FINAL

CITY OF BAINBRIDGE ISLAND
GRANT NO. G1000036

CUMULATIVE IMPACTS ANALYSIS
for City of Bainbridge Island's Shoreline: Puget Sound

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CUMULATIVE IMPACTS ANALYSIS

CITY OF BAINBRIDGE ISLAND'S SHORELINE: PUGET SOUND

1 INTRODUCTION

1.1 Shoreline Management Act Requirements

The Shoreline Management Act guidelines (Guidelines), Chapter 173-26 of the Washington Administrative Code (WAC), require local shoreline master programs to regulate new development to "achieve no net loss of ecological function." The Guidelines (WAC 173-26-186(8)(d)) state that, "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."

The Guidelines do not include a definition of cumulative impacts; however, federal guidance has defined a cumulative impact as:

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency… or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (Council on Environmental Quality 1997).*

Consistent with Washington Department of Ecology (Ecology) guidance, cumulative impacts addressed in this analysis only include those that will result from development and uses within the shoreline jurisdiction of the City of Bainbridge Island (City) and are subject to regulation under its shoreline master program (SMP). Cumulative impacts that may result from development outside shoreline jurisdiction are not considered in this analysis (Washington Department of Ecology 2010).

The Guidelines elaborate on the concept of net loss as follows:

> *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 (WAC 173-206-201(2)(c)).*

In short, updated SMPs must contain goals, policies and regulations that are designed to direct development activities and uses in a manner to prevent degradation of ecological functions relative to the existing conditions as documented in an inventory and analysis report. For those projects that result in degradation of ecological functions, the required mitigation must at a minimum return the resultant ecological function back to the baseline. This is illustrated in the figure below (Figure 1-1). The jurisdiction must be able to demonstrate that it has accomplished that goal through an analysis of cumulative impacts that might occur through implementation of the updated SMP. WAC 173-26-186(8)(d) states that the "[e]valuation of such cumulative impacts should consider:

(i) current circumstances affecting the shorelines and relevant natural processes;
(ii) reasonably foreseeable future development and use of the shoreline; and
(iii) beneficial effects of any established regulatory programs under other local, state, and federal laws."

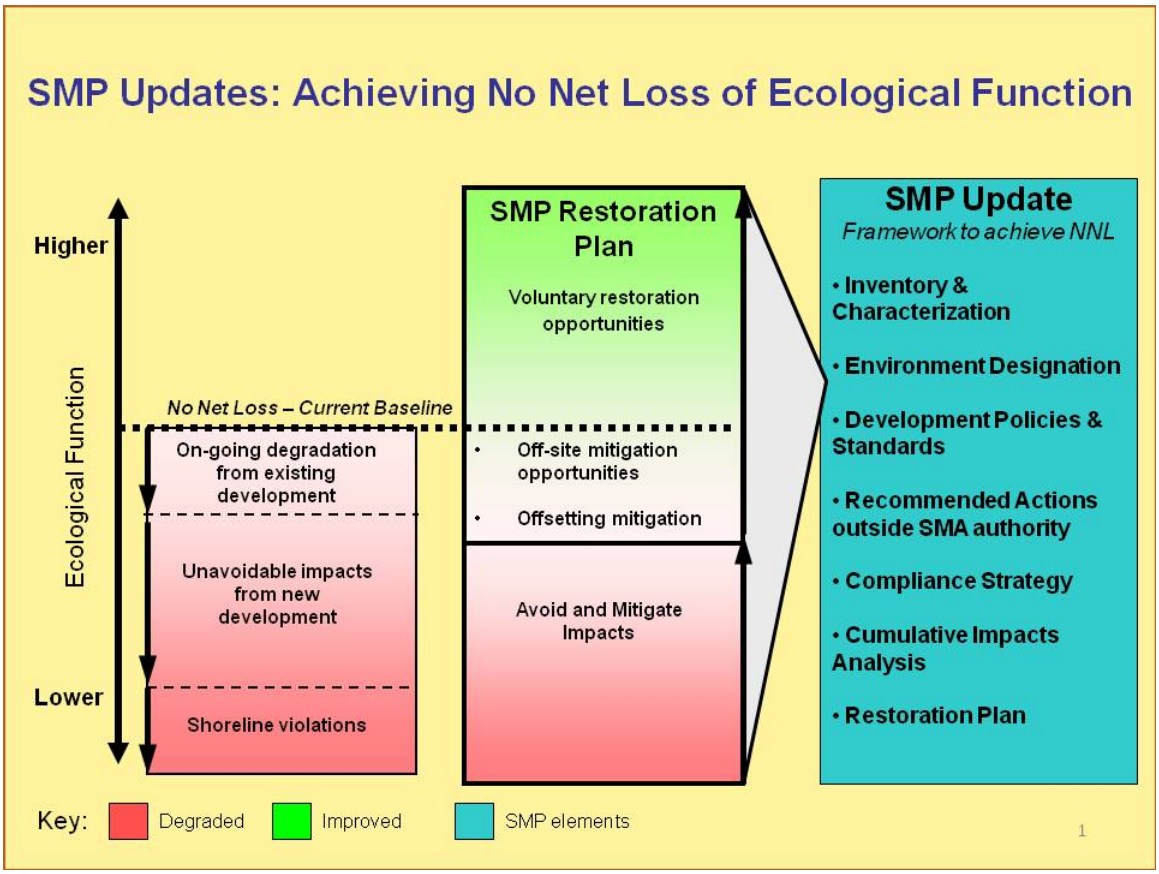

Figure 1-1. Achieving the No-Net Loss Standard through the Shoreline Master Program Process (Source: Department of Ecology).

As outlined in the *Shoreline Restoration Plan* (Herrera 2012) prepared as part of this SMP update, the Shoreline Management Act also seeks to restore ecological functions in degraded shorelines. This cannot be required by the SMP at a project level, but WAC 173-26-201(2)(f) says "master programs shall include goals and policies that provide for restoration of such impaired ecological functions." See the *Shoreline Restoration Plan* for additional discussion of SMP policies and other programs and activities in the City that contribute to the long-term restoration of ecological functions relative to the baseline condition.

1.2 Methodology

Consistent with previous studies, this analysis organizes the City's shoreline into nine distinct management areas, established by Williams et al. (2004) and based on nearshore drift cells, which are formed and influenced by dominant hydrologic and sediment processes.

The discussion of "current circumstances affecting the shorelines and relevant natural processes" provided in this report is largely based on GIS data analysis provided by the City and the *Bainbridge Island Nearshore Habitat Characterization and Assessment, Management Strategy Prioritization, and Monitoring Recommendations* (Williams et al. 2004).

To evaluate "reasonably foreseeable future development and use of the shoreline," the City's permit database was manipulated to provide records related to shoreline use and development. Selected records for the past 10 years were used to project development trends for the next 20 years. Additional analyses of the capacity for subdivision and new docks, given shoreline land capacity, proposed SMP regulations, and other existing local regulations, were performed to refine the evaluations of projected development. A more detailed discussion of the methods for determining future development can be found in Chapter 3, Anticipated Development.

Based on the results of the quantitative analysis of anticipated development, a qualitative analysis was performed to determine whether past permitting activity was likely to reflect future actions in light of proposed SMP provisions, and if so, how foreseeable growth patterns might result in impacts to shoreline functions. A qualitative evaluation of potential impacts associated with possible future development, including upland development, overwater structures, and shoreline armoring was conducted at a City-wide level. An analysis was also performed to determine how applicable regulations related to each of the impacts identified, and what, if any regulations should be added or expanded to create more protection. This included a review of "beneficial effects of any established regulatory programs under other local, state, and federal laws." Cumulative ecological effects were evaluated for each Management Area and for the City as a whole.

To the extent that existing information was sufficiently detailed and assumptions about possible new or re-development could be made with reasonable certainty, the following analysis is quantitative. In some cases information about existing conditions and/or redevelopment potential was not available at a level that could be assessed quantitatively or the analysis would be unnecessarily complex to reach a conclusion that could be derived more simply. For this reason, much of the following analysis is qualitative.

2 EXISTING CONDITIONS

In general, the City's shoreline along Puget Sound is primarily used for shoreline residential development, with limited areas of recreational, commercial, and water-dependent industrial development. Shoreline functions range from highly impacted to relatively intact.

For purposes of analyzing ecological functions and existing land uses in more detail, this analysis organizes the City's shoreline into nine distinct management areas, established by Williams et al. (2004) and based on nearshore drift cells, which are formed and influenced by dominant hydrologic and sediment processes (Figure 2-1). Sections 2.1 through 2.9 summarize the physical setting, ecological functions, and effects of existing

development in each management area based on GIS data analysis provided by the City and conditions described in the *Bainbridge Island Nearshore Habitat Characterization and Assessment, Management Strategy Prioritization, and Monitoring Recommendations* (Williams et al. 2004). Geomorphic shoreline shoreforms identified in the City's shorelines by Williams et al. (2004) include Rocky; Marsh/Lagoon; Spit/Barrier/Backshore; Low Bank; and High Bluff. Tables 2-1 through 2-9 provide a quantitative summary of conditions by management area and proposed environment designation (discussed further in Section 4.1). Table 2-10 provides a summary of existing shoreline modifications in each management area and proposed environment designation.

A complete summary of existing conditions can be found in the *Bainbridge Island Nearshore Habitat Characterization and Assessment, Management Strategy Prioritization, and Monitoring Recommendations* (Williams et al. 2004). These reports include an in-depth discussion of specific reach characteristics and information including physical processes, ecological measures, and other topics that are only summarized below.

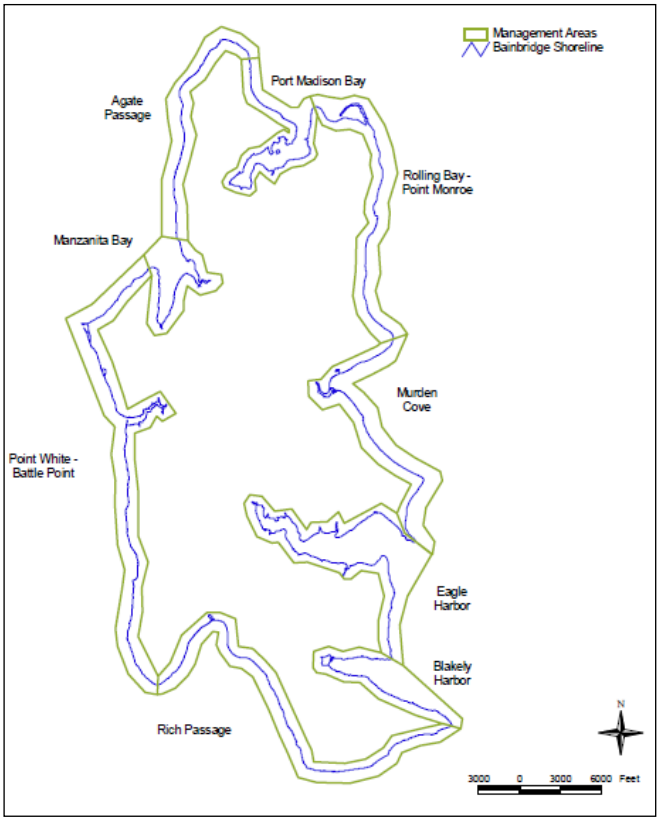

Figure 2-1. Map of Shoreline Management Areas in the City of Bainbridge Island (from Williams et al. 2004).

2.1 Agate Passage (MA-1)

The Agate Passage Management Area (MA-1) includes high bluff and low bank shoreforms. Shorelines are considered "semi-protected" along Agate Passage to "protected" along Port Madison. Forage fish spawning beaches, eelgrass beds, and

geoduck resources are common throughout the Management Area.

Shoreline development in MA-1 is primarily residential. Vegetation functions are relatively high in MA-1, as overhanging riparian vegetation is relatively common, and the ratio of percentage of natural vegetation to percent impervious surface coverage in MA-1 is among the highest in the City. On the other hand, shoreline armoring at the toe of potentially important feeder bluffs and backshore areas has impaired hydrologic and sediment transport functions. Furthermore, several reaches within this management area have experienced shellfish closures, indicating that water quality impairments are present.

Table 2-1. Shoreline Conditions in Agate Passage by Proposed Environment Designation.

Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Shoreline Residential	5,278 ft 80 acres	75%	High Bluff: 19.7% Low Bank: 80.3%	0.0%	4.0%	No
Shoreline Residential Conservancy	14,395 ft 153 acres	74%	High Bluff: 100%	1.6%	18.2%	No

2.2 Port Madison Bay (MA-2)

The Port Madison Bay Management Area is comprised of marsh, high bluff, spit, and low bank shoreforms, including a short stretch of feeder bluffs between Agate Point and Port Madison Bay. The management area includes several biologically significant areas, including forage fish spawning beaches, extensive eelgrass beds, clam and geoduck beds, and potential juvenile coho rearing habitat. Shoreline wave exposure is considered “semi-protected” to “protected” along Port Madison, and “very protected” within Port Madison Bay.

Shoreline development in MA-2 is primarily residential, with a large number of piers, moorage structures, and shoreline armoring. Terrestrial vegetation coverage in the shoreline area is relatively high (66 percent); however, vegetation overhanging the shoreline is less common. The density of overwater structures impacts intertidal and shallow subtidal vegetation and habitat. Much of the shoreline armoring is characterized as fill, as opposed to erosion protection. This fill acts to limit intertidal and nearshore habitat; however, given the “very protected” nature of wave energy at the site, it does not play a significant role in reflecting wave energy. At least eight marinas are present in the management area. Water quality is a concern in the Hidden Cove area, where the Washington Department of Fish and Wildlife (WDFW) has reported chronic mortality of herring embryos.

Table 2-2. Shoreline Conditions in Port Madison Bay by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Shoreline Residential	22,451 ft 181 acres	65%	High Bluff: 27.0% Low Bank: 22.7% Marsh/ Lagoon: 38.5% Spit/Barrier/Backshore: 11.9%	3.1%	3.9%	No
Residential Conservancy	8,291 ft 70 acres	59%	High Bluff: 31.6% Low Bank: 2.9% Marsh/ Lagoon: 3.4% Spit/Barrier/Backshore: 62.1%	2.0%	6.2%	No
Island Conservancy	2,127 ft 44 acres	83%	High Bluff: 100%	15.2%	11.2%	No

2.3 Rolling Bay-Point Monroe (MA-3)

Rolling Bay-Point Monroe Management Area (MA-3) includes Point Monroe, Point Monroe Lagoon, and Rolling Bay to Skiff Point. The management area is primarily composed of high bluff shoreforms, some of which, on the landward side of the lagoon have experienced recent instability. Other shoreforms include spit/backshore, low bank, and a large marsh/lagoon. Extensive tideflats are also present in MA-3. These shoreforms support herring and sandlance spawning areas, eelgrass beds, and geoduck resources. Cutthroat trout have also been documented in Dripping Water Creek, which flows into MA-3. Shorelines are primarily considered "semi-protected," with "very protected" shorelines in Point Monroe Lagoon.

Shoreline development in MA-3 is primarily residential. Much of the shoreline armoring in this management area is composed of vertical concrete bulkheads that extend into the intertidal zone where they reflect wave energy, disrupt hydrologic and sediment transport processes, and limit intertidal and shallow-subtidal habitats. Despite a high level of shoreline armoring, the overall density of overwater structures is lower compared to other management areas.

Two of the most highly impacted historical feeder bluffs on Bainbridge Island occur in Rolling Bay, where shoreline residential development at the base of the bluffs has accompanied extensive shoreline stabilization, overwater structures, loss of shoreline vegetation, and high impervious surface coverage. On the other hand, the management area also includes Fay Bainbridge State Park, with a sandy beach, intact riparian vegetation, and no shoreline modifications.

Table 2-3. Shoreline Conditions in Rolling Bay-Point Monroe by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Shoreline Residential	7,604 ft 14.8 acres	5%	Low Bank: 8.0% Marsh/Lagoon: 45.1% Spit/Barrier/Backshore: 47.0%	5.7%	2.8%	No
Residential Conservancy	20,336 ft 204 acres	47%	High Bluff: 82.5% Low Bank: 1.5% Spit/Barrier/Backshore: 16.0%	6.8%	24.7%	No
Island Conservancy	1,143 ft 17 acres	70%	High Bluff: 4.1% Spit/Barrier/Backshore:95.9%	0%	2.3%	No
Natural	640 ft 1 acre	0%	Marsh/Lagoon: 48.5% Spit/Barrier/Backshore: 51.5%	64%	0%	No

2.4 Murden Cove (MA-4)

Murden Cove (MA-4) includes Murden Cove, as well as Yeomalt Point and part of Wing Point. Shoreforms present include high bluff, spit/backshore, marsh/lagoon, and low bank. Extensive tideflats and abundant geoduck resources are present throughout the management area. There are also some small documented areas of surf smelt and sandlance spawning, as well as continuous-to-patchy eelgrass beds in Murden Cove. Cutthroat trout, coho, and chum salmon are also documented to spawn in Murden Cove Creek, and these species likely to rear in shallow nearshore areas in this management area. Shorelines in the management area are generally considered "semi-protected," with more protected areas within Murden Cove.

Shoreline development in MA-4 is primarily residential, with homes built on the high bluffs. The extent of overhanging riparian vegetation is among the greatest in all management areas in the City. Shoreline armoring, particularly in the intertidal zone, is relatively low in MA-4 compared to other management areas in the City. Similarly, the density of shoreline modifications and overwater structures is lowest in MA-4 compared to all other management areas. The management area includes one of the least-altered high bluff reaches, and two of the least-altered marsh/lagoon reaches in the City.

Table 2-4. Shoreline Conditions in Murden Cove by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Shoreline Residential	6,006 ft 41 acres	42%	High Bluff: 32.9% Spit/Barrier/Backshore: 67.1%	0%	11.9%	No
Residential Conservancy	20,476 ft 153 acres	60%	High Bluff: 75.9% Low Bank: 8.4% Marsh/Lagoon: 4.8% Spit/Barrier/Backshore: 10.9%	7.0%	20.8%	No
Island Conservancy	247 ft 1 acre	60%	Spit/Barrier/Backshore: 100%	1.5%	0%	No
Natural	2.355 ft 11 acres	76%	Marsh/Lagoon: 36.0% Spit/Barrier/Backshore: 64.0%	0%	1.0%	No

2.5 Eagle Harbor (MA-5)

Eagle Harbor Management Area (MA-5) includes diverse shoreforms. Shoreline wave exposure ranges from "semi-protected," to "very protected" in the inner portion of Eagle Harbor. Eagle Harbor receives upland flows from six watersheds with moderate-to-high levels of land use, including the most intensive land use of the Bainbridge shoreline. Nearshore habitat is limited in Eagle Harbor, as eelgrass beds, geoduck resources, and potential forage fish spawning areas are uncommon.

Land use in the Eagle Harbor Management Area includes a mix of commercial, industrial, and residential development and shoreline parks. The proportional cover of overhanging riparian vegetation (23 percent) is among the lowest in the City, and MA-5 is the only management area in the City where the impervious surface coverage exceeds total vegetation coverage. The management area includes superfund sites at Bill Point, within portions of the outer harbor, and at the mouth of the Ravine Creek. Eagle Harbor has experienced recreational shellfish closures/warnings as a result of water quality contamination. Together, high impervious surface coverage, high outfall densities, and high rate of armoring in the intertidal zone have impaired hydrologic functions in the management area. Vegetative functions are also impaired as a result of low forest cover and high impervious surface coverage.

Table 2-5. Shoreline Conditions in Eagle Harbor by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Urban	5,742 ft 34 acres	31%	Low Bank: 29.3% Marsh/Lagoon: 70.7%	0%	0.1%	Sediment: Mercury
Shoreline Residential	19,878 ft 151 acres	45%	High Bluff: 12.3% Low Bank: 4.9% Marsh/Lagoon: 25.0% Spit/Barrier/Backshore: 57.8%	0.4%	9.3%	Bioassay: PCB, PAHs Water: Dissolved oxygen
Residential Conservancy	12,561 ft 93 acres	57%	High Bluff: 34.1% Low Bank: 9.3% Marsh/Lagoon: 41.7% Spit/Barrier/Backshore: 14.9%	11.7%	15.1%	Sediment: Mercury
Island Conservancy	8,466 ft 80 acres	45%	Marsh/Lagoon: 100%	24.3%	9.4%	No
Natural	348 ft 5 acres	65%	Marsh/Lagoon: 100%	10.7%	46.1%	No

2.6 Blakely Harbor (MA-6)

Blakely Harbor is an embayment with the following shoreforms: spit/backshore, low bank, rocky shore, and marsh/lagoon. Shorelines along the southern stretch of MA-6 are considered "semi-protected," and the interior of Blakely Harbor is considered "protected" to "very protected." Blakely Harbor has a limited area of surf-smelt spawning and eelgrass beds, and geoduck resources are have not been documented. Two of the five creeks that enter Puget Sound in Blakely Harbor provide cutthroat trout, and coho salmon spawning habitat, and the shoreline likely provides rearing habitat for these species, as well as non-natal Chinook and pink salmon.

The management area is dominated by single-family residential development. The Blakely Harbor Management Area has the lowest level of shoreline armoring and intertidal armoring in the City. Functions in MA-6 rank highly among the City's shorelines in terms of wave energy, natural shade, sediment supply, substrate type, depth/slope, water quality, and hydrology. Despite the high rankings, groins do affect alongshore sediment transport in the management area.

Historically, a large commercial sawmill with a log rafting pond and a large stone jetty was operated in Blakely Harbor. Today, this area is park land with public shoreline access, recreational trails, and a planned interpretive center, although the jetty still exists, and constricts tidal exchange. Three of the least-impacted, low-bank reaches on Bainbridge Island are also located in Blakely Harbor.

Table 2-6. Shoreline Conditions in Blakely Harbor by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Shoreline Residential	5,334 ft 47 acres	39%	Low Bank: 12.0% Spit/Barrier/Backshore: 88.0%	0.1%	38.5%	No
Residential Conservancy	5,010 ft 137 acres	88%	Low Bank: 82.7% Rocky Shore: 8.1% Spit/Barrier/Backshore: 9.3%	4.2%	9.4%	No
Island Conservancy	11,895 ft 403 acres	85%	Rocky Shore: 100%	8.8%	5.0%	No

2.7 Rich Passage (MA-7)

The Rich Passage Management Area extends from Restoration Point to Point White, including Pleasant Beach and South Beach. The management area is primarily composed of spit/backshore and low bank shoreforms, as well as one marsh/lagoon at the restored Schel-Chelb estuary. Shorelines along the eastern stretch of MA-7 near Restoration Point are considered "semi-protected," whereas the interior of Rich Passage is considered "protected." Forage fish spawning, eelgrass beds, and geoduck resources are all limited within the management area. Cutthroat trout and coho salmon spawn in one tributary, Schel-Chelb Creek.

Shoreline uses are primarily residential, and also include road frontage, a state park with a boat launch and public access, a restored estuary, an Atlantic salmon commercial fish farm, and a sewage treatment outfall. The proportional cover of overhanging riparian vegetation is the lowest of all of the management areas in the City; however, this is not unexpected, as the dominant shoreforms of spit/barrier/backshore, low bank, and rocky shore in this management area are unlikely to support such vegetation. The ratio of natural vegetation coverage to impervious surface coverage in MA-7 is also among the lowest in the City. Hydrologic functions in the management area have been impacted by vertical concrete armoring and a high density of shoreline modifications (groins, piers, buoys, and boat ramps). Vegetative functions are lower in this management area as a result of shoreform types and extensive residential development. Water quality impairments have led to advisories against the harvest and consumption of shellfish in this management a rea.

Table 2-7. Shoreline Conditions in Rich Passage by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Urban	476 ft 5 acres	4%	Spit/Barrier/Backshore: 100%	0%	0%	No
Shoreline Residential	23,313 ft 183 acres	47%	Marsh/Lagoon: 13.9% Spit/Barrier/Backshore: 86.1%	0.1%	17.0%	Water: fecal coliform and dissolved oxygen
Residential Conservancy	2,092 ft 19 acres	31%	Marsh/Lagoon: 17.0% Spit/Barrier/Backshore: 83.0%	30.3%	0%	No
Island Conservancy	5,690 ft 140 acres	60%	Marsh/Lagoon: 3.5% Rocky Shore: 8.2% Spit/Barrier/Backshore: 88.3%	7.2%	10.4%	No

2.8 Point White-Battle Point (MA-8)

The Point White-Battle Point management area faces Port Orchard Bay and includes Battle Point, Battle Point Lagoon, Fletcher Bay, Tolo Lagoon, and part of Point White. The shoreline includes a mix of spit/backshore, high bluff, marsh/lagoon, and low bank shoreforms. Wave exposure in this management area ranges from "protected" to very-protected." Forage fish spawning beaches occur in some reaches, and geoduck beds are found throughout the management area. Eelgrass bed habitat is limited. Cutthroat trout, steelhead, chum, and coho salmon are also documented to spawn in Fletcher Creek and other streams in Fletcher Bay.

Shoreline development is primarily residential. Overall, existing development has had a moderate impact on ecological functions compared to other shorelines in the City. Hydrologic and habitat functions are limited by shoreline armoring, particularly in the intertidal zone.

Some of the most highly altered spit/backshore and marsh/lagoon reaches in the City are located in the Point White-Battle Point Management Area. In addition to shoreline armoring, high density of overwater structures, and a loss of vegetation in these reaches, subtidal dredging for channel maintenance also affects hydrologic and habitat functions in Fletcher Bay. Shellfish closures have occurred in the above mentioned reaches as a result of degraded water quality. Removal or modification of shoreline armoring is likely possible in the more protected waters, such as Fletcher Bay, or in front of feeder bluffs. Septic system upgrades in Fletcher Bay could also help improve water quality.

Table 2-8. Shoreline Conditions in Point White-Battle Point by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Shoreline Residential	23,770 ft 203 acres	67%	High Bluff: 17.9% Low Bank: 15.5% Marsh/Lagoon: 26.7% Spit/Barrier/Backshore: 39.9%	0.8%	11.7%	No
Residential Conservancy	22,064 ft 234 acres	83%	High Bluff: 40.5% Low Bank: 18.7% Marsh/Lagoon: 29.2% Spit/Barrier/Backshore: 11.6%	2.6%	23.5%	Water: fecal coliform
Island Conservancy	896 ft 15 acres	39%	High Bluff: 58.5% Spit/Barrier/Backshore: 41.5%	10.8%	0.6%	Water: dissolved oxygen
Natural	5,041 ft	80%	Marsh/Lagoon: 41.1% Spit/Barrier/Backshore: 58.9%	0%	0%	No

[1]The parcels in the Point White-Battle Point management area that feature a Natural designation also feature another designation (the Natural designation covers sand spits). The area of the Natural designation is reflected in the area calculations of the other designations.

2.9 Manzanita Bay (MA-9)

Manzanita Bay (MA-9) is the smallest management area in the City. It includes marsh/lagoon, high bluff, spit/backshore, and low bluff shoreforms, and no feeder bluffs have been identified. Shorelines are considered "protected" or "very-protected." Forage fish (herring, sandlance, and surf smelt) spawning beaches and geoduck resources are plentiful in the management area, although eelgrass beds are fairly sparse. Cutthroat trout, chum, and coho salmon are also documented to spawn in the Manzanita Creek, which flows into the management area.

Shoreline development in MA-9 is primarily residential. Management area 9 has among the highest ratio of vegetated surface cover to impervious cover in the City. A high proportion of the shoreline has overhanging vegetation, as well. On the other hand, shoreline armoring in the intertidal zone is also among the highest in the City, and the management area has a high level of overwater coverage. The management area has not experienced any shellfish closures, indicating that water quality is likely not impaired.

Table 2-9. Shoreline Conditions in Manzanita Bay by Proposed Environment Designation.

Proposed Environment Designation	Total Shoreline Length & Area	% Forested Coverage	% Shoreform	% Wetland Area	% Steep Slopes Area	Water Quality: 303d listings
Shoreline Residential	12,600 ft 116 acres	81%	High Bluff: 37.6% Low Bank: 25.5% Marsh/Lagoon: 14.3% Spit/Barrier/Backshore: 22.6%	0.7%	11.6%	No
Residential Conservancy	5,560 ft 76 acres	80%	High Bluff: 4.0% Marsh/Lagoon: 96.0%	20.3%	4.2%	No
Island Conservancy	466 ft 4 acres	68%	High Bluff: 100%	0%	42.3%	No

Table 2-10. Shoreline Modifications.

Environment Designation	Management Unit	Shoreline Armoring		Overwater Structures (OWS)
		% of Shoreline Length Armored	% of Lots with Shoreline Armoring	Mean Area of OWS by Parcel (SF)
Urban	Eagle Harbor	54.2%	38.1%	16,562
	Rich Passage	47.1%	35.7%	NA
Shoreline Residential	Agate Passage	59.0%	71.8%	595
	Port Madison Bay	67.2%	71.6%	2,113
	Rolling Bay-Point Monroe	49.2%	76.0%	695
	Murden Cove	33.5%	37.7%	NA
	Eagle Harbor	58.4%	53.5%	1,334
	Blakely Harbor	82.8%	82.5%	1,715
	Rich Passage	72.7%	65.2%	7,757[1]
	Pt White-Battle Pt	65.6%	64.3%	610
	Manzanita Bay	83.2%	79.8%	1,273
Residential Conservancy	Agate Passage	57.6%	64.6%	1,004
	Port Madison Bay	42.5%	42.7%	1,714
	Rolling Bay	53.7%	64.7%	599
	Murden Cove	36.1%	42.6%	212
	Eagle Harbor	35.6%	46.7%	2,107
	Blakely Harbor	3.4%	4.5%	NA
	Rich Passage	0.0%	0.0%	NA
	Pt White-Battle Pt	43.7%	48.3%	650
	Manzanita Bay	7.5%	23.1%	160
Island Conservancy	Port Madison Bay	55.8%	83.3%	1,689
	Rolling Bay	0.0%	0.0%	NA
	Murden Cove	0.0%	0.0%	NA
	Eagle Harbor	40.9%	47.6%	NA
	Blakely Harbor	0.2%	14.3%	NA
	Rich Passage	20.0%	60.0%	NA
	Pt White-Battle Pt	6.7%	33.3%	NA
	Manzanita Bay	20.4%	14.3%	NA
Natural	Rolling Bay	0.0%	0.0%	NA
	Murden Cove	17.7%	66.7%	NA
	Eagle Harbor	0.0%	0.0%	NA
	Pt White-Battle Pt	0.0%	0.0%	NA

[1] Significant overwater coverage in the Shoreline Residential environment in Rich Passage is associated with ongoing aquaculture.

3 ANTICIPATED DEVELOPMENT

As stated in Section 1.1, Shoreline Management Act Requirements, WAC 173-26-186(8)(d) says that a cumulative impacts analysis should evaluate the "reasonably foreseeable future development and use of the shoreline." This chapter presents the

results of such an evaluation. Commensurate with the timeframes of other long-range planning studies, this cumulative impacts analysis considers "future development and use" as that occurring within the next 20 years.

3.1 Anticipated Development by Management Area

3.1.1 Methods

The City actively maintains a database for tracking local permitting activity. The database includes specific information such as the type of permit issued (e.g. shoreline substantial development permit, shoreline exemption, building permit), the permitted action (e.g. pier repair, construction of a new single-family residence), and year.

Given the availability of such detailed local permit data, this cumulative impacts analysis evaluates the reasonably foreseeable future development and use of the City's shorelines primarily by projecting past development and use trends forward.

Specifically, the City's permit database was manipulated to provide 10-year (2002-2011) permitting summaries for all nine management areas, as well as for the environment designations within each management area. To facilitate analysis, permitted actions with similar environmental impacts were aggregated (e.g. "new barn/shop/shed" and "new studio/ADU/guest cottage" were aggregated into "new accessory structure"). Next, permitted actions were excluded from the analysis if the nature of the action had indeterminate or negligible ecological impacts (e.g. "front yard setback") or if the permitted action had occurred only one time in the City in the previous ten years. In the latter case, these impacts were deemed unforeseeable.

To evaluate future development and use, permitted actions were assumed to be twice as likely to occur in the next 20 years as they were in the previous 10 (e.g. if four docks were repaired in a given area from 2002 to 2011, eight docks would be projected to be repaired from 2012 to 2031). Summaries of previous and projected permitted actions, by management area and environment designation, are provided in Subsection 3.1.2, Results.

The "straight-line" extrapolation methodology employed in this cumulative impacts analysis provides a relatively straightforward way of evaluating potential future shoreline development and use given local area conditions; however, it relies on the assumption that past trends will continue on in the future at the same rate, which, may not always hold true. In some cases the amount of data for some areas may be too limited to allow for an accurate projection of future shoreline development and use. In other cases, development of recreational amenities in Parks may be planned in areas with little past permitting history.

It is also critical to recognize that the evaluation primarily represents potential future development and use, and that the actual potential to enact such actions in the future could be limited by land capacity (if an area can no longer accommodate the rate of past

development) or by new provisions limiting such development in the proposed SMP. For these reasons, projected future development may frequently overestimate the actual development that could be expected. To further examine these issues, separate analyses of the capacity for the shoreline to accommodate projected subdivisions and new docks were conducted, given the existing level of development, proposed SMP regulations, and other existing local regulations. The methods and findings of these analyses are presented in Section 3.2, Potential for Subdivision, and Section 3.3, Potential for New Docks. Additional analysis of the likely impacts of SMP provisions on future development is also included in Section 7, Cumulative Effects on Shoreline Functions.

In summary, while the methodology for evaluating future development and use employed in this cumulative impacts analysis may err in the precise quantities projected, it should provide a general sense of development and use trends. In turn, having a general sense of future development and use trends should allow for a more thorough assessment of potential cumulative impacts on the City's shorelines.

3.1.2 Results

The following subsections provide summaries of previously and projected permitted actions, by management area and environment designation. Overall, 1,091 of the permitted actions listed on the below tables were recorded as occurring on City's marine shorelines for the time period beginning in 2002 and ending in 2011.

Agate Passage (MA-1)

In the Residential Conservancy environment, more prevalent projected future shoreline development and use actions include new and expanded single-family residences; new accessory structures and development (e.g. sheds, garages, carports); staircase, path or tram replacement; clearing; and new buoys.

For the Shoreline Residential environment, new or expanded single-family residences, as well as new accessory structures and development, are projected to be the most common development and use actions.

Table 3-1 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-1. Previously Permitted and Projected Actions in the Agate Passage Management Area.

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Residential Conservancy	Accessory structure/development - expansion/addition	2	4
	Accessory structure/development - new	6	12
	Boathouse - repair	1	2
	Boathouse - replacement	1	2
	Buoy - new	9	18
	Clearing	6	12
	Dock - new	1	2
	Dock - replacement	1	2
	Filling/Grading	1	2
	Nearshore restoration	1	2
	Shoreline stabilization, hybrid - new	1	2
	Shoreline stabilization, soft - new	1	2
	Shoreline stabilization, unspecified - new	1	2
	Shoreline stabilization, unspecified - replace	1	2
	Single-family residence - expansion/addition	14	28
	Single-family residence - new	5	10
	Single-family residence w/critical areas - new	1	2
	Staircase/Path/Tram - new	2	4
	Staircase/Path/Tram - repair	2	4
	Staircase/Path/Tram - replacement	6	12
	Underground tank - removal	2	4
	Subtotal	*65*	*130*
Shoreline Residential	Accessory structure/development - expansion/addition	1	2
	Accessory structure/development - new	4	8
	Boathouse - expansion/addition	1	2
	Buoy - new	1	2
	Clearing	1	2
	Nearshore restoration	1	2
	Shoreline stabilization, hard - replacement	1	2
	Single-family residence - expansion/addition	4	8
	Single-family residence - new	3	6
	Subtotal	*17*	*34*
	Total	*82*	*164*

Port Madison Bay (MA-2)

In the Residential Conservancy environment, permitted actions that are projected to be more common include new or expanded single-family residences, hard shoreline stabilization replacement, and clearing.

The Shoreline Residential environment in the Port Madison Bay management area is one of the most active areas in the City in terms of shoreline development activity. In the future, the most prevalent permitted actions are projected to be new and expanded

single-family residences, new accessory structures and development, clearing, new buoys, new and replacement docks, and piling replacement.

Very limited development is projected for the Island Conservancy environment, although restoration may be possible on park properties owned by the City. The Bainbridge Island Municipal Parks and Recreation Department (BIMPRD) is planning to replace the existing dock and float at Hidden Cove Park (Barrett personal communication, February 24, 2012).

Table 3-2 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-2. Previously Permitted and Projected Actions in the Port Madison Bay Management Area.

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Island Conservancy	Clearing	1	2
	Nearshore restoration	1	2
	Dock - replacement	0	1[1]
	Subtotal	*2*	*4*
Residential Conservancy	Accessory structure/development - new	2	4
	Boatlift - new	2	4
	Buoy - new	2	4
	Clearing	3	6
	Dock - new	1	2
	Dock - replacement	1	2
	Filling/Grading	1	2
	Float - replacement	1	2
	Nearshore restoration	1	2
	Piling - replacement	2	4
	Shoreline stabilization, hard - expansion/addition	1	2
	Shoreline stabilization, hard - replacement	3	6
	Shoreline stabilization, soft - new	1	2
	Shoreline stabilization, unspecified - repair	1	2
	Single-family residence - expansion/addition	3	6
	Single-family residence - new	3	6
	Underground tank - removal	1	2
	Subtotal	*29*	*58*
Shoreline Residential	Accessory structure/development - expansion/addition	1	2
	Accessory structure/development - new	10	20
	Boat ramp - replacement	1	2
	Boathouse - repair	1	2
	Boatlift - new	1	2
	Buoy - new	11	22
	Buoy - replacement	1	2
	Clearing	9	18
	Dock - expansion/addition	2	4

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
	Dock - new	6	12
	Dock - repair	4	8
	Dock - replacement	7	14
	Filling/Grading	3	6
	Float - replacement	2	4
	Land division	2	4
	Piling - replacement	6	12
	Shoreline stabilization, hard - new	2	4
	Shoreline stabilization, hard - replacement	1	2
	Shoreline stabilization, unspecified - new	2	4
	Shoreline stabilization, unspecified - replacement	1	2
	Single-family residence - expansion/addition	9	18
	Single-family residence - new	22	44
	Underground tank - new	1	2
	Subtotal	*105*	*210*
	Total	*136*	*272*

[1] Replacement of existing dock and float is planned for Hidden Cove Park (Barrett personal communication, February 24, 2012).

Rolling Bay-Point Monroe (MA-3)

The Residential Conservancy environment of the Rolling Bay-Point Monroe management area is one of the busier areas in the City for shoreline development. Permitting actions projected to be prevalent in the future include new and expanded single-family residences, new accessory structures and development, clearing, hard shoreline stabilization repair and replacement, and dock repair.

Minimal development in the Shoreline Residential environment is projected, with new and expanded single-family residences being the most typical permitting actions.

In Fay Bainbridge Park in the Island Conservancy environment, the BIMPRD is currently pursuing septic repair and replacement. Maintenance and repair of the existing boat ramp at the Park is also a priority for BIMPRD, and other site development may occur (Barrett personal communication, February 24, 2012).

Table 3-3 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-3. Previously Permitted and Projected Actions in the Rolling Bay-Point Monroe Management Area.

Environment Designation[1]	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Residential Conservancy	Accessory structure/development - expansion/addition	2	4
	Accessory structure/development - new	6	12
	Boathouse - replace	1	2
	Boatlift - new	1	2
	Buoy - new	2	4
	Clearing	7	14
	Dock - expansion/addition	1	2
	Dock - new	1	2
	Dock - repair	4	8
	Float - replacement	1	2
	Piling - replacement	1	2
	Shoreline stabilization, hard - expansion/addition	2	4
	Shoreline stabilization, hard - new	1	2
	Shoreline stabilization, hard - repair	5	10
	Shoreline stabilization, hard - replacement	4	8
	Shoreline stabilization, soft - new	1	2
	Shoreline stabilization, soft - repair	1	2
	Shoreline stabilization, soft - replacement	1	2
	Shoreline stabilization, unspecified - new	1	2
	Shoreline stabilization, unspecified - replacement	1	2
	Single-family residence - expansion/addition	16	32
	Single-family residence - new	10	20
	Staircase/Path/Tram - new	4	8
	Staircase/Path/Tram - repair	1	2
	Staircase/Path/Tram - replace	1	2
	Underground tank - removal	2	4
	Subtotal	*78*	*156*
Shoreline Residential	Accessory structure/development - new	2	4
	Boathouse - repair	1	2
	Buoy - new	2	4
	Dock - expansion/addition	1	2
	Dock - repair	4	8
	Float - replacement	1	2
	Piling - replacement	1	2
	Shoreline stabilization, hard - expansion/addition	1	2
	Shoreline stabilization, hard - repair	1	2
	Shoreline stabilization, hard - replacement	2	4
	Shoreline stabilization, soft - repair	1	2
	Shoreline stabilization, soft - replacement	1	2
	Single-family residence - expansion/addition	8	16
	Single-family residence - new	5	10
	Subtotal	*31*	*62*
	Total	*109*	*218*

[1] No data were recorded for the Island Conservancy and Natural environment designations.

Murden Cove (MA-4)

In the Residential Conservancy environment, the more frequent permitted actions projected to occur include new and expanded single-family residences, new accessory structures and development, and clearing.

In the Shoreline Residential environment, the expansion of single-family residences is projected to be the most common permitted action.

Minimal development is anticipated in the Natural environment.

Table 3-4 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-4. Previously Permitted and Projected Actions in the Murden Cove Management Area.

Environment Designation[1]	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Natural	Shoreline stabilization, hard - new	1[2]	0[2]
	Subtotal	*1[2]*	*0*
Residential Conservancy	Accessory structure/development - expansion/addition	2	4
	Accessory structure/development - new	9	18
	Buoy - new	1	2
	Clearing	5	10
	Filling/Grading	1	2
	Land division	1	2
	Nearshore restoration	2	4
	Shoreline stabilization, hard - new	3	6
	Shoreline stabilization, hard - repair	2	4
	Shoreline stabilization, hard - replacement	3	6
	Shoreline stabilization, soft - new	1	2
	Single-family residence - expansion/addition	15	30
	Single-family residence - new	14	28
	Single-family residence w/critical areas - new	1	2
	Staircase/Path/Tram - new	3	6
	Staircase/Path/Tram - replacement	2	4
	Underground tank - removal	3	6
	Subtotal	*68*	*136*
Shoreline Residential	Accessory structure/development - expansion/addition	1	2
	Accessory structure/development - new	1	2
	Land division	1	2
	Lot coverage	1	2
	Shoreline stabilization, hard - new	1	2
	Shoreline stabilization, hard - repair	1	2
	Shoreline stabilization, hard - replacement	2	4
	Shoreline stabilization, hybrid - new	1	2
	Shoreline stabilization, unspecified - replacement	1	2
	Single-family residence - expansion/addition	7	14

Environment Designation[1]	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
	Single-family residence - new	2	4
	Underground tank - removal	3	6
	Subtotal	*22*	*44*
	Total	*91*	*180*

[1] No data were recorded for the Island Conservancy environment designation.
[2] Past shoreline stabilization was associated with a shoreline residential use adjoining the Natural environment, new and replacement shoreline stabilization is prohibited in the Natural environment.

Eagle Harbor (MA-5)

Eagle Harbor is one of the busiest management areas in terms of shoreline development activity.

In the Island Conservancy environment, projected permitted actions are led, interestingly, by filling and grading and nearshore restoration. The BIMPRD has identified the potential to restore shoreline at the west end of Pritchard Park by removing an existing bulkhead. The Parks department also plans to build an interpretive dock at the Japanese American Memorial on the west end of Pritchard Park (this dock has already been approved through a conditional use permit). The Parks Department also has plans to explore stabilization and stormwater maintenance issues at Rockaway Beach Park (Barrett personal communication, February 24, 2012).

More common development and use actions projected in the Residential Conservancy environment include expanded single-family residences, new accessory structures and development, clearing, and hard shoreline stabilization repair. Some dredging could also occur in this area.

The Shoreline Residential environment is projected to see a relatively high amount of shoreline development activity in the future. More commonly projected development and use actions include new and expanded single-family residences, new accessory structures and development, clearing, and new buoys.

In the Urban environment, the expansion of commercial and institutional uses, clearing, piling repair and replacement, and float replacement are the most commonly projected actions to occur, though only at modest levels.

Minimal development is projected to occur in the Natural environment.

Table 3-5 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-5. Previously Permitted and Projected Actions in the Eagle Harbor Management Area.

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Island Conservancy	Accessory structure/development - new	3	6
	Clearing	1	2
	Dock - repair	1	3[1]
	Filling/Grading	4[2]	8
	Nearshore restoration	4	8
	Single-family residence w/critical areas - new	1	2
	Staircase/Path/Tram - new	2	4
	Underground tank - removal	1	2
	Subtotal	*17*	*34*
Natural	Clearing	1	2
	Subtotal	*1*	*2*
Residential Conservancy	Accessory structure/development - new	7	14
	Boathouse - expansion/addition	1	2
	Buoy - new	3	6
	Clearing	8	16
	Dock - expansion/addition	1	2
	Dock - repair	3	6
	Dock - replacement	1	2
	Dredge	1	2
	Filling/Grading	1	2
	Lot coverage	1	2
	Shoreline stabilization, hard - expansion/addition	3	6
	Shoreline stabilization, hard - new	1	2
	Shoreline stabilization, hard - repair	4	8
	Shoreline stabilization, unspecified - new	1	2
	Single-family residence - expansion/addition	10	20
	Single-family residence - new	2	4
	Single-family residence w/critical areas - new	1	2
	Staircase/Path/Tram - new	2	4
	Underground tank - new	1	2
	Underground tank - removal	1	2
	Subtotal	*53*	*106*
Shoreline Residential	Accessory structure/development - expansion/addition	1	2
	Accessory structure/development - new	11	22
	Boathouse - replacement	1	2
	Buoy - new	11	22
	Buoy - replacement	1	2
	Clearing	9	18
	Filling/Grading	1	2
	Land division	1	2
	Piling - repair	1	2
	Shoreline stabilization, hard - new	3	6
	Shoreline stabilization, hard - repair	1	2
	Shoreline stabilization, hard - replacement	2	4

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
	Shoreline stabilization, soft - new	2	4
	Shoreline stabilization, soft - replacement	1	2
	Shoreline stabilization, unspecified - replacement	1	2
	Single-family residence - expansion/addition	19	38
	Single-family residence - new	13	26
	Single-family residence w/critical areas - new	1	2
	Staircase/Path/Tram - new	1	2
	Staircase/Path/Tram - replacement	3	6
	Underground tank - removal	5	10
	Subtotal	*89*	*178*
Urban	Clearing	2	4
	Commercial/institutional - expansion/addition	2	4
	Dock - repair	1	2
	Dock - replacement	1	2
	Dredge	1	2
	Filling/Grading	1	2
	Float - replacement	3	6
	Piling - repair	2	4
	Piling - replacement	3	6
	Shoreline stabilization, unspecified - replacement	1	2
	Underground tank - removal	1	2
	Subtotal	*18*	*36*
	Total	*178*	*356*

[1] The Bainbridge Island Parks Department plans to install a new interpretive dock at the Japanese American Memorial on the west end of Pritchard Park.
[2] Two projects were associated with shoreline restoration efforts (Wycoff superfund site and Strawberry Park restoration). Projected future fill and grading may be an overestimate.

Blakely Harbor (MA-6)

In the Island Conservancy environment, more common future shoreline development and use actions projected to occur include the expansion of commercial and institutional uses, new accessory structures and development, and new buoys. In Blakely Habor Park, future site development could include a restroom, bridge, picnic area, kayak access, trails, and environmental restoration.

In the Residential Conservancy environment, clearing, unexpectedly, is projected to be the most common permitted action, followed by single-family residences and new buoys.

More frequent development and use actions projected to occur in the Shoreline Residential environment include new and expanded single-family residences and clearing.

Table 3-6 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-6. Previously Permitted and Projected Actions in the Blakely Harbor Management Area.

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Island Conservancy	Accessory structure/development - expansion/addition	1	2
	Accessory structure/development - new	8	16
	Boat ramp - replacement	2	4
	Boathouse - replacement	2	4
	Buoy - new	4	0[1]
	Commercial/institutional - expansion/addition	3	6
	Nearshore restoration	1	2
	Piling - replacement	2	4
	Subtotal	*23*	*38*
Residential Conservancy	Accessory structure/development - new	1	2
	Buoy - new	6	12
	Clearing	16	32
	Filling/Grading	1	2
	Forest practices	2	4
	Land division	1	0[2]
	Shoreline stabilization, soft - repair	1	2
	Single-family residence - expansion/addition	3	6
	Single-family residence - new	10	20
	Single-family residence w/critical areas - new	1	2
	Staircase/Path/Tram - new	2	4
	Subtotal	*44*	*86*
Shoreline Residential	Accessory structure/development - expansion/addition	1	2
	Accessory structure/development - new	2	4
	Buoy - new	1	2
	Clearing	5	10
	Dock - expansion/addition	1	2
	Dock - replacement	1	2
	Filling/Grading	1	2
	Float - new	1	2
	Nearshore restoration	2	4
	Shoreline stabilization, hard - new	3	6
	Shoreline stabilization, hard - repair	1	2
	Shoreline stabilization, soft - new	1	2
	Single-family residence - expansion/addition	6	12
	Single-family residence - new	6	12
	Subtotal	*32*	*64*
	Total	*99*	*188*

[1] New mooring buoys in the Island Conservancy environment prohibited under the updated SMP.
[2] Based on an analysis of the potential for subdivision, further land division is not possible in this area.

Rich Passage (MA-7)

Little development activity is projected to occur in the Residential Conservancy environment. Impacts to critical areas from single-family residential development may be an issue here.

The Shoreline Residential environment is projected to see a very high level of shoreline development activity in the future. Considerable amounts of new and expanded single-family residences, new accessory structures and development, clearing, hard shoreline stabilization replacement, and new buoys are projected to occur.

Minimal development activity is projected for the Island Conservancy and Urban environments. Development in Fort Ward Park may include a new picnic shelter, repair and maintenance of existing utilities, repair and maintenance of existing boat ramp, as well as other possible upland facilities (Barrett personal communication, February 24, 2012).

Table 3-7 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-7. Previously Permitted and Projected Actions in the Rich Passage Management Area.

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Island Conservancy	Buoy - replacement	1	2
	Clearing	1	2
	Subtotal	*2*	*4*
Residential Conservancy	Accessory structure/development - new	3	6
	Clearing	2	4
	Single-family residence - expansion/addition	1	2
	Single-family residence w/critical areas - new	3	6
	Subtotal	*9*	*18*
Shoreline Residential	Accessory structure/development - expansion/addition	4	8
	Accessory structure/development - new	20	40
	Buoy - new	24	48
	Clearing	9	18
	Dock - new	1	0[1]
	Filling/Grading	3	6
	Lot coverage	1	2
	Nearshore restoration	3	6
	Piling - replacement	1	2
	Shoreline stabilization, hard - new	5	10
	Shoreline stabilization, hard - repair	4	8
	Shoreline stabilization, hard - replacement	11	22
	Shoreline stabilization, hybrid - new	1	2
	Shoreline stabilization, unspecified - new	1	2
	Single-family residence - expansion/addition	21	42

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
	Single-family residence - new	23	46
	Staircase/Path/Tram - new	2	4
	Staircase/Path/Tram - repair	1	2
	Underground tank - removal	4	8
	Subtotal	*139*	*276*
Urban	Shoreline stabilization, hard - repair	1	2
	Shoreline stabilization, soft - repair	1	2
	Single-family residence - expansion/addition	1	2
	Underground tank - removal	1	2
	Subtotal	4	*8*
	Total	*154*	*306*

[1] Based on an analysis of the potential for new docks, no new docks are possible in this area.

Point White-Battle Point (MA-8)

The Point White-Battle Point management is one of the busiest management areas for shoreline development.

In the Residential Conservancy environment, the more common projected future shoreline development and use actions include new and expanded single-family residences, new accessory structures and development, clearing, and new buoys.

The Shoreline Residential environment will likely see a relatively high overall amount of development activity in the future. Development and use actions projected to occur with considerable frequency include new and expanded single-family residences, new accessory structures and development, clearing, and new buoys.

Minimal development activity is expected in the Island Conservancy and Urban environments. BIMPRD is planning pier maintenance and replacement of the existing pier at the Point White Dock facility. Development at Gazzam Beach may include a new trail (Barrett personal communication, February 24, 2012).

Table 3-8 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-8. Previously Permitted and Projected Actions in the Point White-Battle Point Management Area.

Environment Designation[1]	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Island Conservancy	Dock - replacement	0	1[2]
Residential Conservancy	Accessory structure/development - new	9	18
	Boathouse - replacement	1	2
	Boatlift - new	1	2
	Buoy - new	8	16
	Clearing	5	10
	Dock - repair	1	2
	Float - replacement	1	2
	Piling - replacement	2	4
	Shoreline stabilization, hard - expansion/addition	1	2
	Shoreline stabilization, hard - repair	3	6
	Shoreline stabilization, hard - replacement	1	2
	Shoreline stabilization, unspecified - repair	1	2
	Shoreline stabilization, unspecified - replacement	1	2
	Single-family residence - expansion/addition	11	22
	Single-family residence - new	8	16
	Staircase/Path/Tram - new	3	6
	Staircase/Path/Tram - replacement	1	2
	Underground tank - removal	4	8
	Subtotal	*62*	*124*
Shoreline Residential	Accessory structure/development - expansion/addition	6	12
	Accessory structure/development - new	16	32
	Buoy - new	25	50
	Clearing	12	24
	Dock - expansion/addition	1	2
	Dock - new	1	2
	Dock - repair	2	4
	Dock - replacement	1	2
	Filling/Grading	2	4
	Float - replacement	2	4
	Land division	1	2
	Piling - replacement	1	2
	Shoreline stabilization, hard - replacement	5	10
	Shoreline stabilization, unspecified - replacement	1	2
	Single-family residence - expansion/addition	31	62
	Single-family residence - new	12	24
	Single-family residence w/critical areas - new	1	2
	Staircase/Path/Tram - new	1	2
	Staircase/Path/Tram - replacement	2	4
	Underground tank - removal	4	8
	Subtotal	*127*	*254*
	Total	*189*	*378*

[1] No data were recorded for the Island Conservancy and Natural environment designations.
[2] Pier maintenance and replacement of existing pier are planned at the Point White Dock facility.

Manzanita Bay (MA-9)

In the Shoreline Residential environment, more common development and use actions projected to occur in the future include new and expanded single-family residences, new accessory structures and development, clearing, dock replacement, hard shoreline stabilization replacement , and new buoys.

Interestingly, clearing is projected to be one of the more common permitted actions in the Island Conservancy environment. Minimal development is projected for the Residential Conservancy environment.

Table 3-9 provides a detailed summary of previous and projected future shoreline development and use actions in this management area.

Table 3-9. Previously Permitted and Projected Actions in the Manzanita Bay Management Area.

Environment Designation	Permitted Action	Number of Permitted Actions in Previous 10 Years	Projected Number of Permitted Actions in Next 20 Years
Island Conservancy	Accessory structure/development - new	1	2
	Buoy - new	2	0[1]
	Clearing	3	6
	Subtotal	*6*	*8*
Residential Conservancy	Buoy - new	1	2
	Single-family residence - expansion/addition	1	2
	Subtotal	*2*	*4*
Shoreline Residential	Accessory structure/development - new	5	10
	Buoy - new	2	4
	Buoy - replacement	1	2
	Clearing	4	8
	Dock - expansion/addition	1	2
	Dock - new	1	2
	Dock - replacement	4	8
	Float - new	1	2
	Float - replacement	1	2
	Land division	2	4
	Piling - replacement	2	4
	Shoreline stabilization, hard - expansion/addition	1	2
	Shoreline stabilization, hard - repair	1	2
	Shoreline stabilization, hard - replacement	4	8
	Single-family residence - expansion/addition	5	10
	Single-family residence - new	5	10
	Staircase/Path/Tram - new	2	4
	Staircase/Path/Tram - replacement	1	2
	Underground tank - removal	2	4
	Subtotal	*45*	*90*
	Total	*53*	*102*

[1] New mooring buoys in the Island Conservancy environment prohibited under the updated SMP.

3.2 Potential for Subdivision

As mentioned in the introduction to this chapter, this section presents the results of a separate analysis of the capacity for the shoreline to accommodate projected subdivisions. This analysis was conducted for several reasons. First, the analysis was performed to determine whether the land divisions expected based on past permit data could be accommodated in their respective shoreline areas. Note that although an assessment of the capacity for the shoreline to accommodate projected new single-family residential development on undeveloped lots would be useful for this cumulative impacts analysis, such an assessment could not be performed due to permit data limitations (the permit data does not distinguish between the development of new single-family residences on vacant lots versus the development of new single-family residences on currently developed lots). Additionally, the analysis was conducted to understand the maximum potential for development on undeveloped shoreline lots to occur. Finally, the analysis was performed to foster compliance with WAC 173-260(3)(d)(iii), which directs that "particular attention should be paid to policies and regulations that address platting or subdividing of property …"

3.2.1 Methods

The analysis of the potential for subdivision was conducted using geographic information system (GIS) data with consideration of existing zoning regulations and regulations in the proposed SMP. The analysis evaluated the number of existing lots, the number of existing vacant lots with potential for development, and the potential number of new lots in shoreline jurisdiction that could be created through subdivision.

In conducting the analysis of the potential for new development, the following assumptions were made:

1. Any subdivision will maximize the number of units in shoreline jurisdiction, except if shoreline lots are presently developed.

2. If a residence is located on a lot such that subdivision is difficult (e.g. a residence located in the middle of a lot), it will not be removed if its assessed valuation is $400,000 or greater.

3. The minimum width of a lot is calculated based on recent development patterns to be approximately 100 feet rather than 70 feet, which is the minimum width for shoreline lots based on zoning regulations. A notable exception to this assumption is at Hanson Landing, where the minimum width is 200 feet.

4. Subdivision will reflect neighborhood patterns (e.g. similar lot widths).

3.2.2 Results

Utilizing data from Tables 3-1 through 3-9, Table 3-10 shows that a total of 16 land divisions are projected and able to occur in the City's shorelines during the period from

2012 to 2031, a rate of less than one land division per year. Only the Residential Conservancy designation in the Blakely Harbor management area would not be able to accommodate the projected number of land divisions.

The permit database does not indicate the number of lots created in past land divisions, so no data are available to make inferences from regarding how many future lots the projected land divisions might create. However, given that the City's marine shorelines predominantly consist of smaller private parcels serving existing residential development, it is likely that most projected future land divisions would individually result in the creation of only a minimal number of new lots.

Table 3-10 also indicates the maximum potential for subdivision in the shoreline. Overall, maximum subdivision would create 104 new lots in the shoreline (a 5 percent increase). The overwhelming majority of these new lots would occur in areas with R-1 and R-2 zoning.

Finally, the analysis indicates that approximately 154 existing vacant lots are able to accommodate development. The continued availability of existing vacant lots should help ensure that future subdivision does not occur at an increased rate.

Table 3-10. Potential for Subdivision.

Management Area	Environment Designation	Number of Existing Lots	Approximate Number of Existing Vacant Developable Lots	Number of Potential New Lots from Subdivision (Potential Percent Change)	Projected Number of Land Divisions in Next 20 Years[1]	Capacity for Projected Number of Land Divisions in Next 20 Years
Agate Passage	Residential Conservancy	127	12	9 (+7%)	0	None projected
	Shoreline Residential	39	4	1 (+3%)	0	None projected
	Subtotal	*166*	*16*	*10 (+6%)*	*0*	*None projected*
Port Madison Bay	Island Conservancy	6	0	0 (no Δ)	0	None projected
	Residential Conservancy	57	0	7 (+12%)	0	None projected
	Shoreline Residential	162	15	18 (+11%)	4	4 of 4
	Subtotal	*225*	*15*	*25 (+11%)*	*4*	*4 of 4*
Rolling Bay-Point Monroe	Island Conservancy	3	0	0 (no Δ)	0	None projected
	Natural	1	0	0 (no Δ)	0	None projected
	Residential Conservancy	220	23	5 (+2%)	0	None projected
	Shoreline Residential	80	3	0 (no Δ)	0	None projected
	Subtotal	*304*	*26*	*5* (+2%)	*0*	*None projected*
Murden Cove	Natural	3	1	1 (+33%)	0	None projected
	Residential Conservancy	67	10	5 (+7%)	2	2 of 2
	Shoreline Residential	61	3	4 (+7%)	2	2 of 2
	Subtotal	*131*	*14*	*10 (+8%)*	*4*	*4 of 4*
Eagle Harbor	Island Conservancy	21	0	0 (no Δ)	0	None projected
	Natural	6	0	0 (no Δ)	0	None projected
	Residential Conservancy	92	4	3 (+3%)	0	None projected
	Shoreline Residential	241	12	7 (+3%)	2	2 of 2
	Urban	42	1	3 (+7%)	0	None projected
	Subtotal	*402*	*17*	*13* (+3%)	*2*	*2 of 2*
Blakely Harbor	Island Conservancy	7	1	0 (no Δ)	0	None projected
	Residential Conservancy	22	1	0 (no Δ)	2	0 of 2
	Shoreline Residential	40	3	1 (+3%)	0	None projected
	Subtotal	*69*	*5*	*1 (+1%)*	*2*	*0 of 2*
Rich Passage	Island Conservancy	5	3	2 (+40%)	0	None projected
	Residential Conservancy	19	4	2 (+11%)	0	None projected

Management Area	Environment Designation	Number of Existing Lots	Approximate Number of Existing Vacant Developable Lots	Number of Potential New Lots from Subdivision (Potential Percent Change)	Projected Number of Land Divisions in Next 20 Years[1]	Capacity for Projected Number of Land Divisions in Next 20 Years
	Shoreline Residential	269	12	6 (2%)	0	None projected
	Urban	14	0	0 (no Δ)	0	None projected
	Subtotal	*307*	*19*	*10* (+3%)	*0*	*None projected*
Point White-Battle Point[2]	Island Conservancy	3	0	0 (no Δ)	0	None projected
	Residential Conservancy	177	19	15 (+8%)	0	None projected
	Shoreline Residential	255	8	9 (+4%)	2	2 of 2
	Subtotal	*435*	*27*	*24* (+6%)	*2*	*2 of 2*
Manzanita Bay	Island Conservancy	5	0	0 (no Δ)	0	None projected
	Residential Conservancy	25	5	1 (+4%)	0	None projected
	Shoreline Residential	124	10	5 (+4%)	4	4 of 4
	Subtotal	*154*	*15*	*6* (+4%)	*4*	*4 of 4*
	Total	*2,193*	*154*	*104 (+5%)*	*18*	*16 of 18*

[1]Figures in this column are those from the column "Number of Permitted Actions in Previous 10 Years" in Tables 3-1 through 3-9, above, multiplied by two.
[2]The parcels in the Point White-Battle Point management area with a Natural designation also have another designation (the Natural designation covers sand spits). Data for the Natural designations are reflected in the other designations.

3.3 Potential for New Docks

In Section 3.1, Anticipated Development by Management Area, the future number of new docks for each of the proposed environment designations within a particular management area was projected based on previous trends. To determine whether the projected numbers of new docks could be accommodated in their respective shoreline area, a separate analysis of the capacity for new docks was conducted. Note that term "new dock," as used in the permit database, indicates a dock built on a parcel where no dock previously existed.

3.3.1 Methods

The analysis of the capacity for new docks was conducted using GIS data updated in 2011, considering existing conditions and the effects of the proposed SMP on the development of new docks. Given the public perception that the revised SMP may implement more stringent regulations on future pier construction, an increase in pier permitting and construction activity may be anticipated prior to SMP implementation. Additional piers permitted or constructed after the GIS analysis was conducted, but prior to adoption of the SMP were not incorporated into the capacity estimate or the evaluation of permitting trends. Projections are based primarily on the potential for new

docks associated with single family residential development. The following assumptions were made in conducting the analysis:

1. New docks would not be allowed in the following areas:
   - Areas of high currents (Rich Passage and Agate Passage)
   - Areas of high wave potential (outside on east side of island, South Beach)
   - At the foot of feeder bluffs
   - Blakely Harbor (due to restriction on individual docks in SMP)
2. New docks would not be built in areas with no current docks (e.g. south of Battle Point).
3. In areas currently with docks, new docks are likely on any parcel lacking a dock.
4. In the Point Monroe lagoon and the Hidden Cove area of Port Madison Bay, where joint docks are proposed and would be possible under this analysis, individual properties were assigned capacity for half of a dock.
5. Furthermore, WDFW may prohibit new docks in kelp and eelgrass beds.

3.3.2 Results

Table 3-11 compares the capacity for new docks with the projected numbers from Tables 3-1 through 3-9. Overall, the shoreline has capacity for 22 of the 24 new docks projected based on past permitting data. Only the Shoreline Residential environment designation in the Rich Passage management area has insufficient capacity to accommodate the projected number of new docks.

Table 3-11. Potential for New Docks.

Management Area	Environment Designation	Approximate Capacity for New Docks	Projected Number of New Docks in Next 20 Years[1]	Capacity to Accommodate Projected Number of New Docks
Agate Passage	Residential Conservancy	11	2	2 of 2
	Shoreline Residential	1	0	0 of 0
	Subtotal	*12*	*2*	*2 of 2*
Port Madison Bay	Island Conservancy	1	0	0 of 0
	Residential Conservancy	5	2	2 of 2
	Shoreline Residential	32	12	12 of 12
	Subtotal	*38*	*14*	*14 of 14*
Rolling Bay-Point Monroe	Island Conservancy	0	0	0 of 0
	Natural	0	0	0 of 0
	Residential Conservancy	6	2	2 of 2
	Shoreline Residential	10	0	0 of 0
	Subtotal	*16*	*2*	*2 of 2*
Murden Cove	Island Conservancy	0	0	0 of 0
	Natural	0	0	0 of 0
	Residential Conservancy	0	0	0 of 0
	Shoreline Residential	0	0	0 of 0
	Subtotal	0	*0*	*0 of 0*
Eagle Harbor	Island Conservancy	0	1[2]	0 of 0
	Natural	0	0	0 of 0
	Residential Conservancy	4	0	0 of 0
	Shoreline Residential	19	0	0 of 0
	Urban	1	0	0 of 0
	Subtotal	*24*	*0*	*0 of 0*
Blakely Harbor	Island Conservancy	0	0	0 of 0
	Residential Conservancy	0	0	0 of 0
	Shoreline Residential	0	0	0 of 0
	Subtotal	*0*	*0*	0 of 0
Rich Passage	Island Conservancy	0	0	0 of 0
	Residential Conservancy	0	0	0 of 0
	Shoreline Residential	0	2	0 of 2
	Urban	0	0	0 of 0
	Subtotal	*0*	*2*	*0 of 2*
Point White-Battle Point	Island Conservancy	0	0	0 of 0
	Natural	0	0	0 of 0
	Residential Conservancy	10	0	0 of 0
	Shoreline Residential	3	2	2 of 2
	Subtotal	*13*	*2*	2 of 2
Manzanita Bay	Island Conservancy	0	0	0 of 0
	Residential Conservancy	1	0	0 of 0
	Shoreline Residential	51	2	2 of 2
	Subtotal	*52*	*2*	2 of 2
	Total	*155*	*24*	*22 of 24*

[1]Figures in this column are those from the column "Number of Permitted Actions in Previous 10 Years" in Tables 3-1 through 3-9, above, multiplied by two.
[2]New pier already permitted through a conditional use permit at Japanese American Memorial site.

4 PROTECTIVE PROVISIONS

The Guidelines include the following suggestions to help achieve no net loss of ecological functions:

- Prohibit uses that are not water-dependent or preferred shoreline uses. For example, office and multi-family housing buildings are not water-dependent or preferred uses.
- Require that all future shoreline development, including water-dependent and preferred uses, be carried out in a manner that limits further degradation of the shoreline environment.
- Require buffers and setbacks. Vegetated buffers and building setbacks from those buffers reduce the impacts of development on the shoreline environment.
- Establish appropriate shoreline environment designations. The environment designations must reflect the inventory and characterization. A shoreline landscape that is relatively unaltered should be designated Natural and protected from any use that would degrade the natural character of the shoreline.
- Establish strong policies and regulations. Policies and regulations will define what type of development can occur in each shoreline environment designation, determine the level of review required through the type of shoreline permit, and set up mitigation measures and restoration requirements.
- In all cases, require mitigation sequencing. The SMP must include regulations that require developers to follow mitigation sequencing: avoid impacts, minimize impacts, rectify impacts, reduce impacts over time, compensate for impacts, monitor impacts and take corrective measures.

Measures described below implement the above guidance and help the City achieve the no net loss standard.

4.1 Environment Designations

The first line of protection of the City's shorelines is the environment designation assignments. According to the Guidelines (WAC 173-26-211), the assignment of environment designations must be based on the existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through a comprehensive plan.

The assignment of environment designations can help minimize cumulative impacts by concentrating development activity in lower functioning areas that are not likely to

experience significant function degradation with incremental increases in new development.

Environment designations for the City include:

- Urban
- Shoreline Residential
- Shoreline Residential Conservancy (or Residential Conservancy)
- Island Conservancy
- Natural
- Aquatic
- Priority Aquatic

A map of the City's environment designations are shown in Figure 4-1, below.

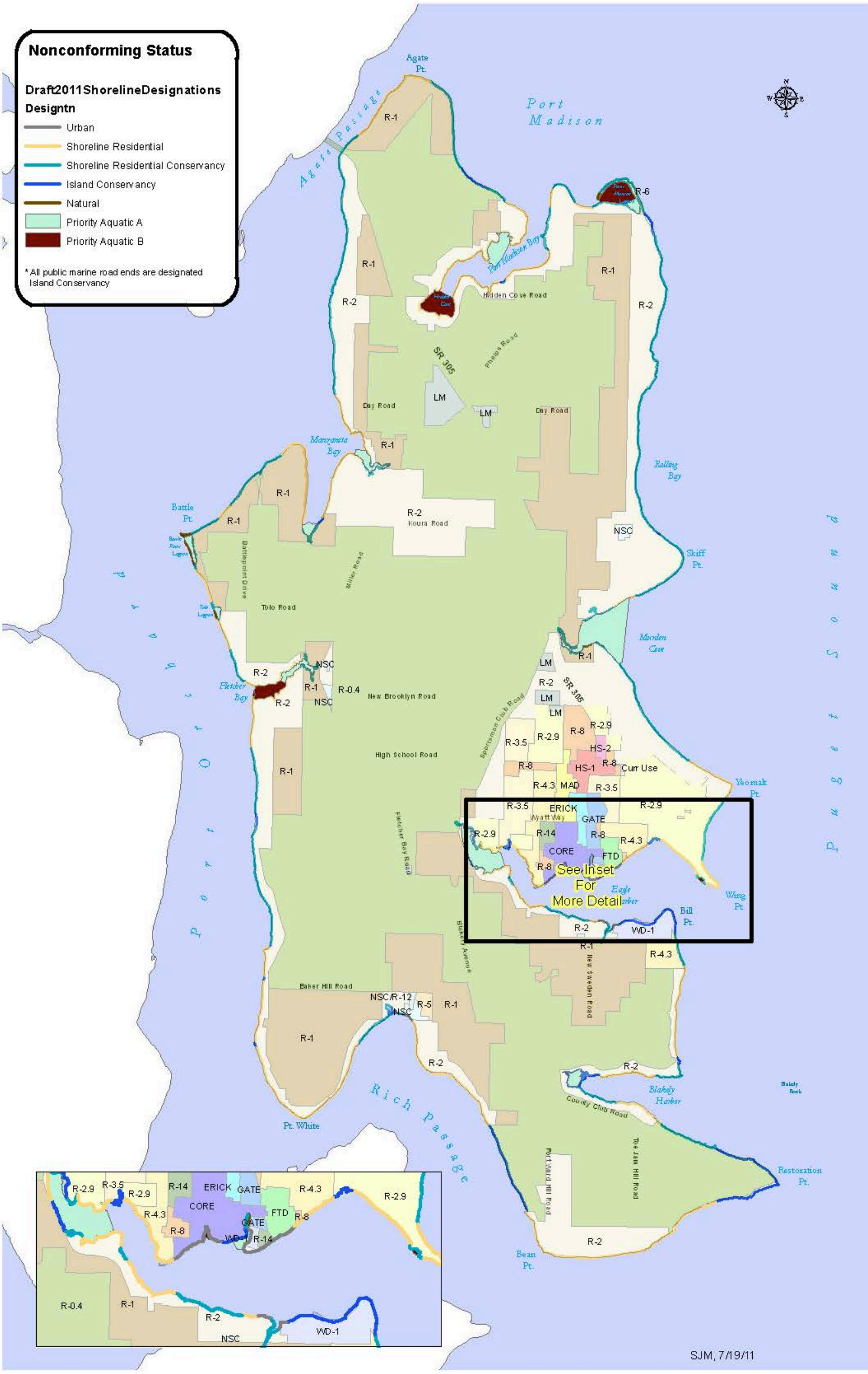

Figure 4-1. City of Bainbridge Island Environment Designations.

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4.2 Shoreline Use and Modification Activity Matrix

The Shoreline Use and Activity Matrix, included in Appendix A as Table A-1 (Table 4-1 in the SMP, in subsection 3.5), establishes what shoreline activities are allowed and prohibited in the upland environment designations discussed in the previous section of this document. Moreover, if an activity is allowed, the matrix establishes whether the activity is permitted through an administrative or conditional use process.

In general, the matrix shows a pattern of allowing more types of activities and more intensive activities in lower functioning areas that are less likely to experience significant function degradation with incremental increases in new development. Moreover, fewer conditional use permits are required in lower functioning areas. This pattern is shown graphically in Figure 4-2 below.

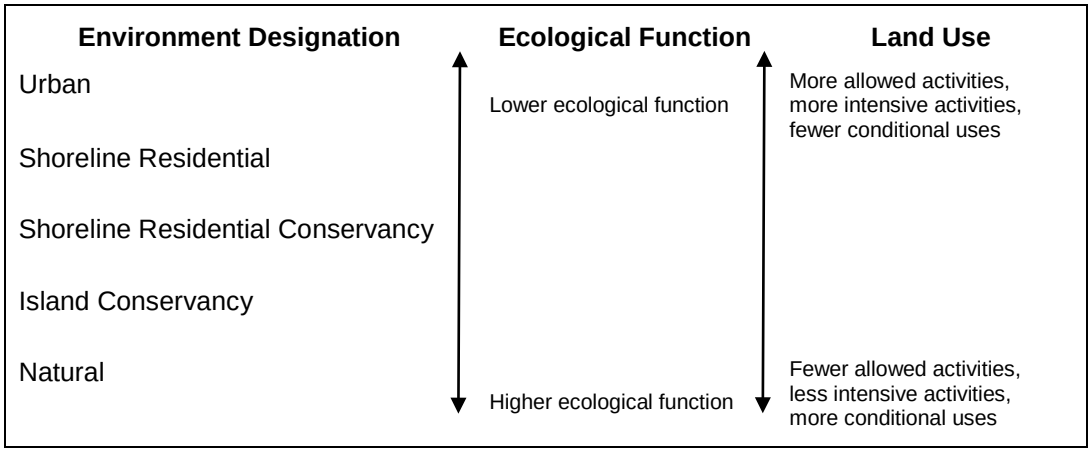

Figure 4-2. Shoreline Use and Activity Matrix Pattern.

4.3 General Provisions

Section 4 of the SMP, General (Island-wide) Policies and Regulations, contains numerous general provisions intended to protect the ecological functions of the City's shorelines and prevent adverse cumulative impacts. Section 4 is divided into two subsections: 4.1, Environmental Quality and Conservation and 4.2, General Use. Subsection 4.1 addresses topics such as environmental impacts, vegetation conservation and management, and water quality and stormwater. Subsection 4.2 addresses topics such as parking, public access, and utilities.

For each of these two subsections, Tables 4-1 and 4-2, below, summarize regulations that provide protection for ecological functions. A thorough listing of the protective provisions in Section 4 would be lengthy and duplicative of the SMP; therefore, only select regulations are summarized below.

Table 4-1. General Environmental Quality and Conservation Regulations Protective of Shoreline Ecological Functions.

SMP Section	Summary of SMP Regulations Providing Protection for Ecological Functions
Environmental Impacts [4.1.2]	Shoreline use and development, including preferred uses and uses that are exempt from permit requirements, shall be located, designed, constructed, and maintained in a manner that protects ecological functions and ecosystem wide processes and avoids, minimizes and/or mitigates adverse impacts. [4.1.2.4(1.)]
	In reviewing and approving shoreline developments the Administrator shall condition the shoreline development, use, and/or activities such that it will result in no net loss of ecological functions necessary to sustain shoreline resources, including loss that may result from the cumulative impacts of similar developments over time. [4.1.2.4(2.)]
	Mitigation sequencing (avoid, minimize, rectify, reduce or eliminate, compensate, monitor) required. [4.1.2.5(1.)]
Vegetation Conservation and Management Zones [4.1.3]	Shoreline buffer must be maintained in a predominantly natural, undisturbed and vegetated condition unless exempt. [4.1.3.5(3.)]
	Establishes order of preference for mitigation planting that favors planting closer to the OHWM. [4.1.3.5(4.)]
Water Quality and Stormwater [4.1.6]	Low Impact Development techniques must be considered and implemented if site allows. [4.1.6.5(3.)]
	On-site sewage systems must be located on the landward side of any new residence when feasible or business or in other location approved by Administrator. [4.1.6.5(5.)]
	New residences or businesses on the shoreline within 200 feet of an existing sewer line and/or within an established sewer service area must connect. [4.1.6.5(8.)]

Table 4-2. General Use Regulations Protective of Shoreline Ecological Functions.

General Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
Parking	• Water quality impacts (heavy metals and oils) • Reduced infiltration • Reduced vegetative functions	Parking as a primary use is prohibited, except if part of a road end or scenic vista. [4.5.3(1.), 4.5.3(3.)]
		Parking prohibited over water except for publicly-owned ferry terminal. [4.5.3(2.)]
		Accessory parking is conditional use in the Natural designation. [4.5.4(2.)]
		Parking facilities shall be located upland of the water oriented dependent portions of the development, where feasible, landward of the principal buildings unless contained within a permitted structure, and set back from the OHWM according to SMP standards. [4.5.5(1.)]
		Design and construction of parking facilities shall assure that surface water runoff will not pollute adjacent waters or cause soil or beach erosion. Oil separators and detention facilities shall be required for new facilities. Alternatives to conventional storm water treatment, such as use of pervious materials, shall be considered where appropriate. [4.5.5(2.)]
		Surface parking areas shall be developed using low impact development techniques whenever possible. [4.5.5(7.)]
		For boating facilities, long-term parking and paved storage areas shall be separated from the OHWM by a vegetated native vegetation

General Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
		zone of at least 100 feet. [4.5.7(1.)]
Public Access - Visual and Physical	• Clearing of vegetation • Impervious surfaces; reduced infiltration	Public access requirements do not apply if unacceptable environmental harm that cannot be adequately mitigated will result. [4.6.5(3.)(d.)]
Transportation Facilities	• Water quality impacts (heavy metals and oils) • Fish passage barriers • Reduced infiltration • Reduced vegetative functions • Impairment of sediment recruitment processes • Filling of waterbodies • Associated shoreline armoring (see potential effects below)	New highways, arterials, secondary arterials, bridges over Puget Sound waters, and other facilities prohibited. New transportation facilities in front of feeder bluffs, over driftways or on accretion shoreforms prohibited. [4.8.3(1.)(a.,b.,d.]
		Landfills for transportation facility development are prohibited in water bodies, wetlands, marshes, bogs, swamps and on accretion beaches except when there is a demonstrated purpose and public need that supports the uses, and alternatives to accomplish the same purpose have been shown to be infeasible. [4.8.3(2.)]
		New access roads shall be allowed only where other means of access are demonstrated to be infeasible or environmentally unacceptable or the road is needed for ferry service. [4.8.4(6.)]
		Transportation facilities and services shall utilize existing transportation corridors whenever possible, provided that facility additions and modifications will not adversely impact shoreline resources. [4.8.4(8.)]
		Preference for mechanical brush control (over herbicides). [4.8.5(2.)]
		Transportation facilities should employ pervious materials and other appropriate low impact development techniques where soils and geologic conditions are suitable and where such measures could measurably reduce stormwater runoff. [4.8.5.3(1.)]
		Culverts, bridges, and similar devices must be designed to pass water, sediment, and debris loads anticipated under appropriate hydraulic analysis and shall not impede the migration of anadromous fish. [4.8.5.3.(4.)]
Utilities	• Reduced vegetative functions • Habitat disturbance • Associated shoreline armoring (see potential effects below) • Stream flow reduction through water withdrawals • Water quality degradation through sewage and stormwater outfalls and leaking on-site sewage	Utilities requiring withdrawal of water from streams prohibited. [4.9.4(1.)(c.)]
		Primary use utilities conditional use in the Shoreline Conservancy, Shoreline Residential, Urban, and Aquatic environments. Prohibited in Natural, Island Conservancy, and Priority Aquatic environments. [4.9.5(1.)]
		Must avoid the use of any shoreline stabilization structural or artificial shore defense or flood protection works. [4.9.5(4.)]
		Utility lines must utilize existing routes if possible, be completely buried under stream bed if applicable, and cross shoreline jurisdiction by the most direct route possible (unless such route would cause significant environmental damage). [4.9.5(6.)(a.,b.,c.)]
		Clearing of native vegetation for the installation or maintenance must be kept to a minimum. [4.9.5(8.)]
		For water systems, private and public intake facilities, and wells in the shoreline jurisdiction should be located where there will be no net loss in ecological functions or adverse impacts upon shoreline resources, values, natural features, or other users. Construction and maintenance BMP must be followed. [4.9.6(1.)(2.)]

General Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
		Sewage system components that are not water-dependent must be located away from shoreline jurisdiction unless alternative locations, including alternative technology, are demonstrated to be infeasible and the facilities do not result in a net loss of shoreline ecological functions and processes. [4.9.6(2.)(1.)]
		Sewage system outfall pipelines and diffusers should be located only where there will be no net loss in shoreline ecological functions and processes. [4.9.6(2.)(2.)]
		Natural gas pipelines, except local service lines, must not be located in shoreline jurisdiction unless alternatives are infeasible. [4.9.6.3.(1.)]
		Energy and communication systems components that are not water-dependent shall not be located in shoreline jurisdiction unless alternatives are demonstrated to be infeasible. [4.9.6.4.(1.)]
		New or electrical energy and communications systems replacement lines that cross water bodies or other critical areas may be required to be placed underground depending on impacts on ecological functions and processes. [4.9.6.4.(3.)]
		Poles or other supports treated with creosote or other wood preservatives that may leach contamination in water shall not be used along shorelines or associated wetlands. [4.9.6.4.(4.)]
		Maximum site coverage for utility development including parking and storage areas shall not exceed standards in the underlying zoning and shall not exceed 50% on Urban, and 35% on Shoreline Residential and Shoreline Residential Conservancy. [4.9.6.8.]
		New residences or businesses on the shoreline within 200 feet of an existing sewer line and/or within an established sewer service area shall be connected to the sewer system. Existing residences shall be connected at the end of the when the on-site sewage system has reached the end of its useful life. [4.9.8.(2.)]
		On-site sewage systems shall be located on the landward side of any new residence when feasible or business or in another approved location and designed to meet all applicable water quality, utility, and health standards. [4.9.8.(3.)]

4.4 Shoreline Use and Modification Provisions

Protective provisions addressing shoreline uses and modifications are contained in Section 5 of the SMP, Specific Shoreline Use and Development Policies and Regulations, and Section 6, Shoreline Modification Policies and Regulations. Section 5 includes subsections addressing uses and developments such as boating facilities, recreational development, and recreational development. Section 6 includes subsections addressing modifications such as shoreline stabilization and overwater structures.

For allowed shoreline uses and modifications, Tables 4-3 and 4-4, below, summarize the use or modification's potential impacts to shoreline function and summarizes the SMP regulations that provide protection. A thorough listing of the protective provisions in Section 4 would be lengthy and duplicative of the SMP; therefore, only select regulations are summarized below. Moreover, for brevity, regulations applicable to multiple uses or modifications are generally not repeated.

Table 4-3. Specific Shoreline Use Potential Impacts and Protective Provisions.

Specific Shoreline Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
Aquaculture	• Potential competition with native populations • Water quality impacts (e.g. nutrient enrichment, herbicides, pesticides, etc)	Aquaculture prohibited in areas where a proposal will result in any significant adverse environmental impacts that cannot be eliminated or adequately mitigated. [5.3.3(1.)]
		Aquaculture that releases herbicides, pesticides, antibiotics, fertilizers, non-indigenous species, parasites, pharmaceuticals, genetically modified organisms, feed or other materials known to be harmful into surrounding waters is prohibited. [5.3.3(2.)]
		Commercial aquaculture prohibited in the Natural and Priority Aquatic environments. Non-commercial aquaculture is prohibited in Priority Aquatic Category A, unless part of an approved restoration project. [5.3.4(1.)]
		Must avoid loss of ecological functions, impacts to eelgrass and macro algae, spreading disease, introducing non-native species. [5.3.4(3.)]
		Aquacultural facilities with net-pens or rafts must be separated by at least on nautical mile (unless a lesser distance would not be contrary to the SMP). [5.3.5(5.)]
		Operational monitoring, including periodic benthic analysis, may be required. [5.3.6(2.)]
Boating Facilities	• Alteration of submerged aquatic vegetation, nearshore habitat, predator /prey relationships, and benthic community assemblages • Reduction in shoreline vegetative functions • Alteration of hydrologic	Boating facilities confined to the Urban environment designation (permitted), Shoreline Residential (conditional), and public parks designated Island Conservancy (conditional). [5.4.3(1.)]
		Marinas required to provide boater education addressing boater impacts on water quality and other shoreline resources. [5.4.3(3.)]
		New overwater coverage at marinas prohibited. [5.4.3(4.)]
		Before a new marina site is approved, evidence must show existing marinas are inadequate and cannot be expanded to meet regional

Specific Shoreline Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
	processes • Alteration of sediment transport processes • Water quality and benthic habitat impacts from facility construction, materials, boat use and maintenance	demand. [5.4.4(1.)]
		Marinas and boat launches only allowed on stable shorelines where water depths adequate to eliminate or minimize dredging and similar activities. [5.4.4(3.) & 5.4.8.2(1.)(a.)]
		Marinas and boat launches prohibited at or along significant littoral drift sectors, wetland-type areas, mud flats and salt marshes, and fish spawning and rearing areas. [5.4.4(7.) & 5.4.8.1(1.)]
		Boating facilities must be designed, constructed, and maintained to provide thorough flushing and not restrict the movement of aquatic life requiring shallow water, and to minimize interference with geo-hydraulic processes and the disruption of existing shore forms. [5.4.5(2.)(a.) & 5.4.5(2.)(b.)]
		All marinas must have accessible boat sewage disposal. Existing marinas must comply within one year of effective date. [5.4.6(1.)]
		If dredging at marina entrances changes littoral drift processes and adversely affects adjacent shores, replenishment of shoreline with aggregate required. [5.4.7(4.)]
Commercial development	• Reduced vegetative functions • Reduced infiltration • Water quality impacts	Confined to two environment designations: Urban (permitted) and Shoreline Residential (conditional). [5.5.3(1.)(a.)]
		Must be located, designed and constructed to minimize adverse impacts to shoreline resources and must provide mitigation to ensure no net loss of ecological functions and processes. [5.5.3(3.)]
		Accessory and non-water-dependent commercial portions must be set back at a sufficient distance to minimize water quality impacts. [5.5.4(1.)(a.)]
		Water-dependent commercial development must promote joint use of over-water and accessory facilities (including parking) if feasible. [5.5.4(1.)(b.) & 5.5.4(1.)(c.)]
Forest Practices	• Reduced vegetative functions • Reduced infiltration • Reduced habitat	Timber harvesting and forest practices except conversions conducted with a Class IV-General permit must comply with the current rules and regulations adopted under the Forest Practices Act and the Timber, Fish and Wildlife agreement (or their successors). [5.6.3(1.)]
		Commercial timber cutting must be by selective cutting and not exceed 30 percent of the merchantable trees in any ten-year period. [5.6.3(7.)]
Industry	• Water contamination • Reduced vegetative functions • Reduced infiltration	Industry allowed only in Urban environment (and waterward aquatic sections). [5.7.3(1.)]
		Portions of industrial development which are accessory to and not considered not water-dependent shall be set back from the shoreline at a sufficient distance to minimize impacts to water quality. [5.7.4(1.)(a.)]
		Must promote joint use of over-water and accessory facilities such as piers, docks, storage, and parking whenever practicable. [5.7.4(1.)(b.)]
		Shipyards and mobile services shall employ best management practices (BMPs) concerning the various services and activities they performed and their impacts on the surrounding water quality.

Specific Shoreline Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
		[5.7.5(1.)]
Overwater Structures Piers, Docks, Recreational Floats, and Mooring Buoys	• Alteration of submerged aquatic vegetation, nearshore habitat, predator /prey relationships, and benthic community assemblages • Reduction in shoreline vegetative functions • Water quality and benthic habitat impacts from construction, materials, boat use and maintenance • Alteration of hydrologic processes • Alteration of sediment transport processes	Overwater structures prohibited in the Natural and Priority Aquatic A environments (except two mooring buoys per parcel for public access when upland property is owned by a public entity). New single use docks, mooring buoys and floats prohibited in Priority Aquatic B designation [5.9.4]
		Preference for mooring buoys over docks, if feasible. [5.9.5(2.)]
		New boat houses and new covered moorage prohibited. [5.9.5(5.)]
		Lighting shall be the minimum necessary. [5.9.5(7.)]
		New piling associated with a new pier must be spaced at least 20 feet apart unless the length of structure itself is less than 20 feet (then can only be placed at the ends of the structure). Piles in forage fish spawning areas need to be spaced at least 40 feet apart. [5.9.7.1.(1.)(b.)]
		Piles, floats, or other members in direct contact with water shall not be treated or coated with biocides such as paint or pentachlorophenol. Use of arsenate compounds or creosote-treated members is prohibited. In saltwater areas characterized by significant shellfish populations or in shallow embayments with poor flushing characteristics, untreated wood, used pilings, precast concrete, or other nontoxic alternatives shall be used. In all cases where toxic-treated products are allowed, products, methods of treatment, and installations shall be limited to those that are demonstrated as likely to result in the least possible damage to the environment based on current information. [5.9.7.1.(1.)(e.)]
		Pier width of the modified portion of a pier or proposed new pier must not exceed 4 feet for single use and 6 feet for joint use (marinas and public docks may exceed with mitigation). [5.9.7.2.(1.)(a.)]
		Functional grating resulting in a total open area of a minimum of 30% must be installed on all new or replacement piers up to 6 feet wide. [5.9.7.2.(1.)(b.)]
		Pier sections that span upper intertidal obligate vegetation that section must be fully grated with grating having 60% open area. [5.9.7.2.(1.)(c.)]
		For single-use structure, float width must not exceed 8 feet and length must not exceed 30 feet. Functional grating must be installed on at least 50% of the surface area of the float. [5.9.7.3.(1.)(a.)]
		For joint-use structure, float width must not exceed 8 feet and the float length must not exceed 60 feet. Functional grating must be installed on at least 50% of the surface area of the float. [5.9.7.3.(1.)(b.)]
		Float floatation must be fully contained. [5.9.7.3.(1.)(e.)]
		Float required to be suspended a minimum of 1 foot above the tidal substrate at all times, with preference for float stops on piling. [5.9.7.4.(1.)]
		Hotels, motels, and/or multifamily residential development proposing to provide moorage facilities shall be required to construct a single, joint-use moorage facility. [5.9.8(1.)]
		New subdivisions and short subdivisions with shoreline frontage must

Specific Shoreline Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
		provide community docks rather than individual, private docks. [5.9.10(2.)]
		For residential uses, maximum length and width of a pier or dock shall be the minimum necessary to accomplish moorage for the intended boating use. [5.9.10(3.)(a.)]
		Mooring buoys and floats for recreational use allowed in the Aquatic environment offshore from Island Conservancy, Shoreline Residential, Shoreline Residential Conservancy, and Urban environments. Mooring buoys for commercial use allowed only as conditional uses offshore from the Urban environment. Mooring buoys for public open water moorage and anchorage areas allowed in the Aquatic environment offshore of all upland environments. [5.9.12(1.)]
		In general, for non-commercial or industrial properties, one buoy or float may be installed for each ownership beyond extreme low water or line of navigability. [5.9.12(2.)]
		Moorings buoys must be a minimum of 100 feet from other permitted buoys. [5.9.13(1.)]
		Single-property-owner recreational floats shall not exceed eight 8 feet by 8 feet. [5.9.9(9.)]
		Recreational floats shall include stops or other device to keep the floats off the bottom of tidelands at low tide. [5.9.9(10.)]
Recreational Development	• Water quality impacts from pesticides/fertilizers and boat use and maintenance • Wildlife disturbance • Clearing of vegetation • Impervious surfaces; reduced infiltration	Valuable shoreline resources and fragile or unique areas shall be used only for passive and nondestructive recreational activities. [5.10.4(1.)]
		Water-oriented recreational use/development shall be allowed when the proponent demonstrates that it will not result in a net loss of shoreline ecological functions. [5.10.4(3.)]
		Use of fertilizers, pesticides, or other toxic chemical use shall be consistent with the water quality regulation of the SMP. [5.10.4(7.)]
		Motorized vehicular access is prohibited on all beaches and spits, except for boat launching activities. Recreational facility design and operation shall prohibit the use of all-terrain and off-road vehicles in the shoreline area. [5.10.5(7.)]
		The removal of on-site native vegetation shall be limited to the minimum necessary. [5.10.5(8.)]
		Use of jet skis and similar recreational equipment limited in sensitive aquatic areas and prohibited in the Priority Aquatic environment. [5.10.6(2.)]
		Chemical management plan to eliminate the possibility of damage to riparian vegetation, wildlife, and surface and ground water quality required of golf courses located in shoreline jurisdiction. [5.10.6(3.)]
Residential Development	• Reduced infiltration • Reduced shoreline vegetative functions • Water quality impacts from fertilizers/ pesticides/ household	Residential development permitted in the Shoreline Residential, Shoreline Residential Conservancy, and Urban environments, a conditional uses in the Island Conservancy environment, and shall be prohibited in the Natural, Aquatic, and Priority Aquatic environments. [5.11.4(1.)]
		Land subdivision permitted in the Shoreline Residential, Shoreline

Specific Shoreline Use	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
	wastes • Impacts from accessory uses	Residential Conservancy, and Urban environments, and allowed as a conditional use in the Natural and Island Conservancy environments. [5.11.4(2.)]
		Residential development over water, including floating homes, is prohibited. [5.11.8(1.)]
		Live-aboard vessels allowed only at marinas or in the Eagle Harbor public open water marina. [5.11.8(2.)]
		All new subdivisions shall record a prohibition on new private docks on the face of the plat. Shared moorage with less than 6 slips may be approved. [5.11.8(3.)]

Table 4-4. Specific Shoreline Modification Potential Impacts and Protective Provisions.

Specific Shoreline Modification	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
General Shoreline Modification Provisions	• Alteration of submerged aquatic vegetation, nearshore habitat, predator /prey relationships, and benthic community assemblages • Reduction in shoreline vegetative functions • Water quality impacts • Alteration of hydrologic processes • Alteration of sediment transport processes	Shoreline stabilization and flood protection works are prohibited in wetlands and salmon and trout spawning areas (except for habitat enhancement). [6.1.4(1.)] Shoreline modification should not be located on feeder bluffs, except when the area is already developed with a primary structure, in which case stabilization may be allowed. [6.1.4(3.)] All shoreline modification activities must be necessary to support or protect an allowed primary structure or a legally existing shoreline use that is in danger of loss or substantial damage (except for mitigation and enhancement projects. [6.1.5(2.)] All new development activities, including additions to existing structures, must be located away from geologically hazardous areas (unless specifically allowed) and designed to prevent or minimize the need for shoreline stabilization for the life of the development or 100 years, whichever is greater. [6.1.5(4.)] All new, replacement and repair modification activities must be limited to the minimum footprint necessary to protect an allowed primary structure or legally existing shoreline use. [6.1.5(5.)] All new, replacement and repair modification activity applications shall be designed, located, sized and constructed to assure no net loss of ecological functions. [6.1.5(7.)] Shoreline stabilization must be designed in a manner that minimizes scouring of the beach at the toe of protective devices, erosion on the level of the seaward beach, impacts to adjacent properties, and the need for mitigation. [6.1.5(9.)]
Shoreline Stabilization	• Hydrologic and sediment transport alterations • Simplification of	New, expanded or replacement structural stabilization proposals must examine and implement alternatives in the following order of preference: no action; increase building setbacks and/or relocate and/or elevate the structures; implement flexible/natural materials

Specific Shoreline Modification	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
	nearshore habitat • Reduction in shoreline vegetative functions	and methods, vegetation, beach nourishment, protective berms or bioengineered stabilization; hybrid structure; exclusively hard stabilization materials. [6.2.4(1.)]
		New or enlarged structural stabilization measures to protect public transportation infrastructure, essential public facilities and primary structures are allowed only when: the danger of loss or substantial damage from shoreline erosion is caused by waves and documented in a geotechnical report, or the existing primary structure is located within 10 feet of the OHWM; there is significant possibility that the primary structure or primary appurtenance structures will be damaged within 3 years in the absence of hard structural stabilization measures; hard structural shoreline stabilization is limited to the zone of influence; the new or expanded structure is designed, located, sized and constructed to assure no net loss of ecological functions; and non-structural measures are shown not to be feasible or sufficient. [6.2.6(1.)(a.,b.,c.,d.,e.,f.)]
		Stabilization structures, with limited exceptions, must be located landward of the OHWM and protective berms (artificial or natural), and must be generally parallel to the natural shoreline. [6.2.7(2.)]
		Hard structural stabilization projects shall submit a 5 year maintenance and monitoring plan that addresses mitigation measures. [6.2.7(15.)]
Dredging and Dredge Material Disposal	• Disruption of sediment and hydrologic processes • Water quality impairments- turbidity and heavy metals • Disturbance of benthic substrate/ organisms; • Reduction in shallow water habitat	Dredging requires conditional use permit in Aquatic environment and shall be for natural resource or navigation purposes. Dredging prohibited in Priority Aquatic A designation environment. In Priority Aquatic B designation, dredging permitted as conditional use when part of an approved restoration plan. [6.3.6(1.)]
		New dredging prohibited in environmentally sensitive habitats (except by conditional use permit); along net-positive drift sectors and where geo-hydraulic processes are active and accretion shoreforms would be damaged, altered, or irretrievably lost; in areas with bottom materials that would require continual maintenance dredging; certain critical habitat areas; where pollutants would be released. [6.3.4(1.)(a.-e.)]
		Dredging and dredge material disposal must be minimum necessary; employ BMPs; not interfere with anadromous fish migration; not adversely alter natural drainage and circulation patterns, currents, and tidal flows, or significantly reduce flood water capacities; not interfere with geohydraulic processes; minimally or nonpolluting. [6.3.6(2.)(a.,e.,f.,g.,i.,j.)]
		Dredging only allowed for certain water-dependent uses; essential public infrastructure and facilities; environmental clean-up; utility installation when other methods infeasible; maintenance dredging; certain navigational purposes; ecological restoration and enhancement; public access. [6.3.7(1.)]
		New development shall be sited and designed to avoid or, if that is not possible, to minimize the need for new and maintenance dredging. [6.3.7(2.)]
		Disposal of dredged materials in water areas other than Puget Sound Dredged Disposal Analysis sites may only be allowed for ecologically beneficial purposes. [6.3.8(2.)]
Landfill	• Disruption of sediment	Landfill waterward of the OHWM requires conditional use permit, and

Specific Shoreline Modification	Potential Direct and Indirect Impacts to Shoreline Function	Summary of SMP Regulations Providing Protection for Ecological Functions
	and hydrologic processes • Water quality impacts • Disturbance of benthic substrate/ organisms • Impacts to shallow water habitat	allowed only for certain water-dependent developments, essential public infrastructure and facilities, environmental cleanup and restoration, maintenance of established uses, and public access. [6.4.3(2.)]
		Landfill in Island Conservancy and Natural environments requires conditional use permit and allowed only for restoration, enhancement, or maintenance of natural resources. [6.4.3(3.)]
		Landfill in Priority Aquatic environment prohibited. [6.4.3(4.)]
		Pile or pier supports must be used instead of landfills, if feasible. [6.4.3(6.)]
		Filling and excavation must minimize adverse impacts on the shoreline, generally not require shoreline stabilization, and not adversely alter hydrology. [6.4.4(1.)]
		Landfill must be minimum size necessary and protect shoreline ecological functions and ecosystem-wide processes. [6.4.4(2.)]
		Fills that will cause significant adverse impacts that cannot be mitigated prohibited. [6.4.4(3.)]
		Landfill construction timing must adhere to WDFW requirements. [6.4.4(7.)]

4.5 Shoreline Critical Areas

Critical areas are defined in the SMP (Section 8, Definitions) as:

a. Critical Aquifer Recharge Areas
b. Fish and Wildlife Habitat Conservation Areas
c. Frequently Flooded Areas
d. Geologically Hazardous Areas
e. Wetlands
f. Critical Saltwater Habitat Areas

Shoreline critical areas are addressed in subsection 4.1.5 of the SMP. This subsection states that in general shoreline development and uses must comply with the shoreline critical areas regulations found in Appendix B of the SMP, which are based on the City's existing critical areas ordinance. Additionally, subsection 4.1.5 includes supplementary protective provisions.

4.6 Use Compatibility

Potential land use conflicts are considered at both the planning and project levels. At the planning level, SMP shoreline environment designations and associated permitted uses and modifications group similar land uses and establish appropriate uses to avoid use conflicts. Comprehensive plans, zoning, existing development intensity, and ecological functions are all weighed in determining appropriate environment

designations to avoid use conflicts. At the project level, development standards are used to reduce potential conflicts between neighboring uses.

The proposed SMP also addresses potential use conflicts by identifying preferred uses, and prohibiting specific uses. Additionally, the permit review and State Environmental Policy Act processes require public notification and allow for public comments often resulting in discussion of land use compatibility issues and measures designed to reduce conflicts.

4.7 Shoreline Restoration Plan

As discussed previously, one of the key objectives that the SMP must address is "no net loss of ecological shoreline functions necessary to sustain shoreline natural resources" (Ecology 2011). However, SMP updates seek not only to maintain conditions, but to improve them:

> *Master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program (WAC 173-26-201(2)(f)).*

Pursuant to that direction, the City has prepared the *Shoreline Restoration Plan*, which is a non-regulatory part of the SMP. Practically, it is not always feasible for shoreline developments and redevelopments to achieve no net loss at the site scale, particularly for those developments on currently undeveloped properties or those developing a new pier or bulkhead. The *Shoreline Restoration Plan*, therefore, can be an important component in making up that difference in ecological function that would otherwise result just from implementation of the SMP. The *Shoreline Restoration Plan* represents a long-term vision for restoration that will be implemented over time, resulting in ongoing improvement over the existing conditions.

The *Shoreline Restoration Plan* for Bainbridge Island discusses restoration strategies for the management areas, programmatic restoration opportunities, the prioritization of restoration opportunities, and potential sources of funding. Site-specific projects are identified and prioritized in terms of ecological functions and the feasibility of implementation. Many of the projects and strategies identified are focused on restoring shoreline processes where possible.

Some key types of shoreline restoration opportunities for the City that could contribute to achievement of no net loss of ecological functions or improvement in ecological functions are summarized below.

- **Removal of deleterious structures, fill, soil, and infrastructure** – Removal of places that have fill and structures associated with abandoned industrial activities on the shoreline can help rehabilitate ecological functions in impaired shoreline areas.

- **Native revegetation and non-native plant species removal** – Removing non-native species and revegetating the shoreline can help restore important vegetative functions to the shoreline.

- **Beach nourishment** – Some of the island's shorelines are critically impaired with regards to sediment supply (Herrera 2012). Beach nourishment can help minimize the impact of shoreline stabilization.

- **Property acquisition** – Acquisition of undeveloped properties can provide habitat continuity conserve key ecological functions. Property acquisition can also serve as the first step to allow for public restoration projects.

- **Easement acquisition** – Conservation easements can be an effective tool to help protect key ecological areas.

- **Educational programs** – Because of the extensive development of Bainbridge Island's shoreline, landowner education is an important element to gaining public support for restoration and encouraging ecologically beneficial actions on privately owned properties.

Projects included in the *Shoreline Restoration Plan* (Herrera 2012) that are underway or in the preliminary stages of development (i.e. where a feasibility assessment has been completed) are described below in Chapter 7.

5 Other Regulatory Programs

5.1 City Plans and Regulations

Besides the SMP, other City plans and regulations that influence development activity in the shoreline are listed below.

Comprehensive Plan: The state legislature adopted the Growth Management Act (GMA) in 1990 in response to concerns that "uncoordinated and unplanned growth, together with a lack of common goals expressing the public's interest in the conservation and wise use of our lands, pose a threat to the environment, sustainable economic development, and the health, safety, and high quality of life enjoyed by the residents of this state." The GMA provides the tools to counties and cities to manage and direct growth to urban areas where public facilities and services can be provided most efficiently, to protect rural character, to protect critical areas and to conserve natural resource lands.

In accordance with the GMA, Bainbridge Island's Comprehensive Plan was initially adopted in 1994 and updated in 2004. SMP goals and policies are an element of the

comprehensive plan. City development regulations must be consistent with and implement the comprehensive plan.

Zoning Code: Title 18 of the Bainbridge Island Municipal Code, Zoning, is one of the primary sets of development regulations implementing the comprehensive plan. For each zone on the island, the zoning code lists information such as permitted and conditional uses, development intensity (e.g. density) requirements, and building height and size parameters.

Critical Areas Regulations: Activities outside of shoreline jurisdiction can impact conditions within shoreline jurisdiction through effects on water quality, freshwater inputs, and physical habitat conditions. Critical Areas Regulations (Chapter 16.20 of the Bainbridge Island Municipal Code) apply outside of shoreline jurisdiction and help limit the effects of activities to sensitive areas.

Stormwater Regulations: Surface drainage and stormwater management are regulated under Chapter 15.20 of the Bainbridge Island Municipal Code. Ecology's 2005 Stormwater Management Manual for Western Washington, adopted by reference and amended, establishes minimum requirements for drainage review, stormwater management, and the use of best management practices. The 2009 Edition of the Low Impact Development (LID) Guidance Manual – A Practical Guide to LID Implementation in Kitsap County is also adopted by reference in the City's stormwater regulations

Issued in 2007, the City's National Pollutant Discharge Elimination System Permit (NPDES Permit), also known as the Municipal Stormwater Discharge Permit, requires the City to inventory and prioritize all receiving waters (streams, harbors, shoreline areas) for Illicit Discharge Detection and Elimination (IDDE) efforts. To gain a more comprehensive understanding of water quality conditions Islandwide, allowing for prioritization of problem areas and optimization of pollutant-tracking and elimination resources, the City began an Island-wide long-term status and trends monitoring effort in June 2010.

5.2 State Regulations

Aside from the Shoreline Management Act, state regulations most pertinent to development in the City's shorelines include the Aquatic Lands Act, Forest Practices Act, Hydraulic Code, State Environmental Policy Act, and Watershed Planning Act. Other relevant state regulations include the Water Resources Act and Salmon Recovery Act.

A variety of state agencies (e.g., Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Natural Resources) are involved in implementing these regulations or own shoreline areas. The Department of

Ecology reviews all shoreline projects that require a shoreline permit, but has specific regulatory authority over Shoreline Conditional Use Permits and Shoreline Variances. Other agency reviews of shoreline developments are typically triggered by in- or over-water work, discharges of fill or pollutants into the water, or substantial land clearing.

Depending on the nature of the proposed development, state regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. During the comprehensive SMP update, the City will consider other state regulations to ensure consistency as appropriate and feasible with the goal of streamlining the shoreline permitting process.

A summary of pertinent state regulations follows.

Aquatic Lands Act: In 1984, the Washington State Legislature passed what is commonly referred to as the Aquatic Lands Act (Chapter 79.105 through 79.135) and delegated to the Washington Department of Natural Resources (WDNR) the responsibility to manage state-owned aquatic lands. The aquatic lands statutes (RCW 79.100 through 79.145) direct WDNR to manage aquatic lands to achieve a balance of public benefits, including public access, navigation and commerce, environmental protection, renewable resource use, and revenue generation when consistent with the other mandates. In addition, it also identifies water-dependent uses as priority uses for the transport of useful commerce.

If a proposed project requires the use of state-owned aquatic lands, the project may be required to obtain an Aquatic Use Authorization from WDNR and enter into a lease agreement. WDNR recommends that all proponents of a project waterward of the ordinary high water mark contact WDNR to determine whether the project will be located on state-owned aquatic lands, and, if so, to determine whether the land is available, whether the proposed use is appropriate, and how the project can be constructed to avoid or minimize impacts to aquatic resources.

Forest Practices Act: The Forest Practices Act (Chapter 76.09 RCW) regulates activities related to growing, harvesting, or processing timber. The Forest Practices Act is implemented by the Forest Practices Rules, which are administered by the DNR. The Forest Practices Rules establish standards for forest practices such as timber harvest, pre-commercial thinning, road construction, fertilization, and forest chemical application. The rules are designed to protect public resources such as water quality and fish habitat while maintaining a viable timber industry.

Forest practices are not regulated under the SMA unless the land is being converted to a use besides growing trees, or the commercial harvest is within 200 feet of a shoreline of statewide significance and exceeds the harvest limits established in the SMA. Conversions must comply with the provisions in the SMP for the new use.

Hydraulic Code: Chapter 77.55 RCW, the Hydraulic Code, gives the Washington Department of Fish and Wildlife (WDFW) the authority to review, condition, and approve or deny "any construction activity that will use, divert, obstruct, or change the bed or flow of state waters." Practically speaking, these activities include projects such as the installation or modification of piers, shoreline stabilization measures, culverts, and bridges. These types of projects must obtain a Hydraulic Project Approval from WDFW, which will contain conditions intended to prevent damage to fish and other aquatic life, and their habitats. In some cases, the project may be denied if significant impacts would occur that could not be adequately mitigated.

State Environmental Policy Act: The State Environmental Policy Act (SEPA) provides a way to identify possible environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified.

Watershed Planning Act: The Watershed Planning Act of 1998 (Chapter 90.82 RCW) was passed to encourage local planning of local water resources, recognizing that there are citizens and entities in each watershed that "have the greatest knowledge of both the resources and the aspirations of those who live and work in the watershed; and who have the greatest stake in the proper, long-term management of the resources."

The City is located within WRIA 15 (Kitsap). A watershed planning group (the City was not an initiating government) received grant funding to plan under the Watershed Planning Act and completed a draft watershed plan in June 2005. However, the planning group was unable to reach consensus. Watershed planning is currently suspended.

5.3 Federal Regulations

Federal regulations most pertinent to development in the City's shorelines include the Clean Water Act, the Endangered Species Act, and the Rivers and Harbors Act. Other relevant federal regulations include the National Environmental Policy Act, Anadromous Fish Conservation Act, Clean Air Act, and the Migratory Bird Treaty Act.

A variety of agencies (e.g., U.S. Army Corps of Engineers (Corps), National Marine Fisheries Service, U.S. Fish and Wildlife Service) are involved in implementing these regulations, with review of shoreline development typically triggered by in- or over-water work, or discharges of fill or pollutants into the water. Depending on the nature of the proposed development, federal regulations can play an important role in the

design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated.

A summary of pertinent regulations follows.

Clean Water Act, Section 402: Section 402 of the CWA required the EPA to develop and implement the National Pollutant Discharge Elimination System (NPDES) program. The NPDES program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Municipal, industrial, and other facilities must obtain permits if their discharges go directly to surface waters. In Washington State, the Department of Ecology has been delegated the responsibility by the U.S. Environmental Protection Agency for managing implementation of this program.

The City operates under a Phase II Municipal Stormwater Discharge Permit. The City has met all of the deadlines for specific permit requirements, and is on course to meet the deadlines for future permit requirements.

Clean Water Act, Section 404: Section 404 of the federal Clean Water Act provides the Corps, under the oversight of the U.S. Environmental Protection Agency, with the authority to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Under Section 404, the extent of Corps jurisdiction in tidal waters extends to the high tide line. While the extent of the Corps' authority and the definition of fill have been the subject of considerable legal activity, it generally means that the Corps must review and approve many activities in the shoreline, including, but not limited to, depositing fill, dredged, or excavated material in waters and/or adjacent wetlands; shoreline and wetland restoration projects; and culvert installation or replacement.

Endangered Species Act (ESA): Section 9 of the ESA prohibits "take" of listed species. Take has been defined in Section 3 of the ESA as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The take prohibitions of the ESA apply to everyone, so any action of the City that results in a take of listed fish or wildlife would be a violation of the ESA and expose the City to risk of lawsuit. Per Section 7 of the ESA, the Corps must consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service on any projects that fall within Corps jurisdiction (e.g., Section 404 or Section 10 permits) that could affect species listed under the Endangered Species Act. These agencies ensure that the project includes impact minimization and compensation measures for protection of listed species and their habitats.

Rivers and Harbors Act: Section 10 of the Rivers and Harbors Act of 1899 provides the Corps with the authority to regulate activities that may affect "navigable" waters of the U.S. These are waters that are subject to the ebb and flow of the tide and/or are

presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Puget Sound is included in the list of federally designated navigable waters. Under Section 10, the extent of Corps jurisdiction in tidal waterways extends to the mean high water line. Proposals to construct new or modify existing in-water structures (including, but not limited to, piers, marinas, bulkheads, and breakwaters), to excavate or dredge, or to "alter or modify the course, location, condition, or capacity of" Puget Sound must be reviewed and approved by the Corps.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Commonly known as Superfund, CERCLA established requirements for closed and abandoned hazardous waste sites; established liability for releases of hazardous waste at these sites; and established a fund to provide for cleanup when no responsible party could be identified. The law authorizes two kinds of response actions:

- Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response.

- Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on EPA's National Priorities List (NPL).

5.4 Special Topics in Shoreline Regulation-Net-pen Aquaculture

Besides local approval, marine net pens are required to obtain state permits or have some oversight from Ecology, WDFW, DNR, and the Washington State Department of Agriculture. In addition, marine net pens are required to obtain federal permits or have some oversight from the National Marine Fisheries Service, Corps, U.S. Fish and Wildlife Service, US Coast Guard, and the Environmental Protection Agency.

Marine net-pen aquaculture is permitted by Ecology through the NPDES (see previous section). Net pen operations must meet the siting guidelines and the conditions set forth in the NPDES permit. The permits place strict requirements for monitoring and reporting. Net pen operators must report feed (feed must be the minimum amount necessary to maintain fish growth and minimize waste), biomass, antibiotic, and chemical usage monthly. Net pen operators must monitor the sediment deposits below the pens for accumulation of organic material and possible adverse impacts to benthic life. The purpose of these requirements is to protect state waters and resources.

6 POTENTIAL IMPACT OF LIKELY DEVELOPMENT AND EFFECTS OF SMP

As discussed previously, WAC 173-26-186(8)(d) directs local SMPs to evaluate and consider cumulative impacts of "reasonably foreseeable future development on shoreline ecological functions." In the City, the most commonly anticipated changes in shoreline development involve residential development (including redevelopment). Common impacts associated with shoreline residential development include upland impacts (e.g. clearing, grading, and impervious surfaces) as well as shoreline and aquatic impacts (e.g. overwater coverage and shoreline armoring).

Although future development in the City may include other less common types of development, the location, timing, and impacts of less common uses and development projects are less predictable. WAC 173-26-201(3(d)(iii) states:

> *For those projects and uses with unanticipatable or uncommon impacts that cannot be reasonably identified at the time of master program development, the master program policies and regulations should use the permitting or conditional use permitting processes to ensure that all impacts are addressed and that there is not net loss of ecological function of the shoreline after mitigation.*

Because such less common types of development will be required to demonstrate no net loss on an individual basis, they will generally not be addressed in great detail in this cumulative impacts analysis.

As directed by the Guidelines, the policies and regulations of the SMP must ensure that cumulative impacts do not result in a net loss of ecosystem functions. A general discussion of the likely effects of the SMP on shoreline uses and modifications is provided in Section 4 of this report. The following discussion provides a more in-depth discussion of the potential impacts of anticipated developments and the effects of the SMP on the City's shorelines.

6.1 Summary of Potential Impacts Associated with Upland Residential Development and Effects of SMP

The most commonly anticipated shoreline uses and developments in the City are residential in character. The residential use and development of shoreline uplands (in-water development is addressed in subsequent sections of this chapter), including accessory development such as utility and transportation infrastructure, generally involves impacts to shoreline ecological functions that result from the replacement of pervious, vegetated areas with impervious surfaces and/or a landscape management regime that includes chemical treatments of lawn and landscaping. However, it is

important to recognize that the impacts of development will vary depending on the type of shoreline habitat. The significance of marine riparian areas and the potential impacts of residential development along the shorelines of the City are addressed in greater depth in the *Addendum to Summary of Science Report* (Herrera 2011a). Table 6-1 summarizes potential impacts to shoreline ecological functions associated with upland development and key countermeasures contained in the SMP.

Table 6-1. Summary of Potential Impacts to Shoreline Ecological Functions Associated with Upland Development in Shoreline Jurisdiction and SMP Countermeasures.

Shoreline Ecological Function	Potential Impacts to Shoreline Ecological Function Associated with Upland Development	SMP Countermeasures
Hydrologic	• Increase in stormwater runoff and discharge in association with more impervious surfaces • Disruption of shoreline wetlands • Hydrologic impacts as a result of associated shoreline stabilization measures (see Section 6.3)	• Environment designations concentrate development in least sensitive areas • Compliance with stormwater manual required • Mitigation standards for vegetation clearing • Low impact development techniques must be employed if possible • Shoreline critical areas provisions
Water quality	• Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons) • Increase in pesticide and fertilizer use • Increased erosion and increased turbidity • Water quality contamination from failed septic systems	• Compliance with stormwater manual required • Low impact development techniques must be employed if possible • BMPs to minimize construction-related erosion and sedimentation • Provisions addressing pesticide, herbicide, and fertilizer use • Vegetated buffer standards • Requirements for reducing water quality impacts from septic systems
Shoreline vegetation	• Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing • Vegetation clearing can result in reduced shoreline habitat complexity, increased temperatures and desiccation in specific habitats, and less LWD	• Vegetated buffer standards • Vegetation clearing limitations • Lot coverage limitations • Mitigation standards for vegetation clearing
Habitat	• Loss of or disturbance to riparian habitat during upland development • Lighting effects on both fish and wildlife in nearshore areas • Increase in pesticide and fertilizer inputs - direct toxicity to forage fish and juvenile salmon • Vegetation clearing can result in reduced shoreline habitat complexity, increased temperatures and desiccation in specific	• Vegetated buffer standards • Mitigation standards for vegetation clearing • Limitations on extent of shoreline armoring • Water Quality standards restrict application of pesticides, herbicides, or fertilizers [4.1.6.5 (12)

Shoreline Ecological Function	Potential Impacts to Shoreline Ecological Function Associated with Upland Development	SMP Countermeasures
	habitats, and less LWD	

The following specific provisions help to avoid a net loss of shoreline function from the residential use and development of shoreline uplands:

- Locate and design residential development to avoid the need for shoreline stabilization for the life of the structure (5.11.5(1.)(a.)).

- Locate and design residential development to protect ecological functions by minimizing the area of soil disturbance, minimizing soil compaction, and infiltrating stormwater runoff, as suitable (5.11.5(1.)(b.)).

Given the myriad of vegetative functions identified above, to the extent that impervious surfaces replace vegetation, it is important that these surfaces are separated from the shoreline waterbody by intact vegetation. The amount of space and extent of vegetation between the shoreline and a structure provides a quick evaluation of shoreline condition. To conserve and protect shoreline vegetation while allowing for flexible development approaches, the SMP provides shoreline residential property owners with two Shoreline Buffer dimensioning options:

1. Develop site-specific Shoreline Buffer standards based on a Habitat Management Plan, provided that the proposed standards are as protective as the standard buffers and that the alternative proposal meets all other standards of the SMP including mitigation sequencing; or

2. Apply the standard Shoreline Buffer dimensions prescribed in the SMP, shown below in Table 6-2.

Table 6-2. SMP Standard Shoreline Buffers.

	Natural	Island Conservancy	Shoreline Residential Conservancy	Shoreline Residential	Urban
Category A	200 ft	150 ft	115 ft	75 ft	30 ft
Category B	200 ft[1]	100 ft[1]	75 ft[1]	50 ft[1]	30 ft[1]
Undeveloped Lots	N/A	150 ft	150 ft	75/150 ft[2]	30 ft

[1]For high bluff properties the greater distance of 50 feet from the top of the bluff or the standard shoreline buffer.
[2]If adjacent to the Priority Aquatic district, then 150 feet is required.

The City's standard Shoreline Buffer dimensions were developed for each environment designation, taking into account the scientific basis for buffer functions, shoreforms, and existing vegetative conditions (Herrera 2011b&c). The proposed buffer and setback

scheme, as described below, is expected to maintain riparian buffer functions consistent with average existing condition in each environment designation. The Shoreline Buffer is separated into two zones: Zone 1 encompasses the 30 feet closest to the water and expands to include existing native vegetation, while Zone 2 encompasses the remaining area of the shoreline buffer. Where lots have at least 65 percent canopy cover in Zone 1, or occur on spit/barrier/backshore, marsh/lagoon, or bedrock shoreforms, Buffer Category A buffers apply. Where lots have a depth of less than 200 feet or occur on a high bluff shoreform, Buffer Category B buffers apply. Buffer Category B buffers are less restrictive to allow for reasonable use of properties with dimensional constraints. For properties with high bluffs, the greater of the standard Shoreline Buffer or 50 feet from the top of bluff applies. Vegetation at the toe and top of a bluff plays a significant role in bluff stabilization, which allows for natural rates of sediment erosion without necessitating shoreline stabilization measures. The minimum 50-foot buffer from the top of bluff helps ensure that stabilizing vegetation will be maintained. The Shoreline Buffer is to be maintained in a primarily natural vegetated state, and only specific, limited modifications are allowed. These regulations promote the conservation and continued development of vegetative functions within shoreline jurisdiction.

The SMP also establishes building setback standards based on the setbacks of existing neighboring development. Where neighboring development occurs within the Shoreline Buffer, the Shoreline Buffer may be reduced, but never waterward of the landward limit of Zone 1. This provision acknowledges differences in existing buffer widths and functions, and allows development to occur consistent with the existing conditions, while ensuring that existing vegetated functions remain intact.

In addition to Shoreline Buffer standards, the proposed SMP establishes stream buffers ranging from a total of 50 to 150 feet (including water quality and habitat buffer), depending on the stream category. Where wetlands occur within shoreline jurisdiction, wetland buffers range from a total of 25 to 300 feet (including water quality and habitat buffer) depending on the wetland scoring and intensity of land use. In lieu of a habitat buffer, an approved Habitat Management Plan may be implemented. Building setbacks of 15 feet are required beyond any stream or wetland buffer.

The proposed SMP also incorporates a standard that applies outside the Shoreline Buffer and within the shoreline jurisdiction that requires tree retention to achieve the standard of no net loss of ecological functions.

The proposed SMP specifies that all development, including shoreline residential development, must follow mitigation sequencing to avoid adverse impacts to the shoreline environment. In reviewing and approving shoreline developments, the shoreline administrator will condition shoreline development to ensure that the no net loss standard is met, and the shoreline administrator may modify site plans or require additional mitigation (either through a site specific mitigation plan or the Standard Residential Mitigation Table) to ensure that the no net loss standard is met.

Potential stormwater impacts of residential development will be minimized through the proposed SMP provisions that require the implementation of low impact development techniques if a site allows for such an approach. Where sewer lines occur within 200 feet of a new residence or business, it must connect to that sewer line. Where sewer lines are not available, on-site sewage systems must be located on the landward side of the building, if feasible, to limit sewage from contaminating shoreline waterbodies.

In summary, new residences and substantial remodels/additions are the primary shoreline use and development activities anticipated to occur in the City's shorelines. The combination of (1) protective shoreline buffers that are tailored to particular shoreforms and existing conditions, (2) shoreline structure setback standards that are specifically driven by existing site-specific conditions, and (3) measures in the SMP specifically focused on ensuring that residential development does not adversely affect shoreline function, are expected to maintain ecological functions of the shoreline over the long term, thereby resulting in no net loss of shoreline ecological function.

6.2 Overwater Structures

The term overwater structures, as used here, includes both overwater and in-water structures. Common overwater structures in the City include piers, docks, and buoys. Less common overwater structures include boardwalks and floating net pens for salmon aquaculture. The potential effects of common overwater structures are discussed in greater detail in the *Addendum to Summary of Science Report* (Herrera 2011a).

6.2.1 Piers and Docks

Piers and docks can adversely affect ecological functions and habitat in the following ways:

- Alter patterns of light transmission to the water column, affecting macrophyte growth and altering habitat for and behavior of aquatic organisms, including juvenile salmon.
- Interfere with long-shore movement of sediments, altering substrate composition and development.
- Contribute to contamination of surface water from chemical treatments of structural materials and related boating uses.

Table 6-3 identifies the general potential impacts of overwater structures in the City and key countermeasures contained in the SMP.

Table 6-3. Summary of Potential Impacts Associated with Overwater Structures in Shoreline Jurisdiction and SMP Countermeasures.

Shoreline Function	Potential Impacts to Shoreline Function	SMP Countermeasures
Hydrologic	• Potential interference with movement of sediments, altering substrate composition and development	• New boating facilities to be located on stable shorelines, where the need for maintenance dredging is minimized • Marinas prohibited from areas with significant ecological functions that could be impacted (e.g. feeder bluffs, salt marshes, mud flats, lagoons, fish spawning and rearing areas) • When maintenance dredging of marina entrances impairs littoral drift processes, periodic replenishment of sediment will be required • Pilings must be spaced to limit hydrologic impacts
Water quality	• Water quality impacts associated with construction of docks and other in-water structures (e.g., spills, harmful materials use) • Water quality impacts associated with related uses of new docks (e.g., boat maintenance and operation)	• Toxic wood preservatives are prohibited • Pumpout and other waste disposal facilities required for new marinas • Floating homes prohibited and live aboard boats limited to the lesser of 10% of marina capacity or 10% of marina surface area. • Marina location standards to avoid areas sensitive to water quality impacts
Shoreline vegetation	• Increased shading in nearshore habitat areas resulting from dock and pier construction can limit macrophyte growth • Associated loss of riparian vegetation increases the potential for erosion, bank instability, turbidity, and higher water temperatures	• New overwater structures prohibited in the Priority Aquatic environment, which includes areas of significant aquatic vegetation • Location and dimensional standards for piers to avoid and minimize impacts to aquatic vegetation • Mitigation standards for new structures may include planting of shoreline vegetation • Mitigation required for vegetation removal
Habitat	• Increased shading in nearshore habitat areas resulting from dock and pier construction can limit macrophyte growth, and alter habitat for and behavior of aquatic organisms • Substrate disturbance from pilings and anchors • Nighttime lighting effects on fish behavior • Loss of habitat for benthic community, less LWD for habitat complexity	• Dimensional standards to minimize extent of overwater cover • Decking standards to maximize light penetration • New boat houses and covered moorage prohibited • Lighting effects to be limited • Marinas prohibited from areas with significant ecological functions that could be impacted (e.g. feeder bluffs, salt marshes, mud flats, lagoons, fish spawning and rearing areas)

Overwater structures in the City are primarily associated with residential development, marinas, and other public moorage facilities. Given existing site conditions and SMP provisions that limit potential areas where piers may be constructed, a total of 155 new piers or docks could be constructed within the City's shoreline jurisdiction (see Subsection 3.3.1 for methods used to determine potential for new overwater structures). However, the actual number of docks likely to be constructed based on past permitting information is much lower, at a total of 24, only 22 of which could actually be built given existing conditions and SMP provisions (see Section 3.3). In addition to new docks, expansion, repair, and reconstruction of docks is also anticipated. The SMP provides dimensional and materials standards to limit overwater coverage, particularly in the nearshore area; avoid impacts to aquatic vegetation; allow maximal light penetration; and limit impacts of piles.

Mitigation measures for overwater structures encouraged by WDFW include the installation of grated decking, removal of unused piles (especially those formerly treated with creosote), reduction of pile size and quantity on modified structures, and general reduction in overall square footage of cover. Any new or replacement structure would require a Hydraulic Project Approval from WDFW and a Section 10 Rivers and Harbors Act permit from the Corps. Because of the presence of listed salmonids, a Corps permit would also entail consultation with the National Marine Fisheries Service to comply with the Endangered Species Act. These agencies would likely require similar mitigation measures noted above for WDFW.

The number of existing piers in the City far outnumbers the 22 piers that are likely to be constructed in the next 20 years. As existing piers are repaired and rebuilt, they will need to conform with dimensional and material standards that are expected to reduce their impact to hydrologic, vegetative, and habitat functions in the nearshore environment over time. The improvements associated with the reconstruction of these structures are expected to offset new impacts associated with the construction of a limited number of new piers.

6.2.2 Mooring Buoys

Mooring buoys are used as semi-permanent vessel moorage. The effects of mooring buoys are generally limited to substrate disturbance and water quality concerns from piling materials and associated boating relating activities if designed properly (i.e., permitted by the Washington Department of Natural Resources) and constructed of non-toxic materials. Overwater shading is generally not a significant impact of buoys. The proposed SMP establishes a preference from the use of mooring buoys rather than fixed piers because of their reduced ecological impact. The SMP limits mooring buoys to one per property or one per every 100 feet of shoreline and specifies that moorage buoys shall be located offshore at a minimum depth of 9 feet below mean lower low water. This positioning further limits the impacts of moorage buoys on marine nearshore

functions. In summary, moorage buoys are not expected to result in a net loss of shoreline functions.

6.2.3 Net-pen Aquaculture

A single net-pen aquaculture facility occurs in the Rich Passage Management Area. Floating net pens and associated aquaculture practices pose concerns for water quality and benthic habitat conditions. These concerns are generally regulated through NPDES permits written and managed by Ecology, which contain conditions and requirements to protect state and federal water quality laws and standards and include requirements for monitoring and reporting. In the proposed SMP, aquaculture is only allowed as a conditional use, meaning that any proposed aquaculture development would need to demonstrate on an individual basis that the proposed development would result in no net loss of ecological functions. The SMP also provides that the installation of net pens must not cause cumulative environmental impacts, and that net pens may be no closer than one mile from another net pen, unless it is demonstrated that such density would not result in adverse cumulative impacts to the shoreline environment.

The combined effects of the City's proposed SMP and permit review by WDFW and the Corps is expected to result in no change in shoreline impacts from net pen aquaculture over time.

6.3 Shoreline Stabilization

The impacts of shoreline stabilization in the City's nearshore environment are discussed in detail in the *Addendum to Summary of Science Report* (Herrera 2011a). Compared to an unaltered shoreline environment, shoreline armoring typically has the following effects on ecological functions:

- Reduction in nearshore habitat quality for both aquatic and terrestrial species. Specifically, shoreline complexity and emergent vegetation that provide forage and cover may be reduced or eliminated. The loss of eelgrass and other submerged aquatic vegetation. Shoreline armoring that extends into the intertidal zone in particular limits shallow nearshore habitat, as well as beach and forage fish spawning habitat. Sediment recruitment and transport processes are particularly affected by shoreline armoring at the base of potential eroding bluffs.

- Reduction of natural sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and preserve shallow water conditions.

Table 6-4 identifies the general potential impacts of overwater structures in the City and the primary anticipated effects of the SMP.

Table 6-4. Summary of Potential Impacts Associated with Shoreline Armoring in Shoreline Jurisdiction and SMP Countermeasures.

Shoreline Function	Potential Impacts to Shoreline Function	SMP Countermeasures
Hydrologic	• Increase in wave energy at the shoreline resulting in increased nearshore turbulence, uprooting of aquatic vegetation, and reduced LWD retention (less applicable to rocky shore and marsh shoreforms) • Disruption of shoreline wetlands • Impoundment of sediment recruitment from backshore areas alters sediment balance, resulting in coarsening of substrate and loss of eelgrass bed (particularly significant for historical feeder bluffs, not applicable for rocky shore)	• Residential development to avoid the need for future stabilization Demonstration of need required for new stabilization • Feasibility of non-structural and soft-shoreline stabilization measures must be investigated prior to implementing hard shoreline stabilization • Mitigation requirements for new and replaced stabilization measures; repairs may require mitigation as well
Water quality	• Water quality impacts associated with construction • Removal of shoreline vegetation increases erosion and water temperatures	• Mitigation requirements for new and replaced stabilization measures; repairs may require mitigation as well
Shoreline vegetation	• Loss of aquatic vegetation • Potential associated loss of terrestrial vegetation increases potential for erosion, turbidity, and higher water temperatures	• Mitigation requirements for new and replaced shoreline stabilization measures; repairs may require mitigation as well
Habitat	• Reduction in nearshore habitat quality-loss of eelgrass beds associated with sediment coarsening. • Increased slope of the nearshore reduces shallow nearshore habitat area	• Shoreline stabilization prohibited in wetland and salmon and trout spawning areas • Feasibility of non-structural and soft-shoreline stabilization measures must be investigated prior to implementing hard shoreline stabilization • Mitigation requirements for new and replaced shoreline stabilization measures; repairs may require mitigation as well

The SMP sets standards for new, repaired, and replacement shoreline armoring. The proposed SMP establishes a preference for non-structural stabilization measures over structural measures. Structural shoreline stabilization measures with less adverse impact on natural functions, such as bioengineering, are strongly preferred over hard structural shoreline stabilization measures, such as seawalls and bulkheads.

Under the proposed SMP, new shoreline stabilization is only allowed if it is proven to be necessary to protect a primary structure. New or expanded armoring is not permitted for new non-water dependent structures unless non-structural approaches are shown to be infeasible, and it is demonstrated that the armoring is designed, located, sized and constructed so that it will not result in a net loss of shoreline function.

Replacement bulkheads may also be permitted if there is a demonstrated need to protect structures provided that these structures are located, designed, sized, and constructed to assure no net loss of ecological functions. Replacement stabilization may be constructed landward of the ordinary high water mark (OHWM) or in the same location as the existing structure.

Mitigation of adverse impacts is required of new, expanded, and replacement stabilization measures. Replacement of existing stabilization that occur waterward of OHWM would need to provide beach nourishment to compensate for the adverse impacts to sediment transport processes. Additionally, any fill waterward of OHWM would need to be mitigated by the removal of existing fill. If soft shoreline stabilization measures are employed to restore ecological functions, replacement structures may extend waterward of the OHWM.

The Corps and WDFW have jurisdiction over new shoreline stabilization projects, and repairs or modifications to existing shoreline stabilization. As part of their efforts to minimize and compensate for shoreline stabilization-related impacts, both agencies encourage implementation of native shoreline enhancement for new shoreline stabilization projects. Further, they also strongly promote shoreline restoration and additional impact compensation measures for many shoreline armoring modification projects, including placement of gravel at the toe of the armoring to create shallow-water habitat, angling the armored face landward to reduce wave turbulence, and shifting the armoring as far landward as feasible.

Based on an evaluation of the City's GIS data, outside of the Natural and Island Conservancy environments, where existing shoreline stabilization is limited to 19 percent and 5 percent of the total shoreline, respectively, between 40 and 70 percent of the remaining environments' shorelines are armored. Given the proposed SMP standards that require that new construction avoid the need for shoreline stabilization and require a demonstrated need for new and replacement shoreline stabilization measures, approvals for new hard shoreline stabilization are expected to be limited. Even in an analysis of past permitting trends, prior to the implementation of the above SMP standards, the number of permits for new hard shoreline stabilization measures was balanced by permits for new soft stabilization measures. The proposed SMP sets more stringent standards for shoreline stabilization measures than the existing SMP, except that the existing SMP prohibited shoreline stabilization at the toe of feeder bluffs, whereas shoreline stabilization at the toe of feeder bluffs could be allowed at the toe of feeder bluffs in the proposed SMP outside of the Natural or Island Conservancy designations. Once the proposed SMP is implemented, it is anticipated that fewer new shoreline stabilization measures will qualify to be permitted, and when they are permitted, a greater proportion will be soft armoring. On the other hand, given the abundance of armoring structures in the City, the need for repair and replacement armoring will likely continue. Replacement stabilization measures will be required to

minimize and mitigate for impacts, and mitigation measures may be required for repairs of existing stabilization.

Over time, the combined effects of the City's proposed SMP and permit reviews from the WDFW and the Corps are expected to result in a reduction over time of the net amount of hardened shoreline at the ordinary high water mark, a reduction in the effects of armoring on hydrologic and geomorphic processes, and an increase in shallow-water habitat within the City's shoreline environment.

7 Cumulative Effects on Shoreline Functions

This chapter provides a summary analysis of the likely cumulative effects on shoreline functions anticipated in each management area based on existing conditions, potential and anticipated development, the effects of the proposed SMP provisions, and other relevant regulatory and non-regulatory programs.

7.1 Agate Passage (MA-1)

Based on past permitting trends in the Agate Passage Management Area, single-family residential development and additions/expansions to existing residential development are among the most likely changes to occur within the management area. Several clearing permits were also issued in the Residential Conservancy environment, and these could be associated with residential development. While potential for subdivision exists in this management area, based on permitting history, subdivisions are not anticipated.

Where high bluffs occur, as in the Residential Conservancy environment, standard Shoreline Buffers are expected to maintain stabilization functions of existing vegetation, and setback standards will keep development further from the bluff edge. Approximately 12 overwater structures could be constructed, but based on past permitting trends only two new docks are likely in the next 20 years, and many more mooring buoys are likely to be added. The majority of existing parcels are armored in both environment designations, and existing armoring may need to be repaired or replaced. Existing armoring at the toe of feeder bluffs within the management area is likely to remain if it is protecting a primary structure, although minimization and mitigation measures to limit associated impairments of ecological functions and/or processes would be required as these features are replaced, and mitigation may be required for bulkhead repairs. These mitigation measures would be important to maintain existing ecological functions given the impairment to existing shoreline processes.

If restoration and protection opportunities identified in the *Shoreline Restoration Plan* were implemented, there is the potential to improve existing sediment transport functions and processes. Based on past permitting trends and the protected/semi-protected nature of shorelines within the management area, it is unlikely that substantial new shoreline stabilization measures would be permitted. In summary, the likely changes in the Agate Passage Management Area include limited shoreline residential development and expansion, minimal development and repair of piers, and repair and replacement of shoreline stabilization measures. Based on the discussion of these impacts in Section 6, above, no net loss of shoreline functions is anticipated in the Agate Passage Management Area.

7.2 Port Madison Bay (MA-2)

Substantial shoreline residential development is anticipated in the highly developed Port Madison Bay Shoreline Residential environment, and to a lesser extent in the Residential Conservancy environment. The most likely development activities include new and expanded single-family residences, new accessory structures and development, clearing, new buoys, new and replacement docks, and piling replacement. The potential for new development of vacant lots and through subdivision is less than the projected number of new residential developments (39 lot potential versus 50 lots projected); therefore, redevelopment of existing homes would be likely in addition to construction on vacant or subdivided lots.

No new development is anticipated on the permanently protected Bloedel Reserve in the Island Conservancy environment, which encompasses ecologically significant feeder bluffs in the management area. The Port Madison Community Shellfish Farm presently operates in the Bloedel Reserve, and the project is designed to maintain and improve shoreline functions while engaging residents in environmental stewardship. Some intensification of recreational uses and facilities, including replacement of the existing pier could be anticipated in Hidden Cove Park, recently acquired by the BIMPRD. As noted in the *Shoreline Restoration Plan*, the park also offers opportunities to reduce the impact of past shoreline development, including actions to remove hard shoreline stabilization, revegetate shorelines, and retrofit docks to minimize impacts on nearshore fish habitat.

At least eight marinas are present in the management area, and a substantial number of private docks occur within Port Madison Bay. The proposed SMP sets limits on the location of new marinas to avoid sensitive shoreline areas and to be located in areas with sufficient mixing and flushing to avoid adverse effects to water quality. New and existing marinas would need to comply with several provisions to limit water quality impacts. An additional 12 residential docks could be expected in the Shoreline Residential environment in the next 20 years. New docks would be prohibited for the Priority Aquatic A~~Aquatic Conservancy~~ environment, and only joint use docks would be permitted in the Priority Aquatic B environment. New dock development would

need to comply with location, design, siting, and construction requirements to avoid and minimize impacts, as well as mitigate for any unavoidable impacts. As docks are repaired and replaced and associated minimization and mitigation measures implemented within the Shoreline Residential environment, the impact of overwater structures is anticipated to decrease over time.

Where shoreline stabilization measures are demonstrated to be required, SMP provisions would limit their continued effects on shoreline processes by encouraging non-structural and soft structural approaches, and requiring minimization and mitigation measures to address the long-term impacts associated with new or replacement stabilization measures. In addition to regulatory mechanisms to maintain shoreline functions, voluntary restoration is underway at the Port Madison private beach. This effort will reduce hard shoreline stabilization measures and restore sediment processes, potential forage fish spawning habitat, and rearing habitat for juvenile salmonids along more than 1,500 feet of shoreline

In summary, although substantial residential development is anticipated in the management area, feeder bluffs, critical to maintaining shoreline functions within the management area would be protected from development. The impacts of development of residences and associated overwater structures and/or shoreline stabilization measures will be limited by SMP standards (see Section 6 above). Planned voluntary restoration and conservation measures should help ensure that shoreline functions are maintained or improved over time in this shoreline management area.

7.3 Rolling Bay-Point Monroe (MA-3)

The Rolling Bay-Point Monroe Management Area is predominantly composed of shoreline residential development. The management area is predominantly designated as Shoreline Residential, which includes Point Monroe, and the management area also includes Residential Conservancy, Island Conservancy in Faye Bainbridge Park, and a small area of Natural environment at the tip of the Point Monroe spit. Minimal development in the Shoreline Residential and Island Conservancy environments is expected. Within Faye Bainbridge Park, control of non-native, invasive vegetation and replanting of native dune grass is underway. The project is expected to improve the connectivity of native vegetation and benefit native shorebirds and other wildlife. The lagoon formed by the spit at Point Monroe is proposed as Priority Aquatic designation, and as such, dredging and new overwater structures would be prohibited by the proposed SMP.

New residential development is anticipated, and this development could be accommodated on existing vacant lots in the Residential Conservancy. Vacant lots and subdivision potential are more limited in the Shoreline Residential environment, where redevelopment of existing homes would be more likely. On Point Monroe, any future development is limited by the lack of adequate wastewater storage or treatment capacity. The repair and replacement of hard shoreline stabilization measures are likely

to continue in the shoreline residential environment, but if new houses are developed, they will need to ensure that shoreline stabilization will not be required to protect the primary structure. This provision should limit the proliferation of hard shoreline stabilization measures.

The Residential Conservancy environment is primarily composed of high bluff shoreforms, and frequently residential structures and accessory uses are built up to the edge of active feeder bluffs. Given these conditions and past permitting trends, continued proposals for replacement and repair of hard shoreline stabilization are anticipated. In such cases, hard shoreline armoring will not be allowed further waterward than existing stabilization measures, and mitigation for impacts to feeder bluff processes and functions will help to maintain shoreline functions, despite impaired processes. Where new residential development is proposed, buffer and setback regulations will ensure that where existing vegetation remains, it will be retained, and at a minimum applicants must demonstrate that shoreline armoring will not be required to protect new residential developments for the life of the structure or subdivided properties for the next 100 years. Acquisition of undeveloped parcels on feeder bluffs or acquisition and subsequent restoration of developed properties on Point Monroe, as proposed in the *Shoreline Restoration Plan*, would allow for natural functions and/or processes to be maintained or restored.

Based on past permitting data, two new piers would be anticipated in the Residential Conservancy environment, and ten additional docks could be constructed in the Shoreline Residential environment. These docks would need to conform with location and design requirements to avoid and minimize impacts, as well as mitigate for any unavoidable impacts. As docks are repaired and replaced and associated minimization and mitigation measures implemented on the lagoon side of Point Monroe, the overall impact of piers in the lagoon are expected to decrease over time. As noted above, no additional piers would be allowed in the Priority Aquatic environment.

In summary, despite substantial residential development and redevelopment potential within the Rolling Bay-Point Monroe Management Area, SMP regulations are expected to result in no net loss of ecosystem function.

7.4 Murden Cove (MA-4)

Similar to the other management areas, the Murden Cove Management Area is dominated by residential uses. Shoreline armoring and overwater structures occur relatively infrequently compared to other management areas, and the management area includes some of the least altered high bluff and marsh/lagoon reaches in the City. In particular, the Murden Cove pocket estuary and Manitou Beach salt marshes provide significant nearshore fish and wildlife habitat.

The shoreline is predominantly designated as Residential Conservancy and Shoreline Residential environments. The Natural environment covers the alluvial fan for Murden Cove Creek, and limited uses and modifications allowed in the environment designation help ensure that this ecologically productive area is conserved. A small area of undeveloped salt marsh is included in the Island Conservancy environment. The *Shoreline Restoration Plan* identifies the opportunity to increase the habitat connectivity of this salt marsh among the key restoration opportunities within the management area. Project feasibility has been completed, so project implementation is likely.

In the Shoreline Residential and Residential Conservancy environment, the most likely actions projected to occur include new and expanded single-family residences, new accessory structures and development, and clearing. Based on permitting trends, applications for new, repaired, and replacement hard shoreline stabilization measures could also be anticipated; however, applicants for any new or replacement stabilization measures would need to demonstrate that shoreline stabilization is needed to protect a primary structure and that the use of non-structural or soft stabilization measures is not feasible. In the Priority Aquatic environment in Murden Cove, hard shoreline stabilization measures would be prohibited.

Where new development occurs, shoreline residences would need to comply with buffer and setback standards (see Section 6.1), and applicants for new development or subdivision would need to demonstrate that shoreline stabilization would not be needed. Therefore, over time, it is anticipated that softer shoreline stabilization measures will replace existing hard shoreline stabilization, and the addition of new stabilization measures will be limited.

New overwater structures would be prohibited in the Murden Cove Management Area.

In summary, use provisions in the Natural and Island Conservancy designations are expected to limit development in the highest functioning and most ecologically significant areas in the management area. SMP standards are expected to change future trends in the construction and replacement of shoreline stabilization measures, such that the installation of new shoreline stabilization measures are significantly limited, and the impact of existing shoreline stabilization is gradually lessened over time through the incorporation of soft stabilization or non-structural stabilization measures.

7.5 Eagle Harbor (MA-5)

Eagle Harbor includes the shoreline area in the City with the highest level of existing use, and correspondingly, some of the most highly impacted areas in the City. Anticipated permitting activity in the Eagle Harbor Management Area is also among the highest in the City. The management area has high impervious surface coverage, high outfall densities, a high rate of armoring in the intertidal zone, and low vegetation coverage compared to other areas in the City. Superfund sites, 303(d) Clean Water Act

listings for chemicals and heavy metals, and recreational shellfish closures/warnings indicate significant issues with water quality contamination.

Limited development is anticipated in the Island Conservancy and Natural environment. Dredging, new overwater structures, and hard shoreline stabilization would be prohibited in the Priority Aquatic environment; this should help to maintain the higher functioning in harbor area of the management area. In the Island Conservancy environment nearshore restoration has been among the more common activities permitted in recent years. This trend is likely to continue as restoration actions associated with superfund clean-up and other restoration efforts within the Island Conservancy environment proceed. One effort presently underway is the planting of eelgrass in holes left from the removal of Milwaukee Dock pilings associated with the Wyckoff Superfund site. In the Winslow area, a feasibility assessment has been completed for the removal of 500 feet of bulkhead in the City's Waterfront Park. This project, which may be implemented in the future, would reconnect the upper intertidal beach to the nearshore environment, allowing for more natural sediment transport processes in the area and improved habitat connectivity.

Common development and use actions projected in the Residential Conservancy environment include expanded single-family residences, new accessory structures and development, clearing, and hard shoreline stabilization repair. The Shoreline Residential environment is projected to see a relatively high amount of shoreline development activity, including new and expanded single-family residences, new accessory structures, addition, repair, and replacement of shoreline stabilization measures, clearing, and new buoys. Shoreline buffers, setbacks, and vegetation conservation standards will play a critical role in maintaining shoreline functions despite increasing residential development in Eagle Harbor. Many existing residences in Eagle Harbor and in the southern portion of the management area are lacking native vegetation. In these cases, where redevelopment occurs, buffer standards are expected to increase the level of buffer filtration functions and offset additional impacts from new development. Given the intensity of development, existing water quality impairments, and the natural geography of Eagle Harbor that limits circulation, water quality control measures will be critical to ensure that water quality is not further degraded.

In the Urban environment, projected development is more modest, with common development including the expansion of commercial and institutional uses, clearing, piling repair and replacement, and float replacement. Specific SMP provisions apply to commercial piers and docks to ensure that oil and toxic materials are not introduced to the waterbody. The SMP also requires that spill clean-up facilities are available for rapid response to any potential incidents that would have the potential to impair water quality. Storage and disposal of industrial wastes is also prohibited within shoreline jurisdiction.

One public open water moorage and anchoring area exists presently in Eagle Harbor, and the proposed SMP provides that only one such facility is allowed in the City. Although several new piers could be developed in the Residential Conservancy, Shoreline Residential, and Urban environments, past permitting trendsdo not indicate any new pier construction in recent years in the Eagle Harbor Management Area. However, at least one new pier is planned and already permitted through a conditional use permit at the Japanese American Memorial site in Pritchard Park. As existing piers and docks for private residences and marinas are repaired and replaced over time, required measures to avoid, minimize and mitigate for impacts should result in an improvement in habitat structure over time.

In summary, despite ongoing residential and commercial development in the Eagle Harbor Management Area, SMP provisions are anticipated to result in no net loss of ecological functions. Ongoing and planned restoration actions in the management area should provide an increase in ecological functions.

7.6 Blakely Harbor (MA-6)

The Blakely Harbor Management Area is dominated by single-family residential development, and in contrast to Eagle Harbor, it has the lowest level of shoreline armoring and highest natural functions in the City.

The westernmost portion of Blakely Harbor, including the historical sawmill that is now public parkland, is designated as Island Conservancy environment. Anticipated development in this portion of the Island Conservancy environment is limited to intensification of recreational uses and modifications accessory to such use, including placement of a restroom, maintaining a meadow, and developing a new bridge and kiosk. The site is constrained by contamination from the prior lumber mill activity and State guidelines related to the contamination. The *Shoreline Restoration Plan* identifies significant restoration potential of the sawmill pond to restore connectivity of the pocket estuary and significant salmonid rearing habitat. However, the cultural and historical significance of the sawmill and its structures impose significant constraints that make complete site restoration a long-range prospect. At the eastern end of Blakely Harbor, a golf course is also included in the Island Conservancy environment. Kelp bed restoration is underway to improve aquatic habitat along this rocky shoreline.

In the Residential Conservancy and Shoreline Residential environments, clearing and the development of new and expanded single-family residences were common. Limited additional clearing is anticipated, as only 4 lots offer the potential for new development in the Shoreline Residential and Residential Conservancy environments, respectively. It is anticipated that the majority of residential development will occur as redevelopment of existing developed lots. As discussed above in Section 6.1, Shoreline Buffers, setbacks, and vegetation conservation standards will be critical to ensure that

environmental impacts are avoided, minimized, and mitigated when these new developments occur.

There are relatively few existing piers within Blakely Harbor, and no new single-use piers would be permitted based on SMP provisions. A total of two community piers and on public pier may be permitted in Blakely Harbor through a conditional use permit. There is potential for limited shoreline improvement if existing piers are replaced.

Past permitting trends indicate that there may be demand for new, repaired, and replacement hard shoreline stabilization measures in the foreseeable future. SMP provisions for new development and shoreline stabilization measures would limit new shoreline stabilization measures. Applicants for new development or subdivision would need to demonstrate that shoreline stabilization would not be needed. Non-structural and soft structural stabilization would be required where practical, and where hard shoreline stabilization measures are demonstrated to be required, minimization and mitigation measures would be implemented to ensure non net loss of ecosystem functions on a site specific basis.

In summary, with strict implementation of the SMP provisions, ecological functions should be maintained. If restoration at the sawmill site is pursued, a significant improvement in ecological functions throughout the management area would be expected.

7.7 Rich Passage (MA-7)

Shoreline uses are primarily residential, and also include road frontage, a park with a boat launch and public access, a restored estuary, an Atlantic salmon commercial fish farm, and a sewage treatment outfall. The management area is impacted by significant impervious surface coverage, vertical concrete armoring and a high density of shoreline modifications (groins, docks, buoys, and boat ramps).

Little development activity is projected to occur in the Island Conservancy, Residential Conservancy, or Urban environments.

In the Island Conservancy environment Fort Ward Park was recently transferred from State ownership to the BIMPRD. This site presents excellent restoration opportunities because it is in public ownership and there have been numerous alterations to the environment that could be easily corrected. The Bainbridge Island Shoreline Restoration Plan recommends a revegetation and invasive species removal project at Fort Ward Park.

Fish pen aquaculture is expected to continue within the Rich Passage environment, and ongoing uses will be regulated by the SMP, as well and state and federal regulations

(See 6.2.3 above). No additional piers are permitted given SMP provisions in the Rich Passage Management Area.

The Shoreline Residential environment in Rich Passage is highly developed, and the shoreline setbacks and existing vegetation separating the shoreline from the primary structure vary throughout the environment designation; many existing residences have no native vegetation separating the shoreline from the structure. Based on past permitting activity and potential land capacity, the Shoreline Residential environment is projected to see a very high level of applications for new and expanded single-family residences, new accessory development, clearing, hard shoreline stabilization addition, repair and replacement, and new buoys. As with other management areas, Shoreline Buffers, setbacks, and vegetation conservation standards will be critical to ensuring no net loss in this environment designation. Although new residential development would need to be built to avoid the need for future shoreline stabilization, given the proximity and position of many houses to the shoreline (particularly in the western portion of the Shoreline Residential environment), hard structural shoreline stabilization measures may be required to protect primary structures. Where hard structural stabilization is replaced, it will require appropriate minimization and mitigation measures to avoid long term adverse ecological impacts.

SMP provisions are expected to maintain the existing functions in the Rich Passage environment in the near-term. To the extent that the processes (e.g., sediment transport and filtration), which drive functional conditions, are degraded in the environment designation, functions could continue to degrade somewhat in the Rich Passage Management Area over an extended timeframe. It is anticipated that a minor loss of functions in the Rich Passage Management Area would be offset by net increases in functions anticipated in several other management areas or if parkland restoration occurs in this management area.

7.8 Point White-Battle Point (MA-8)

Shoreline development in the Point White-Battle Point Management Area is primarily residential. Shoreline Residential and Residential Conservancy environment designations comprise the majority of the shoreline. In the southern portion of the management area, a road runs along the shoreline, separating residential development from the shoreline. The presence of the road will limit vegetative impacts from future development and redevelopment in this area, but stormwater management will still be a significant concern. Past permitting trends indicate that underground tank removals are likely in both the Shoreline Residential and Residential Conservancy environments. Underground tank removals generally refer to the removal of underground oil tanks or septic upgrades, which represent a positive trend toward limiting possible pollutant sources within the management area. In general, existing residential uses in the Shoreline Residential environment designation have limited buffer vegetation and minimal setbacks. In the Residential Conservancy environment, shoreline vegetation

and setbacks are generally greater, thus the greater Shoreline Buffer widths in the Residential Conservancy environment in the proposed SMP are appropriate to maintain existing functions.

In the past, periodic dredging has occurred in Fletcher Bay to maintain a navigational channel for privately moored boats within the lagoon . The proposed SMP would prohibit dredging in areas designated as Priority Aquatic in Fletcher Bay unless part of a restoration project. This would limit future impacts to hydrological and sediment processes and habitat in the ecologically significant bay. Despite the limited wave activity and erosive forces in Fletcher Bay, several residences have extensive hard shoreline stabilization measures. Given the protected positioning, the proposed SMP regulations would likely require either non-structural or soft stabilization measures when existing structures require replacement. This would result in a gradual reduction in nearshore habitat impacts over time.

Although there is the potential for several new piers to be installed, based on past permitting trends, only a couple of new piers are likely in the Shoreline Residential environment, presumably in Fletcher Bay. As existing piers in Fletcher Bay are repaired and replaced, minimization and mitigation measures in the SMP are expected to reduce the existing impacts and offset the impacts of minimal development of new piers in the management area.

Minimal development activity is expected in the Island Conservancy and Urban environments; in fact, permit records do not show any activity within these environments within the past ten years. Proposed SMP regulations should ensure that the ecological value of these sites, including a barrier beach/lagoon at Battle Point, is maintained.

Overall, SMP provisions are expected to maintain ecological functions in the Point White-Battle Point Management Area.

7.9 Manzanita Bay (MA-9)

Shoreline development in Manzanita Bay is primarily residential, and the majority of the management area is designated as Shoreline Residential environment. Vegetative functions are high within the management area, but shoreline armoring is also prevalent.

In the Shoreline Residential environment, more common development and use actions projected to occur in the future include new and expanded single-family residences, new accessory structures and development, and pier replacement. Projected new residential development could be accommodated on existing vacant lots.

Several permits were issued in the past ten years for replacement of hard shoreline stabilization. Several of the existing residences have minimal shoreline setbacks, and in

these cases, future replacement of hard shoreline stabilization measures may be required to protect primary structures; however, given the protected waters of Manzanita Bay and the proposed provisions of the SMP, it is likely that many other existing shoreline stabilization measures would be replaced with non-structural or soft stabilization measures, which would improve intertidal and nearshore habitat conditions and allow more natural sediment transport processes to occur.

Although there is the potential for up to 51 new docks within the shoreline residential environment, based on past permitting trends, only two additional docks are likely to be constructed. SMP standards for location, design, sizing, and construction of new docks will minimize the impacts of new piers, and mitigation will be required to compensate for adverse impacts to the nearshore environment. As existing docks are repaired or replaced, SMP standards are expected to limit their shoreline impacts over time.

Several clearing permits were issued in the Island Conservancy environment; however, given the small size of the Island Conservancy environment and the proposed SMP regulations, significant additional clearing is not anticipated. Minimal development is also projected for the Residential Conservancy environment.

Overall, SMP regulations are expected to require minimization and mitigation for impacts such that no effect on ecological functions is anticipated in the Manzanita Bay Management Area.

8 Net Effect on Ecological Function

On its own, the proposed SMP, which includes the *Shoreline Restoration Plan*, is expected to protect shorelines within the City while accommodating reasonable foreseeable future shoreline development that results in, at a minimum, no net loss of shoreline ecological functions. State and federal regulations, acting in concert with this SMP, will provide further assurances of maintaining shoreline ecological functions over time.

As discussed above, major elements of the SMP that ensure no net loss of ecological functions fall into generally five categories: 1) environment designations (Section 3), 2) general provisions (Section 4), 3) shoreline use provisions (Section 5), 4) shoreline modification provisions (Section 6) , and 5) the *Shoreline Restoration Plan*.

Environment designations: Environment designations were assigned based on the existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through a comprehensive plan (see Section 3 of SMP). Shoreline uses and modifications were then individually determined to be either permitted (as substantial developments or conditional uses) or prohibited in each of those environment designations. Uses and modifications are allowed more often

in the Urban and Shoreline Residential environments than in the Residential Conservancy, Island Conservancy, and Natural environments.

General provisions: Section 4 of the SMP contains a number of regulations that contribute to protection of ecological functions, including Section 4.1.2 (Environmental Impacts), Section 4.1.3 (Vegetation Conservation and Management Zones), Section 4.1.5 (Critical areas),and Section 4.1.6 (Water Quality and Stormwater).

Shoreline modification and use provisions: Regulations in Section 5 focus on exclusion of uses that are incompatible with the existing land use and ecological conditions, and emphasize appropriate location and design of the various uses. Sections 5 and 6 include provisions that guide the development and ongoing activities associated with shoreline modifications and uses, including Section 5.3 (Aquaculture), Section 5.4 (Boating Facilities), Section 6.9 (Overwater Structures), Section 5.11 (Residential Development), Section 6.2.1 (Shoreline Stabilization), Section 6.3 (Dredging). All of these shoreline modification and use regulations emphasize minimization of size of structures, use of designs that minimize impacts to shoreline functions, and mitigation sequencing to avoid degradation of shoreline functions. While allowing water-dependent uses and developments to continue along the shoreline, the proposed SMP emphasizes protection and enhancement of shoreline resources such that no net loss of ecological functions will be achieved over time.

Shoreline Restoration Plan: The *Shoreline Restoration Plan* identifies a number of planned and ongoing site-specific restoration projects on both public and private properties within shoreline jurisdiction (these projects have been prioritized by ecological significance and feasibility of implementation in the *Shoreline Restoration Plan*, and this includes projects that are underway or planned for the immediate future, as well as projects in the conceptual stages). The plan also identifies ongoing City programs and activities, non-governmental organization programs and activities, and other recommended restoration strategies consistent with a variety of ongoing restoration efforts. *The City is an active proponent for restoration along the City's shorelines.*

Summary: The following are some of the key features identified in the proposed SMP and this evaluation which protect and enhance shoreline ecological functions.

- Regulations in the proposed SMP are tailored to the level of existing development, disturbance, and ecological significance of specific shoreline types. These provisions allow for continued development while protecting critical shoreline functions. In several cases, certain uses (e.g., overwater structures) were deemed incompatible with certain physical conditions and environment designations, but not others, and the proposed regulations reflect these determinations.

- Significant shoreline residential development is anticipated throughout most of the City's shorelines. SMP provisions set standard shoreline buffer and setback

regulations that are tailored to the level of existing development and impairment. Larger setbacks are required in areas with a higher need for protection of shoreline resources. This strategy ensures that buffers protect and maintain existing functions without being overly restrictive on future residential development.

- Any projects with potential for significant adverse ecological effects will need to follow mitigation sequencing to avoid, minimize and mitigate any impacts.

- Potential incremental and/or unavoidable impacts are likely to be offset by ongoing and planned restoration actions over time. Planned and ongoing restoration on both public and privately owned lands throughout many areas in the City will help limit existing impairments and improve shoreline functions throughout the City.

- Emphasis on achieving no net loss of shoreline ecological functions throughout the SMP, including development of single family residences, water-dependent uses, and recreational uses.

Given the above provisions of the SMP, including implementation of the *Shoreline Restoration Plan* and the key features listed above, implementation of the proposed SMP is anticipated to achieve **no net loss of ecological functions in the City of Bainbridge Island's shorelines.**

9 REFERENCES

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APPENDIX A

Shoreline Use and Activity Matrix

Table 4-1 of SMP: Shoreline Use and Modification Activity Matrix

"P" = Permitted Use
"C" = Conditional Use
"X" = Prohibited Use
"#" = Same as Upland Property
"A" = Accessory Use

"CA" = Conditional Accessory Use

Additional Use restrictions for BIMC Titles 17 and 18 may apply

SHORELINE USE	UPLAND ENVIRONMENT						AQUATIC ENVIRONMENT			Use Specific Standards 16.12.xxx
	Natural	Island Conservancy	Shoreline Residential Conservancy	Point Monroe District (reserved)	Shoreline Residential	Urban	Aquatic	Priority Aquatic		
								A	B	
Natural Resource Management										
Agriculture	X	X	X		X	X	N/A	N/A	N/A	
Aquaculture	X	CUP	CUP		CUP	CUP	# / P[1]	P[1]	P[1]	
Flood Hazard Management [7]	X	CUP	CUP		CUP	CUP	#	X	X	
Stormwater Management [7]	X	P	P		P	P	#	X	X	
Forest Practices	X	X	CUP		CUP	CUP	N/A	N/A	N/A	

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SHORELINE USE	UPLAND ENVIRONMENT						AQUATIC ENVIRONMENT			Use Specific Standards 16.12.xxx
	Natural	Island Conservancy	Shoreline Residential Conservancy	Point Monroe District (reserved)	Shoreline Residential	Urban	Aquatic	Priority Aquatic		
								A	B	
Shoreline Restoration & Beach Nourishment / Mitigation	P	P	P		P	P	P	P	P	
Commercial Development										
Boating Facilities	X	CUP [8]	CUP [9]		CUP [9]	P	#	X	X	
Nonwater-Oriented	X	P[8]	X		X	CUP	X	X	X	
Water-Dependent	X	X	X		CUP	P	#	X	X	
Water-Related and Enjoyment	X	X	X		CUP	P	X	X	X	
Educational and Community Facilities										
Educational Facility	X	CUP	CUP		CUP	P	X	X	X	
Governmental Facility	X	X	CUP		CUP	P	X	X	X	
Religious Facility	X	CUP	CUP		CUP	P	X	X	X	
Cultural and Entertainment Facilities										
Club	X	CUP	CUP		CUP	P	X	X	X	

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Additional Use restrictions for BIMC Titles 17 and 18 may apply

SHORELINE USE	UPLAND ENVIRONMENT						AQUATIC ENVIRONMENT			Use Specific Standards 16.12.xxx
	Natural	Island Conservancy	Shoreline Residential Conservancy	Point Monroe District (reserved)	Shoreline Residential	Urban	Aquatic	Priority Aquatic		
								A	B	
Commercial Amusement	X	X	CUP		CUP	P	X	X	X	
Cultural Facility	X	CUP	CUP		CUP	P	X	X	X	
Entertainment Facility	X	CUP	CUP		CUP	P	N/A	N/A	N/A	
Industrial										
Mining	X	X	X		X	X	X	X	X	
Nonwater-Oriented	X	X	X		X	X	X	X	X	
Solid Waste Disposal	X	X	X		X	X	X	X	X	
Water-Dependent	X	X	X		X	P	#	X	X	
Water-Related	X	X	X		X	CUP	#	X	X	
Overwater Structures										
Boatlift	X	X	P		P	P	#	X	P	
Marine Railway	X	X	P		P	P	#	X	X	
Marine Railway, Retractable [12]	X	P	P		P	P	#	P	P	

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Additional Use restrictions for BIMC Titles 17 and 18 may apply

SHORELINE USE	UPLAND ENVIRONMENT						AQUATIC ENVIRONMENT			Use Specific Standards 16.12.xxx
	Natural	Island Conservancy	Shoreline Residential Conservancy	Point Monroe District (reserved)	Shoreline Residential	Urban	Aquatic	Priority Aquatic		
								A	B	
Mooring Buoys	X	X	P		P	P	#	X	X	
Piers and Docks	X	CUP	P		P	P	#	X	P	JOINT USE
Recreational Floats	X	X	X		P	P	#	X	X	
Recreational Development										
Golf Courses	X	CUP	CUP		CUP	CUP	X	X	X	
Nonwater-Oriented	X	X	X		CUP	CUP	X	X	X	
Park, Active Recreation	X	CUP	CUP		CUP	P	#	X	X	
Park, Passive Recreation	P	P	P		P	P	#	P[14]	P[14]	
Event, Recreation, Culture, Education										
Water-Oriented	X	P	P		P	P	#	X	X	
Residential										
Accessory Dwelling Unit	X	CUP	CUP		CUP	CUP	X	X	X	

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SHORELINE USE	UPLAND ENVIRONMENT						AQUATIC ENVIRONMENT			Use Specific Standards 16.12.xxx
	Natural	Island Conservancy	Shoreline Residential Conservancy	Point Monroe District (reserved)	Shoreline Residential	Urban	Aquatic	Priority Aquatic		
								A	B	
Flex-lot Subdivision	CUP	CUP	P		P	P	#	#	#	
Multi-family	X	X	X		P	P	X	X	X	
Single-family	X	CUP	P		P	P	X	X	X	
Shoreline/Aquatic Modification [5] [7]										
Beach Enhancement (non-restoration) [6]	CUP [12]	CUP [12]	CUP [12]		CUP [12]	CUP [12]	#	X	CUP	CUP [12]
Breakwaters	X	X	X		X	X	X	X	X	
Dredging	X	X	X		X	X	CUP	CUP	CUP	16.12.6.3
Drift Sill	X	X	X		X	X	P	P	P	16.12.4.4.7
Landfill	CUP	CUP	CUP		CUP	CUP	#	X	X	16.12.6.4
Repair of Structural Stabilization	X	P	P		P	P	#	#	#	
New or Replacement Shoreline Stabilization, Hard [[4]										
Bulkheads	X	CUP	P		P	P	#	X	X	

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	Natural	Island Conservancy	Shoreline Residential Conservancy	Point Monroe District (reserved)	Shoreline Residential	Urban	Aquatic	Priority Aquatic		
								A	B	
Gabions	X	X	X		X	X	X	X	X	
Groins (rock or concrete)	X	X	X		X	X	X	X	X	
Jetties	X	X	X		X	X	X	X	X	
Levees/Dikes	X	X	X		X	X	X	X	X	
Retaining Walls and Bluff Walls	X	CUP	CUP		CUP	CUP	#	X	X	
Revetments	X	X [2]	X [2]		X [2]	X [2]	#	X	X	
Seawalls	X	X	X		X	X	X	X	X	
Hybrid	X	P [1]	P [1]		P [1]	P [1]	#	#	#	
New or Replacement Shoreline Stabilization Non-Structural and Soft										
Non-Structural Stabilization, Softshore Protection	X	P	P		P	P	#	#	#	
Transportation										

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								A	B	
Roads										
Existing Road repair	X	CUP	CUP		CUP	P	X	X	X	
Arterials	X	X	X		X	X	X	X	X	
Highways	X	X	X		X	X	X	X	X	
Secondary Roads	X	X	X		X	X	X	X	X	
Float Plane Facilities and Services	X	X	X		X	CUP	#	X	X	
Heliports	X	X	X		X	X	X	X	X	
Additional Bridge to Bainbridge Island	X	X	X		X	X	X	X	X	
Parking (primary)	X	X	X		X	X	X	X	X	
Public Access Facilities										
Public Ferry Terminal Facilities and Services	X	X	X		X	CUP [10]	#	X	X	
Railroads	X	X	X		X	X	X	X	X	

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								A	B	
Trails	P	P	P		P	P	N/A	N/A	N/A	
Utilities & Telecommunication										
Utilities (primary)	X	X	CUP [11]		CUP [11]	CUP [11]	#	X	X	
Accessory Structures										
All Uses										
Potable Water Wells	X	A	A		A	A	X	X	X	16.12.4.1.3.7
Tram	X	A	A		A	A	X	X	X	16.12.4.1.3.7
Underground Utilities	X	A	A		A	A	X	X	X	16.12.4.1.3.7
Residential										
Primary Appurtenant Structures and Non-habitable Structures (boat house, deck, patio, stairway)	X	CA	A		A	A	#	X	X	16.12.4.1.3.8
Commercial/Industrial										

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	Natural	Island Conservancy	Shoreline Residential Conservancy	Point Monroe District (reserved)	Shoreline Residential	Urban	Aquatic	Priority Aquatic		
								A	B	
Primary appurtenant structures that either support public access or are necessary to support a water-dependent use [13]	X	X	CA		CA	A	#	X	X	16.12.4.1.3.9
Public Park										
Public pathways to the shoreline	X	A	A		A	A	#	#	#	16.12.4.1.3.10
Access Roads	X	A	A		A	A				
Primary appurtenant structures that either support public access or are necessary to support a water-dependent recreational	X	A	A		A	A	#	X	#	16.12.4.1.3.10

[1] Allowed for non-commercial activities for recovery of native populations, restoration, and personal use as defined in Aquaculture 16.12 5.3
[2] Revetments are prohibited unless they are constructed as part of a public facilities project.
[3] Construction of a bulkhead, revetment, or other structure for the purpose of retaining a landfill or creating dry land is prohibited, unless it is proposed in conjunction with a water-dependent or public use.
[4] Stabilization that would cause significant impacts to adjacent to down current properties is prohibited.
[5] Shoreline modification should not be located on feeder bluffs, except when the area is already developed with a primary structure, in which case stabilization may be allowed pursuant to the provisions in Section 6.2, Shoreline Stabilization.
[6] Beach enhancement is prohibited if it interferes with the normal public use of the navigable waters of the state.
[7] Shoreline stabilization and flood protection works are prohibited in wetlands (located in both the upland and the shoreline jurisdiction). They are also prohibited in salmon and trout spawning areas, except for fish or wildlife habitat enhancement.
[8] Public parks only. Non-water oriented commercial development only for concessions as accessory use.
[9] Community and joint use docks providing moorage for six or more vessels are permitted with an SSDP but must comply with the provisions in BIMC 16.12.5.4, Boating facilities, as well as the provisions in BIMC 16.12.6.3, Overwater Structures.
[10] New overwater facilities are permitted as a conditional use only in the ferry terminal district. Normal repair and maintenance of existing facilities do not require a conditional use permit, but may require an SSDP.
[11] Permitted as a conditional use if no feasible alternative exists.
[12] If upland of Priority Aquatic designation, then the use is not allowed.
[13] All structures are prohibited in Zone 1 upland of a Priority Aquatic Category A environment.
[14] Passive recreational uses and activities are allowed. Development and associated structures are allowed through a Shoreline Variance.