City of Bremerton
Shoreline Master Program Update
Shoreline Cumulative Effects Analysis

Prepared for

City of Bremerton
345 6th Street, Suite 600
Bremerton, Washington 98337

This report was funded in part through a grant from the Washington State Department of Ecology.

Prepared by

Parametrix
411 108th Avenue NE, Suite 1800
Bellevue, WA 98004-5571
T. 425.458.6200 F. 425.458.6363
www.parametrix.com

CITATION

Bremerton Shoreline Master Program Update
Shoreline Cumulative Effects Analysis. Prepared by Parametrix,
Bellevue, Washington. 2012.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

BMC	Bremerton Municipal Code
CA	critical areas
CAFO	Concentrated Animal Feeding Operation
cfs	cubic feet per second
City	City of Bremerton
Corps	U.S. Army Corps of Engineers
CZM	Coastal Zone Management
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
EPWN	East Port Washington Narrows
ESA	Endangered Species Act
FWCA	Fish and Wildlife Conservation Areas
GC	Gorst Creek
LK	Lake Kitsap
LWD	large woody debris
MB	Mud Bay
NNL	No Net Loss (of ecologic functions)
NPDES	National Pollutant Discharge Elimination System
OFM	Office of Financial Management
OHWM	ordinary high water mark
OstB	Ostrich Bay
OyB	Oyster Bay
PB	Phinney Bay
PIC	Pollution Identification and Correction [program]
POB	Port Orchard Bay
PSRF	Puget Sound Restoration Fund
RCW	Revised Code of Washington
SED	Shoreline Environment Designation
SI	Sinclair Inlet
SMA	Shoreline Management Act
SMP	Shoreline Management Program
SR	State Route
UGA	Urban Growth Area
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WPWN	West Port Washington Narrows
WRIA	Water Resource Inventory Area
WSDA	Washington State Department of Agriculture

1. SUMMARY

This report supports the City of Bremerton (City) Shoreline Management Program (SMP) update. The City's SMP, also known as Title 16 of the Bremerton Municipal Code (BMC), is being updated to comply with the Washington State Shoreline Management Act (SMA) requirements (Revised Code of Washington [RCW] 90.58), and the state's shoreline guidelines (Washington Administrative Code [WAC] 173–26, Part III), which were adopted in 2003.

The SMP update process involves the following steps:

1. Reviewing and revising shoreline goals and policies;
2. Inventorying and analyzing shoreline conditions;
3. Determining shoreline environment designations (SEDs);
4. Assessing cumulative impacts of shoreline development; and
5. Preparing a restoration plan.

This element assesses the cumulative impacts of shoreline development under the current proposed revisions to the SMP.

This work was funded in part through a grant from the Washington State Department of Ecology (Ecology).

The key criterion addressed in this analysis of cumulative effects is avoidance of a net loss of ecological functions. Specific SMA guidance is as follows:

> Local master programs shall evaluate and consider cumulative impacts of reasonably foreseeable future development on shoreline ecological functions and other shoreline functions fostered by the policy goals of the act. To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities. (WAC 173–26–186(8)(d))

In general, the findings of this analysis, as applied to the Bremerton shorelines are:

- Freshwater aquatic resources in Bremerton largely consist of relatively small watersheds that discharge directly into marine waters. In these watersheds, urbanization has led to changes in land use and vegetation cover that has substantially changed the character of freshwater being discharged to freshwater and marine systems—both in terms of hydrology and water quality.
- Marine shorelines in Bremerton vary greatly in character. Some are protected inlets, such as Oyster Bay, that are shallow with little freshwater recharge and limited tidal flushing; others, such as Port Washington Narrows, experience substantial flows from tidal action.
- Marine shorelines in Bremerton are largely developed. In most cases, native vegetation has been removed and other components that support natural ecological processes altered. The full range of natural ecological functions does not take place in those areas. Important ecological functions, however, continue and support the general ecological productivity of the local and regional aquatic and marine ecosystems.

- There are three relatively undeveloped freshwater watersheds in Bremerton partially under SMA jurisdiction. Two of these, the Union River and Reservoir and Twin Lakes, have been protected for water supply. The third, Gorst Creek, is subject to future urban development. Currently, all of these have relatively intact native land cover and vegetation cover that preserve a natural hydrologic cycle emphasizing interflow and moderating peak flows, as well as preserving riparian corridor interactions between aquatic and upland resources.
- It is not known, at this time, whether general trends in ecological degradation from human disturbance are continuing to result in incremental degradation of ecological functions or whether localized ecosystems have reached a stable condition. There is no scientific consensus on appropriate indicators of ecological productivity and no comprehensive means of monitoring. Based on the continuing trends of declines in key aquatic species in Puget Sound over several decades, the most justifiable conclusion is that existing land use and practices within watersheds and along shorelines are continuing to degrade habitat and trends will continue unless substantial changes in practices are implemented in many areas.
- Specific ongoing contributions to nearshore degradation that will likely continue, unless substantial changes are made to physical facilities, include:
    - Existing practices in managing ornamental vegetation, such as use of fertilizers, herbicides, and pesticides, adversely affect not only the nearshore food chain, but also have adverse impacts on the central nervous system functions of fish, including salmonids.
    - Shoreline bulkheads have negative impacts on substrate through interfering with natural recruitment sources, especially on feeder bluffs; in some cases, they produce a high energy environment because of reflective wave action and also contribute to the absence of shoreline vegetation.
    - The lack of native vegetation on the shoreline likely contributes to the absence of a nearshore food chain, and also results in higher nearshore temperatures due to the lack of shade.
    - Current docks and other moorage facilities contribute to predation and also may cause avoidance behavior in salmonids by forcing them out of nearshore environments and into environments where food and shelter are less available and where predation is increased.

Actions in Bremerton, in conjunction with other jurisdictions, are likely to be important in slowing or reversing trends related to human–induced changes. These include:

- Restoring water quality functions by providing buffer areas in which sediment, nutrients, pathogens, and other pollutants can be removed or entrained;
- Providing urban stormwater management to address hydrologic functions such as peak flows and water quality;
- Moderating temperature in intertidal and stream environments through restoring riparian vegetation;
- Restoring the water quality and habitat functions of wetlands and estuaries; and
- Restoring wetlands and estuaries displaced by other uses.

Such efforts, however, will be effective only if they are undertaken system–wide and address ongoing impacts of existing uses.

Overall, the combined results of the SMP on properties immediately adjacent to shorelines, the critical area regulations that address upstream conditions in watersheds not under SMP jurisdiction, and various restoration activities on shorelines and in watersheds are likely to result in no net loss of ecological functions on Bremerton shorelines. Over time, these actions are also likely to lead to improvements in the ecosystem.

1.1 REPORT PURPOSE

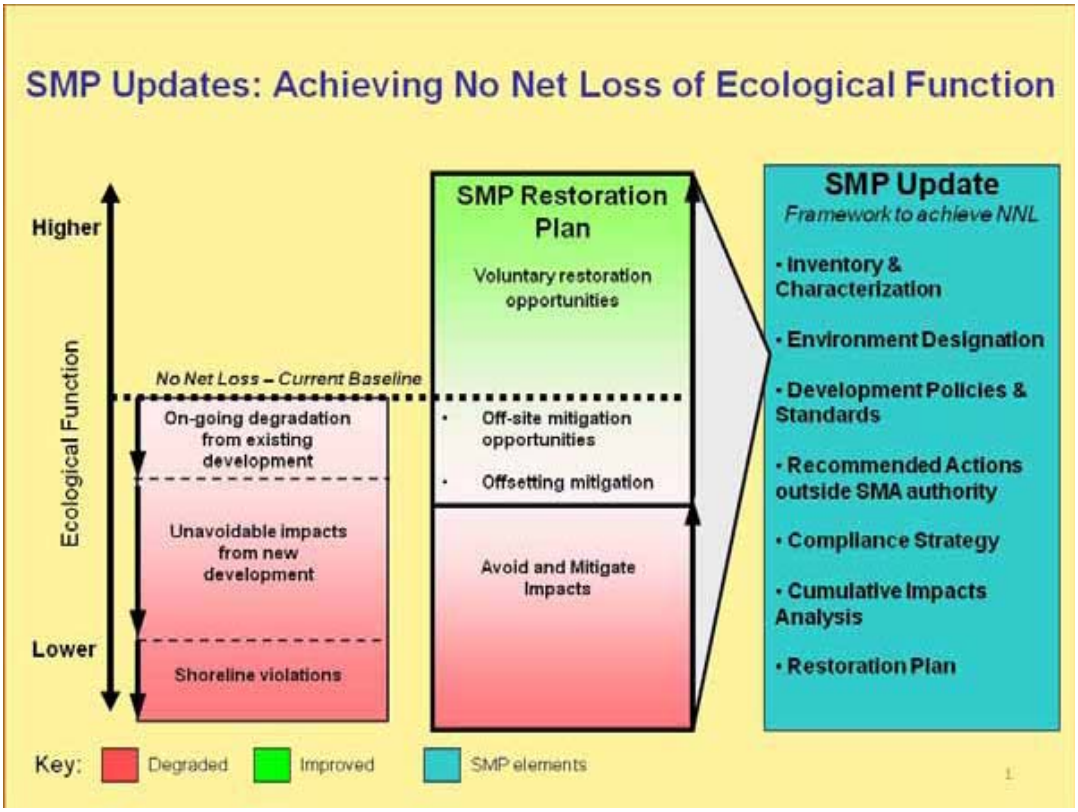
The SMA guidelines (WAC 173–26–18683)(d)) require analysis of cumulative impacts "to ensure no net loss of ecological functions and protection of other shoreline functions and/or uses."

Shoreline regulations convey the principle that regulating development shall achieve no net loss of ecological functions. However, achieving this goal requires that master program policies and regulations address the cumulative impacts on shoreline ecological functions that would result from future shoreline development and uses that are reasonably foreseeable from proposed master programs.

Specific guidance on the concept of no net loss and the relation between regulations and other programs is provided in WAC 173–26–201(2)(c):

> When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. The concept of "net" as used herein, recognizes that any development has potential or actual, short–term or long–term impacts and that through application of appropriate development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist. Where uses or development that impact ecological functions are necessary to achieve other objectives of RCW 90.58.020, master program provisions shall, to the greatest extent feasible, protect existing ecological functions and avoid new impacts to habitat and ecological functions before implementing other measures designed to achieve no net loss of ecological functions.
>
> Master programs shall also include policies that promote restoration of ecological functions, as provided in WAC 173–26–201(2)(f), where such functions are found to have been impaired based on analysis described in WAC 173–26–201(3)(d)(i). It is intended that local government, through the master program, along with other regulatory and non–regulatory programs, contribute to restoration by planning for and fostering restoration and that such restoration occur through a combination of public and private programs and actions. Local government should identify restoration opportunities through the shoreline inventory process and authorize, coordinate, and facilitate appropriate publicly and privately initiated restoration projects within their master programs. The goal of this effort is master programs which include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county.

This difference between the role of regulatory and non–regulatory programs is illustrated in conceptual form in Figure 1–1, below.



Source: Washington State Department of Ecology

Figure 1–1. Achieving No Net Loss through Regulations and Restoration

1.2 APPROACH

When evaluating cumulative impacts, the guidance requires that the following factors be considered (WAC 173–26–186(8)):

- Current circumstances affecting the shorelines and relevant natural processes;
- Reasonably foreseeable future development and use of the shoreline; and
- Beneficial effects of any established regulatory programs under other local, state, and federal laws.

This cumulative impacts assessment uses these three considerations as a framework for evaluating the potential long–term impacts on shoreline ecological functions and processes that may result from development or activities under the proposed SMP over time. The methodology used in this cumulative analysis is based on:

- Current circumstances affecting the shorelines and relevant natural processes, which are based on the findings outlined in the *Revised Shoreline Inventory and Analysis* (City of Bremerton 2010);
- Description of foreseeable future development as addressed in Section 2 of this report; and

- Beneficial effects of any established regulatory programs under other local, state, and federal laws and this SMP as described and addressed in Section 2 of this report.

Existing conditions are addressed in the landscape characterization provided in the *Revised Shoreline Inventory and Analysis* (City of Bremerton 2010). A brief summary of the methodology is provided in Section 1.4 below; please refer to Part I of the *Revised Shoreline Inventory and Analysis* for more detail.

1.3 STUDY AREA CHARACTERISTICS

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 1–2. 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 comprises numerous small drainages flowing directly into Puget Sound.

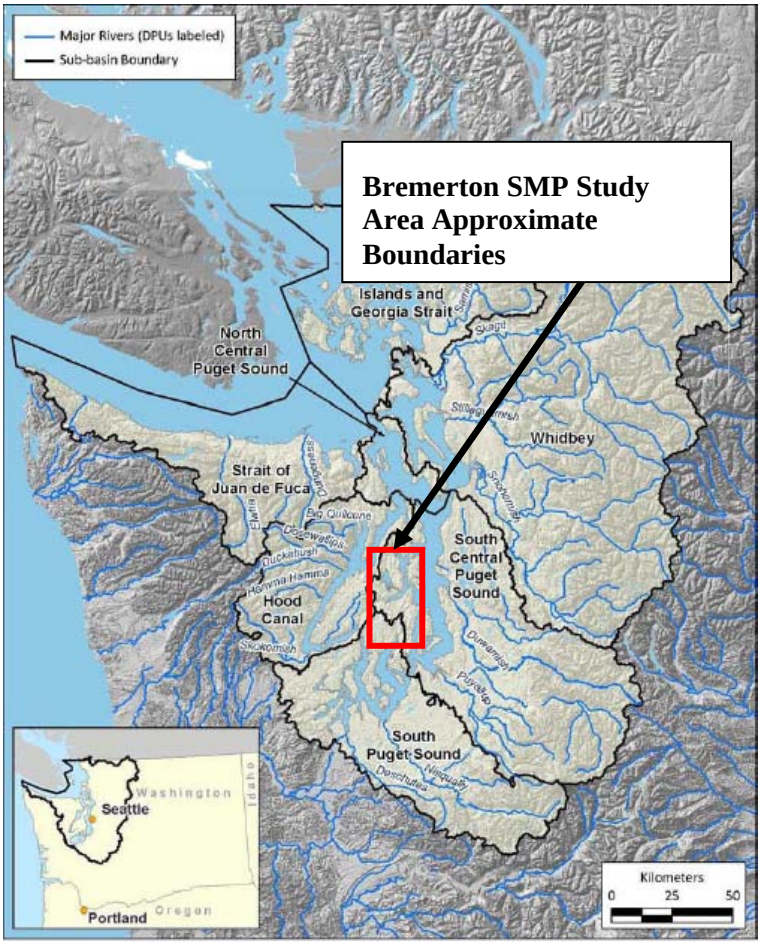


Figure 1–2. Puget Sound Context of Bremerton Shorelines

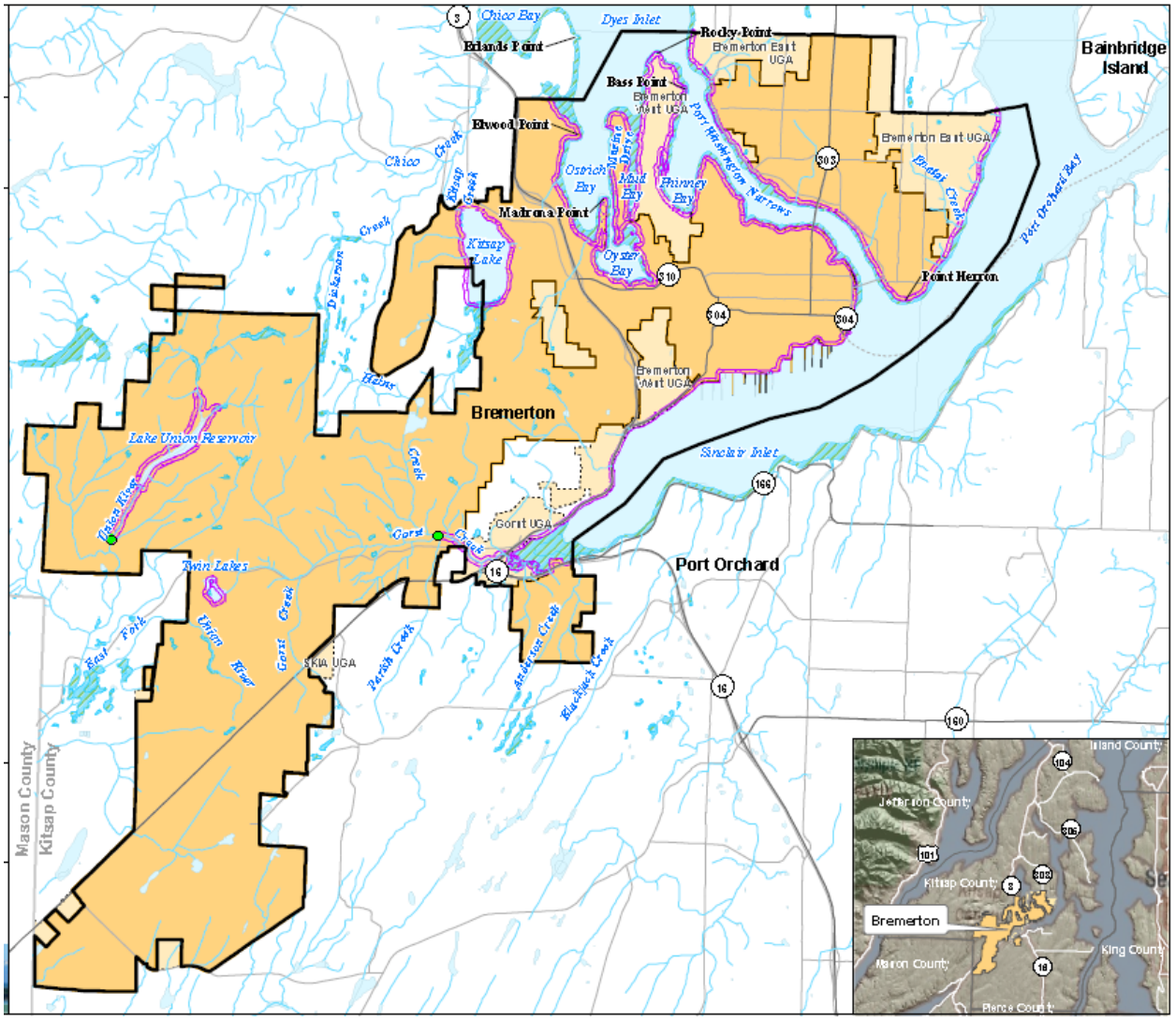


Figure 1–3. Study area for the Ecosystem Characterization of Bremerton Shorelines

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 1–3). Portions of the study area to the west and southwest of Gorst drain into the Union River and ultimately into Hood Canal.

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 Port Washington Narrows, which connects both inlets, and a portion of Port Orchard Bay north of Sinclair Inlet.

There are various local geologic, hydrologic, and oceanographic features that are important in understanding the context in which the SMP and other programs will operate; these features and processes are described below.

1.3.1 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. 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 these 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 (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.

1.3.2 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, or areas with no appreciable bank—bays and estuaries, although higher, steep–sloping bluffs occur along Port Washington Narrows.

Bremerton lies within the Central Basin of Puget Sound, which includes the area between the southern tip of Whidbey Island and Commencement Bay. The study area is relatively more sheltered and shallow than most of the Central Basin. Two small sub–basins occur in the study area: Dyes Inlet and Sinclair Inlet. The main basin of Dyes Inlet is deepest near the center, at about 150 feet, but the many bays are generally shallow (<35 feet). Sinclair Inlet is deepest at the eastern end (about 130 feet) while the head of the bay is <10 feet deep.

1.3.3 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 lowland headwater streams with low gradients that originate with perched groundwater in lakes and wetlands on upland plateaus and hills (Williams et al. 1975; Buffington et al. 2003).

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.

The glacial deposits described above create a complex mix of layers of permeable deposits that rapidly infiltrate water (aquifers), with impermeable deposits such as compacted till, silts, and clays that limit or prevent the infiltration of water (aquitards). As a result of this complex mix of deposits, the study area contains several aquifers and aquitards within the subsurface. This mix of layers therefore controls subsurface water movement from the upland to the lowland, as well as water movement to the streams and creeks that occupy former glacial outwash channels (Deeter et al. 1979). Groundwater flow into Sinclair Inlet and Dyes Inlet has not been documented but is thought to be 'substantial' (Lincoln and Collias 1975; PSCRBT 1990).

1.3.4 Oceanographic Processes

The marine nearshore area of the study area is irregular and composed of numerous bays, harbors, and lagoons, with varied topography and slope. Combined, there are approximately 53 miles of marine shoreline in SMA jurisdiction.

The protected nature of the marine waters means that tidal currents and flows are important in driving local circulation patterns and water exchange. Low tides expose numerous small to moderate–sized tide flats in the bays and at the heads of inlets. Currents are generally weak except in the Port Washington Narrows (about 4 knots; NOAA 1988). Flushing time for marine waters is about 4 days. Tideflats are exposed during low tides. Currents in Sinclair Inlet are relatively weak—about 0.8 knots, resulting in a low flushing rate with an estimated flushing time of about 14 days. The low flushing rates in both Dyes Inlet and Sinclair Inlet means that contaminants entering the inlets are not flushed out but can remain in place and become concentrated, degrading water quality and habitat.

1.3.5 Sediment and Substrate

Streams in the study area are relatively small with moderate gradients and do not move large amounts of sediments compared to the larger river systems in Puget Sound. Steep slopes in the upper watersheds west of Gorst are moderately erosive and contribute sediment to floodplains, stream channels, and stream mouth estuaries. Tidal currents erode and deposit sediment in flats, marshes, and estuaries, creating complex channel networks. These channel networks redistribute organic matter, influence salinity gradients in estuaries, and provide access and refugia for fish and invertebrates.

The sediment that forms beaches and other shoreforms throughout Puget Sound, and in the study area, is predominantly from eroding coastal bluffs. Some areas of the steep coastal bluffs along Port Washington Narrows and in east Bremerton are highly erodible and are important sources contributing sediment to the nearshore. Sediment is eroded, moved, and deposited in a series of littoral drift cells. In areas where shorelines are protected from wave energy, streams entering the nearshore deposit fine sediments such as muds and sands. The large, relatively enclosed areas of Dyes Inlet and Sinclair Inlet have no appreciable net transport of sediment due to weak currents and limited wave action.

1.4 REASONABLY FORESEEABLE FUTURE DEVELOPMENT AND USE OF THE SHORELINE

1.4.1 Methodology

The following parameters are tools used to project foreseeable future development and use of the shoreline:

- Projection of allowed uses, density, general character of uses, and number of units provided by existing zoning on a buildout basis;
- Existing land use patterns affecting cultural and economic trends in response to the opportunities and constraints of the zoning regulations;
- Projection of likely development within the affected area over a 20–year planning horizon, based on the Washington State Office of Financial Management (OFM) projections and the county's Comprehensive Plan; and
- Projection of water–dependent, water–oriented, and non–water–dependent uses.

These parameters are discussed in more detail in Section 3.2.

1.4.2 General Trends

The OFM 2011 population estimate of the City of Bremerton was 37,729 persons whereas the 2010 Census indicated 38,790 persons. The OFM estimates included 17,044 housing units, of which 9,071 are single–family.

The population in Bremerton between 2000 and 2011 has varied from 37,259 in 2000 to as low as 34,580 in 2005. The city population has reflected general trends in Kitsap County population, which is characterized by OFM as showing slow growth. This is partly associated with the loss of one aircraft carrier and several support vessels at the Bremerton Naval Installation—resulting in a decline of approximately 2,000 "ashore" and "afloat" naval personnel. OFM indicates that the expected population growth in Kitsap County is subject to uncertainty due to transportation, military changes, and other issues.

OFM projects Kitsap County growth of about 9 percent over the 20–year period from 2010 to 2030. Based on these forecasts of population and employment growth, the City projects a 6–year increase of 2,778 housing units and 9,300 jobs for 2007 to 2012.

1.4.3 Shoreline Land Use Trends

The following conclusions were drawn from the projection of land use trends on the Bremerton shoreline:

- Most shoreline use will continue to be stable, single–family residential neighborhoods.
- Relatively little change in shoreline conditions will result from new development or redevelopment of existing sites.
- Very minor improvements will occur at a slow pace as individual properties undergo substantial remodeling or as docks and other overwater structures reach the end of their life span and are replaced with new facilities that have relatively less impact. A more detailed assessment by watershed or marine area is included in Section 2.

1.5 BENEFICIAL EFFECTS OF ANY ESTABLISHED REGULATORY PROGRAMS UNDER OTHER LOCAL, STATE, AND FEDERAL LAWS

The beneficial effects of established regulatory programs consist of the following, which are described in more detail in Section 3 of this report:

- Provisions of existing county land use and development regulations;
- State and federal programs;
- The beneficial effects of regulations in the SMP; and
- The beneficial effects of conservation and restoration programs.

1.6 GENERAL CONCLUSIONS

This assessment is based on the description of existing ecological functions in the *Revised Shoreline Inventory and Analysis* (City of Bremerton 2010).

Relatively small areas of the Bremerton shoreline are expected to redevelop in the near term. As they do, there will be marginal improvements based on the following provisions:

- No net loss criteria: The most stringent provision of the SMP is the no net loss criteria in SMP 20.16.630. This provision subjects all shoreline use, development, and redevelopment to a performance standard in which all such activities prevent or mitigate adverse impacts to ensure no net loss of ecological functions and processes. This establishes a performance standard that must be met in addition to any restriction or permission of a use, and in addition to performance standards for individual uses or for shoreline modification.
- Restoration requirements for non–water–dependent uses: The SMA establishes a preference for water–dependent uses (SMP 20.16.720.b.5 and 20.16.740.b.4), which provides for ecological restoration of non–water–dependent commercial and industrial use. Because most new development is likely to be non–water–dependent, this provision will ensure at least some improvement to ecological conditions from major projects.
- Vegetation Conservation: Native vegetation preservation on new lots and development is addressed in SMP 20.16.610 – Buffers and Setbacks, 20.16.620 – Vegetation Conservation, 20.16.650 – Water Quality, Stormwater, and Non–Point Pollution; however, these provisions have limited influence on the majority of shoreline that is already developed. Provisions for vegetation conservation for expansion or alteration of single–family development (SMP 20.16.620(2)) will provide a minimal buffer, which will have limited effect on ecological processes on an individual basis. Over the long term, education programs in conjunction with regulatory programs may lead to changes by land owners in how they maintain shoreline vegetation with beneficial consequences.
- Shoreline stabilization: Hard shoreline armoring in the form of riprap, concrete, or wood structures are common throughout the Bremerton shoreline. Provisions encouraging softer solutions to shoreline stabilization are provided in SMP 20.16.870. These provisions, however, will apply only as existing structures fail or require major modification. Although it is unlikely that these provisions will lead to a substantial change in currently armored shorelines, they will prevent further degradation of relatively unaltered shorelines.

- In–water facilities: Adverse impacts of in–water structures are addressed by SMP 20.16.820 – Docks, Piers, and In–Water structures, 20.16.750 – Marinas and Boating Facilities, and 20.16.760 – Recreational Development. These provisions contain specific performance standards that will reduce impacts. Existing in–water facilities will be gradually upgraded over time as they need to be replaced.

Overall, the combined results of the SMP on properties immediately adjacent to shorelines, the critical area regulations that address upstream conditions in watersheds not under SMP jurisdiction, and various restoration activities on shorelines and in watersheds are likely to result in no net loss of ecological functions on Bremerton shorelines. Over time, these actions would likely lead to improvements in the ecosystem.

2. METHODOLOGY

The analysis of the cumulative effects of the SMP, together with other programs, is summarized in Tables 3–1, 3–2, and 3–3 in Section 3—Matrix by Reach for Evaluation of Cumulative Effects of Shoreline Management Plan on Ecological Productivity. These tables consider the type of effects of various human activities on a cross section of ecological functions and assess the probable beneficial effects of:

- The SMP,
- The critical area regulations adopted in December 2006,
- Other state and federal regulatory programs, and
- Non–regulatory enhancement efforts.

This evaluation is based on the description of ecological functions in the *Revised Shoreline Inventory and Analysis* (City of Bremerton 2010). The landscape analysis methodology used in that analysis involves a number of processes that are important for aquatic resource management. Because that analysis provides the basis of the assessment of cumulative effects, it is summarized below.

2.1 LANDSCAPE CHARACTERIZATION

The landscape characterization approach used in the *Revised Shoreline Inventory and Analysis* (City of Bremerton 2010) examines specific processes including the movement of water, sediment, nutrients, pathogens, toxicants, organic matter, and energy or heat that form and maintain the landscape over a large geographic scale. These processes interact with landscape features to create the structure and function of aquatic resources (Ecology 2005).

The analysis uses a coarse–grained approach for integrating landscape processes into shoreline management, restoration planning, and other land use planning efforts (Ecology 2005). The purposes of the analysis are to highlight the relationship between key processes and aquatic resource functions and to describe the effects of land use on those key processes. This approach is not intended to quantify landscape processes and functions. Rather, the goal is to: 1) identify and map areas on the landscape important to processes that sustain shoreline resources; 2) determine their degree of alteration; and 3) identify the potential for protecting or restoring these areas.

2.1.1 General Framework and Conceptual Model

The watershed analysis approach attempts to answer four questions:

1. What are the key landscape processes that maintain aquatic/shoreline resources and their functions?
2. Which geographic areas within watersheds are most important for maintaining each key process?
3. How have human activities/land use altered important process areas and to what extent have the key processes been impaired?
4. Which areas have potential for sustaining or improving resource function through protection and/or restoration?

The processes that are most important for aquatic resource management are summarized in Tables 2–1 and 2–2.

Table 2–1. Marine Nearshore Process Important Areas and Process Alterations

Process	Process Important Areas	Alterations
Freshwater Inputs	Streams and estuaries Contributing watershed for stream or shoreline Seepage zones in bluffs or banks	Changes in flow regime from dams, diversions, withdrawals, increased impervious areas (changed magnitudes, timing, frequency, duration) Increase in impervious area in watershed (increased peak flows, change in timing of peak flows) Stormwater outfalls in nearshore Constrictions of river flows or encroachment into estuary/delta (e.g., road crossings/culverts at river mouths, filling of floodplains and estuarine wetlands) Armoring or fill in nearshore that cuts off movement of groundwater into beach sediments
Tidal Flows	Rocky shores Beaches Stream deltas Estuaries and pocket estuaries (barrier estuaries) Barrier lagoons/marshes Open coastal inlets	Shoreline armoring/alteration of beach profile Tidal constrictions—tide gates, culverts, bridges, weirs Tidal encroachment—filling of tidal wetlands, dikes/levees, roads within tidal wetlands Increased impervious surfaces in watershed—increased flashiness/peak flows, higher river flows during winter (changes extent of tidal salt wedge intrusion into estuarine habitats and distribution of salt, brackish, and freshwater habitats)
Water Storage	Tidal and distributary channels Estuaries Coastal marshes	Tidal encroachment—filling of tidal wetlands, dikes/levees, loss of tidal channels, roads within tidal wetlands Shoreline armoring/alteration of estuarine/marsh profile Tidal constrictions—tide gates, culverts, bridges, weirs
Sediment Supply	Coastal bluffs Streams	Armoring of shorelines Dams Filling of estuaries, floodplains Tidal restrictions—dikes, tide gates, roads
Sediment Transport	Beaches in transport zones Estuaries (tidal and distributary channels)	Armoring, jetties/groins Fill in intertidal or upper shoreline Overwater structures (associated piers, pilings, seawalls) Tidal restrictions—dikes, tide gates, roads
Sediment Accretion and Deposition	Barrier beaches Stream deltas Estuaries and coastal marshes	Armoring
Habitat Formation—Distributary and Tidal Channels	Estuaries Barrier lagoons/marshes Open coastal inlets	Shoreline armoring/alteration of beach profile Tidal constrictions—tide gates, culverts, bridges, weirs Tidal encroachment—filling of tidal wetlands, dikes/levees, roads within tidal wetlands
Habitat Connectivity and Movement/Exchange of Organisms	Estuaries Beaches/bluffs Marine riparian vegetation	Fill in intertidal areas, estuaries, coastal marshes Shoreline armoring, jetties, groins Overwater structures, piers, pilings Impervious surfaces on bluffs; removal of riparian vegetation Tidal restrictions—tide gates, dikes/levees, culverts, road/railroad fill

Table 2–1. Marine Nearshore Process Important Areas and Process Alterations

Process	Process Important Areas	Alterations
Water Quality (nutrients, pathogens, toxins)	Land uses/land cover adjacent to surface waters discharging to marine shorelines Wetlands adjacent to marine shorelines Semi–enclosed bays/heads of bays with low flushing rates Marine riparian vegetation	Removal of forest cover in contributing watershed Agricultural land uses—dairy, pasture, feed lots, manure sources Impervious surfaces and stormwater runoff from roads, residential lawns Wildlife/domestic animal concentrations Failing septic systems Filling of wetlands adjacent to surface waters discharging to marine environment; Filling of wetlands adjacent to marine shorelines Removal of riparian vegetation Contaminated sediments; point discharges of toxins
Light Energy	Marine riparian Upper beach/shallow intertidal areas Eelgrass beds	Removal of riparian vegetation Shoreline armoring Overwater structures (docks, marinas) Nighttime lighting adjacent to shore (marinas, terminals, roadways)
Organic Imports/Exports, Carbon Cycling, Large Woody Debris	Marine riparian Feeder bluffs Accretion shoreforms Estuaries and coastal marshes	Removal of riparian vegetation Removal of marsh vegetation Fill in coastal wetlands Shoreline armoring Constrictions in estuaries or pocket estuaries—presence of culverts, tide gates, bridges, or piers

Table 2–2. Freshwater Process Important Areas and Alterations

Process	Process Important Areas	Alterations
Water Delivery	Forested uplands Vegetated uplands	Removal of forest cover Impervious surfaces
Water Movement (infiltration/recharge, surface runoff, peak flows, groundwater flow/discharge)	Forested/vegetated uplands Channel migration zones Floodplains Aquifer recharge areas	Impervious surfaces Removal of forest cover Channel confinement Filling of floodplains Levees
Water Storage	Floodplains Wetlands Lakes	Levees Channel confinement Filling or draining wetlands, floodplains, or lakes
Water Loss	Lakes Vegetated areas/forest cover Deep groundwater flows	Removal of vegetation Impervious surfaces
Sediment Supply/Delivery	Steep slopes Bare ground/early seral stage vegetation Channel migration zones	Removal of vegetation cover/loss of forest vegetation Impervious surfaces Bank armoring

Table 2–2. Freshwater Process Important Areas and Alterations

Process	Process Important Areas	Alterations
Sediment Transport	River/stream channels Floodplains Channel migration zones	Bank armoring Dams
Sediment Storage	Floodplains Channel migration zones Lakes Wetlands	Filling of floodplains and wetlands
Channel Migration	Channel migration zone Floodplain	Channel confinement Bank armoring Fill in floodplain Altered flow regime (water diversion, dams, impervious surface)
Floodplain/Hyporheic Connectivity	Floodplain Channel migration zone Forested contributing watershed	Channel incision Channel confinement Bank armoring Fill in floodplain Altered flow regime (water diversion, dams, impervious surface)
Habitat Connectivity and Movement/Exchange of Organisms	Streams/floodplains Riparian zones Channel migration zones	Dams Roads Culverts Channel confinement/levees Removal of vegetation/loss of native vegetation cover
Nutrient Management/Nitrogen and Phosphorous Retention and Cycling	Hyporheic zones/floodplains Lakes Wetlands Riparian zones	Removal of forest cover/riparian vegetation Channel confinement Filling or draining of wetlands
Pathogen and Toxin Removal/Processing	Hyporheic zones/floodplains Wetlands	
Carbon Cycling/Sequestration	Forested/vegetated uplands Vegetated riparian zones Soils/organic soils	
Organic Matter Export and Import/Large Woody Debris	Steep slopes/landslide prone areas Riparian forests Floodplains/hyporheic zones Wetlands	Removal of vegetation/loss of forest cover Channel confinement/levees Fill in floodplains and wetlands Bank armoring
Solar Incidence/Light Energy	Riparian forests Lakes Wetlands	Removal of vegetation/loss of forests Loss of large woody debris

Table 2–2. Freshwater Process Important Areas and Alterations

Process	Process Important Areas	Alterations
	River channels	Overwater structures Artificial nighttime light sources
Disturbance Regime	Steep slopes Channel migration zones Floodplains Forested contributing watersheds Riparian forests Wetlands	Removal of vegetation/loss of forest cover Channel confinement/levees Bank armoring Fill in floodplains Alteration in flow regimes—water diversion, dams, impervious surfaces
Establishment of Native Vegetation	Upland, wetland, and aquatic habitats Riparian zones	Alteration of water processes Alteration of sediment processes Removal of native vegetation Introduction of non–native vegetation Impervious surfaces Habitat fragmentation/loss of connectivity Increased inputs of nutrients, toxins
Establishment of Invasive Species	Disturbed or bare ground	Removal of vegetation cover/loss of forests Increased nutrient inputs Altered flow regimes Filling or draining wetlands Impervious surfaces

2.2 EXISTING CONDITIONS

Refer to the *Shoreline Inventory and Analysis* for a detailed description of existing conditions.

2.3 REASONABLY FORESEEABLE FUTURE DEVELOPMENT

This section provides a general assessment of:

- General growth in population and employment projected to 2022, and
- Shoreline use and development trends.

2.3.1 General Population Trends

OFM identifies the military sector as the largest contributor to the economy of Kitsap County—specifically, the U.S. Navy. Naval facilities in the area include the Puget Sound Naval Shipyard in Bremerton, Naval Submarine Base (Bangor), and the Naval Undersea Warfare Engineering Station (Keyport).

Much of the private employment in the county is related to military activities. The United States Department of Defense actually employs more civilians in Kitsap County than it does uniformed personnel. Approximately 10,500 military personnel are stationed throughout Kitsap County and nearly 13,000 civilians in various military installations—the majority represented by the nearly 8,000 civilians working at the Puget Sound Naval Shipyard in downtown Bremerton.

More recently, there has been an increase in the number of people who live locally but work in Seattle, and who use the state ferry system connecting Bremerton to downtown Seattle. With Bremerton's less diversified job market but lower cost of living, the "bedroom community" phenomenon is recognizable.

About 50 percent of the land in Bremerton is in residential zoning designations, with about 10 percent in commercial/industrial designations. There is about 9,240 acres of public lands, including federal lands (which overlaps land use designations).

Bremerton projects an additional population increase of 13,000 by 2023 in a variety of single–family and multi–family settings. The City projects that it has sufficient properly zoned land area to accommodate the additional residents projected by the Comprehensive Plan, but it also recognizes the existing market constraints. Some of the constraints are regional or national economic conditions, including availability of financing for new construction and home ownership, weak "curb appeal" of available sites, availability of business–related financing, and strength of the job market, etc. Other constrains relate to the willingness of owners to convert lands. Many oversized lots and other vacant infill sites are enjoyed by their owners for yard areas, additional off–street parking, recreational vehicle storage, or to protect views and other amenities. These areas are not readily given up by many resident homeowners. Investors, however, may be more financially inclined and willing to maximize the development potential of these properties.

2.3.2 Demand for Water–Dependent Uses

The demand for water–dependent use is affected by a wide variety of economic and social factors, which are described below.

2.3.2.1 Historic Market Demand for Waterfront Areas

The historic need for industrial users to have water access, based on the easy access and reasonable cost of transporting cargo and raw materials, has undergone a transition in the past 30 to 50 years. In the past, central business districts and industrial areas in the Pacific Northwest tended to be co-located where the rail and water transportation system was linked. A number of trends have weakened the link between industrial centers and waterfronts, including globalization of manufacturing, off–shoring, containerization, telecommunications, the interstate highway system, and general improvements in the technology of transportation. At the same time, the attraction of waterfronts for access and location of non–industrial uses such as housing, tourism, and recreation has grown, including the interest in just being able to view water of any kind. Market demand for any real estate is a complex set of factors generally influenced by demographic, economic, and cultural preferences. An important dynamic of real estate markets is that once demand factors produce specific real estate development, it is resistant to change unless there are very strong market pressures that can overwhelm the costs and risks for redevelopment (ECS 2008).

Industrial–commercial and other non–residential real estate or land uses tend primarily to be either location or price sensitive. Occasionally, other non–economic factors influence the demand for industrial–commercial real estate. For instance, business owners wanting to locate their firm close to their residences or yacht, or enjoy water–related views can overcome or influence the trade–offs between location and price sensitivity. Demand for these non–residential land uses is considered to be derived demand. Industrial–commercial land derives its value from how and what the land can be used for to generate income for businesses. The use of land to build shelter for households or facilities for recreation directly

satisfies consumer demand. Private for–profit recreation businesses, including marinas, are also the result of derived demand.

As a practical matter, the primary industrial–commercial land uses that are now water–dependent or water–related are those that still require transportation by ship, ship containers, barges, large outdoor facilities for processing, storing, lay–down assembling/manufacturing space, and typically need easy and ready access to rail facilities for overland shipment of goods and containers. Even uses long associated with waterfronts, such as fish processing and small boat manufacture and repair, can and do locate where land and buildings are cheaper, not necessarily on waterfront parcels. Water and waterfront areas for vessel moorage, haul–out, and dry storage are among those that remain water–dependent uses.

2.3.2.2 Marine Cargo

Marine cargo use in the Puget Sound is dominated by the Port of Seattle and Tacoma Container Terminals. Both Seattle and Tacoma also have substantial bulk terminals for the movement of grain and products such as pulp and cement. The Ports of Olympia, Everett, and Bellingham have almost no container cargo use but serve a variety of specialty materials such as pulp, wood products, cement, and steel. (BST 2007a)

Bremerton has no significant marine cargo use on its shoreline. Sufficient vacant or redevelopable shoreline areas currently are not available on the Bremerton shoreline to accommodate marine cargo.

2.3.2.3 Ship and Boat Building and Repair

Ship and boat building and repair facilities in the Puget Sound area are concentrated in Seattle and Tacoma with smaller facilities in a variety of locations including Olympia, Everett, Bellingham, Port Townsend, and Whidbey Island where smaller vessels and barges are built.

Ship building and repair in Bremerton is generally limited to the Puget Sound Naval Shipyard, which largely repairs ships for the U.S. Navy. There are no private commercial boat builders on the shoreline in Bremerton.

Currently, there is a limited amount of vacant or redevelopable shoreline areas that could be available for non–federal boat building or repair on the Bremerton shoreline. The area could likely accommodate small facilities, but may not be able to compete with other areas where support infrastructure is in place. If portions of the Puget Sound Naval Shipyard are underutilized in the future, portions of the site could be made available for private use through the Enhanced Use Leasing program. Such a transfer of use, however, would not change the amount of the shoreline devoted to this use.

2.3.2.4 Commercial Moorage

Commercial moorage in Puget Sound is dominated by moorage for the fishing industry. The majority of fishing vessels homeported in Puget Sound is at commercial fishing ports located in Seattle, Bellingham Bay, and Blaine with smaller ports in Friday Harbor, Anacortes, La Conner, Everett, Tacoma, Olympia, and Shelton. About half of the fishing vessels in Puget Sound are oriented to the Alaska fishery (BST 2007b).

There is very little moorage devoted to fishing vessels in Bremerton. The lack of related facilities for servicing and repair would likely limit moorage to fishing vessels owned by residents of the Kitsap Peninsula who have moorage berths in the area for convenience. Those vessels moored in the area are largely accommodated by existing marinas.

2.3.2.5 Recreational Moorage

Recreational moorage demand in Puget Sound has typically been characterized as a situation where demand is in excess of supply. The relative demand for in–water storage of vessels, however, is also affected by the supply, convenience, and cost of other alternatives, including self–launching of small boats and dry storage alternatives. The options for larger boats, however, are more limited because many large boats are impractical for self–launching or dry storage. Moorage space in Puget Sound tends to lag behind the growth of vessel registrations; therefore, waiting lists are typical. Large boats, over 30 feet, can expect to wait 5 to 7 years; smaller boats, typically a year or more (BST 2007b).

Bremerton currently has a substantial supply of recreational moorage spaces and marinas. At the Port of Bremerton marina downtown, the supply of slips typically exceeds demand except at the peak summer boating season. This likely reflects current economic conditions rather than long–term trends.

In the long term, the demand for marina space is likely to be related both to the total number of boats owned in the area, as well as the cost of in–water moorage as it compares to self–launching and dry storage. It is likely that the most consistent demand in the future will be moorage for larger boats, which have fewer alternatives and whose owners are likely to be more able to afford moorage, even if rates increase.

Moorage demand in Bremerton also is likely to be affected by the supply in neighboring communities, such as Port Orchard, but also is affected by the willingness of owners to factor travel time into their choice of location.

The supply, convenience, and cost of boat launches also affect the extent to which alternatives to moorage are available to smaller boats that are trailered and launched to the water, as well as by hand–launched small boats such as kayaks.

2.3.2.6 Boat Dry Storage

As an alternative to wet moorage, dry storage facilities have been developed in several locations including Edmonds, Everett, Port of Everett's Port Gardner Wharf, Lake Union in Seattle, the Thea Foss Waterway in Tacoma, and at the Twin Bridges Marina near Anacortes. Such facilities generally accommodate boats of up to 30 feet in length (BST 2007a).

Bremerton has no current dry storage facilities. Currently, there are limited vacant or redevelopable shoreline areas available to accommodate this use. The most likely potential site is the industrial area in the vicinity of Pennsylvania Avenue.

2.3.2.7 Passenger Vessels

The passenger vessel market is divided between very large vessels and a variety of markets served by smaller vessels.

The large cruise ship market is differentiated between homeports and ports of call. A homeport refers to a vessel's home base when it is in a particular market area. Homeports are chosen for their ability to smoothly transfer passengers to the cruise ship that fly–in or drive–in. This generally requires a large local market with strong airport/highway capacity. For example, Vancouver, B.C. and Seattle are the homeports for vessels in the Alaska cruise market. A port of call is one of the ports that will be visited during a cruise itinerary or when the vessel is re–positioning from one market to another. Cruise vessel ports of call for the Alaska market include Juneau, Ketchikan, Sitka, and other ports of call (BST 2007b).

It is extremely unlikely that Bremerton would be able to compete with other large seaports for large cruise ships as either a homeport or a port of call.

There is also a fleet of smaller cruise ships that serves the Pacific Northwest market including the Victoria Clipper high–speed service to Victoria and the San Juan Islands. Another example is the American West Steamboat Company operation of two modern paddlewheel vessels, the Empress of the North and the Queen of the West. Both vessels are homeported in Portland. Empress of the North spends the summer plying Alaskan waters, before returning to Portland for the winter. Queen of the West spends the entire year operating on the Columbia, Snake, and Willamette rivers, and is joined on this route by the Empress of the North during the winter.

Charter boats, boats for excursions, and dinner boats comprise an additional sector of the passenger vessel market. Argosy Cruises has 11 vessels ranging in size from 35 to 280 linear feet operating in Elliott Bay, the Lake Washington Ship Canal, Lake Union, and Lake Washington. They offer public and private sightseeing tours and host weddings, corporate events, and community activities. There also are a number of smaller specialty boats, including sailboat cruises. The Virginia V steam–powered historic vessel is owned by a foundation and provides charter service (BST 2007b).

It is possible that such services could be provided out of Bremerton, but they likely would use existing marinas rather than develop new facilities.

2.4 WATER–RELATED AND MIXED USES

The use of the terminology "mixed use" differs substantially between the SMA application and the general real estate market. The SMA usage refers to a mix of water–dependent and non–water–dependent uses. The real estate market usage refers to the mix of commercial, office, and residential uses.

The typical real estate market characterization of mixed–use development in the Puget Sound area is some combination of residential over retail or office over retail in multi–storied buildings (vertical mixed use). This type of mixed–use development has become common throughout much of the metropolitan region. There are some combinations that occur in single–storied multi–use buildings called 'flex–tech' buildings. These buildings can contain horizontal mixes of uses including office, retail, restaurant, commercial, small assembly/service/storage, and showrooms. These 'flex–tech' types of buildings/uses tend to occur in business and office parks in suburban areas.

The growth in commercial space in the form of mixed use is a response to the growth in employment in the finance, insurance, real estate, business, professional, and medical–dental industries, as well as administrative offices of firms who are engaged in more industrial activities. One of the key determinants of where this type of vertical mixed use would be located is land values. Higher land values will support the vertical mixed–use type of development. Typically, waterfront areas have higher land values.

The mixed–use building developments generally have three components: office space with some retail or service to supplement office business; parking (surface, structured, or underground); and whatever landscaping and amenities are typical for the market area or required by local regulations. This type of development can be accommodated into waterfront locations where communities value access to and views of the water or waterfront. In order to comply with the SMA and shoreline guidelines, public access and water–related uses can be included with little adverse effect on the economic viability of the development. There is potential for complementary use of project elements such as parking to serve water–

related uses and public access in evenings and on weekends when office demand is reduced and most visitors are oriented to recreational use or amenities (ECS 2008).

The Bremerton downtown waterfront has a large mixed–use development incorporating the ferry terminal and intermodal center, the marina, and the USS *Turner Joy* as water–dependent uses. A large area of public open space provides water–enjoyment uses, as well as some restaurants with water views. The remainder of the area includes hotels, offices, and other uses that relate to the amenities of the water. Residential developments north of Burwell Street are oriented to amenities of the waterfront, including views, but have no water–dependent or water–oriented uses and are isolated from the water by a steep bluff. They do provide public access and views of the water by a trail at the top of the bluff.

Other locations in Bremerton that would allow for a mix of water–dependent and other uses are limited by topography and upland zoning. Most of the shoreline is designated for residential use, which provides little opportunity for water–dependent uses. Commercial areas along the water that provide some potential for a mix of water–dependent and other uses have a variety of limitations as described below.

The small commercial area on Oyster Bay off Kitsap Way has upland zoning and a shoreline designation that would support water–dependent and other uses. The shallow character of Oyster Bay and its designation as an Aquatic Conservancy area are likely to substantially limit the potential for water–dependent uses.

The commercial area along Wheaton Way east of the Warren Avenue Bridge is largely located along a bluff that isolates the upland from shoreline frontage. Critical area regulations designed to protect the area from landslides and also protect the feeder bluff likely preclude water access for most of this area. A small area along Campbell Way has existing commercial development adjacent to the water and may provide for a mix of water–dependent and other uses.

The commercial area at the head of Sinclair Inlet has zoning that would allow a mix of water–dependent and other uses; however, the sensitivity of the Gorst Estuary likely would preclude water–dependent use at this location.

2.5 SHORELINE USE AND DEVELOPMENT TRENDS

The uses allowed in each of the shoreline areas (shoreline environment designations) are provided in the Bremerton Shoreline Master Program and provide the basis for future development trends. The projection of potential future use is also based on an overview of the existing uses and probable market conditions.

The following section outlines presumed development trends in specific geographic areas.

2.5.1 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 10 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.

Specific subareas considered in this analysis include:

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

Ostrich Bay

Ostrich Bay is a large embayment in Dyes Inlet. It supports coho and chum salmon and 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 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 use 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.

Ostrich Bay North`

Ostrich Bay North includes the small embayment north of Elwood Point and Chico Bay. The area is outside of the City's planned annexation area but is important to ecological functions.

Chico Creek is the most important source of freshwater inputs to this area, including the entire west and south portions of Ostrich Bay.

The U.S. Navy and the public own the southerly portion of Chico Bay. No change in land use is expected in this area. It is likely to remain a Rural Residential area under the Kitsap County Comprehensive Plan.

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 U.S. 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. The Kitsap County Health District in a Public Advisory alerted the public to avoid contact with stream waters due to fecal coliform bacteria levels.

The majority of land use is single–family residential. Lots are moderate in size but there is little potential for additional subdivision along the shoreline. It is presumed that the U.S. Navy will not change shoreline uses in their ownership and any future hospital expansion or residential development will take place in the upland outside of shoreline jurisdiction.

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. These areas are generally older residential developments with moderate to large lot sizes. A few lots are in the range of 3 to 5 acres. Single–family land use in this area is not likely to change. There is some potential for subdivision of larger lots.

Oyster Bay

Oyster Bay is a shallow protected embayment with a relatively narrow opening to Ostrich Bay. Oyster Bay has no significant tributary streams, but has shallow habitat areas supporting high primary productivity for the food chain and a diverse assemblage of habitat.

The majority of land in the bay is single–family residential with a small commercial area at the south end along Kitsap Way. The commercial area near the south end of the bay has the potential for redevelopment in the future. It is unlikely to consist of water–dependent use given the shallow nature of the bay and the proposed Aquatic Conservancy designation. Future non–water–dependent or mixed–use development would require shoreline restoration and public access.

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 application of current stormwater management practices, although the redevelopment area is only a part of the tributary watershed draining into the bay.

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. Single–family land use in this area is not likely to change. There is some potential for subdivision of larger lots when sewer service is extended to the area.

2.5.2 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.

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.

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.

Single–family land use in this area is not likely to change. Expansion of the marina would require evaluation of impacts and must meet no net loss criteria, which likely would require on–site and/or off–site mitigation.

Port Washington Narrows West

This area extends from North Lafayette Avenue to Point Turner (which for convenience is considered at 6th Street in downtown Bremerton). This area has complex urban land uses comprising single–family and multi–family residential, industrial, and parkland including Evergreen Park.

There is one marina. Single–family land use in this area is not likely to change. Expansion of the marina would require evaluation of impacts and must meet no net loss criteria, which likely would require on–site and/or off–site mitigation.

Redevelopment of the shoreline in the industrial area in the vicinity of Pennsylvania Avenue would be required to meet no net loss criteria, which likely would require on–site and/or off–site mitigation.

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. Future non–water–dependent or mixed–use development would require shoreline restoration, which likely would include buffer augmentation with feeder bluff functions enhanced.

Port Washington Narrows East

The far northerly 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.)

Single–family land use in this area is not likely to change. There is some potential for subdivision of larger lots when sewer service is extended to the area.

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 will 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 will likely redevelop incrementally. Because non–water–dependent development requires shoreline restoration and public access, buffer areas can be expected to be augmented and feeder bluff functions enhanced.

2.5.3 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.

Downtown Bremerton

The area from 6th Street to the Puget Sound Naval Shipyard within the downtown subarea will be redeveloped with an array of residential, office, and mixed uses with strong connections and views to the waterfront. Most of this area has been redeveloped with only a few additional lots available. 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 are likely to be augmented and feeder bluff functions enhanced.

Puget Sound Naval Shipyard

This reach is heavily modified by the development of the Puget Sound Naval Shipyard. It is not likely that there will be a substantial change in the character of this facility in the future.

Restoration potential in this reach is limited due to intense development. Future development in the downtown will preserve and enhance steep slopes resulting in augmentation of

vegetation and feeder bluff functions. The major opportunity for enhancement is continuing efforts by the U.S. Navy to improve water quality through improvements to process water and runoff.

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. 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, as well as shorebird concentrations along the north shore.

The majority of the north side of the inlet is bounded by State Route (SR) 2 and the U.S. Navy railroad and is not expected to change.

There are extensive areas of commercial development generally south of Gorst Creek that are subject to redevelopment in the future. Because non–water–dependent development is likely, and such development requires shoreline restoration and public access, buffer areas are likely to be augmented.

On Gorst Creek, the commercially zoned area between the inlet and Sam Christopherson Road are low intensity and is likely to be redeveloped in the future. This area could provide stream buffers and incorporate shoreline restoration as a non–water–dependent use.

Between Sam Christopherson Road and West Belfair Valley Road, the residential and urban restricted area can be expected to experience more intensive future development and provide standard stream buffers.

2.5.4 Port Orchard Bay

Point Herron and 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 Shed Restaurant and multi–family development.

The remainder of the reach is single–family lots. The single–family residences in this area are not likely to change in use, although some remodeling may occur.

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 is likely to be reconstructed when it requires major repair or replacement, including grating for light penetration and less surface coverage, which would enhance nearshore ecological functions.

Port Orchard Bay East

The area east of Shore Drive in Bremerton is characterized by large single–family lots with extensive forested uplands.

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

Single–family land use in this area is not likely to change. There is some potential for subdivision of larger lots when sewer service is extended to the area. The undeveloped

shoreline in the eastern part of the reach is likely to feature future development concentrated at the top of the slope due to the proposed Urban Conservancy designation.

2.5.5 Kitsap Lake

The Kitsap Lake shoreline is largely single–family residential, with numerous docks, large areas of modified shoreline, and very little riparian vegetation. There is a large publicly owned wetland on the south side of the lake, a City park, and a U.S. Navy park on the west side of the lake.

Single–family lots are relatively small and narrow with little potential for additional subdivision. No substantive change in the public park, Navy park, or open space is expected.

2.5.6 Union River and Union River Reservoir

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.

No change in use or status is expected.

2.5.7 Twin Lakes

Twin Lakes together are approximately 21.7 acres and lie within the City's utility area.

No change in use or status is expected.

3. ASSESSMENT OF CUMULATIVE EFFECTS

3.1 TYPICAL EFFECTS OF ALTERATIONS ASSOCIATED WITH LAND USES

It is important to recognize that the ecological processes and functions that occur within SMA jurisdiction are affected by processes within the entire watershed, not only those that occur within shorelines regulated by the Bremerton Shoreline Master Plan.

Tables 3–1, 3–2, and 3–3 provide a summary in matrix format for lakes, streams, and marine environments, which outline the types of cumulative effects produced by the processes and functions addressed in the landscape analysis, and the extent to which the proposed revisions to the SMP addresses those potential effects (these tables are included at the end of this chapter in Section 3.6).

3.1.1 Lakes

3.1.1.1 Hydrology

Hydrology typically affects surface runoff, peak flow, and groundwater flow, and is substantially affected by upstream watersheds. At the watershed level, peak flows are affected by the size of the watershed, which affects the structure and pattern of tributary discharge to the system. Larger systems with a greater geographical coverage tend to have tributaries that are affected differentially by precipitation patterns. The effect of single storm events on the system depends on the geographic extent of weather patterns. Natural lake systems experience high water levels in the winter and low water levels in the summer.

Groundwater includes interflow, which is the shallow subsurface flow from shallow aquifers from precipitation that infiltrates into the soil surface and travels by means of gravity toward a lake or tributary stream. Interflow is often a substantial component of base flows in low precipitation periods.

At both the watershed and the reach level, native vegetation influences the patterns by which precipitation reaches surface water. Vegetation cover affects the rate of runoff, infiltration, and the resistance of soils to erosion from a variety of sources. Each of these factors has an impact on stream morphology and stability. Native vegetation is adapted to regional weather, geologic and soil conditions, as well as habitat use by a variety of species; therefore, it will function as a complete system.

Sources of human disturbance take the following forms:

- Pervious surfaces such as lawns and pastures can substantially increase runoff as compared to native forests.
- Impervious surfaces related to roadways, driveways, and parking areas tend to produce much higher peak runoff and much lower base flows and result in lower levels of infiltration and loss of low temperature interflows.
- Reduction in wetlands can decrease storage resulting in larger peak flows and less base flow into the lake system.

3.1.1.2 Water Quality

Water quality includes temperature, nutrient sources, and chemical pollutants. At the watershed level in natural systems, water quality is maintained by a range of processes including the following:

- Tree cover helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate near the shore.
- Riparian vegetation adjacent to lakes and streams reduces nutrients and pollutants through a variety of processes that intercept, filter, or biochemically immobilize substances.
- Wetlands have a variety of beneficial impacts on the nutrients and pollutants:
  - Pollutants in the form of particulates are retained in a wetland with greater detention time.
  - Plants enhance sedimentation by acting like a filter and causing sediment particles to drop to the wetland surface.
  - Wetlands uptake dissolved phosphorus and toxic compounds through adsorption to soil particles.
  - Removal of nitrogen from the aquatic system (denitrification) is done by bacteria that live in the absence of oxygen.

The same mechanisms as outlined above for wetlands are present within SMP jurisdiction.

Sources of human disturbances to water quality take the following forms:

- Pervious surfaces such as lawns and pastures can substantially increase nutrients from fertilizers, pollutants, and toxins through herbicides and pesticides.
- Impervious surfaces related to roadways, driveways, and parking areas tend to accumulate hydrocarbon pollutants and heavy metals.
- Loss of tree cover tends to reduce shade and increase water temperature, as well as reducing or eliminating positive water–quality contributions.
- Loss or alteration of wetlands reduces functions or eliminates positive water–quality contributions.

3.1.1.3 Aquatic Habitat

Aquatic habitat is addressed in terms of substrate structure and sediment size, as well as factors such as adjacent upland vegetation, nearshore conditions, and in–water structures. At the watershed level, upstream changes in hydrology that increase erosion and result in sedimentation change the substrate structure of the nearshore. This is largely related to the proportion of native vegetation in a watershed and the amount of impervious surface. Forest cover tends to control rates of runoff that otherwise lead to excessive erosion and sedimentation. Natural systems tend to produce high quality water with moderate levels of nutrients and few or no toxins.

Interruption of natural sediment sources from dams or dredging of depositional areas such as deltas alter the substrate supply. Structures also may interrupt the longitudinal flow of sediment.

Upland vegetation helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate in the nearshore.

Organic matter is important to the ecosystem in the form of leaves, branches, and terrestrial insects, and is an important element of the food chain in streams and nearshore habitat in lakes.

At the reach level, a wide variety of species depend on lake nearshore habitat for important life cycle functions. The nearshore is an especially productive area for a variety of insect and larvae food sources. A variety of species depend on specific nearshore substrate structure for spawning. Juvenile salmonids, particularly Chinook salmon, rely on nearshore habitat during a critical rearing phase. Chinook use gently sloping, shallow shorelines for weeks to months. Deeper nearshore habitats with rocky substrates and without vegetation appear to be preferred by smallmouth and largemouth bass.

Sources of human disturbances to aquatic habitat take the following forms:

- Changes in sediment recruitment and transport tend to alter substrate structure of the nearshore and make it less suitable for spawning, larvae production, and a variety of habitat characteristics important to a range of species.
- Bulkheads may reflect wave action and create a high energy environment in the nearshore that mobilize fine sediments, leaving the nearshore largely a gravel and cobble substrate unsuitable to many species, and particularly inhospitable to juvenile Chinook.
- The loss of upland buffers through urbanization lead to a loss in shade and cooler temperature areas adjacent to streams and reduces the contribution of organic matter.
- Loss of upland vegetation and nearshore woody debris changes habitat conditions and may lead to less refuge and more predation, particularly for juvenile salmon.
- Docks and other in–water facilities contribute to providing habitat for some predators, particularly bass, and also may cause avoidance behavior in salmonids by forcing them out of nearshore environments and into environments where food and shelter are less available and where predation is increased.

3.1.1.4 Terrestrial Habitat

Terrestrial habitat is affected by riparian vegetation, connectivity, and special habitat features such as wetlands. At the watershed level, continuity with habitat areas outside of the shoreline improves the productivity of habitat by providing links to larger areas and different types of riparian vegetation communities outside of the shoreline. The size of habitat areas is a primary factor in productivity, as well as complexity in habitat type.

At the reach level, the area width and continuity of vegetation, as well as type and maturity, are all important to wildlife habitat productivity. Larger wider riparian communities tend to have more complex vegetation communities and a wider variety of habitat types. Continuity links different types of riparian vegetation communities and a variety of upland areas, which provides for access to greater habitat variety. A nearly continuous riparian zone is the typical natural condition in the Pacific Northwest. Wetlands adjacent to lakes also provide an important habitat niche for a variety of species, particularly amphibians.

Sources of human disturbances to terrestrial habitat include:

- Reduction in the size or width of riparian communities below the threshold to provide meaningful habitat. Fragmentation and isolation reduce the ability of wildlife to access otherwise productive habitat.
- Species that are sensitive to proximity impacts such as noise or light may not occupy otherwise suitable habitat.
- The isolation of prey species in small areas with limited ability for refuge may increase predatory efficiency such that a balance between predation and replacement

may not be maintained. Domestic animals such as dogs and cats may increase the predator population beyond the natural balance.

- Loss of wetlands eliminates a habitat type important to the life cycle of a variety of species.

3.1.2 Streams

3.1.2.1 Hydrology

Hydrology typically affects surface runoff, peak flow, and groundwater flow, and is substantially affected by the condition of upstream watersheds. At the watershed level, peak flows are affected by the size of the watershed, which affects the structure and pattern of tributary discharge to the system. Larger systems with a greater geographical coverage tend to have tributaries that are affected differentially by precipitation. The effect of single storm events on the system depends on the geographic extent of weather patterns. Natural stream systems generally reach equilibrium in geomorphic processes that result in a stable bed and substrate.

Streamflow also includes interflow, which is shallow subsurface flow from shallow aquifers from precipitation that infiltrates into the soil surface and travels by means of gravity toward a stream. Interflow is often a substantial component of base flows in low-precipitation periods.

On both the watershed and reach level, native vegetation influences the patterns by which precipitation reaches surface water. Vegetation cover affects the rate of runoff, infiltration, and the resistance of soils to erosion from a variety of sources. Each of these factors has an impact on stream morphology and stability. Native vegetation is adapted to regional weather, geologic and soil conditions, as well as habitat use by a variety of species; therefore, it will function as a complete system.

Sources of human disturbances to hydrology take the following forms:

- Pervious surfaces such as lawns and pastures can substantially increase runoff as compared to native forests. Impervious surfaces related to roadways, driveways, and parking areas tend to produce much higher peak runoff and much lower base flows and result in higher erosion and sedimentation rates that affect substrate, resulting in lower levels of infiltration and loss of low temperature interflows.
- Reduction in wetlands can decrease storage, resulting in larger peak flows and less base flow into the system.

3.1.2.2 Water Quality

Water quality is affected by temperature, nutrient sources, and chemical pollutants. At the watershed level in natural systems, streams serve as transport pathways for nutrients in both directions. They accumulate nutrients from groundwater and terrestrial sources and transport them downstream, during which time numerous chemical and biological interactions repeatedly cycle the nutrients between organic and inorganic forms. Nutrient levels in natural environments are finely balanced and produce complex interactions with habitat for a variety of species. Natural systems tend to produce high quality water with moderate levels of nutrients and few or no toxins.

Water quality is maintained by a range of processes:

- Tree cover helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate near the shore.
- Riparian vegetation adjacent to lakes and streams reduces nutrients and pollutants through a variety of processes that intercept, filter, or biochemically immobilize substances.
- Wetlands have a variety of beneficial impacts on the nutrients and pollutants:
  - Pollutants in the form of particulates are retained in a wetland with greater detention time.
  - Plants enhance sedimentation by acting like a filter and causing sediment particles to drop to the wetland surface.
  - Wetlands uptake dissolved phosphorus and toxic compounds through adsorption to soil particles.
  - Removal of nitrogen from the aquatic system (denitrification) is done by bacteria that live in the absence of oxygen.

The same mechanisms as outlined above for wetlands are present within the SMP jurisdiction.

Sources of human disturbance take the following forms:

- Pervious surfaces such as lawns and pastures can substantially increase nutrients from fertilizers, pollutants, and toxins through herbicides and pesticides.
- Impervious surfaces related to roadways, driveways, and parking areas tend to produce hydrocarbon pollutants and heavy metals.
- Loss of tree cover tends to reduce shade and increase water temperature as well as reducing or eliminating positive water–quality contributions.
- Loss or alteration of wetlands reduces functions or eliminates positive water–quality contributions.

3.1.2.3 Aquatic Habitat

Aquatic habitat is addressed in terms of channel dynamics and stream structure, which includes substrate and pool structure, as well as factors such as adjacent upland vegetation and woody debris. At the watershed level, upstream changes in hydrology increase erosion and result in sedimentation that changes the substrate structure of the nearshore. This is largely related to the proportion of native vegetation in a watershed and the amount of impervious surface.

Interruption of natural sediment sources from dams or dredging of depositional areas such as deltas alter the substrate supply. Structures also may interrupt the longitudinal flow of sediment.

At the reach level, the stream bottom substratum is critical habitat for a variety of species including food web species such as benthic macroinvertebrates. Substrate is critical for spawning for a variety of fish including salmon. Egg incubation and embryo development is affected by substrate quality.

Large woody debris (LWD) performs several critical functions in forested lowland streams, including dissipation of flow energy, protection of streambanks, stabilization of streambeds, storage of sediment, and providing instream cover and habitat diversity. Many fish species, including salmon, rear primarily in pools with high habitat complexity and abundant cover.

Riparian vegetation helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate over the stream.

Organic matter is important to the ecosystem in the form of leaves, branches, and terrestrial insects and is an important element of the food chain in streams and nearshore habitat in lakes.

Many species, including some species of salmon, rely heavily on small lowland streams and associated off–channel wetland areas during their rearing phase.

Sources of human disturbance to aquatic habitat take the following forms:

- Stream channel morphology can be affected by shifts in the hydrologic regime due to increases in impervious surfaces, which change the amount and patterns of runoff and streamflow. Higher flows generally lead to changes in channel character, higher stream erosion rates, increases in sedimentation, and disconnections from the floodplain with resulting loss of flood storage. In general, these changes compound each other in an urban environment.
- Streambed quality can be degraded by scour and erosion deposition of fine sediment, as well as streambed instability due to high flows. A higher proportion of fine sediment can lead to conditions in which spawning and egg incubation is reduced or precluded and production of macroinvertebrates is reduced.
- Changes in sediment recruitment and transport can be affected by dams and stream armoring that limit the sources of substrate and lead to downstream alteration of substrate structure.
- LWD in streams and resulting functions are reduced by clearing for agriculture or urban development. Absent or immature forests lack the potential for mature trees to fall and provide woody vegetation. Channel clearing and channelization removes LWD that may be present.
- In–water structures such as dams may block or retard (through increased velocity) the movement of fish and other species along a stream. Docks and other in–water facilities contribute to providing habitat for some predators, particularly bass. These structures may also cause avoidance behavior in juvenile salmonids forcing them into environments where food and shelter are less available and where predation is increased.

3.1.2.4 Terrestrial Habitat

Terrestrial habitat is affected by riparian vegetation, connectivity, and special habitat features such as wetlands, as discussed for lakes above.

Streams, however, are much more prevalent in the landscape and provide corridors for movement of a variety of species and connect to a wider diversity of habitat types.

Sources of human disturbance include the same elements as outlined above for lakes.

3.1.3 Marine Environment

3.1.3.1 Freshwater Inputs and Tidal Flows

Freshwater inputs are most important in estuaries where water input and mixing create strong gradients in physical–chemical characteristics, biological activity and diversity, and the

potential for major adverse impacts associated with human activities. Sources include streams estuaries, as well as seepage zones in bluffs or banks.

Tidal flows move water, sediments, organisms , nutrients, and organic matter between the seaward limit of low tides and the landward limit of high tides. Tidal flows contribute to habitat formation, nutrient cycling, organic matter export, dispersal of organisms, species support (e.g., maintenance of salinity gradients) and connectivity. Local tidal flows are influenced by the regional tidal regime, local topography, and connectivity between marine/nearshore waters and shoreline or inland habitats.

Sources of human disturbance take the following forms:

- Changes in stream–flow regime from dams, diversions, and withdrawals.
- Increased impervious surfaces alter the magnitude, timing, frequency, and duration of freshwater inputs.
- Encroachment into the estuary or delta from road crossings and culverts at river mouths, as well as filling of floodplains and estuarine wetlands.
- Armoring or fill in nearshore that cuts off movement of groundwater into beach sediments.
- Elimination of wetlands adjacent to marine shorelines that reduces storage and inputs of freshwater.
- Tidal flows reduced by barriers such as tide gates, fill, culverts, or road crossings.

3.1.3.2 Light Energy or Solar Incidence

Light entering both freshwater and marine nearshore environments is a key factor controlling biological processes such as primary production, the growth of plants, reproductive cycles of aquatic animals, migratory movements, and predator–prey interactions.

Shallow bays and inlets, estuaries, lagoons, and marshes have high productivity due to availability of light, as well as other factors. Eelgrass beds form narrow corridors where light penetration meets its specific needs. Light penetration can vary from site to site depending on many factors including turbidity, the abundance of algae and other factors. In Puget Sound eelgrass beds can be as shallow as 2.5 feet below the low tide line to greater than 30 feet deep. About half of the areas sampled in a recent monitoring program had eelgrass extending to depths greater than 10 feet below the low tide line. Kelp forest distribution is limited to areas with light penetration to the bottom, as well as appropriate substrates, and moderate wave/current energy. Algal production on the surface of tide flats is an important source of food for prey items of salmonids and other fish.

Light levels affect water temperatures that, in turn, directly affect the growth and productivity of aquatic plants and the degree of desiccation and heat stress in upper beach areas, which are important habitats for forage fish spawning.

Foraging success of juvenile fish (or their predators) depends on adequate light levels for locating and capturing prey.

Sources of human disturbance take the following forms:

- Decrease in daytime light levels due to artificial shading from docks and other in–water structures.
- Increase in daytime light levels and heat/desiccation stress due to loss of natural shade from removal of riparian vegetation.

- Increase in nighttime light levels due to artificial lighting from buildings, docks, marinas, or roadways that affect a variety of movement patterns and predatory relationships.

3.1.3.3 Sediment and Substrate Structure

Sediment is a key structural constituent of many marine environments including:

- Beaches that provide energy dissipation, forage fish spawning, habitat formation, shellfish support, waterfowl foraging, eelgrass habitat, and juvenile salmon rearing and migration.
- Sand and mud flats that typically occur at mouths of rivers and streams where relatively large supplies of sediment are deposited.
- Salt marshes and brackish marshes that occur in areas with tidal inundation typically at elevations at and above the mean higher high water mark.

Process intensive areas for sediment supply include coastal bluffs and streams; for transport include streams and beaches in transport zones; for deposition include estuaries (tidal and distributary channels), barrier beaches, and stream deltas.

Coastal bluffs are the primary source of beach sediments in Puget Sound; however, many marine environments in Bremerton are primarily supplied by streams.

Sources of human disturbance take the following forms:

- Changes in stream–flow regime (including runoff from impervious surfaces) which increases instream erosion and the fine sediment component of beaches, estuaries, and other depositional features.
- Armoring of feeder bluffs that may remove sediment sources.
- Nearshore structures such as jetties, groins, docks, dikes, and roads that limit the longitudinal movement of sediment.

3.1.3.4 Carbon Cycling and Water Quality

Nearshore and marine waters receive inputs of nutrients and organic matter (carbon) from adjacent uplands, streams, rivers, and groundwater seeps and from nearshore bottom sediments and deeper ocean waters via estuarine circulation and mixing.

Organic matter import and export provide the basis for detrital food webs, which are important elements of both freshwater and marine food webs. Detrital food webs support many of the prey items salmonids rely on.

Process intensive areas include land uses and land cover adjacent to surface waters discharging to marine shorelines.

Sources of human disturbance include a variety of uses that discharge materials into water including:

- Agricultural land uses—dairy, pasture, feed lots, and manure sources;
- Impervious surfaces and stormwater runoff from roads and residential lawns;
- Wildlife and domestic animal concentrations;
- Failing septic systems;

- Contaminated sediments; and
- Point discharges of toxins.

Local features especially sensitive to inputs include numerous shallow, enclosed bays with low flushing rates and high shoreline to volume ratios.

Elimination of wetlands in tributary streams and adjacent to marine shorelines removes a natural feature that tends to reduce nutrients, pathogens, and toxins. Removal of vegetation cover also eliminates natural processes that attenuate discharge of nutrients, pathogens, and toxins.

3.1.3.5 Aquatic and Terrestrial Habitat

All of the processes previously discussed contribute to the presence and quality of aquatic and terrestrial habitat including:

- Estuaries,
- Barrier lagoons and marshes,
- Brackish marshes,
- Open coastal inlets,
- Eelgrass beds,
- Kelp forests,
- Beaches,
- Upland wetlands, and
- Adjacent marine riparian vegetation.

The presence of these features indicates high quality marine habitat.

Terrestrial habitat is affected by riparian vegetation, connectivity, and special habitat features such as wetlands, as discussed for lakes and streams above.

3.2 EFFECTS OF CURRENT LOCAL REGULATORY PROGRAMS

3.2.1 Comprehensive Plan Urban Growth Areas

The City has designated urban growth areas in cooperative planning efforts with Kitsap County. The Growth Management Act encourages growth within urban growth areas and discourages growth outside them. The Urban Growth Boundary divides urban areas with land that must remain rural. The policies for establishing urban growth boundaries include:

- The need to ensure logical service boundaries;
- The need to avoid isolated pockets of underserved urban development or abnormally irregular city boundaries; and
- Consideration of land needs for residential, commercial, and industrial uses within urban areas.

3.2.2 Zoning

BMC zoning regulations primarily address economic goals and compatibility with other human uses through a variety of mechanisms including:

- Specifying zoning categories with a specific range of allowed uses;
- Establishing density regulations, generally minimum lot sizes;
- Providing for development standards for specific features of development, including
    - Setbacks,
    - Open space,
    - Landscaping,
    - Parking, and
    - Stormwater.

Zoning affects the intensity of urban uses and provides the context for many of the changes in functions of streams and shorelines, but generally does not address shoreline issues directly (except in provisions relating to the SMP).

3.2.3 Critical Areas

The City has adopted critical area regulations that affect lands outside of the SMA jurisdiction and which address:

- Geologically hazardous areas,
- Frequently flooded areas,
- Critical aquifer recharge areas,
- Wetlands, and
- Habitat conservation areas, including streams, lakes, and areas associated with priority species.

Provisions in the regulations generally:

- Provide for the prohibition of alteration in those critical areas with ecological importance such as wetlands, streams, lakes, marine shorelines, and wildlife habitat areas;
- Restrict the range of allowed uses; and
- Provide for buffers to either protect human health and safety (in the case of geological hazards) or preserve ecological functions.

3.2.4 Stormwater

The City has approved use of the latest edition of Ecology's *Stormwater Management Manual for Western Washington*, as the guiding criteria for the planning, design, and construction of stormwater facilities in Bremerton. This Stormwater Manual governs both public and private development projects within the city.

To apply surface water design standards and National Pollutant Discharge Elimination System (NPDES) minimum requirements, all new development regardless of size may be subject to stormwater requirements issued by the City. Site regulation under surface water design includes creation or replacement of impervious surfaces, flow control, and water quality. New developments that create more than 5,000 square feet of new impervious surface trigger a drainage review including off–site analyses, erosion and runoff control, and

conveyance system design. Runoff treatment for pollution–generating impervious surfaces greater than 5,000 square feet includes biofiltration designed for the 2–year storm or an oversized wetpond if the project constructs more than 1 acre of pollution–generating impervious surface.

The Peak Rate Flow Standard detains runoff from a developed site based on single–event hydrologic modeling. NPDES standards require continuous hydrologic modeling to match flow durations between the 2–year flow and the 50–year flow. To comply, the City requires projects generating more than 0.5 cubic feet per second (cfs) of stormwater flow to apply duration–based standards for detention facilities.

Duration standards seek to avoid potential disruption to the downstream channels by choosing a "threshold discharge," below which sediment transport in the receiving channel is presumed not to occur and so post–development flow durations can be increased without concern. This choice can be made by site–specific, but rather expensive, analysis based on stream hydraulics and sediment size or can be applied as a "generic" standard based on pre–development discharges.

An additional issue that remains with a duration standard is the threshold discharge below which there are "no effects" of flow–duration increase.

Problems with structural approaches to stormwater management include:

Point discharge—The consequences of converting a natural condition of dispersed overland flow into numerous headwaters into a point discharge at a surface–water outfall can result in locally severe erosion and disruption of riparian vegetation and instream habitat (Booth 1990).

Groundwater—Flow duration control will not address changes to groundwater recharge or discharge, because no constructed detention ponds, even the largest designed under this standard, can delay winter rainfall sufficiently for it to become a summer discharge.

Individual storm hydrographs—There is no attempt (or ability) to construct detention ponds that match durations for specific storm events or even an entire storm season. Thus, the aggregate flow–duration spectrum may be unchanged, but the timing and brevity of any single storm hydrograph may be quite different from the undisturbed condition (Booth 1997).

3.3 EFFECTS OF CURRENT FEDERAL AND STATE REGULATORY PROGRAMS

3.3.1 National Pollutant Discharge Elimination System

The federal Clean Water Act requires states to set standards for the protection of water quality. The mandate of the federal Clean Water Act is administered by the state Department of Ecology in conjunction with state water quality laws. The program regulates activities that result in wastewater discharges to surface water from industrial facilities or municipal wastewater treatment plants, as well as non–point pollution. NPDES permits for stormwater discharges have two basic components. Stormwater discharge from construction sites are covered by a Statewide General Permit and require compliance for clearing sites of 5 or more acres. NPDES permit requirements for municipal stormwater systems are being phased in with the first phase affecting jurisdictions that serve populations of 100,000 or more.

3.3.2 Section 404 Permit

The federal Clean Water Act also regulates excavation and dredging in waters of the United States, including wetlands. Certain activities in Waters of the United States, including wetlands and streams, may require a permit from the U.S. Army Corps of Engineers (Corps). This requirement is administered by the Corps in conjunction with Section 10 of the Rivers and Harbors Act. As part of the program, Ecology is required to certify compliance with water quality standards under Section 401 of the Clean Water Act.

3.3.3 Endangered Species Act

The federal Endangered Species Act (ESA) addresses the protection and recovery of threatened and endangered listed species. The ESA is jointly administered by NOAA's National Marine Fisheries Service and the U.S. Fish and Wildlife Service (USFWS). Specific programs developed or under development in cooperation with the Corps include design standards for docks contained in the Corps' Regional Permit No. 3. This permit applies to Kitsap Lake and proposed restrictions on shoreline protection included in a Biological Opinion dated December 13, 2007 (NMFS 2007). Other programs with potential impacts on Bremerton include the NMFS Biological Opinions on flood control facilities (issued September 22, 2008) and certain pesticides (issued April 20, 2009). These programs will affect issuance of federal permits, most notably Section 404 Permits.

3.3.4 Washington State Department of Ecology

Ecology has regulatory authority over a wide variety of programs that affect water quantity and quality in waters of the state. Some of these programs include:

- Water pollution control (RCW 90.48),
- Water pollution control facilities financing (RCW 70.146),
- Underground petroleum storage tanks (RCW 70.148),
- Hazardous materials (RCW 70.136),
- Radioactive waste (RCW 70.99),
- Hazardous waste management (RCW 70.105),
- Hazardous waste fees (RCW 70.105A),
- Hazardous waste cleanup, Model Toxics Control Act (RCW 70.105D),
- Mixed radioactive and hazardous waste (RCW 70.105E),
- Detergent phosphorus content (RCW 70.95L),
- Water rights (RCW 90.03–44),
- Shoreline Management Act of 1971 (RCW 90.58),
- Dairy nutrient management (RCW 90.64),
- Underground storage tanks (RCW 90.76), and
- Watershed planning (RCW 90.82).

Many of these programs are administered in coordination with other local regulatory entities to provide multiple benefits, including coordination with the SMA.

3.3.5 Washington State Department of Agriculture

Washington State Department of Agriculture (WSDA) has regulatory authority over programs that address the water quantity impacts of agricultural practices limited to:

- The Dairy Nutrient Management Act of 1998 (RCW 90.64), and
- The Concentrated Animal Feeding Operation (CAFO) permit administered by Ecology.

WSDA provides technical support to Ecology through inspection and technical expertise. The CAFO permit is a delegation of authority to Ecology by the U.S. Environmental Protection Agency under the NPDES Program. Both of these programs are administered in coordination with Ecology and the local Conservation District.

3.3.6 Hydraulic Project Approval

The Washington Department of Fish and Wildlife (WDFW) regulates activities that use, divert, obstruct, or change the natural flow of the beds or banks of waters of the state, which may affect fish habitat. Projects in the shoreline jurisdiction requiring construction below the ordinary high water mark of Puget Sound or streams in the city could require a Hydraulic Project Approval from WDFW. Projects creating new impervious surface that could substantially increase stormwater runoff to waters of the state may also require approval.

3.4 ENHANCEMENT PROGRAMS

This section summarizes existing enhancement efforts by a variety of agencies including the East Kitsap Peninsula Salmon Habitat Restoration Lead Entity, the Puget Sound Parnership, the Washington State Department of Natural Resources, the Washington Department of Fish and WildlifeWDFW, tribes and other agencies.

3.4.1 Salmon Recovery: East Kitsap Peninsula WRIA 15

The planning area for the East Kitsap Peninsula Salmon Habitat Restoration Strategy is the eastern portion of Water Resource Inventory Area (WRIA) 15 that drains toward central Puget Sound, with the exception of Vashon Island. This area includes the streams, nearshore and marine waters of the east side of the Kitsap Peninsula, the Key Peninsula, the Gig Harbor Peninsula, and Fox, McNeil, Anderson, and Bainbridge islands.

The strategy is described in Chapter 6 of the Draft Puget Sound Salmon Recovery Plan as follows:

> The mission of the East Kitsap Lead Entity is to ensure local salmon habitat is preserved and restored to support salmon populations and human communities. The goal of this strategy is to restore healthy self–sustaining wild populations of the salmon species native to the streams and shorelines of the Kitsap Peninsula.

Four strategy objectives include:

- Increase population levels;
- Maintain geographically diverse populations;
- Promote the preservation and restoration of healthy, functioning ecosystems; and
- Increase public understanding and support for salmon recovery.

This strategy addresses local habitat conditions and is therefore an integral part of the larger regional recovery effort.

A complete list of near–term salmon recovery programs is available at: http://www.sharedsalmonstrategy.org/RecoveryPlan.htm.

3.4.2 Puget Sound Partnership

In response to the challenges facing Puget Sound, in 2007 the State Legislature created the Puget Sound Partnership to reverse Puget Sound's decline and restore it to health by 2020. This agency replaced the Puget Sound Action Team created in 1996 to protect and restore Puget Sound and its spectacular diversity of life now and for future generations. The Partnership has developed the following priorities in its Action Plan:

Priority A: Protect the intact ecosystem processes, structures, and functions that sustain Puget Sound. Avoiding problems before they occur is the best and most cost–effective approach to ecosystem health.

Priority B: Restore the ecosystem processes, structures, and functions that sustain Puget Sound. Protecting what we have left is not sufficient, and significant effort at an unprecedented scale is needed to undo past damage.

Priority C: Prevent water pollution at its source. Many of our efforts have focused on cleaning up degraded waters and sediments, but insufficient resources have been devoted to stopping pollutants before they reach our rivers, beaches, and species.

Priority D: Work together as a coordinated system to ensure that activities and funding are focused on the most urgent and important problems facing the region. Many of the programs and laws now used to regulate or support activities in Puget Sound were established on a piecemeal basis to address individual problems. Strategies that will help to address problems more effectively at an ecosystem scale include improved coordination of land use planning, water supply, ecosystem protection, transportation, and species recovery plans. The Action Agenda calls for the reform of environmental regulatory programs, as well as improvements to the capacity of local partners to implement actions and compliance efforts across Puget Sound.

Priority E: Build an implementation, monitoring, and accountability management system.

3.4.3 Washington State Department of Natural Resources

DNR manages state lands including forests, farms, commercial properties, and underwater lands under state ownership. Much of this land is dedicated to supporting trusts for specific public institutions such as schools and universities.

DNR's aquatic lands are managed to provide access to the waters of the state—rivers, lakes, streams, and Puget Sound. DNR also works to serve the continuation of navigation and commerce. Aquatic lands in Kitsap Lake include all lands beyond the inner harbor line. DNR issues leases for uses within harbor lands, including permits for docks and other overwater structures that extend beyond the Inner Harbor Line.

3.4.4 Washington Department of Fish and Wildlife

WDFW is a state leader in providing technical support services, as well as funding for salmon recovery efforts. A complete list of WDFW's activities is available at their website at http://www.wdfw.wa.gov.

3.4.5 Suquamish Tribe

The Suquamish Fisheries Department implements programs 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.

3.4.6 U.S. Navy

The U.S. Navy has undertaken numerous studies and participated in a variety of restoration efforts in water bodies in which past and present operations affect ecological resources. In Bremerton the Navy has participated in Sinclair and Dyes Inlet studies to identify and implement long-term, cost-effective strategies for protecting these water bodies.

3.4.7 Kitsap County Health District

The Environmental Health Division: identifies and prioritizes cleanup of surface water (marine and fresh) including a Pollution Identification and Correction Program; review of appropriate on-site sewage system design and installation and stream, lake, and marine (shellfish) health monitoring and reports.

3.4.8 Puget Sound Restoration Fund (PSRF)

The PSRF implemented a project in Oyster Bay 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.

3.5 EFFECTS OF PROPOSED BREMERTON SHORELINE MASTER PROGRAM

Effects of the proposed program are related to both specific bulk regulations and dimensional standards for buffers, setbacks, and other features, as well as performance standards for specific uses. Key performance standards are outlined below.

No Net Loss Criteria: The most stringent provision of the SMP is the no net loss criteria in SMP 20.16.630. This provision subjects all shoreline use, development, and redevelopment to a performance standard that all such activities prevent or mitigate adverse impacts to ensure no net loss of ecological functions and processes. This provides a performance standard that must be met in addition to any restriction or permission of a use and in addition to performance standards for individual uses or for shoreline modification.

Provisions for Non–Water–Dependent Uses: The SMA establishes a priority for water–dependent uses. Non–single–family uses that are not water dependent must, in effect, earn their way onto the shoreline by providing a net benefit to the public through ecological restoration and public access. The provisions that implement this requirement for commercial and industrial uses are found in SMP 20.16.720.b.5 and 20.16.740.b.4. Because most potential development within shoreline jurisdiction are expected to be non–water–dependent uses, it is likely that improvements in shoreline ecological functions will be

incorporated in most non–single–family projects. In most cases, this is likely to include on–site improvements such as provision or enhancement of buffers, but also may include off–site restoration in some cases.

Dimensional Standards: The dimensional standards provide predictable elements that would be associated with specific shoreline environmental designation. The provisions that have the most impact on ecological functions include the provisions of SMP 20.16.610, which provide building setbacks and buffers. These provisions are reproduced in Table 3–4.

Table 3–4. SMP Standards for Building Setbacks and Buffers

Designation	Minimum Building Setback	Buffer Width Standard
Urban Conservancy	15 feet beyond buffer	175 feet
Single Family and Multi–Family Residential		
Lot depth less than 125 feet	5 feet beyond buffer	20% of lot depth
Lot depth 125 feet to 199 inches	10 feet beyond buffer	20% of lot depth
Lot depth greater than 200 feet	15 feet beyond buffer	30% of lot depth (Maximum of 100 feet)
Recreational	15 feet beyond buffer	100 feet
Commercial/Industrial/Downtown Waterfront	15 feet beyond buffer	50 feet
Isolated	None	None

Please note: For all designations, setbacks and buffers listed above the following shall apply:
(1) Where buffers/setbacks for other critical areas are required, the most stringent buffer/setback shall be applied.
(2) Where lot depth is less than 150 feet on Commercial or Recreational lots, the buffers listed above may be reduced to 20% of the lot depth.
(3) In no case shall a buffer be greater than 200 feet.

These provisions, however, do not apply to water–dependent elements of a development, which necessarily must include elements at the land–water interface or on or over the water.

These buffer areas primarily affect the following ecological functions on lakes, streams, and marine shorelines.

Vegetation Conservation: These provisions are addressed in SMP 20.16.620 and generally serve to protect, conserve, and establish native vegetation near shorelines in order to protect and restore the ecological functions and ecosystem–wide processes performed within riparian and nearshore areas, which include but are not limited to:

- Protecting plant and animal species and their habitats;
- Providing food sources for aquatic and terrestrial species in the form of various insects and benthic macroinvertebrates;
- Providing shade necessary to maintain water temperatures for salmonids, forage fish, and other aquatic biota;
- Protecting and increasing stability of banks and bluffs;
- Reducing the hazard of slope failures or accelerated erosion;
- Reducing the need for structural shoreline stabilization measures;
- Improving the visual and aesthetic qualities of the shoreline;

- Protecting and improving water quality through filtration and vegetative uptake of nutrients and pollutants; and
- Providing habitat corridors parallel and perpendicular to the water body.

These provisions are implemented when Vegetation Conservation Plans are required for new developments, or when existing developments undertake major alteration or expansion.

Vegetation conservation provisions will have limited effect on existing single–family development, which is the predominant use in the shoreline and has highly variable conditions. In general, however, the higher density single–family areas have the least buffer and generally are characterized by lawn or ornamental vegetation that extends to or close to the edge of the water. Provisions in SMP 20.16.620(2) will provide a minimal buffer that will have positive influence on water quality by avoiding application of chemicals such as fertilizers, herbicides, and pesticides close to the water where overspray occurs. Such buffers also will have limited positive contribution by filtering and uptake of nutrients and toxins in overland runoff. The narrow buffer width and the lack of trees will not have a discernible effect on the microclimate, shading, temperature, and potential desiccation of freshwater or marine shorelines. Over time, however, these provisions and public education could lead to a substantial number of residential lots and other development incorporating buffers that will primarily reduce overland discharge of herbicides and pesticides from lawn areas.

Shoreline Sediment Processes: The alteration of instream and marine recruitment processes, as well as sediment transport and deposition in streams or as marine nearshore substrate, will benefit by provisions in SMP 20.16.870 Shoreline Stabilization, 20.16.810 Clearing and Grading, 20.16.830 Dredging, and 20.16.850 Landfills—all of which encourage preservation of natural processes. In cases where natural processes have been altered, some replacement of hard armoring may occur on a case–by–case basis, which may improve some natural functions of recruitment and transport of sediment. This replacement is likely to occur, however, when existing hard armoring fails. In most cases where hard armoring is present in areas where softer solutions would be appropriate, the existing armoring will not be subject to failure and will persist. In areas where hard armoring fails because of natural processes, conditions are less likely to be conducive to softer solutions.

In–water Structures: The adverse impacts from shading due to in–water structures are addressed by SMP 20.16.820 Docks, Piers, and In–water Structures; 20.16.750 Marinas and Boating Facilities; and 20.16.760 Recreational Development. These provisions contain specific performance standards that will reduce impacts from shading and fish–passage barriers. Existing in–water facilities will be gradually upgraded over time as they need to be replaced.

3.6 MATRIX SUMMARY OF CUMULATIVE EFFECTS

The matrices in Tables 3–1, 3–2, and 3–3 address lakes, streams, and the marine shoreline, respectively, and provide a more detailed assessment of potential cumulative effects of development. They also indicate the extent to which benefits of the proposed SMP and other programs would result in potential ecological changes.

Table 3–1. Lakes – Matrix by Reach for Evaluation of Cumulative Effects of Shoreline Management Plan on Ecological Productivity

Lake Environments					
Indicators	**Hydrology**	**Water Quality**	**Aquatic Habitat/Substrate**	**Aquatic Habitat/Organic Matter**	**Terrestrial Habitat**
Processes and Functions	**Watershed Level:** Peak Flows: The watershed size affects the structure and pattern of tributary discharge to the system. Larger systems with a greater geographical coverage tend to have tributaries that are affected differentially by precipitation patterns. The effect of single storm events on the system depends on the geographic extent of weather patterns. Natural lake systems experience high water levels in the winter and low water levels in the summer. Groundwater/Interflow: Water input includes interflow (shallow subsurface flow from shallow aquifers from precipitation that infiltrates into the soil surface and travels by means of gravity toward a lake or tributary stream). Interflow is often a substantial component of base flows in low–precipitation periods. **Reach Level:** Native vegetation influences the patterns by which precipitation reaches surface water. Vegetation cover affects the rate of runoff, infiltration, and the resistance of soils to erosion from a variety of sources. Each of these factors has an impact on stream morphology and stability. Native vegetation is adapted to regional weather, geologic, and soil conditions, as well as use as habitat by a variety of species and therefore will function as a complete system. Sources of human disturbance include: Pervious surfaces such as lawns and pastures can substantially increase runoff as compared to native forests. Impervious surfaces related to roadways, driveways and parking areas tend to produce much higher peak runoff and much lower base flows and result in lower levels of infiltration and loss of low temperature interflows. Reduction in wetlands can decrease storage resulting in larger peak flows and less base flow into the lake system.	**Watershed Level:** In natural systems, water quality is maintained by a range of processes. Tree cover helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate near the shore. Riparian vegetation adjacent to lakes and streams reduces nutrients and pollutants through a variety of processes that intercept, filter or biochemically immobilize substances. Wetlands have a variety of beneficial impacts on the nutrients and pollutants: • Pollutants in the form of particulates are retained in a wetland with greater detention time. • Plants enhance sedimentation by acting like a filter and causing sediment particles to drop to the wetland surface. • Wetlands uptake dissolved phosphorus and toxic compounds through adsorption to soil particles. • Removal of nitrogen from the aquatic system (denitrification) is done by bacteria that live in the absence of oxygen. **Reach Level:** The same mechanisms as outlined above for wetlands are present within SMP jurisdiction. Riparian vegetation reduces nutrients and pollutants through a variety of processes. Wetlands on or near lakes have similar beneficial impacts on the nutrients and pollutants as on a watershed level. Sources of human disturbance include: Pervious surfaces such as lawns and pastures can substantially increase nutrients from fertilizers and pollutants and toxins through herbicides and pesticides. Impervious surfaces related to roadways, driveways and parking areas tend to produce hydrocarbon pollutants and heavy metals. Loss of tree cover tends to reduce shade and increase water temperature. Loss or alteration of wetlands reduces functions or eliminates positive water–quality	**Watershed Level:** Upstream changes in hydrology that increase erosion and result in sedimentation that changes the substrate structure of the nearshore. This is largely related to the proportion of native vegetation in a watershed and the amount of impervious surface. Forest cover tends to control rates of runoff that otherwise lead to excessive erosion and sedimentation. Natural systems tend to produce high quality water with moderate levels of nutrients and few or no toxins. Interruption of natural sediment sources from dams or dredging of depositional areas such as deltas changes substrate supply. Structures may interrupt the longitudinal flow of sediment. **Reach Level:** A wide variety of species depend on lake nearshore habitat for important life cycle functions. The nearshore is an especially productive area for a variety of insect and larvae food sources. A variety of species depend on specific nearshore substrate structure for spawning. Juvenile salmonids, particularly Chinook, rely on nearshore habitat during a critical rearing phase. Chinook use gently sloping, shallow shorelines for weeks to months. Sources of human disturbance include: Changes in sediment tend to alter the substrate structure of the nearshore and make it less suitable for spawning, larvae production and a variety of habitat characteristics important to a range of species. Bulkheads may reflect wave action and create a high energy environment in the nearshore that mobilize fine sediments leaving the nearshore largely a gravel and cobble substrate unsuitable to many species and particularly inhospitable to juvenile Chinook.	**Reach Level:** Upland vegetation helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate in the nearshore. Organic matter is important to the ecosystem in the form of leaves, branches, and terrestrial insects and is an important element of the food chain in streams and nearshore habitat in lakes. Nearshore environments are important to many species. The nearshore is especially critical to the small fry stage of Chinook salmon. They remain in very shallow water along the lake's shorelines and prefer gently sloping sand to gravel with some overhanging or submerged vegetation or fine woody debris that provides cover from avian or fish predators. Deeper nearshore habitats with rocky substrates and without vegetation appear to be preferred by smallmouth and largemouth bass. Sources of human disturbance include: The loss of upland buffers through urbanization leads to a loss in shade and cooler temperature areas adjacent to streams and reduces the contribution of organic matter. Loss of upland vegetation and nearshore woody debris changes habitat conditions and may lead to less refuge and more predation, particularly for juvenile salmon. Docks and other in–water facilities contribute to providing habitat for some predators, particularly bass, and also may cause avoidance behavior in salmonids forcing them out of nearshore environments and into environments where food and shelter are less available and where predation is increased.	**Watershed Level:** Continuity with habitat areas outside of the shoreline improves the productivity of habitat by providing links to larger areas and different types of riparian vegetation communities outside of the shoreline. The size of habitat areas is a primary factor in productivity, as well as complexity in habitat type. **Reach Level:** Area, width and continuity are all important to wildlife habitat productivity. Larger wider riparian communities tend to have more complex vegetation communities and a wider variety of habitat types. Continuity links different types of riparian vegetation communities, and links a variety of upland areas which provides for access to greater habitat variety. A nearly continuous riparian zone is the typical natural condition in the Pacific Northwest. Wetlands adjacent to lakes also provide an important habitat niche for a variety of species, particularly amphibians. Sources of human disturbance include: Reduction in the size or width of riparian community below the threshold to provide meaningful habitat. Fragmentation and isolation reduces the ability of wildlife to access otherwise productive habitat. Species that are sensitive to proximity impacts such as noise or light may not occupy otherwise suitable habitat. The isolation of prey species in small areas with limited ability for refuge may increase predatory efficiency such that a balance between predation and replacement may not be maintained. Domestic animals such as dogs and cats may increase the predator population beyond the natural balance. Loss of wetlands eliminates a habitat type important to the lifecycle of a variety of species.

Lake Environments

Indicators	Hydrology	Water Quality	Aquatic Habitat/Substrate	Aquatic Habitat/Organic Matter	Terrestrial Habitat
		contributions.			
Effects of Programs	**Watershed Level:** Peak Flows: City and Kitsap County land use regulations primarily affect watershed vegetation and impervious surface and runoff patterns through zoning, and density regulations. The extent of large lot forest or rural zoning in a watershed is the primary factor that preserves native vegetation and natural hydrology. City and county Critical Areas (CA) regulations for wetlands, and Fish and Wildlife Conservation Areas (FWCA) preserve some land through buffers, but do not affect enough land area to affect the runoff patterns resulting from removal of native forests. City and county stormwater regulations have a substantial effect on peak runoff for new development, but the majority of existing impervious surface is not affected. Groundwater/Interflow: City and Kitsap County land use regulations affecting watershed vegetation and impervious surface are the primary factors affecting infiltration to the shallow aquifer and from there into tributary streams or directly into lakes. The extent of large lot forest or rural zoning in watersheds affects the scale of interflow. City and county stormwater regulations provide some incentives for infiltration, but do not affect the majority of largely developed land uses in watersheds. **Reach Level:** Native vegetation preservation on new lots and development is addressed in SMP 20.16.610 – Buffers and Setbacks, 20.16.620 – Vegetation Conservation, 20.16.650 – Water Quality, Stormwater, and Non–Point Pollution but has limited influence on the majority of lake shoreline which is already developed. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer but will not have a discernible effect on hydrology. In cases where interflow is limited by hard shoreline armoring, provisions encouraging softer solution to shoreline stabilization are provided in SMP 20.16.870. Where shorelines are currently armored, 20.16.870.b.2 may result in improvements. New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to hydrology by application of: • SMP 20.16.630 – Mitigation Sequencing for No Net Loss of Ecological Function • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of	**Watershed Level:** City and Kitsap County land use regulations affect lake water quality on a watershed level primarily through preservation of native forests on tributary stream watersheds. The effect on water quality is roughly proportional to the extent of large lot forest or rural zoning in a watershed. City and County CA regulations for wetlands, and FWCA preserve beneficial water quality functions of wetlands and buffers. City and county stormwater regulations have a substantial effect on water quality runoff for new development, but existing development, which is the majority of affected watersheds, is little affected. **Reach Level:** Native vegetation preservation on new lots and development is addressed in SMP 20.16.610 – Buffers and Setbacks, 20.16.620 – Vegetation Conservation. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer, which will have a substantial effect on overland discharge of herbicides and pesticides from lawn. In the short term, these provisions will affect few lots. Over time, these provisions and public education could lead to a substantial number of residential lots and other development incorporating buffers that will reduce overland discharge of herbicides and pesticides from lawns. New development and substantial redevelopment of sites will likely result in little or no degradation and improvements to water quality through buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to affect little shoreline in the short term but may cumulatively have a substantial beneficial effect through application of regulations and public education. Improvements on the reach level will have a substantial effect in those cases where contributing watersheds are small compared to the area of the shoreline.	**Watershed Level:** Upstream changes in hydrology that increase erosion and result in sedimentation that changes the substrate structure of the nearshore are addressed by city and county land use regulations that affect vegetation preservation and impervious surface. The scale of the effect is related to the extent of large lot forest or rural zoning that protects forests. City and county stormwater regulations have a substantial effect on peak flows for new development, but existing development, which is the majority of affected watersheds, is little affected. Interruption of natural sediment sources from dams or dredging of depositional areas are addressed by city and county CA regulations. **Reach Level:** Nearshore substrate will be benefitted by provisions limiting hard armoring in SMP 20.16.870 – Shoreline Stabilization. Application to existing single–family development of 20.16.870.b.2 may result in minor improvements to current hard armoring in conjunction with 20.16.620(2), which provides a minimal vegetation buffer. New development and substantial redevelopment of sites will likely result in little or no degradation and improvements to water quality through buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to affect little shoreline in the short term but may cumulatively have a substantial beneficial effect through application of regulations and public education.	**Reach Level:** Native vegetation preservation on new lots and development and resulting habitat benefits are addressed in SMP 20.16.610 – Buffers and Setbacks. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer, which will have a minor impact on providing food chain functions. In the short term, these provisions will affect few lots; however, over time, these provisions and public education could lead to a substantial improvement on buffers on a large number of residential lots. Adverse impacts of in–water structures are addressed by SMP 20.16.820 Docks, Piers, and In–water Structures, 20.16.750 Marinas and Boating Facilities, and 20.16.760 Recreational Development, which contain specific performance standards that will reduce impacts. Existing in–water facilities will be gradually upgraded over time as they need to be replaced. New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in improvements to aquatic habitat through buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to have a substantial cumulative beneficial effect through application of regulations and public education.	**Watershed Level:** City and county land use regulations affect terrestrial habitat primarily through preservation of vegetation. Forest or rural zoning is likely to preserve lands providing habitat. City and County CA regulations for wetlands, and FWCA preserve resources and buffers that provide habitat. The effect of these regulations depends largely on the proportion of watersheds that are not currently developed. **Reach Level:** Native vegetation preservation providing habitat on new lots and development are addressed in SMP 20.16.610 – Buffers and Setbacks. The provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer, which will have a little or no beneficial effect on upland habitat except for small species. Where habitat values are present, new development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5, and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to have a beneficial effect where terrestrial habitat is currently present.

Lake Environments					
Indicators	**Hydrology**	**Water Quality**	**Aquatic Habitat/Substrate**	**Aquatic Habitat/Organic Matter**	**Terrestrial Habitat**
	non–water–dependent commercial and industrial use. Such improvements to hydrology on the reach level are likely to be minor compared to watershed level processes.				
Kitsap Lake					
Lake Kitsap (LK) 1 South side of lake to 1976 Price Road Lake Kitsap Park Shoreline SED: Shoreline Recreation Developed portion of park	Little change in the developed portion of the park is expected. If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of the park occurs it would likely result in little or no degradation to water quality and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation to aquatic habitat/substrate and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation to aquatic habitat/organic matter and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation to terrestrial habitat and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
Lake Kitsap (LK) 2 Easterly portion of Lake Kitsap Park – Wetlands Proposed SED: Urban Conservancy	Little change in preserved open space wetland area is expected. No change in ecological functions.	Little change in preserved open space wetland area is expected. No change in ecological functions.	Little change in preserved open space wetland area is expected. No change in ecological functions.	Little change in preserved open space wetland area is expected. No change in ecological functions.	Little change in preserved open space wetland area is expected. No change in ecological functions.
Lake Kitsap (LK) 3 Platted Lake Kitsap Proposed SED: Shoreline Residential	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change hydrologic conditions of surface water or groundwater interflow. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers that improve food chain and related functions. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Lake Kitsap (LK) 4 1012 Kitsap Lake Road Navy – Camp McKean Proposed SED: Shoreline Recreation	Little change in the developed portion of the park is expected. U.S. Navy actions must comply with SMP as part of the CZM plan. If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs, it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
Twin Lakes					
Twin Lakes Proposed SED: Urban Conservancy	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed.

Lake Environments					
Indicators	**Hydrology**	**Water Quality**	**Aquatic Habitat/Substrate**	**Aquatic Habitat/Organic Matter**	**Terrestrial Habitat**
	No change in ecological functions.	No change in ecological functions.	No change in ecological functions.	No change in ecological functions.	No change in ecological functions.
Union Reservoir					
Union River and Reservoir Proposed SED: Urban Conservancy	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the City's protected watershed. No change in ecological functions.

Table 3–2. Streams – Matrix by Reach for Evaluation of Cumulative Effects of Shoreline Management Plan on Ecological Productivity

Stream Environments					
	Hydrology	**Water Quality**	**Aquatic Habitat/Stream Structure**	**Aquatic Habitat/Organic**	**Terrestrial Habitat**
	Watershed Level: Peak Flows: The watershed size affects the structure and pattern of tributary discharge to the system. Larger systems with a greater geographical coverage tend to have tributaries that are affected differentially by precipitation patterns. The effect of single storm events on the system depends on the geographic extent of weather patterns. Natural stream systems generally reach equilibrium in geomorphic processes that result in a stable bed and substrate. Groundwater/Interflow: Streamflow also includes interflow (shallow subsurface flow from shallow aquifers from precipitation that infiltrates into the soil surface and travels by means of gravity toward a stream). Interflow is often a substantial component of base flows in low–precipitation periods. **Reach Level:** Native vegetation influences the patterns by which precipitation reaches surface water. Vegetation cover affects the rate of runoff, infiltration, and the resistance of soils to erosion from a variety of sources. Each of these factors has an impact on stream morphology and stability. Native vegetation is adapted to regional weather, geologic, and soil conditions, as well as use as habitat by a variety of species and therefore will function as a complete system. Sources of human disturbance include: Pervious surfaces such as lawns and pastures can substantially increase runoff as compared to native forests. Impervious surfaces related to roadways, driveways and parking areas tend to produce much higher peak runoff and much lower base flows and result in higher erosion and sedimentation rates that affect substrate result in lower levels of infiltration and loss of low temperature interflows. Reduction in wetlands can decrease storage resulting in larger peak flows and less base flow into the system.	**Watershed Level:** Streams serve as transport pathways for nutrients in both directions. They accumulate nutrients from groundwater and terrestrial sources and transport them downstream, during which time numerous chemical and biological interactions repeatedly cycle the nutrients between organic and inorganic forms. Nutrient balance in natural environments is finely balanced and produces complex interactions with habitat for a variety of species. Natural systems tend to produce high quality water with moderate levels of nutrients and few or no toxins. Tree cover helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate near the shore. Wetlands have a variety of beneficial impacts on the nutrients and pollutants: • Pollutants in the form of particulates are retained in a wetland with greater detention time. • Plants entrain sedimentation by acting like a filter and causing sediment particles to drop to the wetland surface. • Wetlands uptake dissolved phosphorus and toxic compounds through adsorption to soil particles. • Removal of nitrogen from the aquatic system (denitrification) is done by bacteria that live in the absence of oxygen. **Reach Level:** The same mechanisms as outlined above are present within SMP jurisdiction. Sources of human disturbance include: Pervious surfaces such as lawns and pastures can substantially increase nutrients from fertilizers and pollutants and toxins through herbicides and pesticides. Impervious surfaces related to roadways, driveways and parking areas tend to produce hydrocarbon pollutants and heavy metals. Loss of tree cover tends to reduce shade and increase water temperature. Loss or alteration of wetland functions reduces or eliminates positive water–quality contributions.	**Watershed Level:** Upstream changes in hydrology that increase erosion and result in sedimentation that alters the substrate structure is largely related to the proportion of native vegetation in a watershed and the amount of impervious surface. Forest cover tends to control rates of runoff that otherwise lead to excessive erosion and sedimentation. Natural systems tend to produce high quality water with moderate levels of nutrients and few or no toxins. Interruption of natural sediment sources from dams or dredging of depositional areas such as deltas changes substrate supply. Structures may interrupt the longitudinal flow of sediment. **Reach Level:** The stream bottom substratum is critical habitat for a variety of species including food web species such as benthic macroinvertebrates. Substrate is critical for spawning for a variety of fish including salmon. Egg incubation and embryo development, is affected by substrate quality. LWD performs several critical functions in forested lowland streams, including dissipation of flow energy, protection of streambanks, stabilization of streambeds, storage of sediment, and providing in–stream cover and habitat diversity. Many fish species including salmon rear primarily in pools with high habitat complexity, with abundant cover. Many species, including some species of salmon rely heavily on small lowland streams and associated off–channel wetland areas during their rearing phase. Sources of human disturbance include: Stream channel morphology can be affected by shifts in the hydrologic regime due to increases in impervious surfaces, which changes the amount and patterns of runoff and streamflow. Higher flows generally lead to changes in channel character, higher stream erosion rates, increases in sedimentation, and disconnections from the floodplain with resulting loss of flood storage. In general, these changes compound each other in an urban environment. Streambed quality can be degraded by scour and erosion deposition of fine sediment, and by streambed instability due to high flows. A higher proportion of fine sediment can lead to conditions in which spawning and egg incubation is reduced or precluded and production of macroinvertebrates is reduced. Changes in sediment can be affected by dams	**Reach Level:** Riparian vegetation helps maintain cool water temperatures through provision of shade and creation of a cool and humid microclimate over the stream. Organic matter is important to the ecosystem in the form of leaves, branches, and terrestrial insects and is an important element of the food chain in streams. Sources of human disturbance include: The loss of upland buffers through urbanization leads to a loss in shade and cooler temperature areas adjacent to streams and reduces the contribution of organic matter, all of which are important habitat elements for a variety of species. Loss of upland vegetation and nearshore woody debris changes habitat conditions and may lead to less refuge and more predation, particularly for juvenile salmon. In–water structures such as dams may block or retard through increased velocity the movement of fish and other species along a stream. Docks and other in–water facilities contribute to providing habitat for some predators, particularly bass, and also may avoidance behavior in juvenile salmonids forcing them into environments where food and shelter are less available and where predation is increased.	**Watershed Level:** Continuity with habitat areas outside of the shoreline improves the productivity of habitat by providing links to larger areas and different types of riparian vegetation communities outside of the shoreline. The size of habitat areas is a primary factor in productivity, as well as complexity in habitat type. **Reach Level:** Area, width, and continuity are all important to wildlife habitat productivity. Larger wider riparian communities tend to have more complex vegetation communities and a wider variety of habitat types. Continuity links different types of riparian vegetation communities, and links a variety of upland areas which provides for access to greater habitat variety. Continuity allows movement to respond to local disruptions in productivity. A nearly continuous riparian zone is the typical natural condition in the Pacific Northwest. Wetlands adjacent to lakes also provide an important habitat niche for a variety of species, particularly amphibians. Sources of human disturbance include: Reduction in the size or width of riparian community below the threshold to provide meaningful habitat. Fragmentation and isolation reduces the ability of wildlife to access otherwise productive habitat. Species that are sensitive to proximity impacts such as noise or light may not occupy otherwise suitable habitat. The isolation of prey species in small areas with limited ability for refuge may increase predatory efficiency such that a balance between predation and replacement may not be maintained. Domestic animals such as dogs and cats may increase the predator population beyond the natural balance. Loss of wetlands eliminates a habitat type important to the lifecycle of a variety of species.

Stream Environments					
	Hydrology	**Water Quality**	**Aquatic Habitat/Stream Structure**	**Aquatic Habitat/Organic**	**Terrestrial Habitat**
			and stream armoring that limit the source of substrate and lead to downstream alteration of substrate structure. LWD in streams, and resulting functions are reduced by clearing for agriculture or urban development. Absent or immature forests lack the potential for mature trees to fall and provide woody vegetation. Channel clearing and channelization removes LWD that may be present.		
Effects of Programs	**Watershed Level:** <u>Peak Flows:</u> City and Kitsap County land use regulations primarily affect watershed vegetation and impervious surface and runoff patterns through zoning, and density regulations. The extent of large lot forest or rural zoning in a watershed is the primary factor that preserves native vegetation and preserved natural hydrology. City and county CA regulations for wetlands, and FWCA preserve some land through buffers, but do not affect enough land area to affect the runoff patterns resulting from removal of native forests. City and county stormwater regulations have a substantial effect on peak runoff for new development, but the majority of existing impervious surface is not affected <u>Groundwater/Interflow:</u> City and Kitsap County land use regulations affecting watershed vegetation and impervious surface are the primary factors affecting infiltration to the shallow aquifer and from there into streams. The extent of large lot forest or rural zoning in watersheds affects the scale of interflow. City and county stormwater regulations provide some incentives for infiltration, but do not affect the majority of largely developed land uses in watersheds. **Reach Level:** Native vegetation preservation on new lots and development is addressed in SMP 20.16.610 – Buffers and Setbacks, 20.16.620 – Vegetation Conservation, 20.16.650 – Water Quality, Stormwater, and Non–Point Pollution. These provisions have the most effect on undeveloped land. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer but will not have a discernible effect on hydrology. In cases where interflow is limited by hard shoreline armoring, provisions encouraging softer solution to shoreline stabilization are provided in SMP 20.16.870. Where shorelines are currently armored, 20.16.870.b.2 may result in improvements. New development and substantial	**Watershed Level:** City and Kitsap County land use regulations affect stream water quality on a watershed level primarily through preservation of native forests. The effect on water quality is roughly proportional to the extent of large lot forest or rural zoning in a watershed. City and CA regulations for wetlands and FWCA preserve beneficial water quality functions of wetlands and streams and their buffers. City and county stormwater regulations have a substantial effect on water quality runoff for new development, but existing development which is the majority of affected watersheds is little affected. Programs such as the Dairy Nutrient Management Act and the Concentrated Animal Feeding Operation (CAFO) permit address point pollution. These pollution sources, however, are not a major contributor to watersheds in Bremerton. **Reach Level:** Native vegetation preservation on new lots and development is addressed in SMP 20.16.610 – Buffers and Setbacks. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer, which will have a substantial effect on overland discharge of herbicides and pesticides from lawn. In the short term, these provisions will affect few lots. Over time, these provisions and public education could lead to a substantial number of residential lots and other development incorporating buffers that will reduce overland discharge of herbicides and pesticides from lawns. New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in improvements to water quality through buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4	**Watershed Level:** Upstream changes in hydrology that increase erosion and result in sedimentation that changes the substrate structure of the nearshore are addressed by city and county land use regulations that affect vegetation preservation and impervious surface. The scale of the effect is related to the extent of large lot forest or rural zoning that protects forests. City and county stormwater regulations have a substantial effect on peak flows for new development, but existing development which is the majority of affected watersheds is little affected. Interruption of natural sediment sources from dams or dredging of depositional areas are addressed by city and county CA regulations **Reach Level:** Nearshore substrate will be benefitted by provisions limiting hard armoring in SMP 20.16.870 – Shoreline Stabilization. SMP 20.16.630. Application to existing single–family development of 20.16.870.b.2 may result in minor improvements to current hard armoring in conjunction with 20.16.620(2), which provides a minimal vegetation buffer and will likely result in improvements to water quality through filtering and nutrient uptake. Large woody debris is provided only by mature native forests. Any beneficial effects of new buffers will likely be limited and occur only in the more distant future. New development and substantial redevelopment of sites will likely result in little or no degradation where buffers and mature vegetation are present and will likely result in improvements to buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use.	**Reach Level:** Native riparian vegetation preservation on new lots and development and resulting habitat benefits are addressed in SMP 20.16.610 – Buffers and Setbacks. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer which will have a minor impacts on providing food chain functions. In the short term, these provisions will affect few lots, however, over time, these provisions and public education could lead to a substantial improvement on buffers on a large number of residential lots. Adverse impacts of in–water structures are addressed by SMP 20.16.820 Docks, Piers, and In–water structures, 20.16.750 Marinas and Boating Facilities, and: 20.16.760 Recreational Development which contain specific performance standards that will reduce impacts. Existing in–water facilities will be gradually upgraded over time as they need to be replaced. New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in improvements to aquatic habitat through buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5, and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to have a substantial cumulative beneficial effect through application of regulations and public education.	**Watershed Level:** City and Kitsap County land use regulations affect terrestrial habitat primarily through preservation of vegetation. Forest or rural zoning is likely to preserve lands providing habitat. City and County CA regulations for wetlands and FWCA preserve resources and buffers that provide habitat. The effect of these regulations depends largely on the proportion of watersheds that are not currently developed. **Reach Level:** Native vegetation preservation providing habitat on new lots and development are addressed in SMP 20.16.610 – Buffers and Setbacks. The provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer which will have a little or no beneficial effect on upland habitat except for small species. Where habitat values are present, new development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to have a beneficial effect where terrestrial habitat is currently present.

Stream Environments					
	Hydrology	**Water Quality**	**Aquatic Habitat/Stream Structure**	**Aquatic Habitat/Organic**	**Terrestrial Habitat**
	redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements to hydrology on the reach level are likely to be minor compared to watershed level processes.	which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to affect a small area of the shoreline in the short term but may cumulatively have a substantial beneficial effect through application of regulations and public education. Improvements on the reach level will have a substantial effect in those cases where contributing watersheds are small compared to the area of the shoreline.	Such improvements on the reach level are likely to affect little shoreline in the short term but may cumulatively have a substantial beneficial effect through application of regulations and public education.		
`Gorst Creek					
Gorst Creek (GC) 1 Sinclair Inlet to SR 3 Proposed SED: Left Bank (north) Urban Conservancy Right Bank (south) Parallel Designation: Waterward of Building setback – Urban Conservancy, Landward of Building Setback – Shoreline Commercial Shoreline length 233 feet Number of commercial lots – 2 Commercial lot acres – 1.84 Undeveloped lots–1 (0.14 acres) Lots range in depth from 93 to 133 feet Building setbacks 15 to 25 feet	New development and substantial redevelopment of sites will likely result in little or no degradation and minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. The Urban Conservancy designation from the building setback assures buffers; however, little change to hydrology would occur. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use Greater setbacks of buildings and vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. New development will meet current stormwater standards for treatment. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5, and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use The Urban Conservancy designation from the building setback ensures buffers, and might result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers may result in a riparian corridor that provides a wider range of aquatic habitat functions. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5, and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers would potentially benefit terrestrial habitat. No change or positive change in ecological functions.
Gorst Creek (GC) 2 SR 3 to Sam Christopherson Avenue Proposed SED: Shoreline Commercial Shoreline length 1,666 feet Number of commercial lots – 9 Commercial lot acres – 6.98 Number of residential lots—11 Residential lot acres—8.72 Lots range in depth from 130 to 400 feet	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. The limited extent of the reach limits potential benefits to hydrology. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. New development will meet current stormwater standards for treatment. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Building setback and buffers may result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use Greater setbacks of buildings and vegetated buffers may result in a riparian corridor that provides a wider range of aquatic habitat functions. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers would potentially benefit terrestrial habitat. No change or positive change in ecological functions.

Stream Environments					
	Hydrology	**Water Quality**	**Aquatic Habitat/Stream Structure**	**Aquatic Habitat/Organic**	**Terrestrial Habitat**
Gorst Creek (GC) 3 Sam Christopherson Avenue to W Belfair Valley Road Proposed SED: Shoreline Residential (Note – designated Residential in Bremerton UGA zoning map) Shoreline length 1,000 feet Number of residential lots 5 MH–real property lots 1 Lots range in depth from 100 to 550 feet	This area is likely to change substantially in the future from a rural area to an urban residential neighborhood. Residential development standards in SMP 20.16.770 will likely result in development clustered away from the shoreline with required buffers. New development will meet current stormwater management requirements. Hydrologic inputs from surface water and interflow are likely to be preserved to some extent. No change in ecological functions.	Residential development meeting SMP standards is likely to preserve the existing extensive tree cover and preserve water temperature, water quality and nutrient cycling that maintains water quality. New development will meet current stormwater treatment requirements. No change in ecological functions.	Residential development meeting SMP standards is likely to preserve the stream structure. No change in ecological functions.	Residential development meeting SMP standards is likely to preserve the existing extensive tree cover and preserve water quality and nutrient cycling that maintains aquatic habitat value No change in ecological functions.	Subdivision in the future with Urban Conservancy designation and development standards is likely to preserve riparian vegetation buffers that contribute to terrestrial habitat. No change in ecological functions.
Gorst Creek (GC) 4 W Belfair Valley Road to power line easement (hatchery in Otto Jarstad Park) Proposed SED: Shoreline Recreation City park and fish hatchery	Little change in the developed portion of the park is expected. If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. The channelized stream reach in the park was previously replaced by a more functional naturalized channel and will be retained. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may increase organic inputs important to the food chain and other aquatic habitat functions. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers would benefit terrestrial habitat. No change or positive change in ecological functions.
Gorst Creek (GC) 5 Power line easement in Otto Jarstad Park to end of shoreline jurisdiction Proposed SED: Urban Conservancy City–owned Watershed	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.
Union River and Reservoir	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.	Little or no change is projected on the shoreline or within the watershed of this element of the city's protected watershed. No change in ecological functions.

Table 3–3. Marine Shorelines – Matrix by Reach for Evaluation of Cumulative Effects of Shoreline Management Plan on Ecological Productivity

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
	Freshwater inputs are most important in estuaries where water input and mixing create strong gradients in physical–chemical characteristics, biological activity and diversity, and the potential for major adverse impacts associated with human activities. Sources include streams and estuaries, as well as seepage zones in bluffs or banks. Tidal flows move water, sediments, organisms/propagules, nutrients, and organic matter between the seaward limit of low tides and the landward limit of high tides. Tidal flows contribute to habitat formation, nutrient cycling, organic matter export, dispersal of organisms, species support (e.g., maintenance of salinity gradients) and connectivity. Local tidal flows are influenced by the regional tidal regime, local topography, and connectivity between marine/nearshore waters and shoreline or inland habitats. Sources of human disturbance include: • Changes in stream–flow regime from dams, diversions, and withdrawals. • Increased impervious areas change the magnitudes, timing, frequency, and duration of freshwater inputs. • Encroachment into estuary/delta from road crossings/culverts at river mouths, filling of floodplains and estuarine wetlands. • Armoring or fill in nearshore that cuts off movement of groundwater into beach sediments. • Elimination of wetlands adjacent to marine shorelines that reduces storage and inputs of fresh water. • Tidal flows may be reduced by barriers such as tide gates, fill, culverts or road crossings	Light entering both freshwater and marine nearshore environments is a key factor controlling biological processes such as primary production, the growth of plants, reproductive cycles of aquatic animals, and migratory movements and predator–prey interactions. Shallow bays and inlets, estuaries, lagoons, and marshes have high productivity due to availability of light, as well as other factors. Eelgrass beds form narrow corridors where light penetration is limited by turbidity. Kelp forest distribution is limited to areas with light penetration to the bottom, as well as appropriate substrates, and moderate wave/current energy. Algal production on the surface of tide flats is an important source of food for prey items of salmonids and other fish. Light levels affect water temperatures that directly affect the growth and productivity of aquatic plants and the degree of desiccation and heat stress in upper beach areas which are important habitats for forage fish spawning. Foraging success of juvenile fish (or their predators) depends on adequate light levels for locating and capturing prey. Sources of human disturbance include: • Decrease in daytime light levels due to artificial shading from docks and other in–water structures. • Increase in daytime light levels and heat/desiccation stress due to loss of natural shade from removal of riparian vegetation. • Increase in nighttime light levels due to artificial lighting from buildings, docks, marinas, or roadways.	Sediment is a key structural constituent of many marine environments including: • Beaches which provide energy dissipation, forage fish spawning, habitat formation, shellfish support, waterfowl foraging, eelgrass habitat, and juvenile salmon rearing and migration. • Sand and mud flats which typically occur at mouths of rivers and streams where relatively large supplies of sediment are deposited; salt marshes. • Brackish marshes that occur in areas with tidal inundation typically at elevations at and above MHHW. Process intensive areas for supply include coastal bluffs and streams; for transport include streams and beaches in transport zones; for deposition include estuaries (tidal and distributary channels), barrier beaches; stream deltas. Coastal bluffs are the primary source of beach sediments in the Puget Sound; however, many marine environments in Bremerton are primarily supplied by streams. Sources of human disturbance include: • Changes in stream–flow regime impervious surfaces, which increase instream erosion and increase the fine sediment component of beaches, estuaries and other depositional features. • Armoring of feeder bluffs which may remove sediment sources. • Nearshore structures such as jetties, groins, docks, dikes, and roads that limit the longitudinal movement of sediment.	Nearshore and marine waters receive inputs of nutrients and organic matter from adjacent uplands, streams, rivers, and groundwater seeps and from deeper ocean waters via estuarine circulation and mixing, from nearshore bottom sediments. Organic matter import and export provides the basis for detrital food webs, which are important elements of both freshwater and marine food webs. Detrital food webs support many of the prey items salmonids rely on. Process intensive areas include land uses/land cover adjacent to surface waters discharging to marine shorelines. Sources of human disturbance include a variety of uses that discharge materials into water including: • Agricultural land uses – dairy, pasture, feed lots, manure sources • Impervious surfaces and stormwater runoff from roads, residential lawns • Wildlife/domestic animal concentrations • Failing septic systems • Contaminated sediments; point discharges of toxins Local features especially sensitive to inputs include numerous shallow, enclosed bays with low flushing rates, high shoreline to volume ratios. Elimination of wetlands in tributary streams and adjacent to marine shorelines eliminates a natural feature that tends to reduce nutrients, pathogens and toxins. Removal of vegetation cover also eliminates natural processes that attenuate discharge of nutrients, pathogens and toxins.	All of the processes in previous columns contribute to the presence and quality of aquatic and terrestrial habitat. These criteria relate to the presence of particular elements that indicate high quality aquatic habitat including: • Estuaries, • Barrier lagoons/marshes, • Brackish marshes, • Open coastal inlets, • Eelgrass beds, • Kelp forests, • Beaches, • Upland wetlands, and • Adjacent marine riparian vegetation. The presence of these features indicate high quality marine habitat. Terrestrial habitat is also an important element of the shoreline and is generally indicated by adjacent native vegetation with productivity associated with: • Greater area, • Greater width, • Maturity and complexity of vegetation, • Wetlands, • Continuity and links with other habitat areas, • The presence of sensitive species, • Limited proximity impacts such as noise or light, and • Limited access by domestic animals such as dogs and cats that increase predation. The extent of human disturbance is indicated by the relative abundance of these elements.
Effects of Programs	**Watershed Level:** Freshwater inputs are affected by city and county land use regulations that affect watershed vegetation and impervious surface and runoff patterns. The extent of large lot forest or rural zoning in a watershed is the primary factor that	Light levels related to removal of shade and desiccation of upper beaches is addressed by native vegetation preservation on new lots and development addressed in SMP 20.16.610 Buffers and Setbacks, 20.16.620 Vegetation Conservation. Provisions for vegetation conservation for expansion or alteration of single–family development in	**Watershed Level:** Upstream changes in hydrology that increase erosion and result in sedimentation that changes the substrate structure of the nearshore are addressed by city and county land use regulations that affect vegetation preservation and impervious surface. The scale of the effect is related to the extent of large lot forest or rural zoning that protects	**Watershed Level:** City and county land use regulations primarily affect stream water quality on a watershed level primarily through preservation of native forests which generally produce high water quality. The effect on water quality is roughly proportional to the extent of large lot forest or rural zoning in watersheds.	**Watershed Level:** City and county land use regulations and CA regulations provide a variety of programs that tend to reduce adverse impacts from waters flowing into productive marine and terrestrial habitat. State water quality regulations and both dairy and confined animal nutrient control programs

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
	preserves native vegetation and preserved natural hydrology. City and county CA regulations for wetlands, and FWCA preserve some land through buffers, but do not affect enough land area to affect the runoff patterns resulting from removal of native forests. City and county stormwater regulations have a substantial effect on peak runoff for new development, but the majority of existing impervious surface is not affected. Forest cover also affects the scale at which upland watersheds are recharged and allow interflow into tributary streams or directly to marine environments. City and county stormwater regulations provide some incentives for infiltration, but do not affect the majority of largely developed land uses in watersheds. **Reach Level:** Some influence on freshwater inputs are provided by native vegetation preservation on new lots and development is addressed in SMP 20.16.610 – Buffers and Setbacks, 20.16.620 – Vegetation Conservation, 20.16.650 – Water Quality, Stormwater, and Non–Point Pollution. These provisions have the most effect on undeveloped land. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer but will not have a discernible effect on freshwater inputs. Alteration of tidal processes is limited by provisions in SMP 20.16.810 Clearing and Grading, 20.16.820 Docks, Piers, and In–water Structures, 20.16.830 Dredging, 20.16.850 Landfills, and 20.16.870 – Shoreline Stabilization, all of which encourage preservation of natural processes. New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. SMP 20.16.720.b.5 and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use.	20.16.620(2) will provide a minimal buffer which will have a limited effect on shading. Adverse impacts of shading due to in–water structures is addressed by SMP 20.16.820 Docks, Piers, and In–water Structures, 20.16.750 Marinas and Boating Facilities, and 20.16.760 Recreational Development, which contain specific performance standards that will reduce impacts. Existing in–water facilities will be gradually upgraded over time as they need to be replaced. New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in improvements to water quality through buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to have limited beneficial effect in the short term but may cumulatively have a substantial beneficial effect through application of regulations and public education.	forests. Interruption of natural sediment sources from dams or dredging of depositional areas are addressed by city and county CA regulations. **Reach Level:** Nearshore substrate will be benefitted by provisions limiting hard armoring in SMP 20.16.870 – Shoreline Stabilization. SMP 20.16.630. Application to existing single–family development of 20.16.870.b.2 may result in minor improvements to current hard armoring in conjunction with 20.16.620(2), which provides a minimal vegetation buffer. Adverse impacts of structures is addressed by SMP 20.16.820 Docks, Piers, and In–water Structures, which substantially limits jetties, weirs and groins. New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in improvements by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use Such improvements on the reach level are likely to affect limited areas of degraded shoreline in the short term but may cumulatively have a substantial beneficial effect through application of regulations and public education.	City and county CA regulations for wetlands, and FWCA preserve beneficial water quality functions of wetlands and streams and their buffers. City and county stormwater regulations have a substantial effect on water quality runoff for new development, but existing development, which is the majority of affected watersheds, is little affected. Programs such as the Dairy Nutrient Management Act and the Concentrated Animal Feeding Operation (CAFO) permit address point pollution. These pollution sources; however, are not a major contributor to watersheds in Bremerton. **Reach Level:** Buffers which improve water quality through limiting overland discharge of herbicides and pesticides from lawns and that intercept, filter or biochemically immobilize pollutants are addressed in SMP 20.16.610 Buffers and Setbacks. Provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) provide minimal buffers. In the short term, these provisions will affect few lots. Over time, these provisions and public education could lead to a substantial number of residential lots and other development incorporating buffers that will reduce overland discharge of herbicides and pesticides from lawn. New development and substantial redevelopment of sites will likely result in little or no degradation of water quality and will likely result in improvements to water quality through buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5, and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Such improvements on the reach level are likely to affect a small area of the shoreline in the short term but may cumulatively have a substantial beneficial effect through application of regulations and public education.	also contribute. **Reach Level:** Recognition and preservation of productive marine habitat such as estuaries, barrier lagoons/marshes, eelgrass beds, kelp forests, etc. is recognized in a variety of performance standards for shoreline modification and for specific uses. The most significant include SMP 20.16.810 Clearing and Grading, 20.16.820 Docks, Piers, and In–water Structures, 20.16.830 Dredging, 20.16.850 Landfills, and 20.16.870 – Shoreline Stabilization. Adjacent marine riparian vegetation is addressed in SMP 20.16.610 Buffers and Setbacks. The provisions for vegetation conservation for expansion or alteration of single–family development in 20.16.620(2) will provide a minimal buffer with limited beneficial effect on upland habitat except for small species. Where aquatic and terrestrial habitat is present, new development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in buffers and other measures by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use.
Ostrich Bay (OstB) 1 North City Limits to south limit of Naval Hospital	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Proposed SED: Parallel Designations Urban Conservancy waterward of Boone Road Shoreline Commercial landward Includes Puget Sound Naval Complex, Naval Hospital Bremerton Medium bank Vegetation buffer between OHWM and Boone Drive	as part of the CZM plan. Any major changes would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. No change in ecological functions.	part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	part of the CZM plan. No change in ecological functions.
Ostrich Bay (OstB) 2 South limit of Hospital to Myers Place Proposed SED: Shoreline Recreation Includes Puget Sound Naval Complex, Park Medium bank Vegetation along shore is partially altered for shoreline access	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan. Any major changes would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan. No change in ecological functions.
Ostrich Bay (OstB) 3 Myers Place to boundary of NAD Marine Park Proposed SED: Shoreline Residential Medium bank Vegetation buffer between OHWM and Shore Drive One Naval dock in reach	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan. Any major changes would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.
Ostrich Bay (OstB) 4 NAD Marine Park South boundary of Puget Sound Naval Complex to but not including 4126 Wakefield Loop Proposed SED: Urban Conservancy Shoreline linear feet 1,250 Park Shoreline is generally unaltered	Little change in present character of park is likely within shoreline. City park plans emphasize passive use. No change in ecological functions.	Little change in present character of park is likely within shoreline. City park plans emphasize passive use. No change in ecological functions.	Little change in present character of park is likely within shoreline. City park plans emphasize passive use. No change in ecological functions.	Little change in present character of park is likely within shoreline. City park plans emphasize passive use. No change in ecological functions.	Little change in present character of park is likely within shoreline. City park plans emphasize passive use. No change in ecological functions.
Ostrich Bay (0stB) 5 4126 Wakefield Loop to 2151 Madrona Pt Drive (Tip of Madrona Point) Proposed SED: Shoreline Residential Lots range in depth from 112 to 540 feet Building setbacks 0 to 50 feet Shoreline modifications mixed 25–65% and 76–100% 14 in–water structures Upland vegetation limited Intertidal area moderate–extensive In–water vegetation: marsh, kelp, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Oyster Bay (OyB) 1 2148 Madrona Pt to 924 Lower Oyster Bay Drive Proposed SED: Shoreline Residential Lots range in depth from 112 to 540 feet Building setbacks 0 to 50 feet Shoreline modifications mixed 25–65% and 76–100% 8 in–water structures Upland vegetation limited	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. Aquatic conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Intertidal area moderate–extensive In–water vegetation: marsh, kelp, eelgrass		functions.			
Oyster Bay (OyB) 2 From but not including 924 Lower Oyster Bay Drive to and including 4320 Kitsap Way (Flagship Inn Motel) Proposed SED: Shoreline Commercial Lots range in depth from 15 to 280 feet Building setbacks 11.5 to 40 feet Shoreline modifications 76–100% 2 in–water structures Upland vegetation limited Intertidal area limited In–water vegetation: none	New development and substantial redevelopment of sites will likely result in little or no degradation and minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor improvements to buffers and minor increase in shoreline shading by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings might result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions
Oyster Bay (OyB) 3 4310 Kitsap Way to and including 1705 Marine Drive Proposed SED: Shoreline Residential Lots range in depth from 60 to 240 feet Building setbacks 25 to 75 feet Shoreline modifications mix of 25–65% and 76–100% 8 in–water structures Upland vegetation limited–moderate Intertidal area extensive In–water vegetation: marsh	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. Aquatic conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Oyster Bay (OyB) 4 North of 1705 Marine Drive (but not including) to (but not including) 1901 Marine Drive Proposed SED: Parallel designation Urban Conservancy waterward of road Upland beyond road: Shoreline Residential Urban Residential Area waterward of road and water undeveloped 933 linear feet Shoreline modification 25–65% No in–water structures Upland vegetation extensive Intertidal area extensive In–water vegetation: marsh	Urban Conservancy and Aquatic Conservancy designations would retain existing shoreline functions. New residential development on the upland side of the road would have few shoreline impacts with stormwater and other development standards. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Urban Conservancy and Aquatic Conservancy designations would retain existing shoreline functions. New residential development on the upland side of the road would not be likely to substantially change light energy or solar incidence. No change in ecological functions.	Urban Conservancy and Aquatic Conservancy designations would retain existing shoreline functions. New residential development on the upland side of the road would not be likely to change sediment or substrate. No change in ecological functions.	Urban Conservancy and Aquatic Conservancy designations would retain existing shoreline functions. New residential development on the upland side of the road would not be likely to result in-water quality impacts with stormwater and other development standards. No change in ecological functions.	Urban Conservancy and Aquatic Conservancy designations would retain existing shoreline functions. New residential development on the upland side of the road would displace current terrestrial habitat; however, lack of connectivity would result in minor impact. No change in ecological functions.
Oyster Bay (OyB) 5 1901 Marine Drive to 2415 S Marine Drive (Across from Madrona Point) Proposed SED: Shoreline Residential Lots range in depth from 80 to 240 feet Building setbacks 15 to 200 feet Shoreline modification: very limited 1 in–water structure Upland vegetation limited–moderate	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor buffers. Aquatic Conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers and retain existing shoreline or substitute bulkheads with softer solutions. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Intertidal area extensive In–water vegetation: marsh		Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	functions.	quality benefits. No change or positive change in ecological functions.	functions.
Oyster Bay (OyB) 6 3054 S Marine Drive 3042 Marine Drive (tip of Rocky Point) Proposed SED: Shoreline Residential Lots range in depth from 60 to 360 feet Building setbacks 10 to 100 feet Shoreline modification: mostly 76–100%, some 25–65%, small area in northern section 1–24% 8 in–water structures Upland vegetation limited–moderate Intertidal area limited In–water vegetation: eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor buffers. Aquatic Conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers and retain existing shoreline or substitute bulkheads with softer solutions. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Mud Bay (MB) 1 3052 Marine Drive to 1910 Marine Drive (Bottom of Mud Bay) Proposed SED: Shoreline Residential Lots range in depth from 60 to 360 feet Building setbacks 33 to 233 feet Shoreline modifications: 25–65% in northern section, most 1–24%, southern section none. 12 in–water structures Upland vegetation moderate Intertidal area extensive In–water vegetation: marsh, kelp, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor buffers. Aquatic Conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers and retain existing shoreline or substitute bulkheads with softer solutions. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Mud Bay (MB) 2 4366 Kelley Drive to 1385 NW Swiftshore Court (mouth of Mud Bay) Proposed SED: Shoreline Residential Existing: Semi–Rural (Kitsap County) Lots range in depth from 120 to 570 feet Building setbacks 50 to 185 feet Shoreline modifications: very limited 5 in–water structures Upland vegetation extensive Intertidal area extensive In–water vegetation: marsh, kelp	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor buffers. Aquatic Conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers and retain existing shoreline or substitute bulkheads with softer solutions. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Ostrich Bay (OstB) 6 1385 NW Swiftshore Court to 3544 Mathews Drive NW (Tip of Rocky Point) Proposed SED: Shoreline Residential Existing: Semi–Rural (Kitsap County) Building setbacks 0 to 233 feet Shoreline modifications: mixed—mostly 76–100%, some areas with none 7 in–water structures Upland vegetation limited Intertidal area moderate In–water vegetation: marsh, kelp, sargassum, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Phinney Bay (PB) 1 3532 Mathews Drive NW to 2710 Yacht Haven Way Shoreline Residential Proposed SED: Shoreline Residential Existing: Semi–Rural (Kitsap County) Lots range in depth from 240 to 1020 feet Building setbacks 0 to 233 feet Shoreline modifications: mixed—mostly 76–100%, some areas with none 8 in–water structures Upland vegetation limited Intertidal area moderate In–water vegetation: marsh, kelp, sargassum, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Phinney Bay (PB) 2 2700 Yacht Haven Way (Bremerton Yacht Club) Proposed SED: Shoreline Residential Existing: Semi–Rural (Kitsap County) Shoreline linear feet 1000 Lots size 105,415 square feet, Lot depth 200 feet Building setbacks 0 feet Shoreline modifications: 76–100% 157 slips, 2 additional in–water structures Upland vegetation limited Intertidal area west shore=extensive, east shore=limited In–water vegetation: marsh	If substantial redevelopment of marina occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Likely that SMP 20.16.820 Docks, Piers, and In–water Structures, 20.16.750 Marinas and Boating Facilities, and 20.16.760 Recreational Development would increase light penetration of existing and proposed facilities. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
Phinney Bay (BP) 3 4105 NW Kennedy Drive to 3680 NW Phinney Bay Road (Include Shaw Island) Proposed SED: Shoreline Residential Existing: Semi–Rural (Kitsap County) Lot depth 60 to 540 feet Building setbacks 50 to 150 feet Shoreline modification: 76–100% 5 in–water structures Upland vegetation moderate–extensive Intertidal area north=extensive, south=moderate In–water vegetation: marsh, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor buffers. Aquatic Conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers and retain existing shoreline or substitute bulkheads with softer solutions. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers that would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Phinney Bay (PB) 4 3432 NW Phinney Bay Road to NW 3317 Phinney Bay Road Proposed SED: Shoreline Residential Existing: Semi–Rural (Kitsap County) Shoreline modification: 76–100% 0 in–water structures Upland vegetation limited Intertidal area moderate In–water vegetation: marsh, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor buffers. Aquatic Conservancy designation limits new in–water structures. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers and retain existing shoreline or substitute bulkheads with softer solutions. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. Aquatic Conservancy designation limits new in–water structures. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers that would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Phinney Bay (PB) 5 3304 Phinney to 2715 N Lafayette Avenue Proposed SED: Shoreline Residential Lots range in depth from 40 to 915 feet Building setbacks 25 to 150 feet Shoreline modification: west side=76–100%, east side=25–65% and some lower 6 in–water structures Upland vegetation moderate Intertidal area limited In–water vegetation: marsh, kelp, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
West Port Washington Narrows (WPWN) 1 2710 N Lafayette Avenue to 3200 19th Street (Lot 5, Block 4 Anderson Cove 1st Add) Proposed SED: Shoreline Residential Lots range in depth from 40 to 915 feet Building setbacks 25 to 150 feet Shoreline modification: west side= 76–100%, east side=25–65% and some lower 10 in–water structures Upland vegetation moderate Intertidal area limited In–water vegetation: marsh, kelp, eelgrass	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
West Port Washington Narrows (WPWN) 2 (Anderson Cove) 1900 Naval Avenue Port Washington Marina Proposed SED: Parallel Residential and Shoreline Recreation for marina Port Washington Marina Shoreline linear feet 600 Lots size 124,581.6 square feet, Lot ranges in depth from 112.5 to 37.5 feet Building setbacks 0 to 133 feet Shoreline modification: 76–100% About 85 slips in–water structures Upland vegetation extensive Intertidal area limited In–water vegetation: none	If substantial redevelopment of marina occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of marina occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Likely that SMP 20.16.820 Docks, Piers, and In–water Structures, 20.16.750 Marinas and Boating Facilities, and 20.16.760 Recreational Development would increase light penetration of existing and proposed facilities. It is unlikely that the upland multi–family development will change substantially No change or positive change in ecological functions.	If substantial redevelopment of marina occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. It is unlikely that the upland multi–family development will change substantially No change or positive change in ecological functions.	If substantial redevelopment of marina occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. It is unlikely that the upland multi–family development will change substantially Some improvement could occur to water quality. No change or positive change in ecological functions.	If substantial redevelopment of marina occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. It is unlikely that the upland multi–family development will change substantially Some aquatic habitat improvement could occur. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
West Port Washington Narrows (WPWN) 3 (Anderson Cove) 1805 Thompson Drive to High Avenue Proposed SED: Shoreline Industrial Shoreline linear feet 133 Lot size 28,314 square feet, Lot depth 75 feet Shoreline modification: 76–100% 0 in–water structures Upland vegetation extensive Intertidal area limited In–water vegetation: none	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to buffers and minor increase in shoreline shading by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5, and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings might result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4,which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
			functions.	No change or positive change in ecological functions.	functions.
West Port Washington Narrows (WPWN) 4 1731 High Avenue to Warren Avenue Bridge Proposed SED: Shoreline Residential Lots range in depth from 80 to 330 feet Building setbacks 0 to 160 feet Shoreline modification: area with none, but mostly 25–65% 1 in–water structure (not including Warren Ave Bridge) Upland vegetation extensive Intertidal area moderate In–water vegetation: kelp	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
West Port Washington Narrows (WPWN) 5 Both sides Warren Bridge Roto–Vista Park Proposed SED: Shoreline Recreation Roto–Vista Park	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings, and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions
West Port Washington Narrows (WPWN) 6 Warren Ave Bridge to 710 Park Drive Proposed SED: Shoreline Residential Number of Lots 9 5.64 acres Lots range in depth from 60 to 690 feet Building setbacks 0 to 300 feet Shoreline modification: 76–100% 0 in–water structures (not including bridge) Upland vegetation limited Intertidal area limited In–water vegetation: kelp	This area of existing multi–family development has virtually no buffers and is heavily armored. It is unlikely that redevelopment will be proposed that loses existing non–conforming status. If new development or substantial redevelopment of sites occurs, it will likely result in little or no degradation and minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor improvements to buffers and minor increase in shoreline shading by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use Greater setbacks of buildings might result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. No change or positive change in ecological functions.
West Port Washington Narrows (WPWN) 7 Evergreen Park Proposed SED: Shoreline Recreation Park size 13.39 acres Building setbacks 33 to 367 feet Shoreline modification: 76–100% 1 in–water structure Upland vegetation limited Intertidal area moderate	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
In–water vegetation: kelp				No change or positive change in ecological functions.	
West Port Washington Narrows WPWN) 8 Evergreen Park to Manette Bridge Proposed SED: Shoreline Multi–Family (upland zoning is Downtown Regional Center Subarea Zoning MR–1 Multi–Family Residential 1) Urban Commercial Lots range in depth from 100 to 180 feet Building setbacks 20 to 70 feet Shoreline modification: 76–100% 1 in–water structure (not including bridge) Upland vegetation extensive Intertidal area limited In–water vegetation: kelp	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions
West Port Washington Narrows (WPWN) 9 Both sides of Manette Bridge Proposed SED: Shoreline Recreation	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
West Port Washington Narrows WPWN) 10 Manette Bridge to 608 Washington Avenue (6th Street) Proposed SED: Downtown Shoreline Multi–Family (upland zoning is Downtown Regional Center Subarea Zoning MR–1 Multi–Family Residential 1) Lots range in depth from 60 to 210 feet Building setbacks 0 to 114 feet Shoreline modification: 25–65% 0 in–water structure (not including bridge) Upland vegetation extensive Intertidal area limited In–water vegetation: kelp	It is likely that this area of mixed single–and multi–family development will be replaced by larger scale multi–family projects. It would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. The location on a high bank, however, would result in preservation of the bluffs and existing vegetation. Not likely to change freshwater inputs. No change or positive change in ecological functions.	With replacement of this area of mixed single–and multi–family development by larger scale multi–family projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. The location on a high bank, however, would result in preservation of the bluffs and existing vegetation. There would, however, likely be no change to light inputs. No change or positive change in ecological functions.	With replacement of this area of mixed single–and multi–family development by larger scale multi–family projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	With replacement of this area of mixed single and multi–family development by larger scale multi–family projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	With replacement of this area of mixed single and multi–family development by larger scale multi–family projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. Greater setbacks of buildings and vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
Sinclair Inlet (SI) 1 6th Street to Puget Sound Naval Shipyard Proposed SED: Downtown Waterfront Linear feet 1860 2 vacant lots, 0.09 total acres Lots range in depth from 70 to 206 feet Building setbacks 0 to 57 feet Shoreline modification: 25–65% 4 in–water structures, additionally about 300 slips Upland vegetation limited Intertidal area limited	It is likely that the few remaining developable lots will be replaced by larger scale multi–use projects. It would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. The location on a high bank however would result in preservation of the bluffs and existing vegetation. Not likely to change freshwater inputs. No change or positive change in ecological functions.	With replacement of the few remaining developable lots by larger scale multi–use projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. The location on a high bank, however, would result in preservation of the bluffs and existing vegetation. There would, however, likely be no change to light inputs. No change or positive change in ecological functions.	With replacement of the few remaining developable lots by larger scale multi–use projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	With replacement of the few remaining developable lots by larger scale multi–use projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	With replacement of the few remaining developable lots by larger scale multi–use projects under the provisions of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. Greater setbacks of buildings and vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
In–water vegetation: kelp					
Sinclair Inlet (SI2) Puget Sound Naval Shipyard Proposed SED: Shoreline Industrial Urban Industrial Parcel 397.47 acres 19,625 linear feet of shoreline (11,000 excluding docks) Shoreline modification: 100% Upland vegetation none Intertidal area limited In–water vegetation: none	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan. Any major changes would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function impacts would be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within the shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely within shoreline. U.S. Navy actions must comply with SMP as part of the CZM plan including SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function which requires impacts to be addressed and mitigated. No change in ecological functions.
Sinclair Inlet (SI) 3 Puget Sound Naval Shipyard boundary to, but not including 3958 SR 16 West Proposed SED: Parallel designations Waterward of Naval RR and SR 3, at point at which RR and SR 3 diverge, follows SR 3 – Urban Conservancy Upland of SR 3 – Shoreline Excluded Urban (Kitsap County) Shoreline linear feet 7,000 to 3015 SR 3; 11,500 to 3958 SR 16 Shoreline modification: 76–100% 0 in–water structures Upland vegetation (upland side) moderate Intertidal area limited most of the reach In–water vegetation: none identified	The narrow shoreline area between SR 3 and the Navy RR and the shoreline is not likely to see development. Most of the area was subject to a previous restoration program and is protected. Any action in this area would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. Upland of SR 3 future development is isolated from the shoreline by a major highway and railroad. Proximity impacts are unlikely. Development would meet applicable stormwater management requirements. No change in ecological functions.	Little change in present character of development is likely given the narrow strip of shoreline and previous restoration activities. Any action would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely given the narrow strip of shoreline and previous restoration activities. Any action would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely given the narrow strip of shoreline and previous restoration activities. Any action would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.	Little change in present character of development is likely given the narrow strip of shoreline and previous restoration activities. Any action would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.
Sinclair Inlet (SI) 4 3958 SR 16 West to 3650 SR 16 SW Proposed SED: Parallel designations Waterward of Building setback – Urban Conservancy, Landward of Building Setback – Commercial Urban (Kitsap County) Shoreline length 1,300 feet Number of commercial lots – 6 Commercial lot acres – 13.23 Lots range in depth from 35 to 300 feet Building setbacks 30 to 314 feet Shoreline modification: 76–100% 0 in–water structures Upland vegetation limited Intertidal area extensive In–water vegetation: marsh	New development and substantial redevelopment of sites will likely result in little or no degradation and minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. The Urban Conservancy designation from the building setback ensures buffers; however, little change to freshwater inputs of tidal flows would occur. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor improvements to buffers and minor increase in shoreline shading by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use The Urban Conservancy designation from the building setback ensures buffers; however only minor change to solar incidence would be expected. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function and • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use The Urban Conservancy designation from the building setback ensures buffers, and might result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4,, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Sinclair Inlet (SI) 4 3050 SR 16 SW Sinclair Inlet Wildlife Area Proposed SED: Urban Conservancy Shoreline length 800 feet Upland vegetation limited Intertidal area extensive In–water vegetation: marsh	No change in this wildlife area is anticipated. No change in ecological functions.	No change in this wildlife area is anticipated. No change in ecological functions.	No change in this wildlife area is anticipated. No change in ecological functions.	No change in this wildlife area is anticipated. No change in ecological functions.	No change in this wildlife area is anticipated. No change in ecological functions.
Sinclair Inlet (SI) 5	New development and substantial	New development and substantial	New development and substantial	New development and substantial	New development and substantial

Marine Shorelines

	Freshwater Inputs and Tidal Flows	Light Energy or Solar Incidence	Sediment/Substrate Structure	Carbon Cycling/Water Quality	Aquatic and Terrestrial Habitat
2800 SR 16 SW Elandan Gardens Proposed SED: Parallel designations Waterward of Building setback– Urban Conservancy, Landward of Building Setback – Commercial Former landfill Shoreline length – 250 Parcel size – 1.53 acres Building setback 588 feet Shoreline modification: 76–100% 0 in–water structures Upland vegetation extensive Intertidal area extensive In–water vegetation: marsh	redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to hydrology by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function and • SMP 20.16.720.b.5, and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use The Urban Conservancy designation from the building setback assures buffers, however little change to freshwater inputs of tidal flows would occur. No change or positive change in ecological functions.	redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to buffers and minor increase in shoreline shading by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function and • SMP 20.16.720.b.5, and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use The Urban Conservancy designation from the building setback assures buffers, however only minor change to solar incidence would be expected. No change or positive change in ecological functions.	redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function and • SMP 20.16.720.b.5, and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use The Urban Conservancy designation from the building setback assures buffers, and might result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological functions.	redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function and • SMP 20.16.720.b.5, and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use Greater setbacks of buildings and vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	redevelopment of sites will likely result in little or no degradation and will likely result in minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function and • SMP 20.16.720.b.5, and 20.16.740.b.4 which provides for ecological restoration of non–water–dependent commercial and industrial use Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Sinclair Inlet (SI) 6 2800 SR 16 SW east of Elandan Gardens Proposed SED: Urban Conservancy East of former landfill Shoreline length – 500' Shoreline modification: 0% 0 in–water structures Upland vegetation narrow adjacent to road Intertidal area extensive In–water vegetation: marsh	This narrow shoreline area adjacent to the roadway has little or no potential for change, unless the roads were widened. Any action in this area would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.	This narrow shoreline area adjacent to the roadway has little or no potential for change, unless the roads were widened. Any action in this area would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.	This narrow shoreline area adjacent to the roadway has little or no potential for change, unless the roads were widened. Any action in this area would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.	This narrow shoreline area adjacent to the roadway has little or no potential for change, unless the roads were widened. Any action in this area would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.	This narrow shoreline area adjacent to the roadway has little or no potential for change, unless the roads were widened. Any action in this area would be subject to SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Impacts would be addressed and mitigated. No change in ecological functions.
East Port Washington Narrows (EPWN) 1 Riddell Road to 3845 Tracy Beach Road Proposed SED: Shoreline Residential Rural (Kitsap County) Lots range in depth from 180 to 615 feet Building setbacks 30 to 486 feet Shoreline modification: 76–100% 1 in–water structure Upland vegetation limited Intertidal area moderate In–water vegetation: marsh	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers and retain existing shoreline or substitute bulkheads with softer solutions. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may be subdividable and would provide buffers. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
East Port Washington Narrows (EPWN) 2 3765 Tracy Beach Road Sheridan Road Proposed SED: Parallel designation Waterward of Road – Urban Conservancy Upland of Road – Shoreline Residential Shoreline length 4,900 Average road setback from OHWM 30 feet Shoreline modification: 76–100% 1 in–water structure Upland vegetation moderate Intertidal area moderate In–water vegetation: kelp	Urban Conservancy designation would retain existing shoreline functions. New residential development on the upland side of the road would have few shoreline impacts with stormwater and other development standards. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Urban Conservancy designation would retain existing shoreline functions. New residential development on the upland side of the road would not be likely to substantially change light energy or solar incidence. No change in ecological functions.	Urban Conservancy designation would retain existing shoreline functions. New residential development on the upland side of the road would not be likely to change sediment or substrate. No change in ecological functions.	Urban Conservancy designation would retain existing shoreline functions. New residential development on the upland side of the road would not be likely to result in-water quality impacts with stormwater and other development standards. No change in ecological functions.	Urban Conservancy designation would presumably retain existing shoreline functions. New residential development on the upland side of the road would displace current terrestrial habitat; however, lack of connectivity would result in minor impact. No change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
East Port Washington Narrows (EPWN) 3 Sheridan Road to 2475 Stephenson Avenue Lions Park Proposed SED: Shoreline Recreation Park size 19.11 acres Waterfront 2,000 linear feet Building setbacks 10 to 570 feet Shoreline modification: limited 2 in–water structures Upland native vegetation limited Intertidal area moderate In–water vegetation: kelp	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
East Port Washington Narrows (EPWN) 4 2506 Stephenson Avenue to Sheridan Park Proposed SED: Shoreline Residential Lots range in depth from 171 to 371 feet Building setbacks 71 to 257 feet Shoreline modification: 25–65% 0 in–water structure (not including bridge) Upland vegetation moderate–extensive Intertidal area moderate In–water vegetation: kelp	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. If docks are replaced, grating or other light penetration will be provided. Not likely to substantially change light energy or solar incidence. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
East Port Washington Narrows (EPWN) 4 Sheridan Park Warren Bridge Theater Proposed SED: Parallel TOS Setback Upland Commercial below TOS is Urban Conservancy Park size 5.6 acres Waterfront 790 linear feet Building setback 228 feet Shoreline modification: 1–25% 0 in–water structures Upland vegetation extensive Intertidal area limited In–water vegetation: kelp	The theater and park/overlook at the top of the bluff are likely to remain. If substantial redevelopment of the park or theater occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions	The theater and park/overlook at the top of the bluff are likely to remain. If substantial redevelopment of the park or theater occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions	The theater and park/overlook at the top of the bluff are likely to remain. If substantial redevelopment of the park or theater occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	The theater and park/overlook at the top of the bluff are likely to remain. If substantial redevelopment of the park or theater occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	The theater and park/overlook at the top of the bluff are likely to remain. If substantial redevelopment of the park or theater occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
East Port Washington Narrows (EPWN) 5 1107 Campbell Way to 1921 Wheaton Way Proposed SED: Parallel Upland Shoreline Commercial Below TOS Setback Urban Conservancy Shoreline length 1,800 feet Misc. services lots 4; 1.52 acres Sheds and garages lots: 1; 1.39 acres Number of residential lots: 10 Undeveloped lots: 5 Recreational lots: 1 Lots range in depth from 34 to 172 feet Building setbacks 57 to 187 feet Shoreline modification: 1–25% 0 in–water structures	New development and substantial redevelopment of sites will likely result in little or no degradation and application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. The Urban Conservancy designation from the building setback assures buffers, however little change to freshwater inputs of tidal flows would occur. No change or positive change in ecological	New development and substantial redevelopment of sites will likely result in little or no degradation and will likely result in minor improvements to buffers and minor increase in shoreline shading by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. The Urban Conservancy designation from the building setback ensures buffers; however, only minor change to solar	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. The Urban Conservancy designation from the building setback ensures buffers, and might result in softer shoreline stabilization and increased sediment recruitment and transport. No change or positive change in ecological	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological	New development and substantial redevelopment of sites will likely result in little or no degradation and minor enhancement by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Upland vegetation extensive Intertidal area moderate In–water vegetation: kelp	functions.	incidence would be expected. No change or positive change in ecological functions.	functions.	functions.	
East Port Washington Narrows (EPWN) 5 East of 1921 Wheaton to Manette Bridge (includes CCR – City Core Residential and Manette Subarea R–10 zoning) Proposed SED: Shoreline Multi–Family Residential Lots range in depth from 70 to 640 feet Building setbacks 0 to 486 feet Shoreline modification: mostly 76–100% 0 in–water structure Upland vegetation limited Intertidal area limited In–water vegetation: kelp, sargassum	The most extensive probable redevelopment area is the Bremerton Gardens multi–family community between Magnuson Way and 16th Street. Substantial redevelopment would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Buffers and a stormwater system that meets current standards may improve freshwater inputs from the stream that runs through the property and through LID approaches that increase infiltration and interflow. Other multi–family development in the reach is less likely to redevelop. No change or positive change in ecological functions.	The redevelopment of Bremerton Gardens would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function, but is unlikely to change solar incidence. No change or positive change in ecological functions.	The redevelopment of Bremerton Gardens would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function, but is unlikely to change solar incidence. Greater building setbacks and softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	The redevelopment of Bremerton Gardens would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function, but is unlikely to change solar incidence. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	The redevelopment of Bremerton Gardens would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function, but is unlikely to change solar incidence. Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
East Port Washington Narrows (EPWN) 7 Manette Bridge both sides Proposed SED: Shoreline Recreation	Little change in this small park is expected. If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Not likely to change freshwater inputs. No change or positive change in ecological functions.	If substantial redevelopment of the park occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Softer shoreline stabilization may be included as mitigation and increased sediment recruitment and transport. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to water quality by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater vegetated buffers may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides and upgrade of parking to meet current stormwater treatment requirements may result in-water quality benefits. No change or positive change in ecological functions.	If substantial redevelopment occurs it would likely result in little or no degradation and may result in minor improvements to hydrology by application of SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. Greater setbacks of buildings and vegetated buffers vegetated buffers would benefit aquatic habitat through improved water quality. No benefits to terrestrial habitat likely. No change or positive change in ecological functions.
East Port Washington Narrows (EPWN) 8 Manette Bridge to 201 Shore Drive Proposed SED: Shoreline Commercial Manette Subarea NCC–Neighborhood Center Core) length 466 feet Number of commercial lots – 3 Commercial lot acres – 0.41 Number of residential lots– 1 Zoned Communications: 1 lot, 0.09 acres Zoned 370–50+ units: 1 lot, 0.87 acres Lots about 100 feet deep Building setbacks about 0 feet Shoreline modification: 76–100% 2 in–water structures Upland vegetation limited Intertidal area limited In–water vegetation: sargassum	These commercial and multi–family buildings are directly adjacent to the shoreline with heavy shoreline armoring. It is likely that the buildings or shoreline features will change in the foreseeable future. If new development or substantial redevelopment were to occur, it likely would result in little or no degradation by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Given the urbanized upland, there likely would be no effect on freshwater inputs of tidal flows. No change ecological functions.	If new development or substantial redevelopment were to occur, it likely would result in little or no degradation by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. The existing pier in the reach likely would be reduced in size and incorporate grating or other light penetration at such time as it were substantially repaired or reconstructed. No change or positive change in ecological functions.	If new development or substantial redevelopment were to occur, it likely would result in little or no degradation by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5, and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. It is, however, unlikely that substantial change would be made to shoreline armoring, given the high energy marine environment. No change or positive change in ecological functions.	If new development or substantial redevelopment were to occur, it likely would result in little or no degradation by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. Greater setbacks of buildings and vegetated buffers would be difficult to accommodate without substantially reducing the buildable area of site. No change in ecological functions.	If new development or substantial redevelopment were to occur, it likely would result in little or no degradation by application of: • SMP 20.16.630 Mitigation Sequencing for No Net Loss of Ecological Function. • SMP 20.16.720.b.5 and 20.16.740.b.4, which provides for ecological restoration of non–water–dependent commercial and industrial use. If the dock were reduced in size and/or incorporated light penetration it would benefit aquatic habitat. No change or positive change in ecological functions.
Port Orchard Bay (POB) 1 211 Shore Drive to 711 Shore Drive	Little change in present character of single–family development in shoreline is likely.	Little change in present character of single–family development in shoreline is likely.	Little change in present character of single–family development in shoreline is likely.	Little change in present character of single–family development in shoreline is likely.	Little change in present character of single–family development in shoreline is likely.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Proposed SED: Shoreline Residential Lots range in depth from 77 to 120 feet Building setbacks 0 to 60 feet Shoreline modification: 76–100% 1 in–water structure Upland vegetation limited Intertidal area moderate In–water vegetation: sargassum	A few lots may redevelop or remodel and provide minor vegetated buffers; however, lots are so small and existing setbacks so small that very small buffers are practical. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	A few lots may redevelop or remodel and provide minor buffers but they are not likely to affect or resulting impacts on beach desiccation. No change in ecological functions.	A few lots may replace bulkheads with softer solutions although the high energy wave environment limits this potential. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	A few lots may redevelop or remodel and provide minor vegetated buffers, which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Port Orchard Bay (POB) 2 805 Shore Drive to 1151 Shore Drive Proposed SED: Shoreline Residential Average lot depth about 120 feet Building setbacks 0 to 30 feet Shoreline modification: 76–100% 1 in–water structure Upland vegetation limited Intertidal area moderate In–water vegetation: sargassum	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers; however, lots are so small and existing setbacks so small that very small buffers are practical. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers but they are not likely to provide shade or change resulting impacts on beach desiccation. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions although the high energy wave environment limits this potential. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Port Orchard Bay (POB) 3 1334 Jacobson Blvd to 1926 Jacobson Lane Proposed SED: Shoreline Residential Semi–Rural (Kitsap County) Lots range in depth from 195 to 345 feet Building setbacks 0 to 215 feet Shoreline modification: 25–65% 1 in–water structure Upland vegetation limited Intertidal area moderate In–water vegetation: sargassum	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Lots in this area are large with a range of setbacks. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. The lack of requirement for large trees would limit beneficial impacts of shade on beach desiccation. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions although the high energy wave environment limits this potential. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Port Orchard Bay (POB) 4 1938 Jacobson Blvd to 2504 NE Enetai Beach Road Proposed SED: Shoreline Residential Semi–Rural (Kitsap County) Lots range in depth from 300 to 1020 feet Building setbacks 5 to 86 feet Shoreline modification: 1–24% 3 in–water structures Upland vegetation extensive, but not directly adjacent to shore Intertidal area moderate In–water vegetation: kelp, sargassum	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Lots in this area are large with a range of setbacks. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. The lack of requirement for large trees would limit beneficial impacts of shade on beach desiccation. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions although the high energy wave environment limits this potential. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.
Port Orchard Bay (POB) 5 2700 NE Entai Beach Road to (but not including 3735) Bahia Vista Drive Proposed SED: Urban Conservancy Conservancy (Kitsap County) Lots range in depth from 120 to 960 feet Building setbacks 130 to 428 feet Shoreline modification: 76–100%, with section of none 1 in–water structure Upland vegetation extensive Intertidal area moderate In–water vegetation: kelp, sargassum	This area is likely to subdivide in the future. Density will likely depend on provision of water and sewer service. Urban Conservancy designation and residential development standards in SMP 20.16.770 will likely result in development clustered away from the shoreline with substantial buffers. Existing freshwater inputs from surface water and interflow are likely to be preserved. No change in ecological functions.	Subdivision in the future with Urban Conservancy designation and development standards is likely to preserve the existing extensive tree cover and preserve shading and microclimate conditions that make beaches a productive habitat area. No change in ecological functions.	Subdivision in the future with Urban Conservancy designation and development standards is likely to preserve the existing unarmored shoreline and continue natural sediment recruitment, transport and deposition maintaining productive ecological functions. No change ecological functions.	Subdivision in the future with Urban Conservancy designation and development standards is likely to preserve the existing extensive tree cover and preserve water quality and nutrient cycling that maintains ecological productivity. No change in ecological functions.	Subdivision in the future with Urban Conservancy designation and development standards is likely to preserve aquatic habitat. Preservation of terrestrial habitat will require effective upland connections to other habitat areas. No change in ecological functions.

Marine Shorelines					
	Freshwater Inputs and Tidal Flows	**Light Energy or Solar Incidence**	**Sediment/Substrate Structure**	**Carbon Cycling/Water Quality**	**Aquatic and Terrestrial Habitat**
Port Orchard Bay (POB) 6 3735 Bahia Vista Drive to Illahee State Park Proposed SED: Shoreline Residential Rural (Kitsap County) Lots range in depth from 342 to 457 feet Building setbacks 5 to 143 feet Shoreline modification: 76–100% 1 in–water structure Upland vegetation limited directly upland from shore, extensive upland from houses Intertidal area moderate In–water vegetation: kelp, sargassum	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers. Lots in this area are large with a range of setbacks. Not likely to change freshwater inputs of tidal flows. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor buffers. The lack of requirement for large trees would limit beneficial impacts of shade on beach desiccation. No change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may replace bulkheads with softer solutions although the high energy wave environment limits this potential. Not likely to change sediment or substrate substantially. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers which may reduce nutrients and toxic discharge from fertilizers, herbicides, and pesticides with water quality benefits. No change or positive change in ecological functions.	Little change in present character of single–family development in shoreline is likely. A few lots may redevelop or remodel and provide minor vegetated buffers, which would benefit aquatic habitat through improved water quality. No change or positive change in ecological functions.

4. REFERENCES

See:

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

Additional References:

BST Associates. 2007a. Bellingham Waterfront Lands Analysis Final Report. Prepared for Port of Bellingham, Bellingham, WA. January 23, 2007. Accessed at: http://www.cob.org/documents/planning/newwhatcom/2007–03–22–ind–land–supply.pdf.

BST Associates. 2007b. Everett Waterfront Lands Analysis 2007. Update dated April 9, 2007. Clarification of BST Conclusions by Planning Staff. Accessed at: http://www.everettwa.org/Get_PDF.aspx?pdfID=626.

City of Bremerton. 2010. City of Bremerton Shoreline Master Program, Revised Shoreline Inventory and Analysis. Prepared by Parametrix, Bellevue, WA. December 2010. http://22.ci.bremerton.wa.us/forms/communitydev/smp/ShorelineInventory_Analysis.pdf.

ECS (Economic Consulting Services). 2008. City of Renton, Shoreline Management Program Update: Economic Market for Shorelines Uses—Water Dependent Uses. October 15, 2008. Accessed at: http://rentonwa.gov/uploadedFiles/Business/EDNSP/planning/Tech%20Memo%20Demand%20Shoreline%20Dependent%20%2010–15–08.pdf.

Property Counselors. 2009. Seattle Shoreline Master Program Update, Comparison of Land Supply and Demand for Water–Dependent and Water–Related Uses. Prepared for the City of Seattle Department of Planning and Development. December 2009. Accessed at: http://www.seattle.gov/dpd/cms/groups/pan/@pan/@plan/@shorelinemasterprog/documents/web_informational/dpdp018454.pdf.

Shorett, Peter K. and D. Chudzik. 2006. Rent Market Study, Port of Port Townsend Boat Haven, Port Townsend, Washington as of April 10, 2006. Prepared for Port of Port Townsend. Accessed at: http://www.portofpt.com/BHRentSurvey–Final.pdf.