

Final Draft

CUMULATIVE IMPACTS ASSESSMENT

City of Olympia Shoreline Master Program Update

Prepared for
City of Olympia

January 2013



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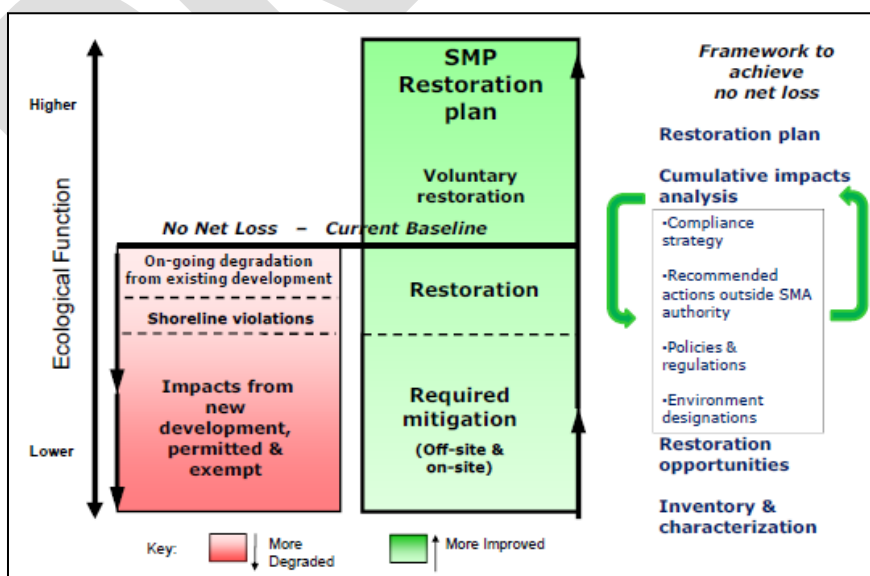
1.0 INTRODUCTION

The City of Olympia is updating its Shoreline Master Program (SMP) consistent with state guidelines (WAC Chapter 173-26). Under the shoreline guidelines, local jurisdictions are required to evaluate and consider cumulative impacts of reasonably foreseeable future development in the shorelines of the state (WAC 173-26-186(8)(d)). This report assesses the cumulative impacts of development in the shoreline that would result from development and activities over time under the provisions contained in the Draft SMP dated January 22, 2013.

Olympia is located in Southern Puget Sound within the Deschutes River Watershed (Water Resource Inventory Area (WRIA) 13). There are approximately 30.6 miles of shoreline within the city limits. The provisions of the SMP apply to all shorelines of the state, all shorelines of statewide significance, and shorelands as defined in RCW 90.58.030. Shorelines that are regulated by the City’s SMP include: Budd Inlet, Black Lake Drainage Ditch, Percival Creek, Capitol Lake, Chambers Lake, Grass Lake, Ken Lake, and Ward Lake. This does not include that portion of Olympia’s Urban Growth Area within currently unincorporated Thurston County.

The Draft Olympia SMP (2013) provides standards and procedures to evaluate individual uses or developments for their potential to impact shoreline resources on a case-by-case basis through the permitting process. The purpose of evaluating cumulative impacts is to ensure that, when implemented over time, the proposed SMP goals, policies and regulations will not result in cumulative impacts and will achieve no net loss of shoreline ecological functions from current “baseline” conditions. Baseline conditions were established and described in the Shoreline Inventory prepared by Thurston Regional Planning Council (TRPC, 2009) and the Shoreline Analysis and Characterization Report prepared by ESA Adolfson (2008) for TRPC. Baseline conditions may also be established at the project or site scale at the time of permit application. The site scale information is typically used to determine appropriate mitigation, which is often necessary to achieve no net loss. Figure 1 provides a visual description of the role of the SMP update in achieving no net loss.

Figure 1. Achieving No Net Loss of Ecological Functions



Source: Washington State Department of Ecology

The guidelines 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 among development opportunities. Evaluation of such cumulative impacts should consider:

1. Current circumstances affecting the shorelines and relevant natural processes;
2. Reasonably foreseeable future development and use of the shoreline; and
3. Beneficial effects of any established regulatory programs under other local, state, and federal laws.”¹

This cumulative impacts assessment uses these three considerations as a framework for evaluating the potential long-term impacts on shoreline ecological functions and processes that may result from development or activities under the proposed SMP over time. This assessment considers current circumstances; reasonably foreseeable future development and use; potential effects of development under the proposed SMP provisions; restoration planning; and other federal, state, and local programs. Based on this information, an assessment is made as to whether reasonably foreseeable developments in the shoreline permitted through the proposed Program would result in cumulative impacts to shoreline functions. Ultimately this assessment will enable the City to make a determination of whether the Proposed SMP would achieve the state’s policy goal of “no net loss” of shoreline ecological functions.

2.0 EXISTING CONDITIONS

Current shoreline circumstances and relevant natural processes were documented in the Shoreline Inventory prepared by Thurston Regional Planning Council (TRPC, 2008) and analyzed in the Shoreline Analysis and Characterization Report prepared by ESA Adolfson (2008). Key ecological functions at risk from future development were evaluated. The following shoreline systems in the city were included:

- Nearshore/Marine Environment – Budd Inlet
- Deschutes River System - Percival Creek and Black Lake Drainage Ditch
- Capitol Lake
- Other Freshwater Lakes including Chambers, Grass, Ken and Ward Lakes

Key processes and functions and their current level of alteration are summarized in Tables 1 through 4. These tables were adapted from the Shoreline Inventory (TRPC, 2008) and the Shoreline Analysis and Characterization Report (ESA Adolfson, 2008) and include only those items specific to the City of Olympia. Additional detail can be found in those documents as well as the Draft Shoreline Restoration Plan prepared by the City of Olympia (2010).

¹ WAC 173-26-286(8)(d)

Table 1. Processes, Functions, and Level of Alteration for the Nearshore/Marine Environment

Nearshore/Marine Environment – Budd Inlet	
Process: Function	Level of Alteration
<p>Habitat: Estuarine habitat; subtidal and intertidal mudflats and salt marshes provide transition habitat between fresh and salt water environments.</p>	<p>High to Moderate Physical modifications to Budd Inlet have changed the spatial mixing of fresh and salt water. The 1951 construction of the 5th Avenue dam converted the Deschutes estuary into the freshwater Capitol Lake, heavily altering the estuary. The installation of roads, bulkheads and other forms of shoreline armoring has tended to disconnect freshwater seeps and wetlands from marine waters.</p>
<p>Hydrology: Attenuation of wave energy.</p>	<p>High The general trend toward a ‘harder’ shoreline (e.g., bulkheads, revetments, docks, etc.) has resulted in less overall wave attenuation than in the pre-disturbance condition. Approximately 73 percent of the Budd Inlet shoreline is modified.</p>
<p>Sediment Generation and Transport: Sediment delivery from coastal bluffs and streams.</p>	<p>Moderate Bluff erosion processes have been modified as structures (e.g., roads, railroads, and bulkheads) at the toe have reduced the frequency of tidal and wave interaction with the bluff. The lack of interaction at the toe has likely reduced smaller-scale erosion throughout the city. Larger-scale erosion events may still occur and have the potential to contribute significant quantities of sediment to the nearshore. However, bulkheads and other shoreline armoring may block those sediments from entering the nearshore.</p>
<p>Water Quality: Wetland removal of pollutants through sedimentation and adsorption.</p>	<p>Moderate Reduction in wetland area has reduced contact time of water with soil. This lowers the potential for filtering and cycling of pollutants, which adhere to soil particles.</p>
<p>Water Quality: Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p>	<p>High Budd inlet has been identified as impaired through the Washington State Department of Ecology 303(d) list for dissolved oxygen, fecal coliform bacteria and other variables. Budd Inlet is on the Category 5 303(d) list for dissolved oxygen. Upland sources of these pollutants have increased significantly as a result of urban and industrial land uses within and near the shoreline. Most of the fecal coliform (93%) comes from Capitol Lake/Deschutes River and Moxlie Creek. Loss of wetlands and installation of impervious surface have reduced the potential for nutrient retention, cycling, and removal.</p>
<p>Habitat Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p>	<p>Moderate Habitat and plant communities along the shorelines and in the nearshore have been subjected to several phases of disturbance. They have recovered in some areas of the shoreline. Priority species associated with lower Budd Inlet include a variety of shorebirds and birds of prey. A total of 45 species of waterfowl, water birds, or raptors were documented in the West Bay bird survey. The steep slopes of Priest Point Park provide beach sediment for forage fish. The Ellis Cove estuary is relatively intact with a salmon-bearing stream. The west shore of the Port Lagoon has patchy salt marsh habitat. Forage fish spawning extends south from Priest Point Park along East Bay for approximately 0.5 mile. There are four salmon-bearing streams located in East Bay: Ellis Creek, Mission Creek, Indian Creek, and Moxlie Creek. Chinook, coho, and steelhead salmon all occur in Capitol Lake. Ellis Creek supports both coho and chum. Indian Creek supports Chinook and coho.</p>
<p>Habitat: Source and delivery of large woody debris (LWD).</p>	<p>High Removal of mature trees from riparian areas and bluffs has significantly reduced the source of LWD to the nearshore system. High-quality riparian shoreline areas are limited to Priest Point Park; the west shore of the Port Lagoon contains medium-quality riparian shoreline; and the west shore north of the Dunlop Towing parcel (“the fills”) along West Bay Drive contains low-quality riparian shoreline. In the City of Olympia, these areas are designated as “Important Riparian Areas.”</p>

Table 2. Processes, Functions, and Level of Alteration for Percival Creek and the Black Lake Drainage Ditch

Percival Creek, and Black Lake Drainage Ditch	
Process: Function	Level of Alteration
<p>Habitat: Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p>	<p>High Black Lake Drainage Ditch was constructed in 1922 to drain potential agricultural land north of Black Lake. Salmon species occurring in Black Lake Drainage Ditch include Chinook, coho, and chum. There have also been occasional observations of sockeye salmon along the stream. Open water and associated wetland habitats along the drainage ditch provide opportunities for a wide variety of bird species to forage and nest. Cutthroat trout and spawning Chinook, coho, and chum salmon are all present along Percival Creek. Chinook salmon are of hatchery origin from the Tumwater Falls Facility. Salmonid habitat within Percival Creek is limited due to several factors, including lack of LWD recruitment; increased summer water temperatures; impaired fish passage, particularly for Chinook, at the Capitol Lake tide gate and seasonally installed Percival Cove screen; and hydrologic alteration along the stream corridor. Historically, Percival Creek discharged directly into Budd Inlet. Following construction of Capitol Lake, the estuary located at the mouth of the stream was lost. Additional alterations along Percival Creek include extensive urban development and a system of stormwater ponds that convey surface water throughout the Percival Creek basin. The east side of the stream, between Percival Creek and Capitol Lake, contains high-density urban land use areas and riparian cover is limited. Due to extensive development along the riparian corridor, LWD recruitment has been reduced along Percival Creek.</p>
<p>Hydrology: Channel and floodplain connection.</p>	<p>High The Black Lake Drainage Ditch is a channelized and straightened waterway from Black Lake to its confluence with Percival Creek. The hydrology of Percival Creek has been highly altered due to construction of the Black lake Drainage Ditch and Capitol Lake. The flow pattern along this stream is generally confined and lacks meanders.</p>

Table 3. Processes, Functions, and Level of Alteration for Capitol Lake

Capitol Lake	
Process: Function	Level of Alteration
<p>Hydrology: Hydroperiod.</p>	<p>High Historically, the Deschutes River flowed north and discharged directly into Budd Inlet. The lake was created in 1951 when a dam was constructed at the mouth of the Deschutes River to form the reflecting pool for the Capitol Building. Capitol Lake represents a highly altered form of the original Deschutes estuary.</p>
<p>Hydrology: Flood flow retention.</p>	<p>Low Capitol Lake, while highly altered, is too low in the system to provide flood flow retention.</p>
<p>Sediment Generation and Transport: Sediment retention.</p>	<p>Moderate to High Capitol Lake retains a significant proportion of the sediments delivered by the Deschutes River and Percival Creek. The tide gate and dam located at the mouth of the Deschutes River, at the south end of the Middle Basin, have led to sediment loading in this area.</p>
<p>Water Quality: Wetland removal of pollutants through sedimentation and adsorption.</p>	<p>High Capitol Lake has had long-term problems with algae, turbidity, fecal coliform and sedimentation. Reduction in wetland area and channel-floodplain connection has reduced contact time of water with soil. This lowers the potential for filtering and cycling of pollutants. Overall water quality is a concern for the lake. Land cover conversion and associated uses have resulted in sedimentation and growth of invasive aquatic plants and algae.</p>

Capitol Lake	
Process: Function	Level of Alteration
<p>Water Quality: Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p>	<p>High The delivery, transport, and disposition of nutrients, pathogens, and toxins have been significantly altered. Upland sources of these pollutants have increased significantly as a result of urban and industrial land uses within and near the shoreline. Sediments from the Deschutes River and Percival Creek are filling the lake, slowly converting it to a freshwater marsh. The lake is closed to swimming due to the health risk. Aquatic life is threatened by high levels of phosphorus, which tends to promote the growth of algae and aquatic weeds and reduce the dissolved oxygen content of the water.</p> <p>Soils adjacent to Capitol Lake are known to be contaminated with diesel, fuel oil and lead. Leaking underground storage tanks from former gas stations and repair shops have contributed to this contamination. In addition, numerous stormwater outfall pipes convey road runoff to the lake.</p>
<p>Habitat: Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p>	<p>Moderate Priority habitat areas associated with Capitol Lake include high-quality riparian shoreline located along the east shore of the Middle Basin, the east and south shore of the South Basin, and the west shore of Percival Cove. Salmonid species occurring in Capitol Lake are those migrating from Puget Sound through Budd Inlet and upstream along the Deschutes River. Capitol Lake and the Deschutes River have been identified by WDFW as a migration corridor for anadromous fish. Salmonids documented in Capitol Lake include fall Chinook, coho, winter steelhead, and sea-run cutthroat trout.</p> <p>The Capitol Lake shoreline has undergone significant alteration, including construction of road infrastructure, railroads, docks and piers, trails, the Tumwater Historic Brewhouse in the South Basin, and a pedestrian bridge that separates the North Basin and Middle Basin. Through these alterations, native riparian vegetation has been removed in many places.</p>
<p>Habitat: Source and delivery of LWD.</p>	<p>High Removal of mature trees from riparian areas has reduced a source of LWD to the lake.</p>

Table 4. Processes, Functions, and Level of Alteration for Other Freshwater Lakes

Freshwater Lakes (Ken, Grass, Chambers and Ward)	
Process: Function	Level of Alteration
<p>Hydrology: Groundwater recharge.</p>	<p>Low Overall lake water levels have not been significantly altered, thereby allowing typical volumes of groundwater discharge.</p>
<p>Hydrology: Flood flow retention.</p>	<p>Low In general, lake volumes and water levels are generally similar to pre-disturbance conditions. Ken Lake lies within the 100- year floodplain and therefore waterfront properties may be affected by high water levels in the lake. The lake experienced flooding issues in 2007.</p>
<p>Sediment Generation and Transport: Upland sediment generation.</p>	<p>Moderate to High Clearing and grading associated with land development generates sediments. Increased impervious surface changes runoff patterns and leads to more scouring which delivers sediments to the lakes.</p>
<p>Water Quality: Lake trophic status/overall water quality.</p>	<p>High The delivery, transport, and deposition of nutrients, pathogens, and toxins have been significantly altered. Upland sources of these pollutants have increased significantly as a result of urban and industrial land uses within and near the shoreline. Potential storage and natural treatment have decreased through wetland loss and installation of impervious surfaces.</p> <p>The presence of relatively high-permeability surficial geology deposits can increase the potential for upland land uses to influence lake water quality.</p>

Freshwater Lakes (Ken, Grass, Chambers and Ward)	
Process: Function	Level of Alteration
Habitat: Lake riparian vegetation community.	High Development around the lakes in the city has removed or altered much of the forest and riparian vegetation.

3.0 REASONABLY FORESEEABLE FUTURE DEVELOPMENT AND USE

Reasonably foreseeable development in the shoreline was assessed using several data sources. The first is an assessment of future development provided in the Thurston Regional Planning Council (TRPC) Cumulative Impacts Assessment (2009). The second is an evaluation of Thurston County assessor’s data conducted in November 2010 to identify vacant properties and properties that are underdeveloped with respect to current zoning standards. The last data source is City staff information on current development proposals and trends obtained during November and December 2010 and updated in November 2012.

TRPC data are shown in Tables 5 through 7, which are adapted to reflect only information relevant to the City of Olympia. Data on vacant and underdeveloped parcels generated from the analysis of assessor’s data are provided in Maps 1 through 4 (Appendix A). The analysis of assessor’s data is a rough methodology used to view the entire shoreline in a broad manner. As noted below, it does not account for specific conditions on individual properties that could limit development potential (for example, presence of wetlands or steep slopes which would be unbuildable). The purpose of the information obtained from staff was to clarify those results. Therefore, staff information is presented as callouts on Maps 1 through 4 (Appendix A).

3.1 TRPC Assessment

As part of its Cumulative Impacts Assessment (CIA) (2009), TRPC conducted an assessment of foreseeable types of development by reviewing the following data sources:

1. Local government Capital Facilities Plans
2. Local parks plans
3. Thurston Regional Trails Plan
4. Development plans for shoreline parcels
5. Past trends in development

Based on this review, the following development types (Tables 5 through 7) were identified as potentially occurring in the future. Because of the relatively built-out nature of the city, nearly all future development is likely to be redevelopment. That is reflected in the TRPC information below. The information in the TRPC CIA has been adapted to include only data relevant to Olympia and has been updated where conditions have changed since publication of the TRPC CIA in 2009. Information is organized by shoreline reach.

Table 5. Foreseeable Development for Marine Shorelines

Shoreline Reach and Existing Use	Reasonably Foreseeable Development
BUDD-3A <i>Marina, BMT</i>	Redevelopment from industrial to office, residential or mixed-use. Possible development: <ul style="list-style-type: none"> • Condominiums • Offices • Retail space • Marinas • Waterfront trail • Public access points • Road improvements (sidewalks, bike lanes, repaving)
BUDD-3B <i>West Bay Park, Port Lagoon</i>	Redevelopment from industrial to public recreation/public access. Possible development: <ul style="list-style-type: none"> • Public buildings in park • Parking • Recreation • Waterfront trail • Public access points • Road improvements (sidewalks, bike lanes, repaving) • Planned and proposed West Bay Trail
BUDD-3C <i>Condos and offices</i>	None anticipated
BUDD-4 <i>4th and 5th Ave & Capitol Lake Dam</i>	As part of the Capitol Lake Adaptive Management Plan (CLAMP), the state is considering several restoration approaches for Capitol Lake, including significant changes to the current berm/tide gates. Potential redevelopment along the isthmus (4 th and 5 th Avenues) includes: <ul style="list-style-type: none"> • Condominiums • Offices • Retail
BUDD-5 <i>Marina and Port of Olympia</i>	Potential future redevelopment includes: <ul style="list-style-type: none"> • Condominiums • Offices • Retail • Industrial • Mixed-use • Repairs and rebuilding of Percival Landing Boardwalk
BUDD-6A	Potential redevelopment along Marine Drive includes; <ul style="list-style-type: none"> • Offices • Retail • Public buildings • Public plaza • Recreation
BUDD-6B	Bulkhead repairs and replacements. Residential repairs and remodels.
BUDD-7	Bulkhead repairs and replacements. Residential repairs and remodels.
BUDD-8A & B	Recreation (trails and public access). Expansion of parking lot.

Table 6. Foreseeable Development for Lake Shorelines

Shoreline Reach	Reasonably Foreseeable Development
CAP-1	Potential Woodland Trail upgrade; could include bridge crossing.
CAP-3A <i>Middle Basin</i> <i>South Capitol Neighborhood</i>	None anticipated.
CAP-3B <i>Part of State Capitol Campus – steam plant</i>	Steam plant repairs/reconstruction. Possible development of new State buildings.
CAP-5 <i>Percival Cove</i>	None anticipated
CAP-6 <i>North Basin</i> <i>Capitol Lake dam & Heritage Park</i>	Potential plans for Heritage Park development.
CAP-7 <i>North Basin</i> <i>Marathon Park</i>	Recreation/park related activities. Potential dredge and dredge stockpiling.
CHAM-2	Residential development, recreation/park development including trails, trailheads, parking.
GRASS-1	Residential development, redevelopment, repairs and remodels. Commercial development and repairs. Roads and utilities maintenance. Park improvements.
KEN-1	Residential repairs and remodels.
WARD-1	Residential repairs and remodels.

Table 7. Foreseeable Development for Stream and Creek Shorelines

Shoreline Reach	Reasonably Foreseeable Development
PERC-1B	Proposed Percival Canyon Trail (alignment likely along railroad right-of-way if it is abandoned).
BLDD-1 <i>Black Lake Meadows SW Facility</i>	None anticipated.

3.2 Vacant and Underdeveloped Property

In addition to the review conducted by TRPC and documented in Tables 5 through 7, an analysis of undeveloped and underdeveloped properties in the shoreline was conducted using Thurston County assessor's records (2009). Together, these two data sources are meant to create a rough picture of reasonably foreseeable future shoreline development.

Through analysis of assessors' data, vacant and underdeveloped parcels were identified. Parcels classified as "undeveloped" that are partially or wholly located within the shoreline jurisdiction were identified. While the term "undeveloped" may not always accurately reflect current conditions and some of these parcels or portions of these parcels may not be developable because of protected open space restrictions, steep slopes, wetlands, or other development restrictions or public ownership, the classification generally indicates that no structural improvements have been made or assessed for taxes on the property. Depending on the land use and zoning designations, these areas may be subject to new development in the future.

In addition to the potential for development on undeveloped parcels, there is potential for underdeveloped or underutilized lots to redevelop or expand. Olympia is a largely developed city with the majority of properties along the shoreline built out. It is reasonable to expect redevelopment or remodeling to occur in the future. Redevelopment was assessed using the improvement to land value ratio (ILR), which assumes that a property is underdeveloped or likely to redevelop if current improvements are valued at less than half the value of the land. Shown here is another illustration of the assumptions used:

Improvement Value / Land Value < 0.50 = Parcels that are underdeveloped or likely to redevelop

For example, if a property has been assessed by Thurston County as having an improvement value of \$10,000 and a land value of \$100,000 then the improvement to land value ratio would be equal to 0.10. Since 0.10 is less than 0.50, the property is considered underdeveloped.

There are notable limitations to using the ILR for predicting redevelopment. The method is based on sales of comparable properties to assess value. While this is relatively effective for residential and common commercial uses, it is less effective for large commercial properties or industrial uses, such as those found in the Port of Olympia. Industrial properties and uses in and around the port are often unique in their configuration and use, which makes assessing value difficult. This data should be considered along with accompanying data and information.

Table 8 summarizes the underdeveloped area by waterbody (e.g., Budd Inlet, Capitol Lake, etc.). Only parcels located landward of the ordinary high water mark were evaluated; parcels waterward of the ordinary high water mark were excluded. Park, open space, and publicly owned parcels were also excluded. The table shows the number of vacant parcels, parcels considered underdeveloped per the assumptions described above, and a rough estimate of the linear length of vacant and underdeveloped parcels that are directly abutting the ordinary high water mark.

These data are also shown on Maps 1 through 4 in Appendix A. The data were also reviewed by City staff and reflect their input as well. As shown in Table 8 and Maps 1 through 4, the City of Olympia's shorelines are largely developed. Less than 7 percent of the city's SMP jurisdiction is vacant excluding the area around Grass Lake. At Grass Lake, 17 percent of the parcels are vacant (7 total). However, development of these parcels is encumbered by the presence of wetlands.

There are also a limited number of underdeveloped or redevelopable parcels adjacent to the shoreline. For most of the City's waterbodies, the number of undevelopable parcels is also less than 7 percent. There are two exceptions. Thirty percent (13) of the parcels with the Black Lake Drainage Ditch were identified as underdeveloped. Development on these parcels is encumbered by the presence of wetlands. Roughly 10 percent of the parcels along Budd Inlet were identified as underdeveloped. These parcels are designated as Urban Waterfront and Industrial on the west side of the Inlet and Residential on the east side.

Table 8. Vacant and Underdeveloped² Shoreline Areas

Waterbody	# of Parcels	Area (acres)	Lineal Feet Abutting Shoreline	% of Shoreline Area
<i>Budd Inlet</i>				
Properties within Shoreline Area	350	284	43,852	100%
Vacant	34	4	444	1.5%
Underdeveloped	82	29	4,733	10.2%
<i>Capitol Lake</i>				
Properties within Shoreline Area	194	137	31,167	100%
Vacant	42	8	2,839	5.8%
Underdeveloped	5	1	1,118	0.7%
<i>Chambers Lake</i>				
Properties within Shoreline Area	39	121	18,344	100%
Vacant	10	5	141	4.4%
Underdeveloped	4	4	680	3.5%
<i>Grass Lake</i>				
Properties within Shoreline Area	54	102	8,768	100%
Vacant	7	17	0	17.0%
Underdeveloped	1	1	0	1.0%
<i>Ken Lake</i>				
Properties within Shoreline Area	125	25	6,625	100%
Vacant	0	0	0	0%
Underdeveloped	1	0.3	0	1.2%
<i>Ward Lake</i>				
Properties within Shoreline Area	98	87	8,894	100%
Vacant	9	5	2,446	6.3%
Underdeveloped	16	5	1,006	6.2%
<i>Percival Creek</i>				
Properties within Shoreline Area	60	52	15,538	100%
Vacant	3	2	0	1.9%
Underdeveloped	1	2	0	4.2%
<i>Black Lake DD</i>				
Properties within Shoreline Area	31	37	4,785	100%
Vacant	0	0	0	0%
Underdeveloped	13	11	0	30%

² Underdeveloped properties were determined by the Improvement to Land Value Ratio (ILR) calculation describe in Section 3.2

4.0 PROTECTIVE PROVISIONS OF THE PROPOSED SMP

4.1 Shoreline Environment Designations

The assignment of Shoreline Environment Designations (SEDs) is one tool for regulating shoreline uses to achieve the policy goals of the Shoreline Management Act (SMA). Local SMPs establish a system to classify shoreline areas into specific SEDs. The purpose of the SED system is to provide a uniform basis for applying policies and use regulations within distinctly different shoreline areas. Environment designations are 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 comprehensive plans as well as the state's guidelines (WAC 173-26-211(2)(a)).

SEDs act as a zoning overlay, providing an additional layer of policy and regulations that apply to land within the SMP jurisdiction. The proposed SMP includes eight shoreline designations including Aquatic, Marine Recreation, Natural, Port Maritime Industrial, Shoreline Residential, Urban Conservancy, Urban Intensity, and Waterfront Recreation (shown on Map 4.1 of the proposed SMP). Regulation of shoreline uses and shoreline modifications associated with each designation are most restrictive or protective for Natural areas, followed by Urban Conservancy, Shoreline Residential, Waterfront Recreation and Marine Recreation. The Port Maritime Industrial, Urban Intensity designations are the least protective in terms of ecological functions, but are assigned to shorelines that currently support and are planned to continue to support higher-intensity water-oriented commercial, transportation, and industrial uses.

Uses allowed in the Natural designation are primarily restricted to restoration and water-oriented recreational uses. Some transportation and utility uses are allowed as conditional uses. Residential development is not allowed in the Natural environment. The Shoreline Residential and Urban Conservancy designations allow similar uses. Water-oriented commercial uses are allowed in Shoreline Residential and not in Urban Conservancy. Greater setbacks are required in the Urban Conservancy district. Waterfront Recreation and Marine Recreation are also similar in allowed uses. The only difference is that Non-water-oriented recreational uses are allowed in Waterfront Recreation as a conditional use. Lastly, the Urban Intensity and Port Maritime Industrial designations are the least restrictive. They are applied to primarily to highly developed and/or modified areas along Budd Inlet and a small area along the east shoreline of Capitol Lake.

Tables 6.1 and 7.1, respectively, in the SMP identify which uses and modifications in each of the shoreline environments are permitted, permitted as a conditional use or prohibited. The tables demonstrate a hierarchy of higher-impacting uses and modifications being allowed in designated high-intensity areas that are highly altered, with uses more limited in the less developed or less altered areas. This strategy helps limit the loss of ecological functions by concentrating development in lower functioning areas that are not likely to experience a steep loss of function with incremental increases in new development. Any loss of function that would occur would have to be mitigated based on the mitigation sequence in the proposed SMP (3.21).

4.2 Use Regulations in the Proposed SMP

The Draft SMP includes policies and regulations that require new or expanding developments to achieve "no net loss" of shoreline functions (SMP 3.21). This is achieved through implementation of development standards, mitigation requirements and other regulatory provisions. The proposed SMP includes shoreline policies and development regulations that encourage shoreline conservation and prohibit development activities that would cause adverse impacts on shoreline functions and processes. As redevelopment occurs, the policies and

regulations in the Draft SMP will require that development must be located and designed in a manner that avoids impacts to ecological functions and/or enhances functions where they have been degraded. The most significant provisions of the proposed SMP are in setbacks, vegetation protection, overwater structures, and shoreline stabilization. Each of these is briefly discussed below.

4.2.1 BUILDING SETBACKS

Setbacks for development and uses are among the most important provisions included in the proposed SMP to protect or restore shoreline functions. Setting back development from the shoreline provides the opportunity to establish a buffer of native shoreline vegetation, enhancing the shorelines' ability to slow and filter stormwater, creating or restoring upland and nearshore aquatic and marine habitat, developing a source of large woody debris, preserving views of the shoreline and water and, in many cases, reserving the shorelines for public access. In addition to protecting ecological functions, the SMA seeks to reserve the shorelines for water-oriented uses and public access. As detailed below (and shown in SMP Table 6.2), the proposed SMP establishes a system of setbacks based on the shoreline environment designation and body of water. to implement the goals of the SMA.

Residential Setbacks

Residential uses are allowed in the Shoreline residential, Urban Conservancy and Urban Intensity designations. When developed in a manner consistent with control of pollution and prevention of damage to the natural environment, single-family residences are considered a priority use by the state as well as the most common form of shoreline development (WAC 173-26-231(3)(j)). The construction of a single-family residence does not require a substantial development permit. However, new single-family development and redevelopment represent a risk to shoreline functions because of the potential loss of native vegetation, increase in impervious surface and codevelopment of a bulkhead and/or dock. Setbacks and mitigation requirements will help maintain shoreline functions. In Olympia, single-family development or redevelopment was identified as reasonably foreseeable on Grass Lake, Ken Lake, and Ward Lake. Multi-family residential development is reasonably foreseeable in some areas of Budd Inlet (see Table 5).

The Draft SMP proposes setbacks for most reaches. Residential setbacks will result in new homes being placed further back from the shoreline, relieving some of the need for shoreline bulkheads to prevent erosion and allowing for more shoreline vegetation. Also, existing structures within the setback will become nonconforming, and while they can still be altered, such as constructing an addition, an increase of nonconformity will not be allowed. Ken Lake and Budd 3A would have 30-foot setbacks. Ward Lake would have a 75-foot setback and Grass Lake would have a 100-foot setback.

High Intensity Setbacks

Setbacks are also proposed for most commercial and industrial uses along Budd Inlet. This area is largely built out, armored and unvegetated. The establishment of shoreline setbacks reserves an area along the shoreline for enhancement of vegetation, which would marginally improve shoreline functions. Where redevelopment is occurring or will occur, the setback and vegetative conservation measures provide a system to enhance existing shoreline vegetation over time. The setback along Budd Inlet is also proposed in consideration of sea level rise. Setbacks along Budd Inlet generally range from 30 to 200 feet.

There is no setback proposed for the Port Marine Industrial designation. The lack of a building setback in this area may allow development at the water's edge and create the potential for impacts largely to water quality. Implementing mitigation consistent with SMP 3.21, stormwater management requirements, and development standards for commercial or industrial uses may decrease the possibility for impacts from future development.

Mitigation for impacts in the in the Port Industrial Maritime designation would likely have to take place offsite consistent with SMP 3.21.

4.2.2 SHORELINE VEGETATION CONSERVATION MEASURES

Alterations to the shoreline from development and loss of shoreline vegetation were noted as key management issues in the Inventory and Characterization Report. In particular, the removal of trees from marine riparian areas has reduced the source and pathways of large woody debris to the nearshore environment. Alterations to shorelines during development have reduced the extent of nearshore in-water habitats, wetlands, and riparian habitats.

The proposed SMP includes requirements for vegetation conservation and enhancement. The intent of the proposed regulations is “to protect and restore vegetation along or near marine or freshwater shorelines to minimize habitat loss and the impact of invasive plants, erosion and flooding and contribute to the ecological functions of shoreline areas.”

The proposed SMP establishes a vegetation conservation area (VCA) or buffer within which development must preserve and/or provide native vegetation. These provisions will help maintain and improve shoreline functions over time. The minimum width of VCAs range from 20 to 200 feet depending on designation and location.

No VCA is required for the Port Marine Industrial designation. The shoreline in this area is heavily altered and used for port and industrial uses. The lack of required VCA could result potential for impacts to shoreline functions. (refer to discussion above regarding building setbacks).

For new development, expansion, or redevelopment, a proponent of a development would have to protect existing native vegetation within the vegetation conservation area. If native vegetation within the vegetation conservation area did not exist, or had been destroyed or significantly degraded, mitigation in the form of restoration or creation of vegetation conservation could be required as a condition of development approval consistent with mitigation sequencing priorities in Section 3.21. In cases where vegetation cannot be enhanced on site, offsite enhancement may be required. This would likely be the case for shoreline development in the Port Maritime Industrial designation.

Alterations to existing single-family residences, including accessory structures, decks, patios, sport courts, and walkways are required to protect existing native vegetation within the VCA. If the minimum vegetation conservation area is not present, the City may require establishment of a VCA that is necessary to prevent adverse impacts to the shoreline ecological functions that may result from any proposed alterations.

Lawns are prohibited within the VCA area and The VCA must be maintained over the life of the use or development.

4.2.3 OVERWATER STRUCTURES

Overwater structures such as docks and piers have several deleterious effects on shoreline functions. They create shade, limiting the growth of aquatic vegetation such as eelgrass and kelp in the marine environment; create a barrier to fish movement; and change the predator-prey dynamic. Docks and piers are typically associated with shoreline vegetation clearing. As noted in the Inventory and Characterization Report, there are overwater structures along Budd Inlet as well as Ken Lake (32 docks) and Ward Lake (48 docks). While docks

associated with single-family residences are exempt from a shoreline substantial development permit, the Draft SMP includes standards that limit the types of uses allowed overwater, limit new overwater coverage and introduce requirements for light-penetrating materials. The proposed SMP includes the following protection provisions:

- New overwater covered moorage, boathouses and storage structures are prohibited (SMP table 6.1).
- The maximum length of a new or expanded pier or dock for private or recreational use on Marine waters shall be 100 feet from the mean higher-high water mark and shall not exceed a depth of -3 feet as measured from mean lower low water mark (SMP 3.66).
- In fresh water, the length of new or expanded piers or docks for private or recreational use shall not exceed fifty (50) feet as measured from the ordinary high water mark (SMP 3.67).
- On marine waters, the maximum width of piers is 4 feet and piers must have a minimum of 60 percent grating (SMP 3.66).
- The length, width and height of piers, docks and floats shall be no greater than that required for safety and practicality of the intended use. They shall be spaced and oriented in a manner that avoids shading of substrate below and do not create a 'wall' effect that would impair wave patterns, currents, littoral drift or movement of aquatic life forms (SMP 3.63).
- The construction of new, or the expansion of existing, overwater industrial or commercial buildings is prohibited (SMP 3.52 and 3.49).
- The overall area of freshwater docks and floats are limited depending on type of use.

4.2.4 SHORELINE STABILIZATION

The Inventory and Characterization Report identified that hardened shorelines change bluff erosion processes, displace nearshore habitat, and alter fish migration. Structural shoreline stabilization in all shorelines disconnects uplands from the water, affecting water quality and habitat functions. The proposed SMP includes provisions to protect against the adverse effects of shoreline stabilization. Along with mitigation requirements, these provisions will help achieve no net loss of ecological functions. The proposed SMP encourages non-structural and soft shoreline protection measures instead of hard shore structural measures. For shoreline armoring, the permitting requirements will change under the proposed regulations. The intent is to encourage applicants of shoreline bank stabilization proposals to first consider non-structural alternatives.

- Structural shoreline stabilization is prohibited in all SEDs, except as authorized by the SMP and then only as a conditional use. Non-structural shoreline stabilization is permitted in all shoreline environments as a conditional use (SMP 3.77).
- New shoreline use and development shall be located and designed to eliminate the need for concurrent or future shoreline stabilization. New development requiring structural shoreline stabilization shall only be allowed if: (1) the need to protect development from erosion is demonstrated through a geotechnical report; (2) the erosion is not being caused by upland loss of vegetation or drainage; (3) non-structural measures are not possible; (4) the structure will not result in a net loss of shoreline ecological functions or processes; (5) impacts to sediment transport are avoided; and (6) the structure will not cause adverse impacts to down-current properties (SMP 3.72).
- Development on steep slopes must be set back so that shoreline stabilization is not needed (SMP 3.72).

- New or enlarged shoreline stabilization is only allowed when it has been demonstrated that it is necessary to protect existing or approved development, human safety, or restoration/remediation (SMP 3.73).
- Hard shore structural stabilization measures are prohibited unless a geotechnical analysis demonstrates that soft shore structural stabilization measures or non-structural measures are not feasible (SMP 3.73).
- Mitigation shall be required where adverse impacts to shoreline functions cannot be avoided. Mitigation plans will need to demonstrate that mitigation measures would result in no net loss of functions (SMP 3.73).

4.3 Mitigation and Conditional Uses

Several types of activities such as unregulated activities, platting and subdivision, as well as the ongoing effects of past development carry the potential for cumulative effects exists. However, most of these activities would be subject to City review under the State Environmental Policy Act (SEPA), which would require that activities do not result in unmitigated significant adverse impacts to the environment. Subdivision and platting are not a major concern in Olympia as the City's shorelines are largely developed and the land use pattern established.

Exempt activities, while not subject to a substantial development permit, are subject to all other provisions of the SMP and would have to demonstrate that they would not result in a loss of ecological functions.. The proposed SMP requires that proposed shoreline uses and development must demonstrate that projects will not result in a loss of shoreline functions through the use of mitigation sequencing, whereby mitigation shall occur in the following order of priority:

1. Avoiding the adverse impact altogether by not taking a certain action or parts of an action, or moving the action;
2. Minimizing adverse impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology and engineering, or taking affirmative steps to avoid or reduce adverse impacts;
3. Rectifying the adverse impact by repairing, rehabilitating or restoring the affected environment;
4. Reducing or eliminating the adverse impact over time by preservation and maintenance operating during the life of the action;
5. Compensating for the adverse impacts by replacing, enhancing, or providing similar substitute resources or environments; and
6. Monitoring the impact and the compensation projects and taking appropriate corrective measures.

For the most part, mitigation measures are required to occur in the immediate vicinity of the impact. If this is not feasible, mitigation may occur off-site if it provides greater improvement to shoreline ecological functions. The City may also approve use of alternative mitigation practices such as in-lieu fee programs, mitigation banks, and other similar approaches provided they have been approved by the Department of Ecology, the Department of Fish and Wildlife, or the Army Corps of Engineers (3.21).

Lastly, the state guidelines and the City's proposed SMP include authority to permit some uses and activities as conditional uses. A conditional use permit allows flexibility in the application of use regulations in a manner consistent with the SMP and that maintains ecological functions. The conditional use permit can be issued on a case-by-case basis for certain uses which may have a greater potential for impacts without project-specific conditions. In authorizing a shoreline conditional use permit, the City or the Department of Ecology could place

special conditions to control any undesirable effects of the proposed use. The proposed SMP also provides for control of new or unforeseen uses. Shoreline uses that are unlisted in the SMP would require a shoreline conditional use permit.

4.4 Navigation and Public Access

Consistent with the state shoreline guidelines (WAC 173-26-201), this assessment also addresses cumulative impacts on other functions such as interference with navigation and public access. The proposed SMP includes several provisions that require the protection of navigation rights as a condition of development. One of the management policies for the Aquatic environment designation is: “the rights of navigation should be protected.” The proposed plan establishes policy provisions to ensure that new docks and moorage facilities do not interfere with navigation and regulations and standards that implement that policy.

As reflected in the Inventory and Characterization Report, the City currently has adequate public access. The proposed SMP includes several provisions that prohibit impacts to existing public access and require additional public access for some types of new development. Based on these provisions, cumulative impacts to navigation and public access are not anticipated to result from implementation of the proposed SMP.

4.5 Restoration Opportunities

In addition to the application of shoreline environment designation and use regulations, the SMP update includes a Shoreline Restoration Plan (Olympia, 2010). The restoration plan identifies projects and programs that are or would be implemented through the City’s current plans and programs including the comprehensive plan, critical areas regulations, and storm and surface water utility. The plan also identifies programs and projects being implemented by regional agencies, Tribes, the Port and conservation groups. Lastly, the restoration plan identifies specific restoration projects organized into three categories: Budd inlet, Freshwater Streams and Rivers, and Lakes. These projects would achieve local restoration goals and would be feasible with City departments as the lead or partner agencies.

4.6 Beneficial Effects of Any Established Regulatory Programs under Other Local, State, and Federal Laws

4.6.1 Local

A variety of other regulatory programs, plans, and policies work in concert with the City’s SMP to manage shoreline resources and regulate development near the shoreline. The City’s Comprehensive Plan establishes the general land use pattern of growth and development the City has envisioned for areas both inside and outside the shoreline jurisdiction. Various sections of Olympia’s Municipal Code (OMC) are relevant to shoreline management, such as OMC Title 18, the Unified Development Code, which contains zoning and development standards.

The City’s development standards and use regulations for environmentally critical areas (OMC Chapter 18.32) are particularly relevant to the City’s SMP. Designated critical areas are found throughout the City’s shoreline jurisdiction. The proposed SMP adopts Chapter 18.32 by reference, designates the same areas as critical areas under the SMP, and generally imposes the same regulations. The SMP also recognizes that the need for shoreline public access and water-dependent use in some critical areas and their buffers can be addressed through development and performance standards, and so allows these uses subject to new standards.

In 1995, the Port completed its new Comprehensive Plan for all Port properties in Thurston County. It included a land use plan for the Port's Budd Inlet properties on both the Port Peninsula and along West Bay. In 2005, the Port conducted a 10-year review of the plan that included a summary of environmental accomplishments, several of which relate to the shoreline functions of Budd Inlet (Bayhouse Associates, 2005). The accomplishments include the Cascade Pole site cleanup. This site, located on the Port Peninsula north of the Marina, was a holding pond for toxic chemicals used to treat wood. The chemicals seeped into the ground and polluted some 18 acres of land, including 3 acres of tidelands. Cleanup and reuse of the property is largely complete. The Port and Ecology continue to partner in monitoring efforts.

The Port has replaced many of the creosoted pilings on the Port Peninsula with concrete or steel pilings and has reconstructed the North Point bulkhead in a fish-friendly manner. Its cargo yards are now mostly paved, allowing effluent to be contained and regular cleanup of debris to take place easily. The Swantown Boatworks was constructed with a paved yard, onsite stormwater containment, and a self-contained wash-down area which recycles water and removes waste. The Marina has a new pumpout facility, new showers and toilets, and energy-efficient lighting. Marina staff has also instituted a tenant-audit system to make sure these facilities are used. Strict best management practices have been put in place to assure the facility remains environmentally friendly. Lastly, the Port has ceased industrial use of its West Bay properties and is in the process of transferring them to the City of Olympia to be used as a park and as intertidal habitat for marine life.

The Port has also recently updated its Comprehensive Scheme of Harbor Improvement (CSHI) (Port of Olympia, 2011). The Port is required by statute to develop and update a CSHI, which includes information regarding the planning for capital improvement projects deemed likely to be implemented. It was most recently amended 2011. The Proposed Draft 2012 CSHI lists the following environmental activities that would have the potential to improve shoreline functions:

1. **Cascade Pole Water Treatment Plant Replacement** - Replace the existing groundwater treatment plant at the Cascade Pole Site. Portions of the construction will be carried over from 2011.
2. **Mission Creek Restoration Project** - Restoration project to perform salmon habitat restoration work at the mouth of Mission Creek, within Priest Point Park. This project is associated with the Port's consent decree in the Clean Water Act citizens' suit brought by the Olympians for Public Accountability.
3. **East Bay Redevelopment/Cleanup** - Cleanup of East Bay properties to prepare them for redevelopment.
4. **Marine Terminal Stormwater Compliance/Treatment System** - Implementation of Level 3 response required under the Port's Industrial Stormwater General Permit. The project includes the evaluation of the current Marine Terminal Conveyance System and design and construction of a stormwater treatment system.
5. **Budd Inlet Sediment and Source Control Investigation** - Investigation of nature and extent of contamination in sediments, and into potential sources of contaminants in the vicinity of the Port Peninsula in West and East Bays of Budd Inlet.

The City is also partnering with the South Sound Salmon Enhancement Group and the Port to restore the Mission Creek estuary within Priest Point Park on the eastern shores of Budd Inlet. The project will restore fish passage and estuarine functions at Mission Creek by removing an existing road embankment, culvert and accumulated sediments. The City has also completed Phase I of Percival Landing, which includes areas of

shoreline restoration. The City, as a member of LOTT Alliance, is also engaged in the effort to utilize reclaimed water and redevelop 14 acres of the Port of Olympia's East Bay property with several public uses.

4.6.2 State and Federal

A number of state and federal agencies have jurisdiction over land or natural elements in the City's shoreline jurisdiction. Local development proposals most commonly trigger requirements for state or federal permits when they impact wetlands or streams; potentially affect fish and wildlife listed under the federal Endangered Species Act; result in over one acre of clearing and grading; affect the floodplain or floodway; or involve in-water or overwater activities. As with local requirements, state and federal regulations may apply throughout Olympia, but regulated resources are common within the City's shoreline jurisdiction. The state and federal regulations affecting shoreline-related resources include but are not limited to the following regulations:

Endangered Species Act:

The federal ESA addresses the protection and recovery of federally listed species. The ESA is jointly administered by the National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly referred to as the National Marine Fisheries Service), and the United States Fish and Wildlife Service (USFWS).

Clean Water Act:

The federal CWA requires states to set standards for the protection of water quality for various parameters, and it regulates excavation and dredging in waters of the U.S., including wetlands. Certain activities affecting wetlands in the City's shoreline jurisdiction or work in the adjacent rivers may require a permit from the U.S. Army Corps of Engineers and/or Washington State Department of Ecology under Section 404 and Section 401 of the CWA, respectively.

Federal Emergency Management Agency National Flood Insurance Program:

Communities that participate in the National Flood Insurance Program receive federally backed flood insurance. In order to participate, the community must adopt and enforce floodplain management ordinances, which reduce future flood damage. The National Flood Insurance Program is also responsible for mapping the country's flood hazard areas.

Hydraulic Project Approval:

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

Rivers and Harbors Act:

Any work or project that may affect or obstruct navigable waters requires a Section 10 permit under the Rivers and Harbors Appropriation Act of 1899. The U.S. Army Corps of Engineers reviews and authorizes projects with either a standard individual permit, letter-of-permission, nationwide permit, or regional permit.

National Pollutant Discharge Elimination System:

Ecology regulates activities that result in wastewater discharges to surface water from industrial facilities or municipal wastewater treatment plants. NPDES permits are also required for stormwater discharges from industrial facilities, construction sites of one or more acres, and municipal stormwater systems that serve census-defined Urbanized Areas (areas with more than 50,000 people and densities greater than 1,000 people per square mile).

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5.0 GENERAL ASSESSMENT OF CUMULATIVE IMPACTS

As shown in the analysis in Appendix C, when the anticipated uses in the shoreline are considered together with the regulations that would apply, in most cases there would be no loss of ecological functions compared to the level of ecological functions documented in the Shoreline Inventory prepared by Thurston Regional Planning Council (TRPC, 2008) and the Shoreline Analysis and Characterization Report prepared by ESA Adolfson (2008) for TRPC. The cumulative actions taken over time in accordance with the City's Draft SMP are not likely to result in a net loss of shoreline ecological functions from existing baseline conditions. Conclusions on the future performance of key shoreline functions are summarized as follows:

Hydrology: Loss in hydrological function from baseline is not expected and there is the potential for improvement. In most areas shoreline modifications have resulted in alterations to natural hydrological functions. In marine waters, new policies and regulations that prefer soft shore over hard shore stabilization have the potential to reconnect coastal bluffs and upland shorelands to the water and partially restore natural processes. New controls on docks, piers and other overwater structures also have the potential to improve hydrologic conditions. If Capitol Lake is converted back to the estuary of the Deschutes River, hydrologic conditions would improve.

Water Quality: Generally, no loss in water quality is expected. Regulations would limit any additional impacts to wetlands, and any impacts would be mitigated. SMP policies and regulations encourage use of low impact development best management practices addressing non-point source pollution. New policies and regulations prohibit septic systems, treated wood, and the use of harmful pesticides, herbicides, and fertilizers.

The lack of a vegetation conservation area (VCA) or building setback in the Port Maritime Industrial designation may allow industrial or commercial uses to develop at the water's edge. Current and future uses may represent a potential for cumulative impacts to water quality. Shoreline functions are severely altered in the Port Maritime Industrial designation. Required mitigation, stormwater management practices, and the prohibition of uses that pose a risk of contamination to ground or surface waters may achieve no net loss of shoreline functions, but would have to be evaluated at the project level.

Habitat: Habitat elements such as riparian vegetation, large woody debris and organic contributions have been altered in many of the City's shorelines. Vegetated conservation areas (VCAs) are established and would require enhancement for new development, redevelopment or expansion. New setbacks established under the Draft SMP would also allow for shoreline vegetation conservation and revegetation as future development occurs. New regulations on the size and materials used for overwater structures would also improve nearshore habitat over time. Lastly, the preference for softshore stabilization has the potential to improve marine riparian and nearshore habitat over time.

As described in the Shoreline Inventory and Characterization Reports, past and ongoing uses along Olympia's shorelines have led to altered shoreline functions. Development and increased impervious surface have led to water quality degradation, shoreline modifications have altered natural hydrological processes, and loss of riparian vegetation and overwater structures have altered habitats. However, as described above, updates to shoreline environment designations, requirement of mitigation sequencing, use regulations and development

standards, along with implementation of the shoreline restoration plan, provide substantially improved protection of shoreline functions.

In concert with implementation of restoration actions in the city and other ongoing state and federal programs, the regulatory provisions of the Draft SMP would serve to maintain the overall condition of shoreline resources in the city and largely avoid long term cumulative impacts.

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Assessment of Ecological Functions along the City of Olympia’s Shorelines

Waterbody	Ecological Processes/ Functions WAC173-26- 201(3)(d)(i)(C)	Current Performance <i>Shoreline Inventory and Characterization Report (TRPC, 2010)</i>	Foreseeable Future Development	SMP Provisions: Protection and Restoration Protection = Proposed SMP regulations (with reference to SMP section number) Restoration = Draft Restoration Plan Objectives	Conclusions (Future Performance)
Budd Inlet	<p>Marine Hydrology - Transporting and stabilizing sediment, attenuating wave and tidal energy</p> <p>Water Quality - Removing excessive nutrients and toxic compounds</p> <p>Marine Habitat - Estuarine habitat; subtidal and intertidal mudflats and salt marshes provide transition habitat between fresh and salt water environments.</p> <p>Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p> <p>Source and delivery of LWD.</p>	<p>Hydrology: Low The general trend toward a ‘harder’ shoreline (e.g., bulkheads, revetments, docks, etc.) has resulted in less overall wave attenuation than in the pre-disturbance condition.</p> <p>Bluff erosion processes have been modified as structures (e.g. roads, railroads, piers and docks, bulkheads) at the toe and nearshore have reduced the frequency of tidal and wave interaction with the bluff.</p> <p>Approximately 73% of the shoreline is modified. Overwater structures include the Percival Landing Boardwalk, several Marinas and ten smaller docks.</p> <p>Water Quality: Low Reduction in wetland area has reduced contact time of water with soil. This lowers the potential for filtering and cycling of pollutants, which adhere to soil particles.</p> <p>The delivery, transport, and disposition of nutrients, pathogens, and toxins have been significantly altered from the pre-disturbance condition. Upland sources of these pollutants have increased significantly as a result of urban and industrial land uses within and near the shoreline. Potential storage has decreased through wetland loss and installation of impervious surfaces.</p>	<p>Future Development:</p> <p>Less than two percent of the shoreline is vacant approximately nine percent is considered redevelopable or underdeveloped.</p> <p>In the residential areas along Budd Inlet Bulkhead repairs and replacements and Residential repairs and remodels can be expected.</p> <p>Along the east shoreline of Budd Inlet future develop could include redevelopment of industrial uses to mixed use developments including residential units, offices, and retail. Development of park space is also likely and could include a waterfront trail and public access points. Redevelopment would likely include road improvements (sidewalks, bike lanes, repaving).</p> <p>The Capitol Lake Adaptive Management Plan (CLAMP) is currently considering several restoration approaches for Capitol Lake, including significant changes to the current berm/tide gates in Budd-4.</p> <p>Redevelopment along the Isthmus (4th and 5th Avenues) and along East Bay Drive is anticipated and could include high-density residential, office and retail uses.</p> <p>Repairs and rebuilding of Percival Landing Boardwalk are anticipated.</p>	<p>Hydrology:</p> <p>Protection:</p> <p>Shoreline stabilization standards:</p> <ul style="list-style-type: none"> Structural shoreline stabilization is prohibited in all SEDs, except as authorized by the Program and then only as a conditional use. Non-structural shoreline stabilization is permitted in all shoreline environments as a conditional use (SMP 3.77) New shoreline use and development shall be located and designed to eliminate the need for concurrent or future shoreline stabilization. New development requiring structural shoreline stabilization shall only be allowed if: 1) the need to protect development from erosion is demonstrated through a geotechnical report; 2) the erosion is not being caused by upland loss of vegetation or drainage; 3) nonstructural measures are not possible; 4) impacts to sediment transport are avoided and 5) structure will not cause adverse impacts to down current properties. Where not possible, soft structural protection measure shall be preferred over hard structural measures (SMP 3.78) Development on steep slopes must be setback so that shoreline stabilization is not needed ((SMP 3.78). New or enlarged shoreline stabilization is only allowed when it has been demonstrated that it is necessary to protect existing or approved development, human safety, or restoration/remediation. (SMP 3.78). Hard structural stabilization measures are prohibited unless a geotechnical analysis demonstrates that soft structural stabilization measures and or non-structural measures are not feasible (SMP 3.79). Mitigation shall be required where adverse impacts to shoreline functions cannot be avoided. Mitigation plans will need to demonstrate that they would result in no net loss of functions (SMP 3.79). <p>Breakwaters, Jetties, Groins and Weirs</p> <ul style="list-style-type: none"> Breakwaters, jetties, groins and weirs are prohibited in all shoreline environment designations except for the Urban Intensity environment subject to a shoreline conditional use permit, and only when there is a documented need for the protection of navigation, a harbor, water dependent industrial activities, a marina, fisheries or habitat enhancement project, or a comprehensive beach management plan (SMP 3.78) Breakwaters, jetties, groins and weirs shall evaluate the movement of sand and beach materials as a part of the permit review. Those projects which are found to block littoral drift or cause new erosion of down-drift shoreline shall be required to establish and maintain an adequate long-term beach feeding program (SMP 3.78). <p>Marine overwater structures standards (Docks and Piers):</p> <ul style="list-style-type: none"> New overwater covered moorage and the expansion of existing covered moorage is prohibited (SMP 3.47). New covered moorage and boathouses are prohibited (SMP 3.70). Maximum length of a new or expanded pier or dock for private or recreational use shall be 100 feet from the mean higher-high water mark and shall not exceed a depth of -3 as measured from mean lower low water mark (SMP 3.66). Maximum width of piers is 4 feet and piers must a minimum of 60% grating (SMP 3.66). Commercial and industrial piers or docks must demonstrate that they are the minimum necessary for the intended use and all other provisions of the Shoreline Program can be met (SMP 3.66). The construction of new, or the expansion of existing, overwater industrial buildings is prohibited (SMP 3.52). The construction of new, or the expansion of existing, overwater commercial buildings is prohibited (SMP 3.49). 	<p>No loss of function or Improvement of hydrologic processes:</p> <p>New policies and regulations that prefer soft shore or hard shore stabilization and controls on overwater structures increase opportunities to reconnect bluff areas to the shoreline.</p> <p>Mitigation requirements and restoration efforts offer opportunity for shoreline armoring removal or soft shore stabilization.</p> <p>No loss of function in water quality:</p> <p>Regulations would limit any additional impacts to wetlands, and impacts would be mitigated.</p> <p>As properties redevelop along Budd Inlet, local, state and federal requirements related to water quality and stormwater would result in an overall improvement.</p> <p>No loss of function or Improvement of habitat:</p> <p>Vegetation conservation areas (buffers) and mitigation requirements have the potential to increase native vegetation, habitat and sources of LWD along the shoreline.</p> <p>Controls on overwater structures and mitigation also limit future loss of nearshore marine habitat.</p> <p>Restoration efforts will increase the amount of intact habitat along Budd Inlet overtime.</p>

Waterbody	Ecological Processes/ Functions WAC173-26- 201(3)(d)(i)(C)	Current Performance <i>Shoreline Inventory and Characterization Report (TRPC, 2010)</i>	Foreseeable Future Development	SMP Provisions: Protection and Restoration Protection = Proposed SMP regulations (with reference to SMP section number) Restoration = Draft Restoration Plan Objectives	Conclusions (Future Performance)
		<p>Habitat: Low Physical modifications to Budd Inlet have changed the spatial mixing of fresh and salt water. The installation of roads, docks, and bulkheads has tended to disconnect freshwater seeps and wetlands from marine waters.</p> <p>While plant communities along the shoreline have been subjected to several phases of disturbance, they have recovered along many areas of the shoreline.</p> <p>Removal of mature trees from riparian areas, and from surrounding bluffs has significantly reduced the source of LWD to the nearshore system.</p>		<p>Boating Facilities:</p> <ul style="list-style-type: none"> • New marinas are allowed in all environments except natural as conditional uses, provided that standards are met. Standards include the following (SMP 6.6.4(A and C)): <ul style="list-style-type: none"> • Hard armoring is not used; • The project includes ecological restoration measures to improve baseline conditions over time; and • The proposed location will not require excavation and/or filling of wetlands or stream channels. • Boat launch ramps shall be located, designed, constructed and maintained to reduce impacts to the shoreline. Preferred ramp designs, in order of priority, are (SMP 3.46): <ul style="list-style-type: none"> • Open grid designs with minimum coverage of beach substrate; • Seasonal ramps that can be removed and stored upland; • Structures with segmented pads and flexible connections that leave space for natural beach substrate and can adapt to change in beach profile. • Ramps shall be located, constructed and maintained where alterations to the existing foreshore slope are not required (SMP 3.45). <p>Dredging</p> <ul style="list-style-type: none"> • Dredging may be allowed in the Aquatic environment by conditional use permit. Dredging is prohibited in all other SEDs except when associated with a restoration project (SMP 3.62). • Dredging is allowed for the following uses (SMP 3.61): <ul style="list-style-type: none"> • Water-dependent uses; • Bridges, navigational structures or wastewater treatment facilities; • Maintenance of irrigation reservoirs, drains, canals or ditches for agricultural and stormwater purposes; • Establishing, expanding, relocating or reconfiguring navigation channels and basins where necessary to assure safe and efficient accommodation of existing navigational uses; • Restoration or enhancement projects • Public access and public water-oriented recreational development and uses; • 8. Minor trenching to allow the installation of necessary underground pipes or cables • Dredging projects that create significant unavoidable adverse impacts shall mitigate by creating in-kind habitat near the project (SMP 3.61). <p>Fill</p> <ul style="list-style-type: none"> • Fill in the Natural environment is prohibited except for restoration projects; fill in the Aquatic and Urban Conservancy environment may be allowed through a conditional use permit when associated with a permitted use in the adjacent upland; Fill in the Shoreline Residential and Urban intensity environments may be permitted with a substantial development permit if associated with a permitted use in the adjacent upland (SMP 3.65) • Fill must not be located where shore stabilization would be necessary (SMP 3.63). • Fill is allowed waterward of the OHWM only for the following uses (SMP 3.64): <ul style="list-style-type: none"> • Port development for water dependent uses where other upland alternatives or structural solutions, including pile 	

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				<p>or pier supports is infeasible;</p> <ul style="list-style-type: none"> • 2. Expansion or alteration of transportation facilities where there are no feasible upland alternatives; • 3. Ecological restoration or enhancement such as beach nourishment, habitat creation, or bank restoration when consistent with approved restoration or mitigation plan; • 4. Construction of protective berms or other structures to prevent the inundation of water resulting from sea level rise; • 5. Public access and water-oriented recreational uses; • 6. Cleanup of contaminated sites; or • 7. Maintenance of lawfully established development. <p>Water Quality</p> <p>Protection:</p> <p>Water Quality Standards:</p> <ul style="list-style-type: none"> • Septic systems for new development within the shoreline jurisdiction are prohibited (SMP 3.38). • Stormwater management facilities for new uses and development shall be designed, constructed, and maintained in accordance with the current City Stormwater Drainage Manual (SMP 3.38). • Use of treated wood and harmful pesticides, herbicides, fertilizers, etc. are prohibited (SMP 3.38). <p>Marine overwater structures (Docks and Piers) and Marinas:</p> <ul style="list-style-type: none"> • Construction materials shall not include wood treated with creosote, pentachlorophenol or other similarly toxic materials (SMP 3.38 & 3.70). • Breakwaters, jetties, groins and weirs shall be constructed of suitable materials. The use of solid waste, junk or abandoned automobiles, asphalt or any building demolition debris is prohibited (SMP 3.78). • Boating facilities, including marinas and boat yards, must prevent the release of oil, chemicals, or other hazardous materials into the water (SMP 3.34). <p>Fill Standards:</p> <ul style="list-style-type: none"> • Fill shall consist of clean material including sand, gravel, soil, rock or similar material approved by City. The use of contaminated material or construction debris shall be prohibited (SMP 3.43). <p>Shoreline Stabilization</p> <ul style="list-style-type: none"> • Materials used for shoreline stabilization shall be durable, erosion resistant, and not harmful to the environment (SMP 3.75). <p>Transportation Facilities Standards:</p> <ul style="list-style-type: none"> • New or expanded roads must demonstrate that construction is designed to protect the adjacent shorelands against erosion, uncontrolled or polluting drainage, and other factors (SMP 3.55). <p>Marine Habitat:</p> <p>Vegetation Conservation Areas</p> <ul style="list-style-type: none"> • Parcels with frontage on marine waters shall preserve or provide a native vegetation conservation areas. The vegetation conservation area shall be 20 feet from OHWM in the Urban Intensity and Shoreline Residential shoreline environments and 50 feet from OHWM in the Urban Conservancy and Natural shoreline environments (SMP 2.18). 	

Waterbody	Ecological Processes/ Functions WAC173-26- 201(3)(d)(i)(C)	Current Performance <i>Shoreline Inventory and Characterization Report (TRPC, 2010)</i>	Foreseeable Future Development	<p align="center">SMP Provisions: Protection and Restoration</p> <p align="center">Protection = Proposed SMP regulations (with reference to SMP section number)</p> <p align="center">Restoration = Draft Restoration Plan Objectives</p>	Conclusions (Future Performance)
				<ul style="list-style-type: none"> • Vegetation conservation areas shall be placed in a separate tract in which development is prohibited; protected by execution of an easement dedicated to a conservation organization or land trust; or similarly preserved through a permanent protective mechanism acceptable to the City (SMP 3.32). • Vegetation shall be maintained over the life of the use or development (SMP 3.32). • Speculative clearing, grading, or vegetation removal is prohibited. Clearing, grading and vegetation removal within shoreline setbacks and vegetation conservation areas shall be the minimum necessary for the intended use or development (SMP 3.32). • All clearing and grading in the shoreline jurisdiction must be accompanied by a vegetation management plan that demonstrates it will achieve no net loss of ecological functions (SMP 3.33) • New and expanded single family residential developments will require enhancement of the vegetated buffer dependant on the size fo the project ((SMP 3.32) <p>Commercial Development:</p> <ul style="list-style-type: none"> • All commercial use and development in the shoreline must restore or enhance the vegetation conservation area (SMP 3.49). <p>Utility Standards</p> <ul style="list-style-type: none"> • Vegetation clearing during utility installation and maintenance shall be minimized, and disturbed areas shall be restored or enhanced following project completion. <p>Restoration: The following objectives from the City’s Restoration Plan are aimed at achieving no net loss of ecological functions along Budd Inlet:</p> <ul style="list-style-type: none"> • Preserve and restore estuarine habitat. Subtidal and intertidal mudflats and salt marshes provide transition habitat between fresh and salt water environments. • Enable natural wave energy attenuation, which is restricted by the hardening of shorelines with bulkheads, revetments, docks, etc. • Improve sediment generation and transport. Bluff erosion processes have been modified as structures (roads, railroads, piers, docks, and bulkheads) at the toe have reduced the frequency of tidal and wave interaction with bluffs. • Improve water quality. Reduction in wetland area has reduced contact time of water with soil, lowering the potential for filtering and cycling of pollutants, which adhere to soil particles. Reduce or eliminate upland sources of pollutants, which have increased as a result urban and industrial land uses within and near the shoreline, and subsequently, are the result of an increase in stormwater runoff. • Preserve and restore wildlife habitat. Shoreline vegetation provides habitat for invertebrates, birds, amphibians, reptiles, and mammals. • Increase sources and delivery of large woody debris. Removal of mature trees from riparian areas, and from surrounding bluffs has significantly reduced the source of large woody debris to the shoreline. 	
Capitol Lake	Freshwater Hydrology -	Hydrology: Low	Future Development:	<u>Hydrology</u>	No loss or potential improvement of

Waterbody	Ecological Processes/ Functions WAC173-26- 201(3)(d)(i)(C)	Current Performance <i>Shoreline Inventory and Characterization Report (TRPC, 2010)</i>	Foreseeable Future Development	SMP Provisions: Protection and Restoration Protection = Proposed SMP regulations (with reference to SMP section number) Restoration = Draft Restoration Plan Objectives	Conclusions (Future Performance)
	<p>Hydroperiod, flood flow retention and sediment retention.</p> <p>Water Quality - Wetland removal of pollutants through sedimentation and adsorption.</p> <p>Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p> <p>Habitat - Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p> <p>Source and delivery of LWD.</p>	<p>Capitol Lake represents a highly altered form of the original Deschutes Estuary with the installation of a berm and tide gate system.</p> <p>Capitol Lake, while highly altered, is too low in the system to provide flood flow retention.</p> <p>Capitol Lake now retains a significant proportion of the sediments delivered by the Deschutes River and Percival Creek.</p> <p>Water Quality: Low Reduction in wetland area and channel-floodplain connection has reduced water contact time of water with soil. This lowers the potential for filtering and cycling of pollutants.</p> <p>The delivery, transport, and disposition of nutrients, pathogens, and toxins have been significantly altered from the pre-disturbance condition. Upland sources of these pollutants have increased significantly as a result of urban and industrial land uses within and near the shoreline.</p> <p>Habitat: Low Native riparian vegetation has been removed. There are portions of the lake that are currently forested, and are under some level of public protection.</p> <p>Removal of mature trees from riparian areas has significantly reduced the source of LWD to the lake.</p>	<p>Less than two percent of the shoreline is vacant and less than two percent is considered redevelopable or underdeveloped.</p> <p>Future development in the South Basin is anticipated to include restoration of the Old Brewhouse with a potential new bridge crossing and potential Woodland Trail Bridge crossing.</p> <p>Future development in the Middle basin are limited to possible development of new state buildings, recreation/park related activities, and steam plant repairs.</p> <p>In the North Basin future development is likely to include plans for Heritage Park development and Recreation/park related activities.</p> <p>The Capitol Lake Adaptive Management Plan (CLAMP) is currently considering several restoration approaches for Capitol Lake, including significant changes to the current berm/tide gates.</p>	<p>Protection:</p> <p>Shoreline Stabilization Standards:</p> <ul style="list-style-type: none"> New structural shoreline stabilization is prohibited in all SEDs, except as authorized by the Program and then only as a conditional use. Non-structural shoreline stabilization is permitted in all shoreline environments as a conditional use (SMP 3.72) Replacement structures should be designed, located, sized, and constructed to assure no net loss of shoreline ecological functions (SMP 3.74). Replacement walls or bulkheads may not encroach waterward of the ordinary high water mark or existing structure, except for soft shoreline stabilization measures that provide restoration or shoreline ecological functions (SMP 3.74). Development on steep slopes must be setback so that shoreline stabilization is not needed ((SMP 3.78). New or enlarged shoreline stabilization is only allowed when it has been demonstrated that it is necessary to protect existing or approved development, human safety, or restoration/remediation. (SMP 3.78). Hard structural stabilization measures are prohibited unless a geotechnical analysis demonstrates that soft structural stabilization measures and or non-structural measures are not feasible (SMP 3.79). Mitigation is required where adverse impacts to shoreline functions cannot be avoided. Mitigation plans will need to demonstrate that they would result in no net loss of functions (SMP 3.79). <p>Freshwater Overwater Structures</p> <ul style="list-style-type: none"> New covered moorage and boathouses are prohibited (SMP 3.70). In fresh water, the length of new or expanded piers or docks for private or recreational use shall not exceed fifty (50) feet as measured from the ordinary high water mark. Pier and dock surface coverage shall not exceed: 1) 480 square feet for single use structures; 2) 700 square feet for two-party joint use; and 3) 1,000 square feet for residential pier/docks serving three or more residences (SMP 3.67). Piers shall not exceed four feet in width and must be fully grated with at least 60 percent open area. Ramps shall not exceed three feet in width and must be 100 percent grated ((SMP 3.67). <p>Dredging and Fill</p> <p>SMP protective measure for dredge and fill are the same as reported for Budd Inlet.</p> <p>Water Quality:</p> <p>Protection:</p> <p>Water Quality Standards:</p> <ul style="list-style-type: none"> Septic systems for new development within the shoreline jurisdiction shall not be allowed (SMP 3.38). Stormwater management facilities for new uses and development shall be designed, constructed, and maintained in accordance with the current City Stormwater Drainage Manual (SMP 3.38). Use of treated wood and harmful pesticides, herbicides, fertilizers, etc. are prohibited (SMP 3.38). <p>Overwater Structures:</p> <ul style="list-style-type: none"> Construction materials shall be limited to untreated wood, approved plastic composites, concrete, or steel (SMP 3.38). 	<p>hydrologic functions:</p> <p>The Lake shorelines are highly altered. No additional alterations are expected. New regulation of shoreline stabilization will maintain or improve hydrological conditions of the Lake.</p> <p>Mitigation requirements and restoration efforts offer opportunity for shoreline armoring removal or soft shore stabilization.</p> <p>It is not possible to predict whether Capitol Lake will remain as a lake, or will be converted back to the estuary of the Deschutes River. If Capitol Lake is converted back to the Deschutes estuary, hydrologic conditions would improve.</p> <p>No loss of function in water quality:</p> <p>Regulations would limit any additional impacts to wetlands, and impacts would be mitigated.</p> <p>Improved local, state and federal requirements related to water quality and stormwater would result in an overall improvement.</p> <p>No loss of function or Improvement of habitat:</p> <p>Vegetation conservation areas (buffers) and mitigation requirements have the potential to increase native vegetation, habitat and sources of LWD along the shoreline.</p> <p>Any additions to existing structures will require vegetation conservation or revegetation of native plants along the shoreline</p> <p>Any other development actions requiring a shoreline permit will require vegetation conservation or revegetation of native plants along the shoreline.</p>

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				<p>Transportation:</p> <ul style="list-style-type: none"> Construction of transportation facilities must be designed to protect the adjacent shorelands against erosion, uncontrolled or polluting drainage, and other factors detrimental to the environment both during and after construction (SMP 3.55). Debris, overburden and other waste materials from transportation related construction will be disposed of to prevent their entry into the adjoining water body (SMP3.55). <p>Habitat:</p> <p>Critical Areas:</p> <ul style="list-style-type: none"> All uses and development occurring within the shoreline jurisdiction shall comply with the City's critical area regulations as adopted in the SMP (SMP 3.22). Development on parcels located within critical areas and/or associated buffers must include vegetation in accordance with the provisions of the City's critical areas code (SMP 2.18). <p>Vegetation Conservation Areas</p> <ul style="list-style-type: none"> Parcels with frontage on Capitol Lake shall preserve or provide a native vegetation conservation areas. The vegetation conservation area shall be 20 feet from OHWM in the Urban Intensity shoreline environments and 50 feet from OHWM in the Urban Conservancy environments (SMP 2.18). Other SMP protective measure for vegetation conservation are the same as reported for Budd Inlet. <p>Commercial Development:</p> <ul style="list-style-type: none"> All commercial use and development in the shoreline must restore or enhance the vegetation conservation area (SMP 3.49). <p>Utility Standards</p> <ul style="list-style-type: none"> Vegetation clearing during utility installation and maintenance shall be minimized, and disturbed areas shall be restored or enhanced following project completion. <p>Restoration:</p> <p>The following objectives from the City's Restoration Plan are aimed at achieving no net loss of ecological functions in the City's Lakes including Capitol Lake:</p> <ul style="list-style-type: none"> Restore natural sediment retention patterns. Fine sediment loading is elevated due to land cover alterations and increased impervious surface. Improve water quality. Reduction in wetland area and lacustrine floodplain connection has reduced water contact time with soil, lowering the potential for filtering and cycling of pollutants. Upland sources of pathogens and toxins have increased significantly as a result of urban and industrial land uses, resulting in the growth of invasive aquatic plants and algae, phosphorous loading, and increased water temperatures. Preserve and restore wildlife habitat. Vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals. Increase sources and delivery of large woody debris. Removal of mature trees has significantly reduced the source of large woody debris. 	

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Chambers Lake	<p>Lake Hydrology - Groundwater recharge, flood flow and sediment retention recruitment of structural LWD.</p> <p>Water Quality - Lake trophic status/overall water quality.</p> <p>Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p> <p>Habitat - Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p> <p>Source and delivery of LWD.</p>	<p>Hydrology: Low The hydrology of Chambers Lake has been highly altered by the surrounding urban environment.</p> <p>Potential storage has decreased through wetland loss and installation of impervious surfaces.</p> <p>Water Quality: Moderate The delivery, transport, and deposition of nutrients, pathogens, and toxins have been significantly altered from pre-disturbance conditions.</p> <p>Upland sources of these pollutants have increased significantly as a result of urban and industrial land uses within and near the shoreline.</p> <p>Chambers Lake was listed as a Category 2 for total phosphorus in the DOE 303(d) list.</p> <p>Habitat: Moderate Vegetation along the shorelines in the City have been highly altered to accommodate moderate density urban development.</p> <p>The East Basin shoreline is characterized by a narrow band of riparian vegetation surrounded by moderate density urban development on the north and east sides of the basin.</p>	<p>Future Development:</p> <p>Approximately four percent of the shoreline is vacant and approximately 3 percent is considered redevelopable or underdeveloped.</p> <p>Shorelines are planned for some low-density residential and commercial uses. However, wetlands and buffers limit shoreline development. There is the possibility of future residential development. Likely shoreline development may also include recreation/park development including trails, trailheads, parking.</p>	<p>Protection:</p> <p>Hydrology</p> <p>Shoreline Stabilization Standards Freshwater Overwater Structures</p> <ul style="list-style-type: none"> Protection Shoreline Stabilization Standards and overwater structures regulations are the same as reported for Capitol Lake. <p>Water Quality</p> <p>Water Quality Standards:</p> <ul style="list-style-type: none"> Water quality standards are the same as those reported for Capitol lake <p>Habitat</p> <p>Critical Areas</p> <ul style="list-style-type: none"> All uses and development occurring within the shoreline jurisdiction shall comply with the City's critical area regulations as adopted in the SMP (SMP 3.22). <p>Vegetation Conservation</p> <ul style="list-style-type: none"> Development on parcels located within critical areas and/or associated buffers must include vegetation in accordance with the provisions of the City's critical areas code (SMP 2.18). <p>Recreation</p> <ul style="list-style-type: none"> Water-oriented recreation uses and development are allowed when they will not cause a net loss of shoreline ecological functions or processes (SMP 3.53). <p>Restoration:</p> <p>See the restoration plan objectives for lakes under the Capitol lake section of this Table.</p>	<p>No loss or potential improvement of hydrologic functions:</p> <p>Much of the City's Chambers lake shorelines is wetland and critical areas buffer and are protected through CAO.</p> <p>Residential setbacks have increased or stayed the same, meaning that any additions to existing structures will be no closer to the shoreline.</p> <p>New regulation of shoreline stabilization and docks will maintain or improve hydrologic functions.</p> <p>No loss of function in water quality:</p> <p>Water quality is currently good.</p> <p>Regulations would limit any additional impacts to wetlands, and impacts would be mitigated.</p> <p>Improved local, state and federal requirements related to water quality and stormwater could result in an overall improvement.</p> <p>No loss of function or Improvement of habitat:</p> <p>Any additions to existing structures will require vegetation conservation or revegetation of native plants along the shoreline</p> <p>Vegetation conservation areas (buffers) and mitigation requirements have the potential to increase native vegetation, habitat and sources of LWD along the shoreline.</p> <p>Development actions requiring a shoreline permit will require vegetation conservation or revegetation of native plants along the shoreline.</p>

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Grass Lake	<p>Lake Hydrology - Wetland function, flood flow and sediment retention and recruitment of structural LWD.</p> <p>Water Quality - Lake trophic status/overall water quality.</p> <p>Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p> <p>Habitat - Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p> <p>Source and delivery of LWD.</p>	<p>Hydrology Moderate - Historically, Grass Lake was part of an extensive wetland system. The Grass Lake wetland system is now fragmented due to drainage ditching, construction of stormwater facilities, and road infrastructure associated with a highly altered urban environment.</p> <p>Water Quality: High - Grass Lake and Lake Louise are not listed on the state's 303(d) list of impaired waterbodies.</p> <p>Habitat: High - Grass Lake is within Grass Lake Refuge, a 164 acre undeveloped city-owned park in Olympia.</p> <p>Riparian habitat in the Grass Lake area contains mixed coniferous and deciduous forest along with shrub and grass vegetation.</p>	<p>Future Development:</p> <p>Approximately 15 percent of the shoreline is vacant and less than one percent is considered redevelopable or underdeveloped. Many of the vacant properties are within critical areas or buffers.</p> <p>Most of the Lake's shoreline are within the Grass Lake refuge. Future development is likely limited to residential repairs and remodels, minor commercial repairs, and road and utilities maintenance.</p>	<p>Protection:</p> <ul style="list-style-type: none"> Protective SMP measures for Grass Lake for hydrology, water quality and habitat are the same as those reported for Chambers and Capitol Lake. <p>Restoration:</p> <p>See the restoration plan objectives for lakes under the Capitol lake section of this Table.</p>	<p>No loss or potential improvement of hydrologic functions:</p> <p>Residential setbacks have increased or stayed the same, meaning that any additions to existing structures will be no closer to the shoreline.</p> <p>There are few modifications to the Lake's shorelines. New regulation of shoreline stabilization and docks will maintain or improve hydrologic functions.</p> <p>No loss of function in water quality:</p> <p>Regulations would limit any additional impacts to wetlands, and impacts would be mitigated.</p> <p>Improved local, state and federal requirements related to water quality and stormwater would result in an overall improvement.</p> <p>No loss of function or Improvement of habitat:</p> <p>The Lake's shorelines include significant amounts of wetland and buffer, which are protected through CAO.</p> <p>Because of the refuge, Habitat functions are high. Continued public ownership will retain this.</p> <p>Vegetation conservation areas (buffers) and mitigation requirements have the potential to increase native vegetation, habitat and sources of LWD along the shoreline.</p> <p>Any additions to existing structures will require vegetation conservation or revegetation of native plants along the shoreline</p> <p>Development actions requiring a shoreline permit will require vegetation conservation or revegetation of native plants along the shoreline.</p>

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Ken Lake	<p>Lake Hydrology - Flood flow and sediment retention; recruitment of structural LWD.</p> <p>Water Quality - Lake trophic status/overall water quality.</p> <p>Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p> <p>Habitat - Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p> <p>Source and delivery of LWD.</p>	<p>Hydrology: Low Shoreline modification at Ken Lake has been extensive. The lake was dredged when the surrounding subdivision was developed to maximize recreational opportunities at the lake. Dredging activities have resulted in decreased water storage capacity in the lake during rain events. There are 32 private docks on the lake.</p> <p>Water Quality: Moderate Ken Lake is not listed by Ecology on its 303(d) list of impaired waterbodies.</p> <p>Habitat: Low Riparian forest cover around Ken Lake is limited.</p> <p>The lake is surrounded by moderate density urban development with interspersed shrub and maintained lawn vegetation</p> <p>The majority of the lake shoreline is dominated by residential back yards and is also characterized by 32 private, residential docks.</p>	<p>Future Development:</p> <p>There are no vacant parcels and less than one percent are redevelopable or underdeveloped.</p> <p>The shorelines of Ken Lake are largely developed with single-family homes. There are no vacant or undeveloped lots on the Lake. Future development will be limited to expansion and redevelopment of single family homes and existing bulkheads and docks.</p>	<p>Protection:</p> <p><u>Hydrology</u></p> <p>Shoreline Stabilization Standards:</p> <ul style="list-style-type: none"> • New structural shoreline stabilization is prohibited in the shoreline residential environment, except as authorized by the Program and then only as a conditional use. Non-structural shoreline stabilization is permitted in all shoreline environments as a conditional use (SMP 3.72) • Replacement structures must be designed, located, sized, and constructed to assure no net loss of shoreline ecological functions (SMP 3.74). • Replacement walls or bulkheads may not encroach waterward of the ordinary high water mark or existing structure, except for soft shoreline stabilization measures that provide restoration or shoreline ecological functions (SMP 3.74). • New or enlarged shoreline stabilization is only allowed when it has been demonstrated that it is necessary to protect existing or approved development, human safety, or restoration/remediation. (SMP 3.78). • Hard structural stabilization measures are prohibited unless a geotechnical analysis demonstrates that soft structural stabilization measures and or non-structural measures are not feasible (SMP 3.79). • Mitigation is required where adverse impacts to shoreline functions cannot be avoided. Mitigation plans will need to demonstrate that they would result in no net loss of functions (SMP 3.79). <p>Freshwater Overwater Structures:</p> <ul style="list-style-type: none"> • New covered moorage and boathouses are prohibited (SMP 3.70). • In fresh water, the length of new or expanded piers or docks for private or recreational use shall not exceed fifty (50) feet as measured from the ordinary high water mark. • Pier and dock surface coverage shall not exceed: 1) 480 square feet for single use structures; 2) 700 square feet for two-party joint use; and 3) 1,000 square feet for residential pier/docks serving three or more residences (SMP 3.67). • Piers shall not exceed four feet in width and must be fully grated with at least 60 percent open area. Ramps shall not exceed three feet in width and must be 100 percent grated ((SMP 3.67). <p>Residential Dock Standards:</p> <ul style="list-style-type: none"> • Only one type of moorage facility shall be allowed per waterfront lot (SMP 3.65). • Floats shall not be located farther waterward than existing floats or established swimming areas (SMP 3.68). • Placing fill waterward of the ordinary high water mark for purposes of constructing a dock or pier is prohibited (SMP 3.63). <p>Residential Density and Setbacks:</p> <ul style="list-style-type: none"> • Residential density may not exceed 8 du/acre. Residential structures must be setback minimum of 30 feet from the OHWM (SMP 6.3). <p>Dredging and Fill</p> <p>SMP protective measures for dredge and fill are the same as reported for Capitol Lake.</p> <p><u>Water Quality</u></p> <p>Water Quality Standards:</p> <ul style="list-style-type: none"> • Septic systems for new development within the shoreline jurisdiction shall not be allowed (SMP 3.38). • Stormwater management facilities for new uses and development shall be designed, constructed, and maintained in 	<p>No loss in hydrologic functions:</p> <p>The Lake shorelines are completely and developed to current zoning. No additional alterations are expected.</p> <p>New regulations for shoreline stabilization structures and residential docks will likely maintain or may minimally improve hydrological conditions of the Lake.</p> <p>No loss of function in water quality:</p> <p>Improved local, state and federal requirements related to water quality and stormwater would result in an overall improvement over time.</p> <p>SMP standards for materials used in shoreline stabilization and docks should reduce pollution source.</p> <p>No loss of habitat function:</p> <p>Vegetation conservation requirements areas (buffers) and mitigation requirements have the potential to increase native vegetation along shoreline.</p> <p>There are very few undeveloped single-family residential lots along the Lake. Complete redevelopment of any lots will be placed further back from the shoreline and shoreline vegetation conservation and replanting will be required.</p> <p>Residential setbacks have increased, meaning that any additions to existing structures will be no closer to the shoreline.</p> <p>Additions to existing structures will require revegetation of a portion of the buffer with native plants along the shoreline.</p>

Waterbody	Ecological Processes/ Functions WAC173-26- 201(3)(d)(i)(C)	Current Performance <i>Shoreline Inventory and Characterization Report (TRPC, 2010)</i>	Foreseeable Future Development	<p align="center">SMP Provisions: Protection and Restoration</p> <p align="center">Protection = Proposed SMP regulations (with reference to SMP section number) Restoration = Draft Restoration Plan Objectives</p>	Conclusions (Future Performance)
				<p>accordance with the current City Stormwater Drainage Manual (SMP 3.38).</p> <ul style="list-style-type: none"> Use of treated wood and harmful pesticides, herbicides, fertilizers, etc. are prohibited (SMP 3.38). <p>Residential Docks:</p> <ul style="list-style-type: none"> Construction materials shall be limited to untreated wood, approved plastic composites, concrete, or steel (SMP 3.65). <p>Habitat</p> <p>Critical Areas:</p> <ul style="list-style-type: none"> All uses and development occurring within the shoreline jurisdiction shall comply with the City's critical area regulations as adopted in the SMP (SMP 3.22). Development on parcels located within critical areas and/or associated buffers must include vegetation in accordance with the provisions of the City's critical areas code (SMP 2.18). <p>Vegetation Conservation Standard</p> <ul style="list-style-type: none"> Speculative clearing, grading, or vegetation removal is prohibited. Clearing, grading and vegetation removal within shoreline setbacks and vegetation conservation areas shall be the minimum necessary for the intended use or development (SMP 3.32). Vegetation shall be maintained over the life of the use or development (SMP 3.32). Vegetation conservation areas shall be placed in a separate tract in which development is prohibited; protected by execution of an easement dedicated to a conservation organization or land trust; or similarly preserved through a permanent protective mechanism acceptable to the City (SMP 3.32). All clearing and grading in the shoreline jurisdiction must be accompanied by a vegetation management plan that demonstrates it will achieve no net loss of ecological functions (SMP 3.33). <p>Vegetation Conservation Areas - Single Family Specific</p> <ul style="list-style-type: none"> Parcels with frontage on Ken Lake must preserve a 20 foot vegetation conservation area (SMP 2.18). Alterations to existing single-family residences, including accessory structures, decks, patios, sport courts, and walkways must protect existing native vegetation within the vegetation conservation area. If native vegetation within the vegetation conservation area has been destroyed or significantly degraded, vegetation shall be required as follows (SMP 3.31): Where a nonconforming single-family structure cannot provide the full width of the vegetation conservation area, an equivalent area of vegetation shall be provided elsewhere on the site (SMP 3.31). <p>Restoration:</p> <p>See the restoration plan objectives for lakes under the Capitol lake section of this Table.</p>	

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Ward Lake	<p>Lake Hydrology - Flood flow and sediment retention and recruitment of structural LWD.</p> <p>Water Quality - Lake trophic status/overall water quality.</p> <p>Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p> <p>Habitat - Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p> <p>Source and delivery of LWD.</p>	<p>Hydrology: Low to moderate – Lake water levels have not been significantly altered, thereby allowing typical volumes of groundwater discharge.</p> <p>The lake shoreline is largely modified by single-family homes with lawns. There are approximately 48 private docks on the lake. There is also one boat ramp along the east shore.</p> <p>Water Quality: Low - Stormwater runoff flowing directly into Ward Lake from high density residential areas has occurred in at least three locations.</p> <p>Ward Lake sediments have been measured high for arsenic and contained the highest levels of cadmium, chromium, copper and nickel of any of the lakes in the basin.</p> <p>The lake is on the DOE 303(d) list of impaired waterbodies for PCB contamination of fish.</p> <p>Riparian: Low - A narrow band of riparian vegetation lines the shoreline of Ward Lake. This is dominated by mixed coniferous and deciduous forest, shrubs, and maintained lawns. The majority of the shoreline is developed with single-family homes with landscaped yards and 48 private docks.</p>	<p>Future Development:</p> <p>Approximately six percent of the shoreline is vacant six percent is considered redevelopable or underdeveloped.</p> <p>Ward Lake is largely developed with single family houses and park properties. Future development would likely include redevelopment and/or expansion of existing homes and potential park facilities development. Minimal new home construction is possible.</p> <p>There is a planned urban under development on the west side of the lake, across Henderson Blvd that historically served as a landscape plant nursery.</p>	<p>Protection:</p> <ul style="list-style-type: none"> Protective SMP measures for Ward Lake for hydrology, water quality and habitat are the same as those reported for Ken Lake. Residential structures must maintain a 75 foot setback from the OHWM (SMP 6.3). <p>Restoration:</p> <p>See the restoration plan objectives for lakes under the Capitol lake section of this Table.</p>	<p>No loss in hydrologic functions:</p> <p>The Lake shorelines are largely developed to current zoning. Additional alterations may arise from limited new home construction (7 vacant privately owned parcels).</p> <p>New regulations for shoreline stabilization structures and residential docks will likely maintain or may minimally improve hydrological conditions of the Lake.</p> <p>No loss of function in water quality:</p> <p>Improved local, state and federal requirements related to water quality and stormwater would result in an overall improvement over time.</p> <p>SMP standards for materials used in shoreline stabilization and docks will reduce pollution source.</p> <p>No loss of habitat function:</p> <p>Vegetation conservation requirements areas (buffers) and mitigation requirements have the potential to increase native vegetation along shoreline.</p> <p>There are very few undeveloped single-family residential lots along the Lake. Complete redevelopment of any lots will be placed further back from the shoreline and shoreline vegetation conservation and replanting will be required.</p> <p>Residential setbacks have increased or stayed the same, meaning that any additions to existing structures will be no closer to the shoreline.</p> <p>Additions to existing structures will require revegetation of a portion of the buffer with native plants along the shoreline.</p>
Percival Creek	<p>Hydrology – Flow pattern and hydroperiod.</p> <p>Water Quality - Lake trophic status/overall</p>	<p>Hydrology: Moderate Percival Creek has been highly altered due to construction of Black Lake Drainage Ditch and Capitol Lake. The flow pattern along</p>	<p>Future Development:</p> <p>Less than two percent of the shoreline is vacant and approximately four percent is considered redevelopable or underdeveloped.</p>	<p>Protection:</p> <p>Hydrology</p> <p>Shoreline Stabilization Standards:</p> <ul style="list-style-type: none"> Structural shoreline stabilization is prohibited in all SEDs, except as authorized by the Program and then only as a 	<p>No loss of function or Improvement of hydrologic processes:</p> <p>New policies and regulations that prefer soft shore or hard shore stabilization present opportunities to</p>

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	<p>water quality.</p> <p>Delivery, movement, and loss or removal of nutrients, pathogens, and toxicants; storage of phosphorus and removal of nitrogen and toxins through sedimentation and adsorption.</p> <p>Habitat - Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals.</p> <p>Source and delivery of LWD.</p>	<p>this stream is generally confined and lacks meanders.</p> <p>The shoreline of Percival Creek is highly modified. The BNSF railroad, constructed in the 1890s, defines the northern shoreline of the creek.</p> <p>Water Quality: High Percival Creek is not listed on the Category 5 303(d) list and is considered to have good water quality.</p> <p>Habitat: Low Riparian vegetation along the stream generally consists of coniferous forest, mixed coniferous and deciduous forest, and shrub cover.</p> <p>The east side of the stream, between Percival Creek and Capitol Lake, contains high density urban land use areas and riparian cover is limited in these areas.</p> <p>Due to extensive development along the riparian corridor, LWD recruitment has been reduced along Percival Creek.</p>	<p>Most of the Percival Creek Shoreline within the City is a steep undeveloped canyon owned by the City. Very little development is anticipated within the shoreline. The only development that is likely is a proposed Trail that would follow the railroad alignment if it is abandoned.</p>	<p>conditional use. Non-structural shoreline stabilization is permitted in all shoreline environments as a conditional use (SMP 3.72)</p> <ul style="list-style-type: none"> New shoreline use and development shall be located and designed to eliminate the need for concurrent or future shoreline stabilization. New development requiring structural shoreline stabilization shall only be allowed if: 1) the need to protect development from erosion is demonstrated through a geotechnical report; 2) the erosion is not being caused by upland loss of vegetation or drainage; 3) nonstructural measures are not possible; 4) impacts to sediment transport are avoided and 5) structure will not cause adverse impacts to down current properties. Where not possible, soft structural protection measure shall be preferred over hard structural measures (SMP 3.78) Development on steep slopes must be setback so that shoreline stabilization is not needed ((SMP 3.78). New or enlarged shoreline stabilization is only allowed when it has been demonstrated that it is necessary to protect existing or approved development, human safety, or restoration/remediation. (SMP 3.78). <p>Transportation:</p> <ul style="list-style-type: none"> New or expanded transportation facilities shall be kept to the minimum width necessary and located as far landward as possible (SMP 3.55). <p>Utility Standards:</p> <ul style="list-style-type: none"> New utility installations shall be planned, designed and located to eliminate the need for structural shoreline armoring or flood hazard reduction measures (SMP 3.56). <p>Water Quality</p> <p>Water Quality Standards:</p> <ul style="list-style-type: none"> Septic systems for new development within the shoreline jurisdiction shall not be allowed (SMP 5.11.2(A)). Stormwater management facilities for new uses and development shall be designed, constructed, and maintained in accordance with the current City Stormwater Drainage Manual (SMP 3.38). Use of treated wood and harmful pesticides, herbicides, fertilizers, etc. are prohibited (SMP 3.38). <p>Transportation:</p> <ul style="list-style-type: none"> Construction of transportation facilities must be designed to protect the adjacent shorelands against erosion, uncontrolled or polluting drainage, and other factors detrimental to the environment both during and after construction (SMP 3.55). <p>Debris, overburden and other waste materials from transportation related construction will be disposed of to prevent their entry into the adjoining water body (SMP 3.55).</p> <p>Habitat</p> <p>SED Specific Provisions:</p> <ul style="list-style-type: none"> With the Urban Conservancy environment, roads, railroads, trails and parking within 100 feet of the OHWM require a conditional use permit. Beyond 100 feet from OHWM these facilities may be permitted with a shoreline substantial development permit (SMP 6.3). <p>Critical Areas</p> <ul style="list-style-type: none"> All uses and development occurring within the shoreline jurisdiction shall comply with the City's critical area regulations as adopted in the SMP (SMP 3.22). <p>Vegetation Conservation</p> <ul style="list-style-type: none"> Development on parcels located within critical areas and/or associated buffers must include vegetation in accordance 	<p>modify the BNSF right-of-way.</p> <p>Mitigation requirements and restoration efforts offer opportunity for shoreline armoring removal or soft shore stabilization.</p> <p>Upstream alterations that effect flow in Percival Creek can only be addressed regionally.</p> <p>No loss of function in water quality:</p> <p>Improved local, state and federal stormwater requirements would result in an overall improvement over time.</p> <p>No loss of habitat function:</p> <p>The Creek's shorelines and canyon walls are protected through the City's CAO stream and landslide hazard areas provisions. Limited development is alloed in the shoreline.</p> <p>Vegetation conservation requirements and mitigation requirements have the potential to enhance native vegetation along shoreline.</p>

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				<p>with the provisions of the City's critical areas code (SMP 2.18).</p> <p>Recreation</p> <ul style="list-style-type: none"> Water-oriented recreation uses and development are allowed when they will not cause a net loss of shoreline ecological functions or processes (SMP 3.53). <p>Utility Standards</p> <ul style="list-style-type: none"> Vegetation clearing during utility installation and maintenance shall be minimized, and disturbed areas shall be restored or enhanced following project completion (SMP 3.56)). <p>Transportation</p> <ul style="list-style-type: none"> All new or expanded transportation facilities should be designed and located to minimize impacts to shoreline ecological functions including riparian and nearshore areas, stream outfalls, steep slopes and natural vegetation (SMP 2.28). <p>Restoration:</p> <p>The following objectives from the City's Restoration Plan are aimed at achieving no net loss of ecological functions in the City's creeks and streams including Percival Creek:</p> <ul style="list-style-type: none"> Preserve and restore estuarine habitat. Shoreline modifications, such as the introduction of fill and culverts have disrupted naturally occurring estuaries. Changes in flow regime due to changing land uses have modified timing and quantities of freshwater flows. Regulate seasonal flows. Upstream land uses and development have resulted in less water flowing during the summer low-flow periods. Restore natural sediment generation and transport processes. Due to build-up and wash-off from urban and industrial land uses, an increasing amount of fine sediment is being transported. An Increase in local impervious surfaces is contributing to greater and more frequent flood events, which results in an increase in incidents of stream bank erosion and channelization. Improve water quality. Upland sources of pathogens and toxins have increased significantly as a result of urban and industrial land uses. Potential storage has decreased through the loss of wetlands and subsequently a reduction in water to soil contact. The increasing installation of impervious surfaces also results in more urban flooding, often resulting in urban stormwater runoff flowing directly into rivers and streams. Preserve and restore wildlife habitat. Vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals. Increase sources and delivery of large woody debris. Removal of mature trees from riparian areas has significantly reduced the source of large woody debris, which provides structure for streams, readily utilized by fish and other wildlife. 	

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Black Lake Drainage Ditch	<p>Hydrology Hydroperiod and flood flow retention.</p> <p>Water Quality Wetland removal of pollutants through sedimentation and adsorption and overall water quality</p> <p>Habitat - Shoreline habitat for wildlife; vegetation provides structure for invertebrates, birds, amphibians, reptiles, and mammals. Source and delivery of LWD.</p>	<p>Hydrology: Moderate Black Lake Drainage Ditch is a channelized and straightened waterway from Black Lake to its confluence with Percival Creek. The ditch alters the hydrology of Black Lake.</p> <p>Water Quality: Low Reduction in wetland area and channel-floodplain connection has reduced water contact time of water with soil. This lowers the potential for filtering and cycling of pollutants.</p> <p>The Black Lake Drainage Ditch is on the 303(d) water quality list for temperature and has documented pollution problems related to fecal coliform concentrations.</p> <p>Because of high summer temperatures, dissolved oxygen in the ditch was found to be below standards in the summer of 2005.</p> <p>Habitat: Low Black Lake Drainage Ditch was constructed in 1922 to drain potential agricultural land north of Black Lake. As a result, instream habitats are degraded.</p> <p>Riparian vegetation at the south portion of Black Lake Drainage Ditch is dominated by mixed coniferous and deciduous forest along with shrub vegetation. The north portion of the stream contains a combination of medium and high density urban development and shrub vegetation.</p>	<p>Future Development:</p> <p>There are no vacant properties in the shoreline, but approximately 30 percent is considered redevelopable or underdeveloped.</p> <p>Uses along the shorelines include publically owned parks, preserves, and open space open space. Future development in these areas would be limited to recreational facilities.</p> <p>Other uses include commercial and industrial uses. Future development could include redevelopment and/or expansion.</p>	<p>Protection:</p> <ul style="list-style-type: none"> Protective SMP measures for Black Lake Drainage Ditch hydrology, water quality and habitat are the same as those reported for Percival Creek. <p>Restoration:</p> <p>See the restoration plan objectives for creeks and streams under the Percival Creek section of this table.</p>	<p>No loss of function or Improvement of hydrologic processes:</p> <p>Mitigation requirements and restoration efforts offer opportunity for creating more natural shorelines.</p> <p>Upstream and historical alterations that effect flow in the Black lake Drainage Ditch can only be addressed regionally.</p> <p>No loss of function in water quality:</p> <p>Improved local, state and federal stormwater requirements would result in an overall improvement over time.</p> <p>No loss of habitat function:</p> <p>The ditch's shorelines are protected as streams and habitat conservation areas through the City's CAO. Limited development is allowed in these buffer areas.</p> <p>Vegetation conservation requirements and mitigation requirements have the potential to enhance native vegetation along the shoreline.</p>