

STEVENSON

SHORELINE MASTER PROGRAM



City of Stevenson
Public Release Draft Cumulative Impact Analysis

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Tasks 3.6



DRAFT



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Executive Summary

5 This report provides a summary and analysis of the cumulative impacts that can be expected to occur over time as the City of Stevenson (City) implements its updated Shoreline Master Program (SMP) (Chapter 18.08 – Shorelines Management of the Stevenson Municipal Code [SMC]). The City is updating its SMP in order to comply with the Washington State Shoreline Management Act (SMA) and the Washington Administrative Code (WAC) implementing rules (WAC 173-26, also called the Shoreline Master Program Guidelines and referred to in this report as the SMP Guidelines).

10 The City is developing an updated locally approved SMP (Draft SMP), which contains policies and regulations to protect the City's shorelines from potential negative effects caused by future development. The City is also developing a Restoration Plan (RP) to identify opportunities to improve or restore ecological functions that have been impaired as a result of past development activities. This report compares the impacts expected through Draft SMP policies to the improvements expected through the Restoration Plan in order to assess whether the City's proposal is consistent with the state SMP Guidelines and the policy goals of the SMA related to loss of shoreline ecological functions. Prior to final adoption of the SMP, this report will be retitled the Stevenson 2018 Shorelines No Net Loss Report and this executive summary will more specifically detail the ecological protections of the program.

20 The conclusions of this report indicate that 9 of the City's 12 indicators of ecological function will show improvement based on the Draft SMP and Restoration Plan. For the 3 indicators where decline is expected, improvements to other indicators are expected to offset the likely impacts to the underlying ecological functions.

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Chapter 1 – Introduction

1.1 Title

This document shall be known and may be cited as the Stevenson 2018 Cumulative Impacts Analysis (CIA).

1.2 Introduction

This cumulative impacts analysis supports the City of Stevenson (City) Comprehensive Shoreline Master Program (SMP) update. The City's long-standing SMP is being updated in order to comply with updates to Washington's Shoreline Management Act (SMA), the Revised Code of Washington (RCW) 90.58, and the Washington Administrative Code (WAC) 173.26 adopted in 2003 by the state legislature. The City's SMP was first adopted in June 1974, was revised in August 1975.

This report assesses the potential cumulative impacts of shoreline development under the Draft SMP. The analysis contained in this report relies on the existing condition information provided in the City's "Final Shoreline Inventory & Characterization Report" (ICR), which evaluated ecosystem processes and included an inventory and analysis of shoreline conditions related to land use, public access, and environmentally sensitive areas and habitat. This analysis also utilizes the Inventory & Characterization Report to assess development potential based on proposed shoreline environment designations (SEDs) contained in the Draft SMP.

1.3 Purpose

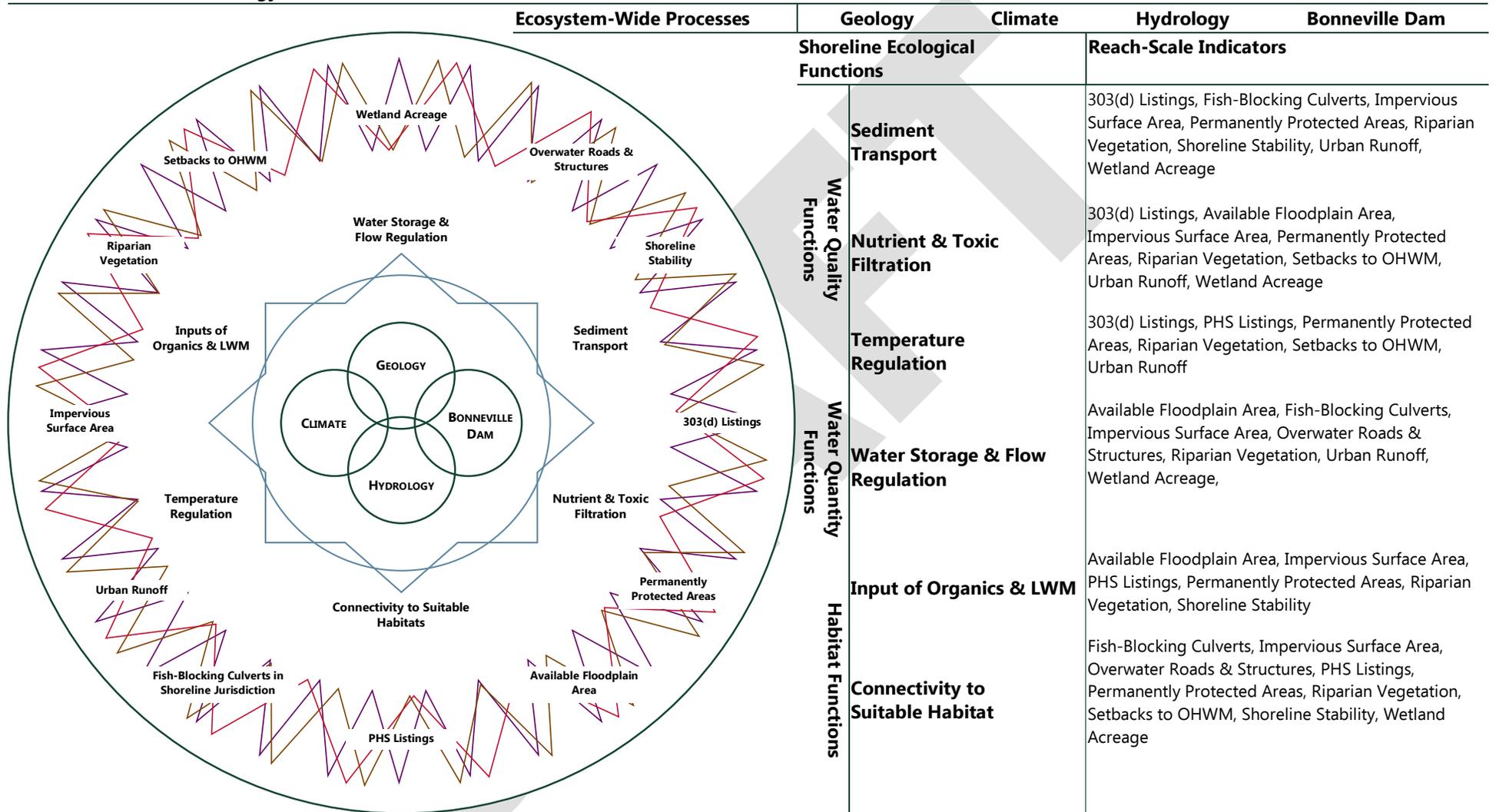
This report was generated to address the requirements for a cumulative impacts analysis that are contained in the Shoreline Master Program Guidelines (WAC 173-26-201; referred to in this report as the SMP Guidelines). Cumulative impact analyses are conducted while drafting SMP provisions as part of the comprehensive update process. The City is required to evaluate the cumulative impacts of "reasonably foreseeable" future development to verify that the updated proposed policies and regulations for shoreline management contained in the Draft SMP are adequate to ensure "no net loss" of shoreline functions compared to "baseline" conditions. "No net loss" means that impacts may occur, but adequate measures are in place within the overall shoreline program to mitigate them such that the post development conditions are no worse overall than pre-development conditions.

The findings of this report will be used to inform decisions on policies, programs, and regulations in the Draft SMP to address adverse cumulative impacts and protect shoreline ecological functions. This analysis is not proposed for inclusion as part of the Stevenson Comprehensive Plan or the development regulations of the Stevenson Municipal Code (SMC), but may serve as a useful reference during SMP implementation.

According to the SMP guidelines, the assessment of cumulative impacts occurs at both the planning stage and at the permitting stage or when individual development proposals are reviewed (a site-specific effort once the SMP is adopted and implemented). The Guidelines recommend assessing the impacts of "commonly occurring and planned development" at the planning stage "without reliance on an individualized cumulative impacts analysis." In contrast, developments that have un-anticipatable

FIGURE 1-1 STEVENSON'S ECOSYSTEM-WIDE PROCESSES, ECOLOGICAL FUNCTIONS, AND REACH-SCALE INDICATORS

Characterization Methodology



impacts that cannot be reasonably identified at the time of SMP development should be evaluated via the shoreline substantial development and conditional use permit processes to ensure that there is no net loss of ecological function after mitigation (WAC 173-26-201(3)(d)(iii)).

1.4 Methodology

Although quite flexible, WAC 173-26 requires the use of a particular framework to evaluate the potential cumulative impacts on shoreline functions and processes that may result from activities or development under the City's proposed SMP over time. The framework includes the following factors.

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

1.4.1 Relationship to Inventory & Characterization Report

To address the first 2 bullet points above, this analysis relies on the City's Shoreline Inventory & Characterization Report (ICR), which evaluated ecosystem-wide processes, shoreline ecological functions, and the land uses within shoreline jurisdiction. To address the first bullet point, the existing condition information provided in ICR Chapter 4 is used. Figure 1-1 on the preceding page is taken from the ICR to describe how the 4 ecosystem-wide processes, 6 ecological functions, and 12 reach-scale indicators interact within the snapshot of existing conditions. In ICR Chapter 4 each of the 12 reach-scale indicators were qualitatively based on a 5-point scale (Figure 1-2).

FIGURE 1-2 RATING INDICATORS OF ECOLOGICAL FUNCTION



Qualitative Scale for Indicators of Ecological Function

Figure Credit: Ben Shumaker (2017) after Consumer Reports.

To assess the physical and biological resources of the shoreline of the Columbia River, the inventory and characterization broke it into 7 manageable units based on geographic location along Ashes Lake, the Columbia River, Rock Cove and Rock Creek. No other streams or lakes within the City are considered part of its shoreline jurisdiction. A summary evaluation of the indicators of ecological function is provided for each of these reaches in Figure 1-3, below.

The projection of future shoreline development and use in ICR Table 5.3-1 provides the basis of analysis under the second bullet point. The potential use changes/conflicts listed in that table are included in CIA Figure 2-4, and accepted as the reasonably foreseeable future development and use of the shoreline.

1.4.2 Relationship to Restoration Plan

The third bullet point in this analysis relies on the description of restoration strategies, programs and projects in the City's Shoreline Restoration Plan, especially Restoration Plan Figure 2-2 which identifies

FIGURE 1-3 INDICATORS OF ECOLOGICAL FUNCTION IN ALL REACHES

Indicators of Ecological Functions—Summary of All Reaches

	Physical Environment			Biological Environment				Altered Conditions				
	Available Floodplain Area	Riparian Vegetation	Shoreline Stability	Fish-Blocking Culverts	Permanently Protected Areas	PHS Listings	Wetland Acreage	303(d) Listings	Impervious Surface Area	Overwater Roads & Structures	Setbacks to OHWM	Urban Runoff
Columbia River Reach 1—East Urban Area	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Columbia River Reach 2—Downtown Waterfront	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Columbia River Reach 1—West Urban Area	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Rock Creek Reach 1	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Rock Creek Reach 2	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Rock Cove	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ashes Lake	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔

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the shoreline reaches and the indicators of shoreline ecological functions where improvements are expected based on the implementation of the projects and actions. Each of the projects listed in that table are transferred to CIA Figure 2-6, below.

1.4.3 Impacts Analysis

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In order to analyze the impacts of reasonably foreseeable shoreline development, use, and restoration, an assessment of development types and projects has been performed. This assessment rates how each interacts with the 12 indicators of shoreline ecological functions. The degree to which any specific project degrades or improves the indicators of shoreline ecological functions is qualitative and based on several factors, including proximity, duration and scale of the project or the project’s impacts. The anticipated changes to the indicators of ecological functions are represented using another 5-point rating system (Figure 1-4) that ranges from Much Worse to Much Better.

45

FIGURE 1-4 RATING PROJECTED CHANGES TO INDICATORS



Relative Change of Ecological Functions

Figure Credit: Ben Shumaker (2018)

Chapter 2 – Impacts Analysis

The state SMP guidelines require that Shoreline Environment Designations be assigned to shoreline areas according to their function, existing land uses, and the goals and aspirations of the community. For those unfamiliar with the Shoreline Management Act (SMA), a Shoreline Environment Designation (SED) is similar to the more common concept of a zoning district. Consistent with the City’s requirements under the SMA, this chapter provides a system SEDs which mirror those outlined in the SMP guidelines and overlay other zoning district requirements. The locations of the City’s SEDs are described in and depicted on the map of shoreline jurisdiction and environment designations in Appendix A.

2.1 Reasonably Foreseeable Development Activities

Together SMP Table 5.1 and SMP Table 6.1 list 19 high-level categories of shoreline use and modification. These high-level categories are then separated by water-orientation and other specific types of development activities warranting regulatory consideration. In total at least 53 specific types of shoreline uses and modifications are specifically regulated in the SMP. Of these 42 (from 16 of the high-level categories) either 1) currently exist, 2) are referenced in ICR Table 5.3-1 or 3) are reasonably foreseeable as associated with existing or anticipated uses. The high-level categories are listed in Figure 2.1. Their impacts and the protective provisions of the SMP are analyzed in CIA Section 2.2, below.

FIGURE 2-1 CATEGORIES OF REASONABLY FORESEEABLE SHORELINE USE & MODIFICATION

Shoreline Uses		
Boating Facilities & Overwater Structures	Commercial & Industrial	Forest Practices
Institutional	Instream Structures	Land Division
Recreational Utilities	Residential	Transportation & Parking Facilities
Shoreline Modifications		
Vegetation Removal	Fill	Shoreline Stabilization
Shoreline Restoration	Dredging	Breakwaters, Jetties, Groins & Weirs

2.2 Shoreline Development and Protective Provisions

The protective provisions of the SMP primarily rely on 3 types of regulatory tools: Shoreline Environment Designations (SEDs), regulations that are applicable to all uses and others applicable to specific uses, and No Net Loss Standards. When working in concert, Figure 2-2 demonstrates the effects these protective provisions are expected produce on the ICR’s 12 indicators of ecological function at the reach scale.

FIGURE 2-2 PROJECTED INDICATOR CHANGES BASED ON PROTECTIVE PROVISIONS OF THE SMP

Shoreline Reach	Impact Narrative	Projected Indicator Changes											
		Available Floodplain Area	Riparian Vegetation	Shoreline Stability	Fish-Blocking Culverts	Permanently Protected Areas	PHS Listings	Wetland Acreage	303(d) Listings	Impervious Surface Areas	Overwater Roads & Structures	Setbacks to OHWM	Urban Runoff
Columbia River Reach 1 – East Urban Area	No Net Loss protections will prevent project scale declines in this reach for most indicators. Proposed setbacks will slightly increase the average distance of structures to the OHWM. Foreseeable development in this reach will improve indicators as detailed in CIA Figure 2-5.	→	→	→	→	↗	→	↗	↗	→	→	↗	→
Columbia River Reach 2 – Downtown Waterfront	No Net Loss protections will prevent project scale declines in this reach for most indicators. Proposed setback reductions will decrease the average distance of structures to the OHWM. Foreseeable development in this reach will improve indicators as detailed in CIA Figure 2-5.	→	↗	→	→	↗	↗	↗	↗	↖	↗	↖	↗
Columbia River Reach 3 – West Urban Area	No Net Loss protections will prevent project scale declines in this reach for most indicators. Proposed setbacks will increase the average distance of structures to the OHWM. Foreseeable development in this reach will improve indicators as detailed in CIA Figure 2-5.	→	↗	→	→	↗	↗	→	↗	→	↗	→	→
Rock Creek Reach 1 – City Reach	No Net Loss protections will prevent project scale declines in this reach for most indicators. Proposed setbacks will slightly increase the average distance of structures to the OHWM. Foreseeable development in this reach will improve indicators as detailed in CIA Figure 2-5.	→	→	→	→	→	↗	→	↗	→	↗	↖	↗
Rock Creek Reach 2 – County Reach	No Net Loss protections will prevent project scale declines in this reach for most indicators. Proposed setbacks will slightly decrease the average distance of structures to the OHWM. Foreseeable development in this reach will improve indicators as detailed in CIA Figure 2-5.	→	→	→	→	↗	→	→	→	→	→	↖	→
Rock Cove Reach	No Net Loss protections will prevent project scale declines in this reach for most indicators. Proposed setbacks will decrease the average distance of structures to the OHWM. Foreseeable development in this reach will improve indicators as detailed in CIA Figure 2-5.	→	→	→	→	↗	↗	↗	↗	↖	→	↖	↗
Ashes Lake Reach	No Net Loss protections will prevent project scale declines in this reach for most indicators. Foreseeable development in this reach will improve indicators as detailed in CIA Figure 2-5.	→	↗	→	→	→	→	→	→	→	→	→	→

2.2.1 Shoreline Environment Designations & Setbacks

The types of development allowed on Stevenson’s shorelines will vary subject to the SED assigned to each shore segment. In order to guide development appropriately, Ecology’s SMP Guidelines require that SEDs be assigned to shoreline areas according to their ecological function, existing land uses, and the goals and aspirations of the community. These designations will help protect ecological functions and values and accommodate preferred and water-dependent shoreline uses. Stevenson’s SMP proposes 4 SEDs, listed in order from most protective to most permissive: Aquatic, Natural, Shoreline Residential, Urban. The approximate acreage of each land-based SED is included in Figure 2-3, below.

FIGURE 2-3 DISTRIBUTION OF SHORELINE ENVIRONMENT DESIGNATIONS

Location	Natural	Shoreline Residential	Urban	TOTAL
City Jurisdiction	17 ac 17%	17 ac 17%	64 ac 65%	98 ac
Pre-designated Area	44 ac 47%	23 ac 24%	27 ac 29%	94 ac
TOTAL	61 ac 32%	40 ac 21%	91 ac 47%	192 ac

*Total acreage in this table differs from the ICR, which considered the Piper Road Landslide Area as part of the preliminary shoreline jurisdiction.

SMP Table 5.1 lists common shoreline uses and whether they are prohibited, are allowed, or may be conditionally allowed. Maximum height and minimum setback from the OHWM are also listed in that table.

In the Natural SED, 14 of the 16 types of development from CIA Figure 2-1 may be allowed, but only 5 are allowed without first obtaining a Shoreline Conditional Use Permit (SCUP). This SED allows building heights of up to 35 ft, the limit allowed under the City’s Zoning Code. Setbacks to the OHWM range from 0 to 100 ft, with non-water-dependent uses requiring the largest setbacks.

In the Shoreline Residential SED, all 16 types of reasonably foreseeable development may be allowed, 11 of which may be allowed without obtaining a SCUP. This SED also establishes a maximum height of 35 ft for development and the minimum setback ranges from 0 to 100 ft with some non-water-dependent uses allowed to be as close as 50 ft from the OHWM.

In the Urban SED, all 16 of the reasonably foreseeable development categories are allowed and only 2 require a SCUP. Most development in the Urban SED is subject to the statutory 35 ft height limit, however Commercial & Industrial, Institutional, Recreational, and Residential (Multi-Family) development is permitted to develop with a 50 ft maximum height where allowed by the Zoning Code. Setbacks in this SED range from 0 to 150 ft, with 25 ft as the closest allowance for non-water-dependent uses.

Setbacks to OHWM and Overwater Roads & Structures are the primary indicators of ecological function directly affected by the use of SEDs and the only indicators where the indicator is expected to become Much Better or Worse. Riparian Vegetation, Permanently Protected Areas, PHS Listings, and Impervious Surface Area are indicators that might become Somewhat Better or Worse based on the designation of SEDs.

Columbia River Reach 1 – East Urban Area

35 For Reach CR1, the Shoreline Residential SED will apply to most foreseeable development. The 50 ft
setback required for residential, cemetery, and water-related recreational and trail uses in this SED is
likely to increase the overall mean (39 ft) and median (24 ft) setbacks for structures in that area. As a
result, ecological functions based on this indicator can be expected to be Somewhat Better if
developed under the City's proposed SMP. However, because these provisions are not likely to affect
40 existing development, the 5 related indicators could be expected to get Somewhat Worse in this reach
if SEDs were the only protective provision applied.

Columbia River Reach 2 – Downtown Waterfront

45 In reach CR2, the allowed setbacks for reasonably foreseeable development in the proposed Shoreline
Residential and Urban designations are much closer than the current mean (98 ft) and median (87 ft)
setbacks for existing structures. Implementation of the SMP according to the proposed SEDs is
expected to make this indicator Much Worse. Riparian Vegetation in this reach is already Very
Degraded, and the designation of SEDs will likely result in No Change to the degree of degradation of
the reach. The remaining 4 indicators for this reach could be expected to get Somewhat Worse.

Columbia River Reach 3 – West Urban Area

50 In reach CR3, the Urban designation's allowed setbacks would increase the mean (24 ft) and median
(15 ft) existing setback for structures in the reach and make this indicator Much Better. Allowances for
development of replacement bridges in the Natural designation is likely to make the Overwater Roads
& Structures indicator Somewhat Better. Similar to CR2, the lack of existing shoreline vegetation is a
factor in determining that there would be No Change in the Riparian Vegetation indicator under this
proposal. The remaining 3 indicators would likely become Somewhat Worse in this reach.

Rock Creek Reach 1 – City Reach

55 In reach RC1, the allowed setbacks in the Urban and Shoreline Residential designations will likely
decrease the mean (88 ft) and median (77 ft) existing setbacks for structures. As a result, this indicator
become Somewhat Worse based on reasonably foreseeable development. The 5 other indicators
related to SEDs would also likely become Somewhat Worse.

Rock Creek Reach 2 – County Reach

60 Anticipated impacts in reach RC2, are similar in all ways to RC1. mean (95 ft) and median (89 ft) existing
setbacks would likely decrease based on residential setback requirements of the Shoreline Residential
SED. All related indicators would likely become Somewhat Worse.

Columbia River Reach 2 – Downtown Waterfront

65 In reach RCo, the allowed setbacks for reasonably foreseeable development in the proposed Urban
designation are much closer than the current mean (88 ft) and median (92 ft) setbacks for existing
structures. Implementation of the SMP according to the proposed SEDs is expected to make this
indicator Much Worse. The remaining 5 indicators for this reach could be expected to get Somewhat
Worse if SEDs and setbacks are the only protections considered.

Ashes Lake Reach

70 In reach AL, the natural designation and the limited reasonably foreseeable development will likely
result in No Change to any indicator of ecological function.

Recommendations

- 75
- Do not rely on Shoreline Environment Designations and setback requirements as the sole controls for impacts to Riparian Vegetation, Permanently Protected Areas, PHS Listings, Impervious Surface Area, or Overwater Roads & Structures.
 - Consider increasing setbacks for reasonably foreseeable development in the Urban and Shoreline Residential SEDs.
- 80
- Consider where additional Natural SEDs could be applied instead of Shoreline Residential and/or Urban.

2.2.2 Impacts of Regulated Activities

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Many types of shoreline use and modification involve the same development activities. This analysis relies on the descriptions in Figure 2-4 below to evaluate the impacts of reasonably foreseeable development. These descriptions include an analysis of the uncontrolled impacts of development activities, the reasonably foreseeable uses associated with the development activities, the proposed regulatory controls of the SMP, and whether impacts are expected based on the anticipated impacts and the impact controls.

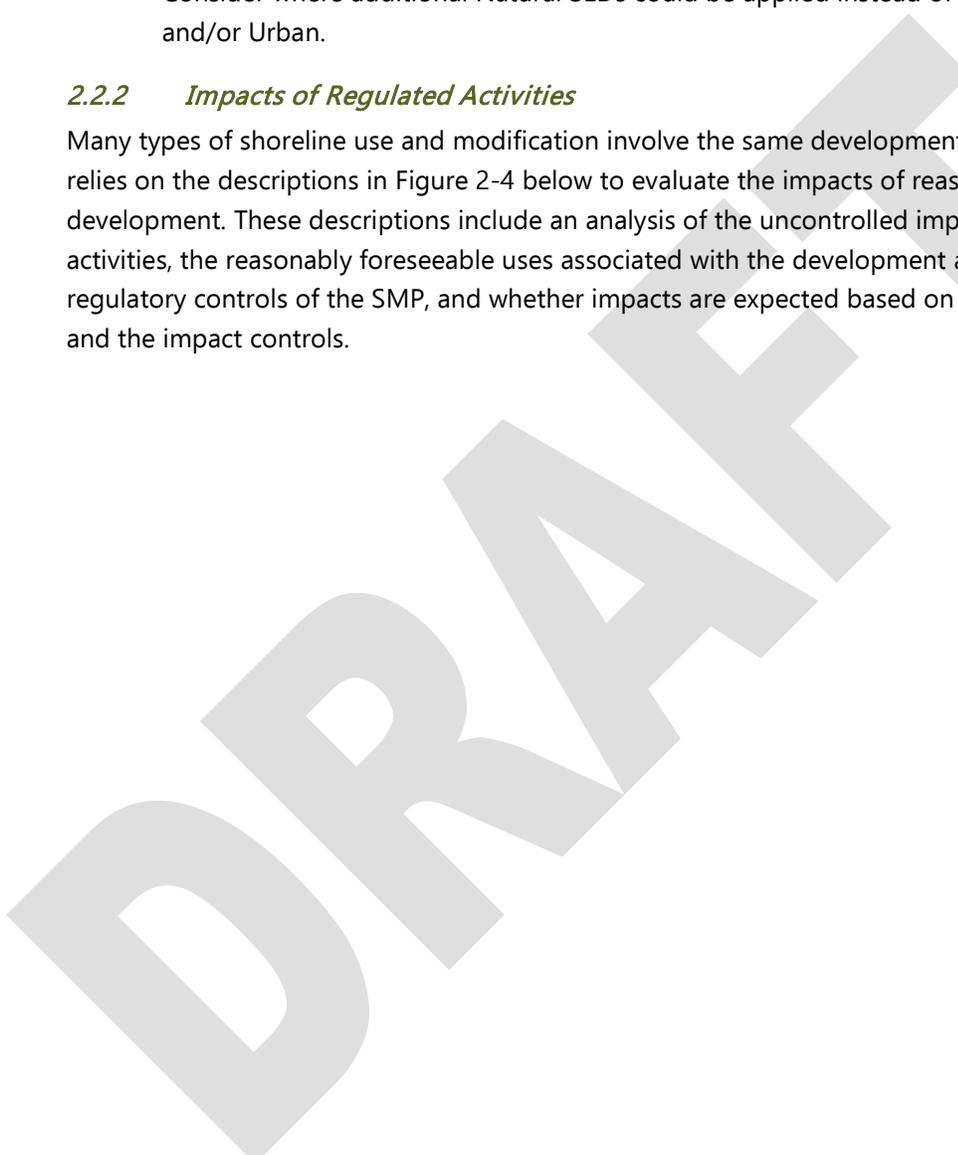


FIGURE 2-4 DEVELOPMENT IMPACTS & REGULATORY CONTROLS

Development Activity & Associated Uses	Uncontrolled Impact of Development	Proposed Development Controls	Anticipated Net Effect/ Recommendations
<p>Construction</p> <p>Description: This category of impacts is among the most noticeable and includes the construction materials (such as windows, construction practices (such as fill, grading, and machinery) and the buildings and structures that result.</p> <p>Associated Uses: All.</p>	<p>Ground disturbance during fill and grading activities can result in dust and excess sediment in runoff waters.</p> <p>Machinery used during construction can both destabilize soils and result in their compaction. These impacts are similar, though less severe, as those discussed under impervious surfaces. The leaks and noise associated with machinery can degrade water quality and disturb nesting and rearing of sensitive species.</p> <p>If sited inappropriately or constructed using inappropriate materials for their setting, inwater and overwater structures can destabilize shorelines and leach pollutants which degrade water quality. Streamside windows and outdoor lighting can lead to glare that disturbs the nesting and rearing habitats of some birds, disrupts salmon migration and feeding, and interferes with other shoreline species.</p> <p>Fill, buildings, and structures in floodways and floodplains reduce the overall capacity of the system to carry water and can alter natural channel migration practices. These actions also supplant and reduce the suitability of habitat, including priority habitats and species and wetlands.</p> <p>The linear nature of fences, roads and utility corridors can affect habitat movement and survival. Roads and their culverts create major barriers for terrestrial, amphibious and aquatic species and increase mortality all species. Overhead utilities can increase bird and bat strikes and affect their mortality.</p>	<p>SMP Section 6.4.2 deals specifically to fill as a shoreline modification. This section applies to fill that "raises the elevation or creates dry land". All proposals for fill require minimization and avoidance of ecological impacts. In upland areas, fill is subject to the setbacks and procedures of the allowed use or modification it supports. In more sensitive areas, fill activities are limited to those that support specific scenarios and/or priority uses.</p> <p>SMP Sections 5.4.3 and 5.4.8 include siting and construction provisions relating to the avoidance of ecological impacts.</p> <p>SMP Section 4.6.3-6 applies to all construction materials coming in contact with water and requires use of suitable and certified materials. SMP Section 5.4.3-3.c reiterates and strengthens this for boating facilities & overwater structures.</p> <p>SMP Section 4.4.5 deals with development in flood hazard areas where the existing regulations of SMC 15.24 continue to apply. The SMP places additional limits on structural flood hazard reduction measures and requires additional analysis and certification for development in channel migration zones.</p> <p>SMP Section 5.4.12 avoiding new transportation and parking facilities in shorelines and sharing them in order to reduce impacts from redundant uses. Similarly SMP Section 5.4.13 requires utility lines to cross shorelines in the least impactful manner, be placed underground, and collocated on bridges or other structures.</p> <p>See also, CIA Section 2.2.1 Shoreline Environment Designations & Setbacks, CIA Section 2.2.3 No Net Loss Protections, and SMC 15.24 Floodplain Management Regulations.</p>	<p>Indicators Projected to be Much Better: None</p> <p>Indicators Projected to be Somewhat Better: 303(d) Listings</p> <p>Indicators where No Change is Projected: Available Floodplain Area, Shoreline Stability, Fish Blocking Culverts, Wetland Acreage, Urban Runoff</p> <p>Indicators Projected to be Somewhat Worse: Riparian Vegetation, Permanently Protected Areas, PHS Listings, Impervious Surface Area, Overwater Roads & Structures, Setbacks to OHWM</p> <p>Indicators Projected to be Much Worse: None</p> <p>Recommendations:</p> <ul style="list-style-type: none"> -Do not rely on development controls as the only protection from impacts to indicators of ecological function. -Maintain access to a list of materials certified for contact with water. -Consider adding requirements for machinery leak and spill prevention and remediation. -Consider combining the shoreline use categories for Boating Facilities & Overwater Structures and Instream Structures. -Consider adding Construction as a type of shoreline modification. -Better reference existing City, State, and federal requirements for temporary erosion and sediment control plans and BMPs at SMP Sections 6.4.2.
<p>Impervious Surfaces & Stormwater</p> <p>Description: Impervious surfaces include rooftops, paved areas, and compacted gravels and soils, prevent precipitation from infiltrating into the ground where it falls, and create stormwater runoff.</p> <p>Associated Uses: Boating Facilities & Overwater Structures, Commercial & Industrial, Institutional, Recreational, Residential, Transportation & Parking, Fill, Shoreline Stabilization.</p>	<p>Stormwater runoff can have significant negative impacts to shorelines and the ecological health of a watershed. During rain events, large volumes of stormwater runoff can be carried to waterbodies and cause flooding and erosion and wash away habitats.</p> <p>Stormwater runoff can pick up pollutants commonly found on impervious surfaces, including sediment, oil and grease, trash, and pesticides and carry them to waterways or into the groundwater. The deposition of sediments can decrease fish passage and reduce viability of habitat areas and wetlands.</p> <p>As the amount of impervious surfaces increases in a watershed, the likelihood of sufficient groundwater recharge and hyporheic transfer decreases, a greater volume of stormwater runoff is generated, and a higher potential of watershed and water quality degradation exists.</p> <p>The treatment of stormwater can impact shoreline ecological functions. If not located below the OHWM, stormwater outfalls may lead to scouring. If improperly designed or constructed, new outfalls and modifications to existing outfalls could impact existing native riparian vegetation or aquatic vegetation attached to, or rooted in, the substrate.</p> <p>In river and stream shorelines, stormwater outfall structures may require permanent bank hardening to prevent failure of the outfall structure or erosion of the shoreline.</p>	<p>SMP Section 4.6 applies to all regulated activities that "affect the water quality or quantity of Stevenson shorelines". This section requires compliance with all existing City, State, and federal stormwater laws, including the Stormwater Management Manual for Western Washington. Stormwater facilities must adhere to the setback provisions of SMP Table 5.1 and discussed in CIA 2.2.1. Existing septic systems that fail are required to connect to sewer if feasible. New septic for "any new development, business, or multifamily unit" are not allowed where sewer is available.</p> <p>See also, CIA Sections 2.2.1 Shoreline Environment Designations & Setbacks and 2.2.3 No Net Loss Protections.</p>	<p>Indicators Projected to be Much Better: None</p> <p>Indicators Projected to be Somewhat Better: Wetland Acreage, 303(d) Listings, Impervious Surface Area, Urban Runoff</p> <p>Indicators where No Change is Projected: Available Floodplain Area, Shoreline Stability, Fish Blocking Culverts, Overwater Roads & Structures</p> <p>Indicators Projected to be Somewhat Worse: Riparian Vegetation, Permanently Protected Areas, PHS Listings, Setbacks to OHWM</p> <p>Indicators Projected to be Much Worse: None</p> <p>Recommendations:</p> <ul style="list-style-type: none"> -Reference the Stormwater Management Manual for Western Washington (SMMWW) sooner in SMP Section 4.6.3. -Consider removing Use-specific references to the SMMWW. - Consider development incentives for projects incorporating highly desirable low impact development strategies. -Consider clarifying the specific shoreline uses and developments where sewer connection is required.

<p>Normal Usage</p> <p>Description: Though sometimes unintentional, incremental impacts from day-to-day use, maintenance practices, and ancillary usage of shoreline areas can have the most persistent and largest effect on shorelines.</p> <p>Associated Uses: Boating Facilities & Overwater Structures, Commercial & Industrial, Institutional, Recreational, Residential, Transportation & Parking, Fill, Shoreline Stabilization.</p>	<p>Noise and light can disrupt salmon migration and feeding, disturb the nesting and rearing habitats of some birds, and interfere with other shoreline species.</p> <p>The spread of invasive and non-native species often accompanies normal use through deliberate planting and inadvertent seeding. These species can interfere with the native plant and animal species that are adapted to Stevenson particular ecological setting. When fertilizers, pesticides, herbicides and other chemical lawn/garden treatments are used for these species it can degrade water quality and health of native species and habitats in shoreline areas.</p> <p>Turbidity and erosion can increase as a result of boating and heightened wave action, propeller scour, and the launching nonmotorized watercraft. The increased sediment in the water can disrupt salmon migration and feeding areas, and, where contamination previously existed in those sediments, water quality can be degraded anew.</p> <p>Trash, trampling, pets, solid waste, compost, and increased foot- and vehicular-traffic results from human presence in shoreline areas. This can increase the incidents of conflict between humans and wildlife, concentrate scavengers and predators, disturb the nesting and rearing habitat of some birds, reduce air and water quality, and prevent stormwater infiltration through compacted soils.</p>	<p>Application of pesticides, fertilizer and other chemicals is included within the definition of regulated activities. When applied to recreational uses, these chemicals must not directly drain or runoff into surface waters.</p> <p>The location of boating facilities must be chosen or developed in a way that considers turbidity- and erosion-related impacts.</p> <p>The Critical Areas protections of SMP Section 4.4 are applicable to all properties and will prevent impacts to those 5 state-mandated areas.</p> <p>The use-specific protective provisions of SMP Section 5.4 require site plan reviews, impervious surface limitations, and other protections that will limit impacts under this category.</p> <p>See also, CIA Sections 2.2.1 Shoreline Environment Designations & Setbacks and 2.2.3 No Net Loss Protections.</p>	<p>Indicators Projected to be Much Better: None</p> <p>Indicators Projected to be Somewhat Better: Wetland Acreage, 303(d) Listings, Urban Runoff</p> <p>Indicators where No Change is Projected: Available Floodplain Area, Shoreline Stability, Fish Blocking Culverts, Overwater Roads & Structures</p> <p>Indicators Projected to be Somewhat Worse: Riparian Vegetation, , Impervious Surface Area, Permanently Protected Areas, PHS Listings, Setbacks to OHWM</p> <p>Indicators Projected to be Much Worse: None</p> <p>Recommendations:</p> <p>-Consider protective controls for pesticides, fertilizers, and other chemicals associated to a broader list of shoreline uses.</p> <p>-</p>
<p>Vegetation Removal</p> <p>Description: Shoreline vegetation is a key component of the ecosystem, and its removal includes clearing, pruning, chemical control, and forestry practices.</p> <p>Associated Uses: All.</p>	<p>The removal of shoreline vegetation reduces terrestrial food supply, shade and large woody material (LWM) recruitment potential and other organic inputs which provide important habitat and food web support functions. When removed through chemical treatment, there is an effect on water quality and habitat health for other species.</p> <p>Vegetation reduction warms the water, decreases in-stream and riparian habitat complexity, and decreases protection from overhead predators.</p> <p>Habitat become more fragmented and wildlife travel corridors become limited.</p> <p>The loss of bank vegetation can result in channel widening and affect sediment supply, which in turn affects the floodplain—needed for habitat and high flow attenuation—and the stability of the shoreline.</p> <p>Shoreline vegetation also plays a role in trapping and removing sediments, nutrients and other pollutants, so the loss of vegetation can also have adverse effects on water quality. Failure to maintain vegetation or plant vegetation after site disturbance can lead to increased incidence of nonnative, invasive species. When this occurs along bluffs it can decrease root strength, create unstable slopes, and increase the likelihood of future landslides.</p>	<p>While Vegetation Removal is permitted in all shoreline environment designations, SMP Section 6.4.1 provides specific policies and regulation that prioritize avoidance and protection prior to removal.</p> <p>All types of vegetation removal must be mitigated according to SMP Table 6.2, which requires more mitigation for high priority native species and locations closer to the OHWM. Mitigation ratios range from 1:1 to 3:1 and require planting of 2 trees and 5 shrubs per 400 sq ft. Mitigation areas must be monitored for 5 years and contingency planting is required.</p> <p>Specific regulations facilitate removal of noxious aquatic and terrestrial weeds while protecting against degradation of other ecological functions.</p>	<p>Indicators Projected to be Much Better: Riparian Vegetation, Permanently Protected Areas, PHS Listings</p> <p>Indicators Projected to be Somewhat Better: Wetland Acreage, 303(d) Listings</p> <p>Indicators where No Change is Projected: Available Floodplain Area, Shoreline Stability, Fish Blocking Culverts, Impervious Surface Area, Overwater Roads & Structures, Setbacks to OHWM, Urban Runoff</p> <p>Indicators Projected to be Somewhat Worse: None.</p> <p>Indicators Projected to be Much Worse: None</p> <p>Recommendations:</p> <p>-Consider adding a stronger requirement for conservation covenants related to Habitat Conservation Areas and better connecting it with the Vegetation Removal Mitigation requirements of SMP Table 6.2 and SMP Section 6.4.1.</p>

2.2.3 No Net Loss Protections

Where the development controls described above can allow loss of shoreline ecological functions if implemented alone, the Environmental Protection & No Net Loss provisions of SMP Section 4.3 fill the gap to ensure new regulated activities do not result in a loss of ecological function. Like all provisions in SMP Chapter 4, these protections apply to all uses and require a Mitigation Sequence to Avoid, Minimize, Rectify, Reduce over time, Compensate, and Monitor impacts to ecological functions. Furthermore, this section requires new regulated activities to consider cumulative impacts of other reasonably foreseeable development affecting the same shoreline.

Projected Changes to Indicators

On their own the provisions of SMP Section 4.3 will not improve any ecological functions, however, they will ensure that each regulated project does not degrade ecological functions. Any potential detrimental effect on ecological functions identified in CIA Sections 2.2.1 and 2.2.2 does not occur, however, any beneficial effect of SMP regulation will accrue regardless of this section.

Recommendations

This section places the burden of proof on the proponent that ecological functions will not be lost based on their proposal. The recommendations included in CIA Section 2.2.1 and Figure 2-4 may be an effective way reduce that burden for the proponent. Alternatively, if any other part of this program is determined to cause net loss of ecological function, those recommendations may be helpful remedies.

2.3 Impacts of Exempt and Unregulated Activities

By far the biggest losses of shoreline ecological functions are expected to occur as a result of existing shoreline development and development that is outside of shoreline jurisdiction or otherwise exempt under the SMP. These impacts are expected in much the same way that impacts from normal usage are considered in CIA Figure 2-4. However, those impacts must rely on existing programs for their control, and many of the beneficial impacts derived from SMP regulations will not be realized and some additional degradation is expected.

FIGURE 2-5 ECOLOGICAL IMPACTS OF EXEMPT AND UNREGULATED ACTIVITIES

 Much Worse	 Somewhat Worse	 No Change	 Somewhat Better	 Much Better
303(d) Listings	Available Floodplain Area, Riparian Vegetation, Permanently Protected Areas, PHS Listings, Impervious Surface Area, Setbacks to OHWM, Urban Runoff	Shoreline Stability, Fish-Blocking Culverts, Wetland Acreage, Overwater Roads & Structures	None	None

2.4 Impacts of Restoration Activities

While detrimental impacts are the primary concern of the preceding sections, the Shoreline Restoration Plan (RP) focuses on actions that can be taken to benefit ecological functions in shoreline areas. Figure 2-6, below details the reach-level impacts expected by completion of the Shoreline Restoration Plan.

FIGURE 2-6 ECOLOGICAL IMPACTS OF RESTORATION PLAN

Shoreline Reach	Impact Narrative	Projected Indicator Changes											
		Available Floodplain Area	Riparian Vegetation	Shoreline Stability	Fish-Blocking Culverts	Permanently Protected Areas	PHS Listings	Wetland Acreage	303(d) Listings	Impervious Surface Areas	Overwater Roads & Structures	Setbacks to OHWM	Urban Runoff
Columbia River Reach 1 – East Urban Area	<p>R.1 – Invasive aquatic, riparian and terrestrial species exist along all shoreline reaches and their removal will benefit water quality, water quantity and habitat functions.</p> <p>R.8 – Kanaka Creek separates Columbia River Reaches 1 & 2. This fish-bearing stream has passage barriers along its length. Correction of these barriers will benefit water quantity and habitat functions for these 2 reaches.</p> <p>R.10 – The City lacks significant data on ecological issues in all shoreline areas and especially in predesignated reaches outside of current City jurisdiction. Closing these gaps will enable better regulation and restoration of all types of ecological functions.</p> <p>R.12, R.13 – See descriptions in RCo, below.</p> <p>R.15 – Riprap armoring is common along all shoreline reaches, especially when used as protection for the rail and highway transportation corridors. Softening this armor will improve water quality, water quantity, and habitat functions.</p>	⇒	↗	⇒	↗	⇒	↗	⇒	↗	⇒	⇒	⇒	⇒
Columbia River Reach 2 – Downtown Waterfront	<p>R.1, R.8, R.10, R.15 – See descriptions in CR1, above.</p> <p>R.2 – By completing its Stevenson Shoreline Restoration & Enhancement Project the Port of Skamania County will soften riprap armoring and eliminate excessive erosion in the Downtown Waterfront reach. This will benefit water quality, water quantity, and habitat.</p> <p>R.4, R.5, R.6, R.11 – See description in RC1, below.</p> <p>R.7, R.12, R.13 – See descriptions in RCo, below.</p>	⇒	↗	↗	↗	↗	↗	⇒	↗	↗	↗	↗	↗
Columbia River Reach 3 – West Urban Area	<p>R.1, R.10, R.15 – See descriptions in CR1, above.</p> <p>R.4, R.5, R.6, R.11 – See description in RC1, below.</p> <p>R.7, R.12, R.13 – See descriptions in RCo, below.</p>	⇒	↗	⇒	⇒	↗	↗	⇒	⇒	↗	↗	⇒	↗
Rock Creek Reach 1 – City Reach	<p>R.1, R.10, R.15 – See descriptions in CR1, above.</p> <p>R.3 – Removal of this bridge and all associated pilings will benefit flood and fish passage through the system and greatly improve water quantity and habitat functions.</p> <p>R.4 – A substantial portion of the city’s residential core drains through the Vancouver Avenue outfall untreated. Adding a treatment facility will improve water quality functions.</p> <p>R.5 – Related to projects R.3, R.4 and R.6, habitat functions and water quality functions would be improved by completion of the actions in this project.</p>	↗	↗	↗	↗	⇒	↗	⇒	↗	↗	↗	↗	↗

	<p>R.6 – Related to projects R.3, R.4, and R.5, completion of the actions in this project would improve water quality and water quantity functions.</p> <p>R.7, R.12, R.13 – See descriptions in RCo, below.</p> <p>R.11 – Several derelict instream and near-stream structures exist in reaches RC1, CR2, CR3, and RCo. Removal will improve water quality, water quantity, and habitat functions.</p> <p>R.14 – Also related to projects R.3, R.4, R.5, and R.6, the actions of this project will benefit water quality, water quantity, and habitat functions of this sediment-overloaded system.</p>												
<p>Rock Creek Reach 2 – County Reach</p>	<p>R.1, R.10, R.15 – See descriptions in CR1, above.</p> <p>R.4, R.5, R.6, R.11, R.14 – See description in RC1, above.</p> <p>R.7, R.12, R.13 – See descriptions in RCo, below.</p>												
<p>Rock Cove Reach</p>	<p>R.1, R.10, R.15 – See descriptions in CR1, above.</p> <p>R.4, R.5, R.6, R.11, R.14 – See description in RC1, above.</p> <p>R.7 – Adding canopy cover, especially along southern and western banks, will improve water quality and habitat functions.</p> <p>R.9 – Foster Creek provides the primary source of waters to Rock Cove. This fish-bearing stream has passage barriers along its length. Correction of these barriers will benefit water quantity and habitat functions for this reach</p> <p>R.12 – Implementation of educational programs will create stewards along all shoreline reaches and improve water quality, water quantity and habitat functions.</p> <p>R.13 – Promoting and implementing stormwater retrofitting for developed land will improve water quality and water quantity functions.</p>												
<p>Ashes Lake Reach</p>	<p>R.1, R.10, R.15 – See descriptions in CR1, above.</p> <p>R.12, R.13 – See descriptions in RCo, above.</p>												

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Chapter 3 – Cumulative Impacts Analysis

3.1 Net Effect of Impacts

5 The combination of the projected changes in indicators of shoreline ecological functions based on the
CIA Figures 2-2, 2-5, and 2-6, above enables a cumulative impacts analysis. In most cases, as described
below, implementation of the draft SMP as it relates to foreseeable development as well as
implementation of Restoration Plan, will likely lead to improved ecological functions in Stevenson's
shoreline areas. While 3 indicators of ecological function are expected to decline after SMP
implementation, there are protections in place to ensure the decline of the indicator will not lead to a
decline of the underlying ecological function. Chapter 2 of this report identifies some additional
10 protections and changes that could help improve interpretation and implementation and avoid any
declines. These recommendations should be considered as part of the ongoing review and amendment
of the SMP documents.

3.2 Gained Ecological Functions

15 The following indicators of ecological function are expected to improve if this draft SMP is
implemented.

3.2.1 Available Floodplain Area

In general shoreline use and development will not change the available floodplain area, however, the
projects of the restoration plan will lead to improvements in several reaches. As a result, the ecological
functions related to this indicator are likely to see the greatest improvement.

3.2.2 Riparian Vegetation

20 The vegetation conservation, removal and mitigation requirements of the SMP are likely to lead to
another of the greatest improvements in indicators of ecological function expected through this SMP.
The inclusion of restoration projects furthers the benefit and improvement of ecological functions
related to this indicator is expected in all reaches.

3.2.3 Shoreline Stability

25 The Restoration Plan projects are the primary determinants for improved ecological functions based on
the Shoreline Stability indicator, and the expected improvements are limited to the 2 Rock Creek
reaches.

3.2.4 Fish-Blocking Culverts

30 Fish-blocking culverts should largely be a concept of the past based on exist permitting requirements.
Where they currently exist, the Restoration Plan projects prioritize removal, and this should lead to an
improvement of ecological functions, especially based on the Kanaka Creek, Foster Creek, and Rock
Creek Drive Bridge projects.

3.2.5 *Permanently Protected Areas*

35 Where development is expected, the designation of permanently protected areas can also be expected based on the provisions of the draft SMP. Ecological functions related to this indicator are likely to improve in all reaches except Ashes Lake.

3.2.6 *PHS Listings*

40 Wherever Riparian Vegetation and Permanently Protected Areas are improved, the quality habitat for PHS Listings should also improve.

3.2.7 *Wetland Acreage*

45 Protections for wetlands exist outside of this SMP, but the Restoration Plan considers projects that will enhance the City's ability to protect and improve wetland functions. This will also improve ecological functions of wetlands related to shoreline areas.

3.2.8 *Overwater Roads & structures*

45 Protections related to new Overwater Roads & Structures together with Restoration Plan projects to remove them where they currently exist will lead to an improvement of ecological functions related to this indicator, especially in the Downtown Waterfront, Rock Cove, and Rock Creek reaches.

3.2.9 *Urban Runoff*

50 Citywide implementation of the Stormwater Management Manual for Western Washington along with voluntary retrofitting and stormwater treatment identified in the Restoration Plan will improve the quality and quantity of runoff received by Stevenson Shorelines. Ecological functions related to this indicator are likely to improve as a result.

3.3 **Lost Ecological Functions**

55 Based on the current draft SMP, some reduction in ecological function is expected through the following indicators.

3.3.1 *303(d) Listings*

60 The most variable of the indicators analyzed, 303(d) Listings are largely based on ecosystem-wide processes beyond the scope of this SMP. Protections and restoration related to the SMP and the Restoration Plan exist, but are unlikely to change downward water quality trends, especially in the Columbia River and Rock Cove reaches.

3.3.2 *Impervious Surface Area*

65 Continued development is expected to occur in shoreline areas and will have an unavoidable impact on total impervious surface coverage. The draft SMP includes some offsets for the underlying ecological functions, but there is expected to be a decrease in rating for this indicator.

3.3.3 *Setbacks to OHWM*

Similarly, continued development is expected to increase the number of structures in shoreline area and in all but Columbia River Reach 1, this indicator is expected to decrease. However, the draft SMP includes some offsets to the underlying ecological functions impacted by this decrease.

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