Port Orchard Bay approximately 1 mile northeast of Point Herron. The creek currently supports chum, coho, and cutthroat in the lower reaches. There are a number of fish passage barriers in this watershed. The riparian condition upstream of Trenton Avenue is poor, with little remaining riparian vegetation,

while the riparian condition in the steep ravine reach downstream of Trenton Avenue is considered to be generally good. Flows are very flashy, likely the result of the intense development in the watershed with no stormwater controls. This creek also has fecal bacterial contamination.

The eastern part of this reach in the UGA is largely undeveloped within the UGA, but with development above the steep bluff that begins at the shoreline.

Restoration Strategy

The preservation of existing undeveloped shoreline in the eastern part of the reach is likely to be accomplished by the proposed "Urban Conservancy" designation with likely future development concentrated at the top of the slope.

Large lots in this area have a variety of buffer conditions varying from wide buffers of native trees to lawn and ornamental vegetation. Where non-native vegetation predominates, adverse impacts from runoff discharge containing sediment and toxins from pesticides and herbicides are likely to be most effectively addressed by the addition or enhancement of native vegetation buffers adjacent to the water through educational efforts and voluntary planting of buffers. As non-subdividable properties undergo major remodeling or redevelopment, minimal buffers on the shoreline would be required. Cumulatively, these efforts are likely to benefit both water quality and nearshore habitat by providing filtering and uptake of pollutants and providing shade to reduce desiccation of the nearshore.

The City may contribute to water quality in the bay through incremental improvements in the storm drainage system that discharges into Dee/Enetai Creek and in public education in order to reduce discharge of nutrients and toxins into the system. Installation of a public sewer system, as recommended by the Kitsap Health District in areas served by failing on-site sewage systems, would address the major source of fecal contamination.

5.2.5 Kitsap Lake

Kitsap Lake is within the Chico Creek drainage. The lake is approximately 238 acres and the shoreline includes land within the city of Bremerton, as well as land within unincorporated Kitsap County. Most of the lake shoreline comprises single-family residential lots, with numerous docks, large areas of modified shoreline, and very little riparian vegetation. There is a large wetland on the south side of the lake, a City park, and a U.S. Navy park on the west side of the lake.

The lake supports resident cutthroat, coho, steelhead, and pink salmon. There is one bald eagle nest and foraging area along the shoreline.

Restoration Strategy

The major restoration activity that will contribute to improved water quality in the lake is protection and restoration of the upstream tributaries, which are addressed in the Chico Creek Management Strategy.

Public parks owned by the City, the county, and the U.S. Navy provide a variety of opportunities for enhancement of native riparian vegetation depending on topography and other conditions implemented as part of ongoing park management. Enhancement opportunities, however, must be balanced with the goals of providing public visual and physical access to the shoreline.

Single-family lots with shoreline frontage predominate on the shoreline; these lots are relatively small and narrow. Most lots have no native vegetation at the shoreline, with lawns and ornamental vegetation the primary ground cover. Few of these lots have the potential for subdivision. Educational efforts may cause some changes in vegetation management leading

to voluntary establishment of limited buffers. Where substantial remodeling or replacement occurs, minimal buffers would be required. Cumulatively, education and regulations are likely to benefit both water quality and nearshore habitat by providing native vegetation that contributes filtering and uptake of pollutants. It is doubtful that such minimal buffers would provide much shade or woody debris.

The majority of the lake shoreline is armored. As bulkheads need replacement in the future, regulations will require consideration of softer armoring, which may lead to more natural shoreline conditions supporting a more productive food web and other functions.

Existing docks and moorage facilities will require enhancement such as grating for light penetration and less surface coverage as they reach the end of their useful life, which would require major repair or replacement.

5.2.6 Union River and Union River Reservoir

The Union River watershed flows into Hood Canal; it is 24 square miles with 10 miles of mainstem and 30 miles of tributaries. The stream originates on the south and eastern sides of Gold Mountain. It flows through managed but undeveloped forest area to the City of Bremerton Union River Reservoir (the City's major water supply). The Union River Reservoir has a surface area of about 40 acres. Shoreline reaches include the entire lake shoreline, as well as the Union River below the reservoir from McKenna Falls to the lake. The combined lake and river shoreline area is approximately 98 acres. The upper watershed and the reservoir are within the City's protected watershed area with deciduous, evergreen, and mixed forest as the predominant land cover.

The Union River system supports chinook, pink, coho, fall-winter chum, summer chum, steelhead, and cutthroat. The Union River is the only basin on the Kitsap Peninsula to currently have a viable native population of summer chum salmon. The lake and river reaches within shoreline jurisdiction support resident cutthroat with the potential presence of coho and steelhead. The Kitsap Refugia report rated the instream habitat and riparian conditions for the river as a whole as generally fair to good. Riparian conditions in the lake and river reaches within shoreline jurisdiction are in good condition, with forested riparian zones on both sides of the river and around the lakeshore. The upper watershed has numerous headwater wetland complexes, providing extensive rearing habitat for salmonids. McKenna Falls is a natural barrier to fish passage upstream, and is located just downstream of the Union Reservoir dam.

Water quality impairments include low dissolved oxygen and pH in the shoreline reaches downstream of the reservoir.

The reservoir and river reach within shoreline jurisdiction are surrounded by the City's 3,000-acre protected watershed area. The Public Works and Utilities Department, Forestry & Natural Resources Division manages the utility-owned forest lands for watershed protection, timber harvest, reforestation, biosolids utilization, and salmon restoration.

Restoration Strategy

No restoration needs have been identified in the City-owned portion of the Union River. There are numerous downstream restoration programs included in the Hood Canal Coordinating Council's *Habitat Recovery Strategy for the Hood Canal and Eastern Strait of Juan de Fuca, version 09-2005.*

5.2.7 Twin Lakes

Twin Lakes together are approximately 21.7 acres and lie within the City's utility area. Twin Lakes are maintained by a diversion of water from the Union River Reservoir. The lakes are

on the hydrologic boundary between the Union River and Gorst Creek watersheds. There is no surface drainage out of the Twin Lakes. Studies by the City indicate that approximately half of the groundwater flow out of the Twin Lakes is to the Union River watershed and half to the Gorst Creek watershed. Twin Lakes is located towards the western end of the Gorst Creek Aquifer Recharge area. In recognition of the importance of the lake to groundwater recharge, Bremerton Municipal Code (BMC) 20.14.430(6)(b)(8) prohibits use of pesticides and fertilizers above agronomic rates within 1,600 feet of Twin Lakes. The area around Twin Lakes is zoned primarily as utility lands, with some areas of low-density residential zoning immediately to the east; the industrially zoned South Kitsap Industrial Area is immediately to the south. The Twin Lakes shorelines are currently designated as "Urban Conservancy."

Restoration Strategy

No restoration needs have been identified in the Twin Lakes watershed.

5.3 PROJECT IMPLEMENTATION, MONITORING, AND REVIEW

To remain consistent with the restoration framework and guidance for SMP development, project implementation and monitoring will survey available funding sources, guide development of project timelines and benchmarks, and document the progress of restoration projects.

5.4 BENCHMARKS AND MONITORING

Under WAC 173-26-201(2)(f)(vi), the development of a jurisdiction's SMP must, "Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented…in meeting the overall restoration goals."

A restoration framework developed in part by Palmer et al. (2005) provides several tasks for assessing restoration actions and revising the planning process to meet restoration goals. The following actions include:

- Adaptively manage restoration projects;
- Summarize restoration progress including grant applications and funds secured;
- Monitor post-restoration conditions;
- Revise the planning process to reflect changes in objectives and policy re-evaluation; and
- Use monitoring and maintenance results to inform future restoration activities.

To document progress toward restoration goals regionally within WRIA 15 and locally within the City, annual assessments should be performed to determine how well restoration criteria are met and how effectively the goals of this Plan are achieved.

5.5 SMP REVIEW

To ensure that restoration goals are being met, it is important for the City to evaluate the effectiveness of this Plan and to adapt to changing conditions. To establish the SMP benchmark for implementation effectiveness, the State Legislature provided a timeframe for jurisdiction amendments to the SMP. This was amended in 2011 to provide an 8-year update schedule.

The 8-year period starts once the City of Bremerton amends its SMP (RCW 90.58.080 (4)(a)). While the review period is taking place, an ongoing assessment of project successes and limitations must still occur as restorations are planned and implemented within the city.

6. REFERENCES

City of Bremerton. 2010. City of Bremerton Shoreline Master Program. Revised Shoreline Inventory and Analysis. Prepared by Parametrix, Bellevue, Washington. December 2010. Accessed at: http://www.ci.bremerton.wa.us/forms/communitydev/smp/ShorelineInventory_Analysis.pdf.