REVISED DRAFT

CITY OF KELSO
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CUMULATIVE IMPACTS ANALYSIS

City of Kelso's Shoreline Master Program

Cowlitz County Partnership
Shoreline Master Program Update
COWLITZ COUNTY • CASTLE ROCK • KALAMA • KELSO • WOODLAND

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CUMULATIVE IMPACTS ANALYSIS

CITY OF KELSO'S SHORELINE MASTER PROGRAM

1 INTRODUCTION

This Cumulative Impacts Analysis assesses the proposed City of Kelso (City) Shoreline Master Program (SMP) policies and regulations in relation to current shoreline conditions documented in the Shoreline Analysis Report (TWC and Parametrix 2014) to assess if future development approved under the proposed SMP could achieve no net loss of ecological function. This Cumulative Impacts Analysis can help the City make adjustments where appropriate in its proposed SMP if there are potential gaps between maintaining and degrading ecological functions.

The State Master Program Approval/Amendment Procedures and Master Program Guidelines (SMP Guidelines; WAC 173-26) require local shoreline master programs to regulate new development to "achieve no net loss of ecological function." The Guidelines (WAC 173-26-186(8)(d)) state that, "To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts."

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

> *"When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. The concept of "net" as used herein, recognizes that any development has potential or actual, short-term or long-term impacts and that through application of appropriate development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist. Where uses or development that impact ecological functions are necessary to achieve other objectives of RCW 90.58.020, master program provisions shall, to the greatest extent feasible,*

protect existing ecological functions and avoid new impacts to habitat and ecological functions before implementing other measures designed to achieve no net loss of ecological functions." [WAC 173-26-201(2)(c)]

In short, updated SMPs shall contain goals, policies and regulations that are intended to prevent degradation of ecological functions relative to the existing conditions as documented in that jurisdiction's inventory and characterization report. For those projects that result in degradation of ecological functions, the required mitigation must return the resultant ecological function back to the baseline. This is illustrated in the figure below. The jurisdiction must be able to demonstrate that it has accomplished that goal through an analysis of cumulative impacts that might occur through implementation of the updated SMP. Evaluation of such cumulative impacts should consider:

(i) current circumstances affecting the shorelines and relevant natural processes [Chapter 3 below and the Shoreline Analysis Report];

(ii) reasonably foreseeable future development and use of the shoreline [Chapter 4 below and *the* Shoreline Analysis Report]; and

(iii) beneficial effects of any established regulatory programs under other local, state, and federal laws." [Chapter 6 below]

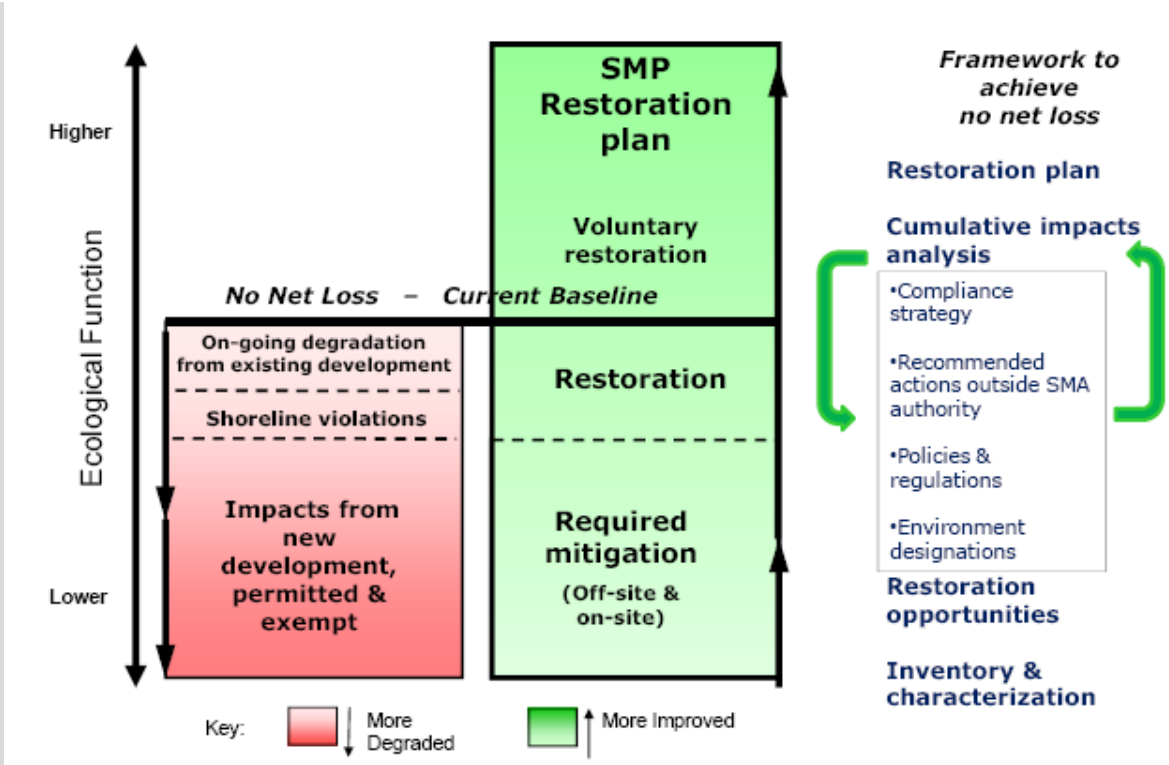

Figure 1-1. Framework to achieve no net loss of ecological function. Source: Department of Ecology.

The Cumulative Impacts Analysis assesses the policies and regulations in the draft SMP to determine whether no net loss of ecological function will be achieved as new development occurs. SMP regulations fundamentally rely on the concept of mitigation sequencing to avoid, minimize, and mitigate for any unavoidable losses of function. An accompanying component of the SMP process that can bring environment conditions to an improved level is the Shoreline Restoration Plan, which identifies and prioritizes potential actions and programs that may be implemented on a voluntary basis. These actions, intended to improve existing environmental conditions through a combination of enhancement, restoration, and protection, cannot be required by SMP regulations, but Section 173-26-201(2)(f) of the Guidelines says: "master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions." In certain communities or shoreline areas, the SMP may not be able to achieve no net loss of functions through regulations alone. For example, a community may expect a significant reduction in riparian vegetation coverage to accommodate a water-dependent use. Compensatory mmitigation would be implemented to offset unavoidable impacts, perhaps through replanting of riparian vegetation in an adjacent site; however, it may take many years before the benefits from the compensatory mitigation are realized. In such a circumstance, as for others, the Shoreline Restoration Plan may help bridge the gap between the SMP-required mitigation outcome and no net loss of ecological function.

As the SMP is implemented, the City will need to identify methods to track shoreline conditions, permit activity, and policy and regulatory effectiveness. City planning staff should track land use and development activity, including exemptions, within shoreline jurisdiction, and may incorporate actions and programs of the other departments as well. With each project application, staff should consider whether implementation of the SMP is meeting the basic goal of no net loss of ecological functions relative to the baseline condition established in the Shoreline Analysis Report. A complete reassessment of conditions, policies and regulations will be considered every eight years, during the scheduled SMP update (concurrent with the Comprehensive Plan update). To conduct a reassessment of the shoreline conditions, the City will need to identify metrics and then monitor, record and maintain key environmental metrics to allow a comparison with baseline conditions. As monitoring occurs, the City should assess environmental effects of development and restoration objectives. With this level of attention to conditions, permitted development, and adaptive management as needed in the long term, the City should be able to ensure that the regulations and mitigation sequencing required by the SMP will maintain shoreline functions over time.

1.1 Document Overview

The ultimate goal of this document is to determine whether future development in the City's shorelines taking place under the proposed SMP would result in no net loss of ecological functions relative to the baseline conditions documented in the Shoreline Analysis Report (The Watershed Company and Parametrix 2014). This section provides an overview of how this document is organized in order to achieve this goal.

To provide the reader with background on the existing conditions in the City's shorelines, a summary of existing conditions based on the Shoreline Analysis Report (The Watershed Company and Parametrix 2014) is provided in Chapter 3. More detailed analysis of specific shoreline functions, uses, and public access can be found in the Shoreline Analysis Report (The Watershed Company and Parametrix 2014).

To understand what future development activities in the City's shorelines might occur that could alter existing conditions, Chapter 4 presents the brief results of an assessment of likely future development. This assessment is based on existing land use conditions, recent trends in land use changes, comprehensive plan designations, zoning, and input from City planners.

Chapter 5 is a key section of this cumulative impacts analysis. It describes how foreseeable development could affect shoreline conditions, and what specific provisions of the proposed SMP will help maintain existing conditions in spite of likely future development. Chapter 5 addresses the following:

- Environment designations and allowed uses relative to shoreline functions;
- Key general standards and regulations intended to protect the ecological functions of the shoreline;
- An assessment of the anticipated future development for each shoreline use or modification, if allowed by available data;
- A summary of the potential impacts that could result from future development of the specific use or modification;
- A summary of key regulations in the SMP that would avoid, minimize, or mitigate potential impacts; and
- A discussion of the potential beneficial effects of the Shoreline Restoration Plan.

Chapter 6 describes the beneficial effects that other regulatory programs may have on the City's shorelines.

Using the information presented in previous chapters, Chapter 7 takes the most probable types of development in the City, and synthesizes the information from Chapters 3 through 6 to assess anticipated cumulative impacts.

Finally, Chapter 8 pulls together all the elements of the SMP and previously discussed background information and analysis to summarize whether and how the SMP ensures no net loss of ecological functions in a way they can be easily digested by the reader.

2 METHODOLOGY

This Cumulative Impacts Analysis was prepared consistent with direction provided in the Shoreline Master Program Guidelines as described above. Existing conditions were first evaluated using the information, both textual and graphic, developed and presented in the Shoreline Analysis Report (TWC and Parametrix 2014). To the extent that existing information was sufficiently detailed and assumptions about possible new or re-development could be made with reasonable certainty, the analysis is quantitative. The analysis addresses only those shorelines within the City of Kelso's shoreline jurisdiction.

2.1 Future Development

2.1.1 Analysis of Land Use Trends

A comparative analysis of county-wide land use data for the years 2002 and 2012 was conducted as part of the Shoreline Analysis Report (TWC and Parametrix 2014). The analysis evaluated recent changes in land use in order to assess the relative scale and types of land use change that may be anticipated in the future. Current land use data were obtained from the Cowlitz County Assessor's Office for 2002 and 2012. The results of this analysis within the City of Kelso are presented in Section 4.1 of this document.

2.1.2 Permit History Data Analysis Methodology

A review of shoreline development permits previously issued by the City of Kelso was undertaken in order to better understand the type and extent of recent development actions occurring in the City, and to help anticipate future trends in shoreline land use changes and shoreline modifications. Permits within City of Kelso shoreline jurisdiction back to 2002 were obtained from the City of Kelso and reviewed for applicability.

2.1.3 Qualitative Analysis

In addition to the land use trends and permit history data, a qualitative analysis of likely land use changes was completed based on input from City planners and known development plans.

2.2 Likely Effects of Development

The effects of likely development were then evaluated in the context of SMP provisions, as well as other related plans, programs, and regulations. For the purpose of evaluating impacts, environments with a likelihood of high densities of new development were evaluated in greatest detail. Areas with limited or low density of projected new development were addressed in general terms without a site-specific discussion of conditions and functions.

3 Summary of Existing Conditions

The following summary of existing conditions is based on the Shoreline Analysis Report (TWC and Parametrix 2014). More detailed information on specific shoreline areas is provided in the Shoreline Analysis Report.

The City of Kelso is located in the Cowlitz Watershed, Water Resource Inventory Area (WRIA) 26 at the confluence of the Columbia, Cowlitz, and Coweeman Rivers. Within the City and its UGA, the Columbia River and Cowlitz River are considered Shorelines of Statewide Significance. The City's western border is shared with the City of Longview. The City covers 8.4 square miles, with a population of 11,925, according to the 2010 US Census.

Industrial is the most prevalent zoning designation along City of Kelso shorelines, comprising approximately 67 percent of shoreline jurisdiction. Approximately eight percent of shoreline jurisdiction is zoned Residential in the Kelso Comprehensive Plan, and another four percent is zoned Commercial. Over 20 percent of shoreline jurisdiction is unzoned. Parks, including Tam O'Shanter Park, the Coweeman River Trail, the Cowlitz River Trail, and the Three Rivers Golf Course, occupy a little over one percent of shoreline jurisdiction.

Within the City of Kelso, levees occupy over half of the total shoreline length, including 100 percent of the Cowlitz River shoreline upstream of the Coweeman River, and the entire west bank of the Coweeman River downstream from Allen Street Road. These structures substantially limit shoreline functions. In addition, approximately one third of City shorelines are armored. A railway runs parallel to the Cowlitz River, further limiting shoreline vegetation functions along most of the City's reaches. Shoreline vegetation and habitat are more diverse and

provide greater habitat functions on the southern bank of the Coweeman River, despite existing development Analysis Report (TWC and Parametrix 2014), a substantial area of wetland habitat along the City's Columbia River shoreline provides significant ecological functions. The entire reach area is within the floodplain of the Columbia River and the reach performs significant hydrologic, habitat, and water quality functions. Wetlands comprise approximately 537 acres, or 66 percent of shoreline jurisdiction. Approximately 68 percent of the City's shoreline jurisdiction falls within a designated floodplain, and approximately 11 percent falls within a floodway. Approximately 62 percent of shoreline jurisdiction is within a channel migration zone. City of Kelso shorelines also support fish and wildlife habitat conservation areas, including priority habitat areas for elk and waterfowl concentrations.

As noted in the Shoreline Analysis Report (TWC and Parametrix 2014), a substantial area of wetland habitat along the City's Columbia River shoreline provides significant ecological functions. The entire reach area is within the floodplain of the Columbia River and the reach performs significant hydrologic, habitat, and water quality functions. Wetlands comprise approximately 537 acres, or 66 percent of shoreline jurisdiction. Approximately 68 percent of the City's shoreline jurisdiction falls within a designated floodplain, and approximately 11 percent falls within a floodway. Approximately 62 percent of shoreline jurisdiction is within a channel migration zone. City of Kelso shorelines also support significant fish and wildlife habitat conservation areas, including priority habitat areas for elk and waterfowl concentrations.

4 Future Development

To understand what future development activities in the City's shorelines might occur that could alter existing conditions, this chapter presents the results of an assessment of likely future development.

4.1 Land Use Trends

An assessment of recent trends in land use changes was completed in the Shoreline Analysis Report (The Watershed Company and Parametrix 2014). This analysis was completed based on the rationale that future changes in land use trends will be roughly comparable to past trends. This approach helps provide a realistic estimate of the level of foreseeable development, rather than looking exclusively at the area of developable lands.

Little change in land use types was observed in the City of Kelso over the past ten years (Table 4-1). The area categorized as transportation lands (including railroads and rights of way) decreased by approximately 20 acres. It is expected that this reduction is primarily a result of differences in categorization of lands over time. If similar land use and permit trends continue in the future, gradual expansion of commercial uses is expected in the City.

Table 4-1. City of Kelso Land use trends 2002-2012.

Category	2002		2012		Change in Percent of Total Acres
	Category Acres	Percent of Total Acres	Category Acres	Percent of Total Acres	
Vacant	500 ac.	61.3%	498 ac.	61.0%	-0.3%
Single Family Residential	7 ac.	0.1%	8 ac.	1.0%	+0.9%
Transportation	150 ac.	18.4%	130 ac.	15.9%	-2.5%
Commercial	9 ac.	1.1%	12	1.5%	+0.4%

Only three permits were identified within shoreline jurisdiction since 2002 (Table 4-2). These permits indicate that limited development of residential and transportation uses and ongoing use of a dredge disposal site has occurred.

Table 4-2 Ten year permit history in the City of Kelso.

Analysis Reach	Permit Application	Activity	Location
Cowlitz 004	SHR09-003	Removal of approximately 50 trees from potential shoreline wetland area	South end of Kelso-Longview Airport runway (Parcel 240910100)
Cowlitz 005	06-001	Develop 54-unit townhomes	2200 Block of S. River Road (Parcel 24370)
Columbia 20	08-001	Continued use of existing 236 acre dredge material disposal site	Wasser-Winters Co. property at south end of Kelso, east bank of Cowlitz River between river mile 0 and 1.

4.2 Land Use Expectations

In addition to evaluating past land use changes, likely future changes in land use were assessed based on comprehensive plan designations, zoning, and input from City planning staff. As described in the Shoreline Analysis Report (The Watershed Company and Parametrix 2014), the following land use changes are anticipated.

Land within the City of Kelso along the Columbia River is designated for industrial use in the Kelso Comprehensive Plan. As much of this land, including along the shoreline, is considered vacant, there is potential for future industrial development.

Plans are underway to extend the airport runway, and the extension may involve impacts to wetlands within shoreline jurisdiction. Mitigation for such impacts would be required.

Multi-family residential development is proposed and under review along the Cowlitz River at the south end of River Road and to the west of the golf course. This development may incorporate water-oriented commercial uses as well. Expansion of low density residential development is anticipated on the left bank of the Coweeman River.

Infill of commercial and industrial development is anticipated on the left bank of the lower Coweeman River, just north of Highway 432.

A discussion of the anticipated effects of the likely future development within the City with the application of the SMP is provided in Sections 5 and 7.

5 Effects of Development with Application of the SMP

This chapter describes how foreseeable development could affect shoreline conditions, and what specific provisions of the proposed SMP will help maintain existing conditions in spite of likely future development. This chapter begins, in Section 5.1, with a summary of the City's proposed environment designation scheme and a discussion of how the scheme allocates allowed uses by relating environment designations to ecological functions. Section 5.3 evaluates where future land use changes are anticipated relative to proposed environment designations. Section 5.4 presents key general standards and regulations in the SMP intended to protect the ecological functions of the shoreline. Section 5.5 includes the following for each specific use or modification listed in the SMP:

- An assessment of the future development potential for the use or modification, if allowed by available data;
- A summary of the potential impacts that could result from future development of the specific use or modification; and

- A summary of key regulations in the SMP that would avoid, minimize, or mitigate potential impacts.

Chapter 5 concludes, in Section 5.6, with a discussion of the potential beneficial effects of voluntary actions identified in the Shoreline Restoration Plan (The Watershed Company 2013).

5.1 Environment Designations

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

The assignment of environment designations can help minimize cumulative impacts by concentrating development activity in lower functioning areas that are not likely to experience significant function degradation with incremental increases in new development or redevelopment.

Consistent with the Guidelines, the City's proposed environment designation system is based on the existing use pattern, the biological and physical character of the shoreline, and community interests. The Shoreline Analysis Report provided information on shoreline conditions and functions that informed the development of environment designations for each of the shoreline waterbodies. The proposed upland environment designations are as follows:

- High-Intensity
- Residential
- Urban Conservancy
- Aquatic

The proposed environment designations are described in more detail below.

The **High-intensity environment designation** is intended to provide areas for high-intensity, water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and seeking to restore ecological functions where they are degraded. The designation is appropriate for those shoreline areas that currently support or are planned for high-intensity uses related to commerce or transportation. Approximately 285.75 acres, or 67.2 percent, of the City's shorelines (see Figure 5-1) are designated High-intensity.

The purpose of the **Residential environment designation** is to accommodate residential development and appurtenant structures that are consistent with the SMP, including single-family and multi-family development. The designation is

appropriate for those shoreline areas that are characterized by single-family or multi-family residential development or are planned and platted for residential development. Approximately 44.4 acres, or 10.4 percent, of the City's shorelines (see Figure 5-1) are designated Residential Environment.

The purpose of the **Urban Conservancy Environment** is to protect and restore ecological functions of open space, floodplain, and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses including recreational areas, facilities, and utilities. Activities permitted are intended to have minimal adverse impacts upon the shoreline. This designation is appropriate for areas where development could occur while maintaining or having the ability to restore ecological functions of the area, and that are not generally suitable for intensive water dependent uses. Approximately 94.8 acres, or 22.3 percent, of the City's shorelines (see Figure 5-1) are designated Urban Conservancy.

The purpose of the **Aquatic Environment** is to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high water mark (OHWM). This environment is defined as the area waterward of the OHWM of all streams and rivers, and other water bodies constituting shorelines of the state together with their underlying lands and their water column; but does not include associated wetlands and other shorelands shoreward of the ordinary high water mark.

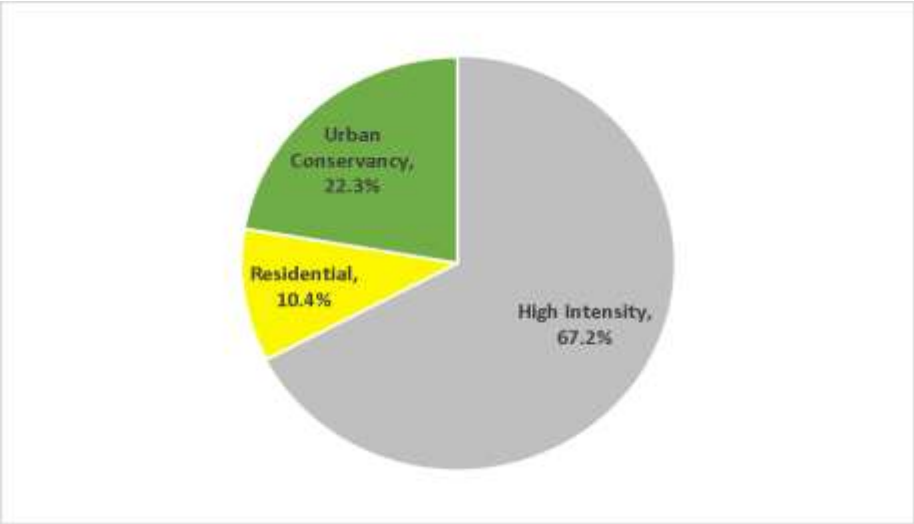

Figure 5-1. Distribution of Shoreline Environment Designations in the City of Kelso.

In addition to existing and planned land use, the analysis of shoreline functions presented in the Shoreline Analysis Report was used to guide the assignment of environment designations. Figure 5-2 shows the distribution of functional scores

among proposed environment designations within the City of Kelso and its urban growth area, respectively.

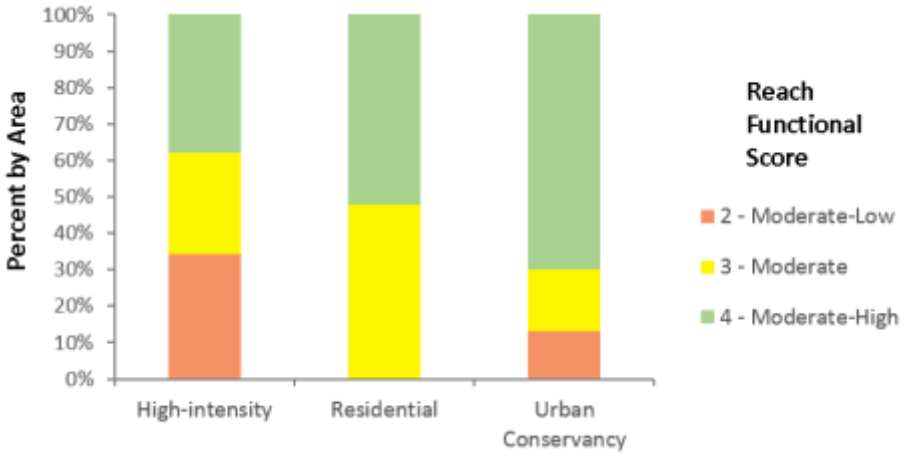

Figure 5-2. Distribution of Functional Scores among Proposed City of Kelso Environment Designations.

Within the City of Kelso, ecological function scores were overall slightly lower for shorelines in the High-intensity designation than for those in the Residential and Urban Conservancy designations. Figure 5-2 should be considered in the context of the distribution of environment designations presented in Figure 5-1. For example, because the High-intensity designation makes up 67.2 percent of the shoreline, the amount of the High-intensity shoreline with a "moderate-low" functional score is a more substantial part of the City's shoreline (146.2 acres) than Figure 5-2 would indicate. The relatively high-functioning shorelines ("moderate-high") within the Residential designation comprise only 23.1 acres. Reaches with a functional score of "moderate-high" within the High-intensity designation are primarily associated with the dredge disposal site at the confluence of the Cowlitz and Columbia Rivers. Additional high-functioning High-intensity shorelines are present along the left bank of the Coweeman River, and primarily consist of underdeveloped or vacant land zoned for commercial development in the Kelso Comprehensive Plan. It is worth repeating that other considerations go into the environment designation process besides ecological function, particularly existing and planned use. In those areas where existing ecological functions are higher, greater regulatory protection may be necessary to maintain existing ecological functions.

5.2 Potential Use Conflicts

The proposed SMP helps provide a framework for allowing and/or encouraging shoreline preferred uses in the shoreline jurisdiction. Kelso currently has no water oriented uses except for public access trails due to the isolation of the shoreline in many areas by levees and transportation corridors.

Areas with potential for future water-oriented uses include the area near the golf course, the area on the south bank of the Coweeman River, and the east bank of Carrol's Channel. All of these areas are currently vacant with no existing single family or other potential conflicting uses.

The area south of Mill Street which is currently single family and designated for future multiple use likely will continue to have some single family uses as parcels redevelop incrementally, but future uses are not likely to be incompatible with existing residential uses.

Land on the Cowlitz River north of the Cowlitz Ave Bridge is designated as commercial use in the Kelso Comprehensive Plan. The proposed SMP includes an environment designation of High-intensity, which addresses actual anticipated uses.

Land in Cowlitz Analysis Reach 39 on the north bank of the Coweeman River is primarily designated with Parks/Open Space use in the comprehensive plan, with a small portion of Commercial designation. The proposed SMP designation is Urban Conservancy to be consistent with the current and anticipated land use.

5.3 Summary of Anticipated Future Land Use by Environment Designation

Shoreline environment designations define which uses and modifications are allowed within shoreline jurisdiction, which are conditionally allowed, and which are prohibited. Table 5-1 (modified from Table 7-1 in the proposed SMP) lists allowed, conditionally allowed, and prohibited uses for each shoreline environment designation. Allowed uses ("P" and "SCUP" in Table 5-1) must obtain a shoreline substantial development permit or shoreline conditional use permit. Additionally, allowed uses are subject to the general provisions of the SMP (see Section 5.3), as well as the provisions specific to that use or modification (see Section 5.4). These provisions are intended to minimize adverse impacts from shoreline uses, and help ensure that such uses result in no net loss of ecological functions.

Table 5-1. Shoreline Use and Modification Regulations by Shoreline Environment Designation

Table Key: P = May be permitted through an SSDP or SLE SCUP = May be permitted through an SCUP review X = Prohibited N/A = Not Applicable	Shoreline Environment Designations			
	High-Intensity	**Residential**	**Urban Conservancy**	**Aquatic**
Shoreline Uses				
Agriculture	X	X	X	x
Aquaculture	P	P	P	P
Boating Facilities	P	P	P	P
Marinas	X	X	X	X
Commercial				
Water-dependent	P	P	X	P
Water-related	P	P	X	X
Water-enjoyment	P	P	P	P
Non-water-oriented	P	X	X	X
Forest Practices	X	X	X	X
Industrial				
Water-dependent	P	X	X	P
Water-related	P	X	X	X
Non-water-oriented	P	X	X	X
Institutional	P	P	P	X
In-stream Structures	P	P	P	P
Mining	SCUP	SCUP	SCUP	SCUP
Recreation				
Water-dependent	P	P	P	P
Water-related	P	P	P	P
Water-enjoyment	P	P	P	P
Non-water-oriented	P	P	X	X
Residential				
Single-family	P	P	P	X
Multi-family	P	P	X	X
Floating or over-water residence, including live-aboard vessels	X	X	X	X
Transportation and Parking				
Roads and railroads	P	P	P	P
Bridges	P	P	P	P
Non-motorized facilities	P	P	P	P
Accessory Parking	P	P	P	X
Utilities	P	P	P	P

Table Key: P = May be permitted through an SSDP or SLE SCUP = May be permitted through an SCUP review X = Prohibited N/A = Not Applicable	Shoreline Environment Designations			
	High-Intensity	**Residential**	**Urban Conservancy**	**Aquatic**
Uses Not Specified	SCUP	SCUP	SCUP	SCUP
Modifications				
Flood Control Works				
Modification of Existing Flood Control Works (including relocation farther landward)	P	P	P	SCUP
New Flood Control Works	P	P	P	SCUP
Shoreline Stabilization	P	P	P	P
Breakwaters and Groins	SCUP	SCUP	SCUP	SCUP
Fill / Excavation	P	P	P	SCUP
Dredging				
Dredging	N/A	N/A	N/A	SCUP
Dredge Disposal / Material Stockpiling	P	P	P	SCUP
Habitat and Ecological Enhancement	P	P	P	P

While Table 5-1 presents the list of *possible* uses within each environment designation, Table 5-2 below presents a summary of *likely* development by environment designation, based on information gathered as part of the Shoreline Analysis Report (TWC and Parametrix 2014). Table 5-2 also summarizes factors that may affect future development potential within each environment designation. These factors are not intended to be a comprehensive list of which SMP provisions would apply; instead, they are intended to highlight the regulatory and/or physical factors that would most limit future development.

Table 5-2. Summary of anticipated land use in the City of Kelso by Shoreline Environment Designation.

Shoreline Environment Designation	Future Use	Factors affecting development potential
High-intensity	Intensification of water-dependent industrial use is anticipated once dredge spoil mining is complete. Little other change is anticipated in this designation.	Wetlands, wetland buffers, and floodway standards are expected to limit development on Owl Creek and on the lower Coweeman River. Dikes and roads parallel to Cowlitz River and Coweeman River limit effects of development.
Residential	Low density single family residential development and redevelopment is anticipated on a recently annexed portion of the left bank of the Coweeman River. Single-family, multi-family, and mixed use development is anticipated on the east bank of the Cowlitz River to the west of the golf course.	Shoreline and wetland buffers will limit potential new development. Much of the existing developed area is separated from the shoreline by dikes and the Urban Conservancy designation.
Urban Conservancy	Significant changes are not anticipated.	Levees limit potential for development in parallel designations. Wetlands limit development on Coweeman River.

5.4 General Regulations

General standards and use regulations are contained in SMP sections 5.5 and 6.1 through 6.7. These provisions include several standards and regulations intended to protect ecological functions of the shoreline and to prevent adverse cumulative impacts. Key regulations protective of ecological functions, grouped by SMP section, are listed below.

5.4.1 Shorelines of State-Wide Significance

Within the City's jurisdiction, the Columbia River and the Cowlitz River are designated as shorelines of state-wide significance. Because these shorelines are major resources from which all people in the state derive benefit, this jurisdiction gives preference to uses which favor long-range goals and support the overall public interest (Table 5-3).

Table 5-3. Summary of key regulations related to shorelines of state-wide significance that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shorelines of State-Wide Significance (5.5)	Preserve the natural character of the shoreline. a. Designate and administer shoreline environments and use regulations to minimize damage to the ecology and environment of the shoreline as a result of man-made intrusions on shorelines. b. Restore, enhance, and/or redevelop those areas where intensive development or uses already exist in order to reduce adverse impact on the environment and to accommodate future growth rather than allowing high-intensity uses to extend into low-intensity or underdeveloped areas. c. Protect and preserve existing diversity of native vegetation and habitat values, wetlands, and riparian corridors associated with shoreline areas. (A.)(2.)	X	X	X	X
	Support actions that result in long-term over short-term benefit. b. Protect resources and values for future generations by modifying or prohibiting development that would irretrievably damage shoreline resources. (A.)(3.)	X	X	X	X
	Protect the resources and ecological function of the shoreline. a. Minimize development activity that will interfere with the natural functioning of the shoreline. b. All shoreline development should be located, designed, constructed and managed to avoid disturbance of and minimize adverse impacts to wildlife resources. c. Restrict or prohibit public access onto areas which cannot be maintained in a natural condition under human use. d. Shoreline materials should be left undisturbed by shoreline development. Gravel mining should be severely limited in shoreline areas. e. Preserve environmentally sensitive wetlands and encourage restoration of presently degraded wetland areas. (A.)(4.)	X	X	X	X

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.4.2 No Net Loss of Ecological Function

The SMP includes provisions that require mitigation sequencing, which involves first avoiding, then minimizing any impacts (Table 5-4). Where impacts are unavoidable, compensatory mitigation is required, as well as monitoring. These provisions apply to all shoreline uses and modifications, and should help ensure that no net loss of functions is maintained on a cumulative basis in the City.

Table 5-4. Summary of key regulations related to no net loss that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
No Net Loss of Ecological Function (6.1)	All shoreline use and development shall be located, designed, constructed, conducted, and maintained in a manner that maintains shoreline ecological functions, in accordance with the mitigation sequencing provision of the SMP. (A.)	X	X	X	X
	Shoreline ecological functions that shall be protected include, but are not limited to, fish and wildlife habitat, food web support, and water quality maintenance. (B.)	X	X	X	X
	Shoreline processes that shall be protected include, but are not limited to, water flow; erosion and accretion; infiltration; groundwater recharge and discharge; sediment delivery, transport, and storage; large woody debris recruitment; organic matter input; nutrient and pathogen removal; and stream channel formation/maintenance. (C.)	X	X	X	X
	In-water work shall be scheduled to protect biological productivity (including but not limited to fish runs, spawning, and benthic productivity), and shall not occur in areas used for commercial fishing during a fishing season unless specifically addressed and mitigated for in the permit. (D.)		X		X
	An application for any permit or approval shall demonstrate all reasonable efforts have been taken to provide sufficient mitigation such that the activity does not result in net loss of ecological functions. Mitigation shall occur in prioritized order. (E.)	X	X	X	X
	Applicants for permits have the burden of proving that the proposed development is consistent with the criteria set forth in the SMP, including demonstrating all reasonable efforts have been taken to provide sufficient mitigation such that the activity does not result in net loss of ecological functions. (F.)	X	X	X	X

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.4.3 Critical Areas within Shoreline Jurisdiction

The proposed SMP requires that activities within shoreline jurisdiction comply with the Shoreline Critical Areas Regulations found in Appendix C of the SMP. These regulations are based on the Kelso Municipal Code (KMC) Chapter 18.20 and have been modified to comply with the provisions of the Washington State Shoreline Management Act.

General Provisions

The SMP includes provision that apply generally to all critical areas within shoreline jurisdiction, and that are intended to protect the ecological processes and functions of those critical areas (Table 5-5). Regulations for wetlands, fish and wildlife habitat conservation areas, frequently flooded areas, and geologic hazard areas within shoreline jurisdiction are found in Appendix C of the SMP, Shoreline Critical Areas Regulations.

Table 5-5. Summary of key regulations related to critical areas within shoreline jurisdiction that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Critical Areas Protection: General Provisions (6.3.2)	Shoreline uses, activities, developments, and associated structures and equipment shall be located, designed, and operated to protect the ecological processes and functions of critical areas. (A.)	X	X	X	X
	New and expanded development proposals shall integrate protection of wetlands, fish and wildlife habitat, and flood hazard reduction with other stream management provisions to ensure no net loss of ecological functions. (B.)	X	X	X	X
	If provisions of Appendix C and other parts of the SMP conflict, the provisions most protective of ecological resources shall apply. (D.)	X	X	X	X
	Unless otherwise stated, critical area buffers associated with jurisdictional shoreline areas shall be protected and regulated in accordance with the SMP and Appendix C. (E.)	X	X	X	X

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

Wetlands

Under the proposed SMP, standard buffers for wetlands in shoreline jurisdiction range from 40 feet to 235 feet (SMP Appendix C (2.)(D.)(Table 1-A)), depending on the wetland rating (as determined by Washington State Wetland Rating System for Western Washington (Ecology Publication #14-06-029, or as revised) and the habitat functions of the wetland.

Buffer averaging (SMP Appendix C (2.)(E.)) is allowed provided specific criteria are met, including that averaging will not degrade functions, and the buffer

width will not be reduced to less than 75 percent of the standard buffer in any location or 75 feet for Category I and II, 50 feet for Category III, and 25 feet for Category IV, whichever is greater. In no case shall the standard buffer be reduced by more than 25 percent.

Fish and Wildlife Habitat Conservation Areas

The proposed SMP includes Fish and Wildlife Habitat Conservation Area (FWHCA) buffers for all streams and waterbodies within shoreline jurisdiction. Proposed revisions to the critical areas regulations apply shoreline buffers based on reach to all shoreline waterbodies (SMP Appendix C (3.)(H.)(Table 4)). These reach-based buffers were derived from an evaluation of reach-specific conditions, including width and condition of existing vegetation, existing barriers to habitat functions, and overall reach functions, as determined by the Shoreline Analysis Report (TWC and Parametrix 2014). This reach-based approach to buffer standards, where buffer standards are proposed based on existing conditions, is consistent with the concept of maintaining no net loss of shoreline ecological functions. Standard buffers on non-shoreline streams within shoreline jurisdiction range from 50-150 feet.

Buffer averaging (SMP Appendix C (3.)(J.)) is allowed provided specific criteria are met, including that averaging will not degrade functions and the buffer width will not be reduced to less than 75 percent of the standard buffer in any given location. Certain uses are allowed within FWHCA buffers, including water-dependent uses; accessories to water-dependent uses (excluding parking lots) that require a location inside the buffer due to site constraints, or to be near the water-dependent use; shoreline residential access constructed of pervious materials; and linear transportation and utility crossings. When allowed, accessories to water-dependent uses must be designed and located to minimize intrusion into the buffer. All uses allowed within FWHCA buffers must comply with the mitigation sequencing requirements for critical areas in shoreline jurisdiction (SMP Appendix C (1.3)) and demonstrate that any adverse impacts to ecological functions are mitigated (SMP Appendix C (3.)(J.)(7.)). Uses not listed as allowed in this section must obtain a Shoreline Variance.

Flood Hazard Areas

Frequently flooded areas are regulated by the City's Floodplain Management regulations (KMC 18.12), which are incorporated into the City's critical areas regulations by reference (SMP Appendix C (4.)). These regulations prohibit new development or fill within the floodway that would result in a net rise in the base flood level (KMC 18.12.320(A)). All lands identified in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, as amended, and approved by the City, as within the 100-year floodplain, are designated as frequently flooded areas (SMP Appendix C (4.)(A.)).

Geologic Hazard Areas

Geologically hazardous areas within shoreline jurisdiction include erosion hazard areas, landslide hazard areas, seismic hazard areas, volcanic hazard areas, and mine hazard areas (SMP Appendix C (5.)(C.)). Regulations specific to geologically hazardous areas apply performance standards to minimize and manage risks and ecological impacts. Any development in a geologically hazardous area requires a geotechnical evaluation by a qualified professional.

In addition to development standards that limit the potential effect of new development on erosion, for all existing landslide or eroded areas, a vegetated buffer of at least 50 feet from the top, toe, and all edges of the slope of the slope is required (SMP Appendix C (5.)(D.)(a.)(i.)). The minimum native vegetation buffer requirement may be adjusted depending on the results of a geotechnical analysis (SMP Appendix C (5.)(D.)(a.)(ii.)).

Critical Aquifer Recharge Areas

Critical aquifer recharge areas include those areas identified to have a very high susceptibility to contamination of the underlying aquifer due to soil type and hydrogeology (SMP Appendix C (6.)(A.)). Aboveground and underground storage tanks and vaults, utility transmission facilities, and land subdivisions are regulated in critical aquifer recharge areas in shoreline jurisdiction. For these regulated activities, hydrogeologic testing and site evaluation may be required (SMP Appendix C (6.)(C.)(1.)). Unless such testing demonstrates that impacts will be mitigated, development that negatively impacts the quality of critical aquifer recharge areas in shoreline jurisdiction is prohibited (SMP Appendix C (6.)(C.)(3.)).

5.4.4 Flood Prevention and Flood Damage Minimization

In addition to flood hazard protections provided through shoreline critical areas regulations, the proposed SMP includes provision to reduce flood hazard, avoid increasing flood hazard, and minimize flood damage (Table 5-6). If strictly enforced, these provisions would be expected to protect ecological functions by restricting development within floodways or channel migration zones. The provisions also define standards and regulations for flood hazard management structures, which are discussed in Section 5.5.3 of this document.

Table 5-6. Summary of key regulations related to flood prevention and flood damage minimization that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Flood Prevention and Flood Damage Minimization (6.4)	New residential, commercial, or industrial development and uses, including subdivision of land, within shoreline jurisdiction are prohibited if it would be reasonably foreseeable that the development or use would require structural flood hazard reduction measures in the channel migration zone or floodway over the life the development. (B.)	X			X
	The following uses and activities may be authorized in floodways or channel migration zones when otherwise permitted by the SMP: 1. Actions and development with a primary purpose of protecting or restoring ecological functions and ecosystem-wide processes. 2. Bridges, utility lines, public stormwater and wastewater facilities and their outfalls, and other public utility and transportation structures where no other feasible alternative exists, or where the alternative would result in unreasonable and disproportionate costs. Where such structures are allowed, mitigation shall address impacted functions and processes in the affected shoreline. 6. Measures to reduce shoreline erosion provided that it is demonstrated that the erosion rate exceeds that which would normally occur in a natural condition, that the measures do not interfere with fluvial hydrological and geomorphological processes normally acting in natural conditions, and that the measures include appropriate mitigation of impacts to ecological functions associated with the river or stream. (C.)	X			X
	Removal of materials such as gravel, sand, or other sediment for flood management purposes is allowed only after a biological and geomorphological study shows that extraction does not result in a net loss of ecological functions. (D.)	X	X	X	X

*An “X” indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.4.5 Shoreline Vegetation Conservation

The proposed SMP includes provision that are intended to protect existing shoreline vegetation (Table 5-7). Through minimization and mitigation of impacts, these provisions would be expected to result in no net loss of native shoreline vegetation.

Table 5-7. Summary of key regulations related to shoreline vegetation conservation that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Vegetation Conservation (6.6)	All development shall minimize vegetation removal in areas of shoreline jurisdiction to the amount necessary to accommodate the permitted use. (A.)			X	
	Unless otherwise specified, all shoreline uses and development shall comply with the setback and buffer provisions of the SMP Critical Areas regulations to protect and maintain shoreline vegetation. (B.)			X	
	Vegetation clearing in shoreline jurisdiction shall be limited to the minimum necessary to accommodate approved shoreline development and to comply with applicable local, state, and federal standards. Routine maintenance of existing landscaping and gardens is allowed. (C.)			X	
	Vegetation clearing in shoreline jurisdiction shall be limited to the minimum necessary to accommodate approved shoreline development and to comply with applicable local, state, and federal standards. Routine maintenance of existing landscaping and gardens is allowed. (D.)		X	X	X
	Shoreline landowners are encouraged to preserve and enhance native woody vegetation and native groundcovers to stabilize soils and provide habitat. When shoreline uses or modifications require a planting plan, maintaining native plant communities, replacing noxious weeds and avoiding installation of ornamental plants are preferred. Non-native vegetation requiring use of fertilizers, herbicides/pesticides, or summer watering is discouraged. (E.)		X	X	X
	Mitigation plans shall be approved before initiation of other permitted activities, unless a phased schedule that ensures completion prior to occupancy has been approved. (F.)			X	
	Aquatic weed control shall only occur to protect native plant communities and associated habitats or where an existing water-dependent use is restricted by the presence of weeds. Aquatic weed control shall occur in compliance with all other applicable laws and standards and shall be done by a qualified expert. (G.)			X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Limbing or crown thinning shall comply with the Tree Care Industry Association pruning standards, unless the tree is a hazard tree as defined by the SMP. No more than 25 percent of the limbs of any single tree may be removed and no more than 20 percent of the canopy cover in any single stand of trees may be removed for view preservation. (H.)			X	
	Vegetation may be removed or altered landward of shoreline buffers, provided that there is no net loss of ecological function. (J.)			X	

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.4.6 Water Quality and Quantity

The proposed SMP provisions help ensure that point-source and non-point-source pollution will be minimized, consistent with existing City policies (Table 5-8).

Table 5-8. Summary of key regulations related to water quality and quantity that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Water Quality and Quantity (6.7)	All shoreline development shall comply with the applicable requirements of the City's Comprehensive Stormwater Plan, Comprehensive Plan, Stormwater Management Performance Standards and best management practices to prevent impacts to water quality and storm water quantity that would result in a net loss of shoreline functions. (A.)	X	X		
	Stormwater management structures including ponds, basins, and vaults shall be located outside of shoreline jurisdiction where possible and as far from the water's edge as feasible and shall minimize disturbance of vegetation conservation buffers. Low-impact development facilities are encouraged in associated with development allowed in shoreline jurisdiction. (B.)		X	X	

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	To avoid water quality degradation, sewer service is subject to the requirements below: 1. Any existing septic system or other on-site system that fails or malfunctions will be required to connect to an existing municipal sewer service system if feasible, or make system corrections approved by the Cowlitz County Environmental Health Unit. 2. Any new development, business, single-family or multi-family unit will be required to connect to an existing municipal sewer service system if feasible, or install an on-site septic system approved by Cowlitz County Environmental Health Unit. (C.)		X		

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5 Use and Modification Provisions

The SMP contains numerous shoreline modification and use policies and supporting regulations intended to protect the ecological functions of the shoreline and prevent adverse cumulative impacts. The SMP requires that preference be given to shoreline modifications that have a lesser impact on ecological functions, and that modifications be designed to incorporate all feasible measures to protect ecological shoreline functions and ecosystem-wide processes (SMP Section 7.3.1(B.) and (C.)). Structural modifications are permitted only where an applicant can demonstrate their necessity to support or protect an allowed primary structure or a legally existing shoreline use, or for reconfiguration of the shoreline for ecological mitigation or enhancement purposes (SMP Section 7.3.1(A.)).

In addition to these general provisions, the SMP contains regulations specific to each shoreline use or modification. The tables in the following sections provide a brief summary of the primary potential ecological impacts that may arise from each of these shoreline uses and modifications, as well as a summary of the proposed SMP regulations intended to conserve ecological functions and prevent adverse cumulative impacts. Regulations that help ensure that impacts are avoided, minimized, and mitigated include provisions that can be separated in the following three general categories: (1) provisions that allow, condition, or prohibit specific types of development depending on Shoreline Designation; (2) provisions that apply specific standards that help avoid and minimize potential

impacts; and (3) provisions that require mitigation of impacts and/or demonstration of no net loss of functions.

The potential impacts described in the tables account for the more significant or most likely impacts, but may not account for the full suite of potential impacts from a given use or modification. These less significant or less likely impacts, while not specifically discussed below, would be addressed during the permitting process through mitigation sequencing requirements. Also, the listing of potential impacts does not mean that these impacts occur in every instance of a certain use or modification.

The tables that describe proposed SMP provisions (in whole or in part) provide an indication of how potential standards may relate to ecological functions or which function or functions the regulations help to protect. It should be noted that an "X" in the following tables indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or has a less direct effect on the function.

5.5.1 Shoreline Stabilization

Shoreline stabilization measures have potentially significant impacts on sediment transport processes and floodplain connectivity. A list of potential impacts from shoreline stabilization is provided below in Table 5-9.

No permits for bank stabilization were issued from 2001; however, limited areas of existing bank stabilization (not including levees, which are addressed separately under Flood Hazard Management) are present in shoreline jurisdiction. Key regulations in the proposed SMP that address potential impacts from shoreline stabilization are listed below in Table 5-10. Under the proposed SMP, new or expanded shoreline stabilization measures would be expected to be permitted infrequently, while repair and replacement of existing structures would be expected to occur more commonly. The proposed SMP substantially limits the development of new shoreline stabilization structures by establishing strict permitting criteria. The proposed SMP further ensures that new and replacement structures evaluate and implement the stabilization approach with the least potential for impacts to shoreline functions.

Table 5-9. Summary of potential impacts from shoreline stabilization.

Functions	Potential Impacts to Functions
Hydrologic	Increase in flow energy at the shoreline resulting in increased bank erosion downstream.
	Disruption of shoreline wetlands.
	Reduction in floodplain connectivity.
Water Quality	Water quality impacts associated with construction.
	Removal of shoreline vegetation increases erosion and water temperatures.
Vegetative/ Habitat	Simplification of shoreline habitat complexity.

Table 5-10. Summary of key shoreline stabilization regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Stabilization (7.3.2)	Shall demonstrate that proposed structures are the minimum size necessary, and comply with mitigation sequencing requirements of the SMP. Modified or enlarged shoreline stabilization proposals shall be treated as new stabilization for all requirements of the SMP. (A.)	X	X	X	X
	Compliance with the following criteria shall be documented through geotechnical analysis, which addresses the necessity for shoreline stabilization by estimating timeframes and rates of erosion and reports on the urgency of the specific situation: 1. New development and lots shall demonstrate that new shoreline stabilization will not be necessary, for the life of the development, in order for reasonable development to occur; 2. Development on steep slopes shall be set back sufficiently to ensure that shoreline stabilization is unlikely to be necessary during the life of the structure; 3. Development that would require new shoreline stabilization that would cause significant impacts to adjacent or down-current properties and shoreline areas shall not be allowed; 4. Hard armoring solutions shall be authorized only under specified circumstances. (B.)	X	X	X	X
	Shoreline stabilization shall be designed and constructed to be the minimum size necessary and to avoid stream channel direction modification, realignment, straightening, and channelization, or impacts to sediment transport. (C.)	X			

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	New or expanded shoreline stabilization shall follow this hierarchy of preference: 1. No action; 2. Non-structural methods such as increased building setbacks, relocating structures, and/or other methods to avoid the need of stabilization; 3. Soft-shore stabilization; 4. Soft-shore stabilization in combination with rigid works; 5. Rigid works. (D.)	X		X	X
	New structural shoreline stabilization measures to protect an existing primary structure, including residences, are only allowed when there is conclusive evidence documented by a geotechnical analysis that the structure is in danger from shoreline erosion caused by currents or waves rather than from upland conditions. The analysis should evaluate on-site drainage issues and address drainage problems by relocating drainage away from the shoreline edge before considering structural shoreline stabilization. Considerations shall include the feasibility of reconstruction and/or relocation of the structure if it is cost effective in relation to any new or expanded erosion control structures shall not result in a net loss of shoreline ecological functions. (E.)	X		X	X
	New structural stabilization in support of a water-dependent development may be permitted when: 1. The erosion is not being caused by upland conditions; 2. There is a need to protect primary structures from damaged due to erosion; and 3. Non-structural measures are not feasible. (F.)	X		X	X
	New structural stabilization in support of new non-water-dependent development may be permitted when: 1. The erosion is not being caused by upland conditions; 2. There is a need to protect primary structures from damage due to erosion caused by natural processes; 3. Non-structural measures are not feasible or not sufficient; and 4. The stabilization structure will not result in a net loss of shoreline ecological functions. (G.)	X		X	X
	New structural shoreline protection for the restoration of ecological functions or hazardous substance remediation projects shall meet the conditions below: 1. Non-structural measures, planting vegetation, or installing on-site drainage improvements are not feasible or not sufficient; 2. The stabilization structure will not result in a net loss of shoreline ecological functions. (H.)	X		X	X
	The construction of a shoreline stabilization structure (soft or hard) for the primary purpose of creating dry land is prohibited. (I.)	X			X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Replacement of an existing stabilization structure is permitted if there is a demonstrated need to protect existing primary uses or structures from erosion caused by current or wave action. Replacement walls shall not encroach waterward of the OHWM or existing structure unless the residence was occupied prior to January 1, 1992,and there are overriding safety or environmental concerns. Replacement must result in no net loss of ecological functions. (J.)	X		X	X
	Bioengineered projects shall be designed in accordance with best available science and incorporate a variety of sustainable plants, unless infeasible. (L.)	X		X	X

* An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.2 Breakwaters, Groins, and Instream Structures

Breakwaters and groins are usually intended to alter currents or to deflect or dissipate wave energy. Instream structures, including dams and water diversions, alter water levels, currents, sediment transport, and flow energy. All of the above structures have the potential to cause unintended impacts on natural bank erosion, sediment transport processes, and habitat. Potential impacts from these structures are summarized below in Table 5-11.

Based on past permit trends, as well as proposed SMP standards (Table 5-12), few, if any, new breakwaters, groins, or instream structures should be anticipated. Where new structures are permitted, they would need to demonstrate no net loss on an individual project basis. Infrequent repair and replacement of existing structures may be expected, and mitigation sequencing would apply for these structures.

Table 5-11. Summary of potential impacts from breakwaters, groins, and instream structures.

Functions	Potential Impacts to Functions
Hydrologic	Potential interference with movement of sediments, altering substrate composition.
Water Quality	Reduced circulation and associated changes in water quality.
Vegetative/ Habitat	Migration barriers for aquatic species.
	Instream habitat alterations and shading.

Table 5-12. Summary of key in-water structure regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Breakwaters and Groins (7.3.3)	Structures located waterward of the ordinary high water mark shall be allowed only where necessary to support water-dependent uses, public access, shoreline stabilization, public safety, or to minimize flooding, or other specific public purpose. (A.)	X			X
	Open-pile or floating breakwaters shall be used unless it can be demonstrated that riprap or other solid construction would not result in any greater net impacts to shoreline ecological functions, processes, fish passage, or shore features. (B.)	X			X
In-Stream Structures (7.2.8)	Applications for new or expanded in-stream structural uses shall include the following information prior to approval: 1. A hydraulic analysis of anticipated effects of the project on stream hydraulics; 2. A habitat management plan prepared by a qualified professional biologist that describes the anticipated effects of the project on fish and wildlife resources, provisions for protecting in-stream resources during construction and operation, and measures to compensate for impacts to resources that cannot be avoided. (A.)	X	X	X	X

* An “X” indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.3 Flood Hazard Management Structures

Potential impacts from flood hazard management are summarized below in Table 5-13. Flood hazard management measures in the City of Kelso primarily consist of dike infrastructure maintained by Diking District No 3. Future flood hazard management development will likely be associated with the maintenance and repair of existing dike infrastructure. The proposed SMP provisions balance maintaining flood protection with protecting ecological functions. Key

regulations in the proposed SMP that address potential impacts from flood hazard management structures are listed below in Table 5-14.

Table 5-13. Summary of potential impacts from flood hazard management structures.

Functions	Potential Impacts to Functions
Hydrologic	Restricted flood flows may increase flood velocities downstream
Water Quality	Increased instream temperatures resulting from decreased riparian vegetation.
Vegetative/ Habitat	Increased mainstem flow velocities, scouring of salmon redds, reduced off-channel refugia
	Reduced riparian vegetation
	Simplification of channel bank complexity

Table 5-14. Summary of key regulations related to flood hazard management structures that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Flood Control Works (6.4)(F.)	New or expanded structural flood works shall be permitted only when it can be demonstrated by a scientific and engineering analysis that: a. They are necessary to protect existing development; b. Non-structural flood hazard reduction measures are infeasible; c. Appropriate vegetation conservation actions are undertaken; and d. Appropriate mitigation is provided consistent with Section 6.1 No Net Loss of Ecological Function. (2.)			X	X
	Dike and levee design shall, to the maximum extent feasible, be: a. Limited in size to the minimum height necessary; b. Placed landward of associated wetlands and designated fish and wildlife conservation area buffers identified in Appendix C of the SMP, except for actions that increase ecological functions, unless there is no other feasible alternative to reduce flood hazard to existing development, in which case all impacts shall be mitigated as required in Section 6.1 and Appendix C; c. Located and designed so as to protect and restore the natural character of the stream, avoid the disruption of channel integrity and provide the maximum opportunity for natural floodway functions to take place; d. Planted with appropriate vegetation meeting the certification requirements while providing the greatest amount of ecological function possible. (4.)	X		X	X
	All flood protection measures shall demonstrate that downstream flooding will not be increased and the integrity of downstream ecological functions will not be adversely affected,	X			X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	including disruption of natural drainage flows and stormwater runoff. (5.)				

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.4 Clearing and Grading

Clearing and grading are commonly associated with most development projects. Potential impacts from clearing and grading are summarized below in Table 5-15. Key regulations in the proposed SMP that address potential impacts from clearing and grading are listed below in Table 5-16.

Table 5-15. Summary of potential impacts from clearing and grading.

Functions	Potential Impacts to Functions
Hydrologic	Alteration of existing water runoff patterns due to topographical alterations.
	Alterations in the stormwater retention timing and infiltration due to the loss of vegetation.
Water Quality	Short-term and long-term increases in turbidity related to vegetation removal and soil disturbance.
	Reduced biofiltration of stormwater resulting from vegetation removal.
Vegetative/ Habitat	Loss of functions due to removal or disturbance.
	Increased water temperatures due to vegetation removal.

Table 5-16. Summary of key regulations related to clearing and grading that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment	Fill and excavation are conditional uses in the Aquatic	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Designations (Table 7-1)	environment.				
Fill and Excavation (7.3.4)	Fill may be placed in flood hazard areas only when otherwise allowed by Critical Areas regulations and where it is demonstrated that adverse impacts to hydrogeologic processes will be avoided. (A.)	X			X
	Fill placed below the OHWM for any other use besides ecological restoration requires a Shoreline Conditional Use Permit. (B.)	X	X	X	X
	Fill may be placed below the ordinary high water mark only when it is demonstrated that the fill is necessary to: support a habitat restoration, mitigation, or enhancement project; correct disruptions to natural stream and habitat conditions from past shoreline modifications; support a water-dependent use or public access proposal; support cleanup of contaminated sediments; or support transportation facilities of statewide significance only when demonstrated that alternatives to fill are not feasible. (C.)	X	X	X	X
	Fill is restricted in wetlands or Fish and Wildlife Habitat Conservation Areas in accordance with Critical Areas regulations. (D.)	X	X	X	X
	Excavation of previously deposited dredge spoils above the ordinary high water mark may be permitted if part of a dredge materials management plan and not part of a beach nourishment or other shoreline restoration project. (E.)	X	X	X	X

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.5 Dredging and Dredge Disposal

Dredging can have significant effects on sediment transport, short term effects on water quality, and by creating deep water, can eliminate significant shallow, nearshore habitat (Table 5-17).

Because the SMP establishes standards for new development to avoid the need for future maintenance dredging, the most likely dredging applications are expected to be related to maintenance dredging of previously dredged channels where habitat functions are already altered. In the City of Kelso, dredging has occurred periodically in the Cowlitz River to maintain flood capacity of the river despite continued sedimentation effects of the debris flow from the Mount St. Helens eruption. On the Columbia River, dredging occurs to maintain navigation

channels. Dredging for both of these purposes has resulted in substantial dredge disposal areas, which have reduced floodplain storage capacity and vegetative functions. Ongoing use of these sites under the proposed SMP is not likely to further degrade existing functions; however, eventual restoration of these sites also offers opportunities for improving habitat and floodplain functions.

The proposed SMP requires physical, chemical, and biological evaluation of the proposed dredge material, and surveys of habitat areas must be conducted in order to ensure that potential impacts are avoided, minimized, or offset, such that no net loss of functions is achieved on a project-by-project basis (Table 5-18).

Table 5-17. Summary of potential impacts from dredging and dredge disposal.

Functions	Potential Impacts to Functions
Hydrologic	Alteration of hydrologic and sediment processes.
Water Quality	Reduction in water quality from turbidity and in water dredge material disposal.
Vegetative/ Habitat	Disruption of benthic community and submerged aquatic vegetation.
	Reduction in shallow-water habitat.

Table 5-18. Summary of key dredge and dredge disposal regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations (Table 7-1)	Dredge disposal is a conditional use in the Residential and Urban Conservancy environments.	X	X	X	X
Dredging and Dredge Material Disposal (7.3.5)	Shall be scheduled to minimize impacts to biological productivity and interference with fishing activities. (K.)				X
Dredging (7.3.5)	Dredging shall be permitted only: 1. When establishing, expanding, or reconfiguring navigation channels, anchorage areas, and basins in support of existing navigational uses; 2. When implementing an approved regional dredge management plan for flood control purposes; 3. As part of an approved habitat improvement project; 4. As part of a Model Toxics Control Act (MTCA) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) project; 5. In conjunction with new transportation, utility, fish hatchery, or other water-dependent use for which there is	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	documented public need and where other feasible sites or methods are not feasible; and 6. When otherwise approved by state and federal agencies. (B.)				
	New development shall be sited and designed to avoid or, if avoidance is impossible, minimize the need for new and maintenance dredging. (C.)	X	X	X	X
	Maintenance dredging shall be restricted to previously authorized locations, depths, and widths. (D.)	X	X	X	X
	Dredging waterward of the ordinary high water mark for the primary purpose of obtaining fill material is allowed only when the material is necessary for the restoration of ecological functions. When allowed, disposal site must be located waterward of the ordinary high water mark. The project must either be associated with a MTCA or CERCLA habitat restoration project or, if approved through a shoreline conditional use permit, any other significant habitat enhancement project. (E.)	X	X	X	X
Dredge Material Disposal (7.3.5)	Dredge materials exceeding the Ecology criteria for toxic sediments shall be disposed of according to state and federal law. Proof of proper disposal at an upland permitted facility may be required. (F.)		X		
	Disposal of dredge material on shorelands or wetlands within a river's channel migration zone shall be discouraged. In the limited instances where it is allowed, disposal shall require a shoreline conditional use permit. Disposal within wetlands or a channel migration zone shall be allowed only when proposed as part of an ecological restoration project demonstrated to improve wildlife habitat, correct impacts from past shoreline modification, or create, rehabilitate, or enhance a beach. This provision is intended to address discharge into the flowing current of the river or in deep water within the channel where it does not substantially affect the geohydrologic character of the channel migration zone. (G.)	X			X
	Dredge material disposal in shoreline jurisdiction shall be permitted only where it is demonstrated by a qualified professional that the disposal will not result in significant or ongoing adverse impacts to water quality, fish and wildlife conservation areas and other critical areas, flood holding capacity, natural drainage and water circulation patterns, or significant plant communities. When such impacts are unavoidable, they shall be minimized and mitigated such that they result in no net loss of ecological functions. (H.)(1.)	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Dredge disposal both above and below the OHWM may be approved if: a. it benefits shorelines resources; or b. if applicable, it utilizes guidance from the 2007, or as amended, Army Corps of Engineers and EPA publication, "Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Material – Beneficial Use Planning Manual;" or c. for dredging projects under Army Corps jurisdiction, the disposal has been identified and evaluated through an approved Corps Dredge Management Material Program. (H.)(2.)	X	X	X	X

* An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.6 Aquaculture

Potential impacts from aquaculture are summarized below in Table 5-19. The City does not have any existing aquaculture facilities, and new facilities are not anticipated. Key regulations in the proposed SMP that address potential aquaculture impacts are listed below in Table 5-20.

Table 5-19. Summary of potential impacts from aquaculture.

Functions	Potential Impacts to Functions
Hydrologic	Alteration in hydrologic and sediment processes associated with aquaculture structures.
Water Quality	Reduction in water quality from substrate modification, supplemental feeding practices, pesticides, herbicides, and antibiotic applications.
Vegetative/ Habitat	Disruption of benthic community.
	Accidental introduction of non-native species or potential interactions between wild and artificially produced species.

Table 5-20. Summary of key aquaculture regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Aquaculture (7.2.2)	New aquaculture uses may be permitted only in association with the restoration of native fish species in the Columbia, Cowlitz, and Coweeman Rivers. (A.)	X	X	X	X
	Non-commercial aquaculture undertaken for conservation or habitat restoration purposes is a preferred use. (C.)				X

* An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.7 Boat and Vessel Facilities, including Marinas

Boating facilities include all in-water and overwater structures for the launching and mooring of vessels. These structures have the potential for a variety of impacts primarily stemming from the shading of nearshore areas (indirectly through boat moorage in the case of buoys) and disturbance of sediment transport (Table 5-21). The City has few existing boat and vessel facilities, and new facilities other than potential hand-launch access sites are not anticipated. The SMP generally addresses boat and vessel facilities by implementing measures to limit the proliferation of structures and through measures that avoid, minimize and mitigate effects on sediment transport, water quality, and nearshore habitat (Table 5-22).

Table 5-21. Summary of potential impacts from boating facilities.

Functions	Potential Impacts to Functions
Hydrologic	Potential interference with movement of sediments, altering substrate composition
Water Quality	Water quality impacts associated with construction of docks and other in-water structures (e.g., spills, harmful materials use) and related uses of new docks (e.g., boat maintenance and operation)

Functions	Potential Impacts to Functions
Vegetative/ Habitat	Increased shading in nearshore habitat areas resulting from dock and pier construction can limit macrophyte growth and alter habitat for and behavior of aquatic organisms, including juvenile salmon
	Disturbance of substrate and submerged aquatic vegetation from pilings and anchors
	Nighttime lighting effects on fish behavior
	Loss of habitat for benthic community, less LWD for habitat complexity

Table 5-22. Summary of key boating facility regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Boating Facilities – General Requirements (7.2.3)(A.)	Shall be located in areas where: a. There is adequate water mixing and flushing; c. Such facilities will not adversely affect flood channel capacity; d. Water depths are adequate to minimize channel maintenance; e. The structure shall minimize the obstruction of currents, alteration of sediment transport, and accumulation of drift logs and debris; f. New shoreline stabilization shall not be needed; and g. Water depths are adequate to prevent floating structures from grounding out. (2.)	X	X	X	X
	Shall not be located along braided or meandering river channels where the channel is subject to change in alignment, on point bars or other accretion beaches. (3.)	X	X	X	X
	Shall be constructed of materials that will not adversely affect water quality or aquatic plants and animals over the long term. (4.)		X	X	X
	Accessory uses at boating facilities shall be limited to water-oriented uses and located as far landward as possible. (6.)	X	X	X	X
	Lighting associated with overwater structures shall be designed to avoid causing glare on water bodies. Illumination levels shall be the minimum necessary for safety. (8.)				X
	Shall be located outside any applicable shoreline buffer unless impossible due to topographical or other constraints. Where allowed, uses and modifications accessory to boating facilities must minimize intrusion into the buffer, and any adverse impacts to ecological functions shall be mitigated. (11.)			X	X
Boating Facilities –	Applicants must demonstrate that the size proposed is the minimum necessary to allow the use proposed. (2.)	X			X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Boat Launches (7.2.3)(B.)	Non-motorized boat launches shall use gravel or other permeable material. (3.)	X			X
	Overwater development in association with public boat launch facility may only be permitted where such use requires direct water access and/or where such facilities will increase public opportunities for water access. (4.)(b.)	X			X
Boating Facilities – Docks (7.2.3)(C.)	New piers and docks shall be allowed only for water-dependent uses or public access. (1.)	X	X		X
	New dock construction shall be permitted only when the applicant has demonstrated that a specific need exists to support the intended primary water-dependent use. (2.)	X	X		X
Residential Moorage Facilities: Docks, Buoys, and Marine Railways (7.2.3)(D.)	A new moorage structure to serve a single-family residence may be allowed only when the lot does not have access to a shared structure and there is no homeowners association or other corporate entity capable of developing a shared structure. (1.)	X	X		X
	Applicant shall demonstrate that a mooring buoy is not feasible to provide moorage. (2.)	X	X		X
	When feasible, new residential development of two or more dwellings with new accessory docks shall provide joint use or community dock facilities to reduce ecological impacts of new overwater facilities. (3.)	X	X		X
	Docks shall be restricted to the minimum size necessary to meet the needs of the proposed water-dependent use. The length of docks accessory to residential use/development shall be no greater than that required for safety and practicality for the residential use. The maximum length for residential docks shall be limited to either sixty (60) feet as measured horizontally from the OHWM, or the length necessary to provide a minimum of six (6) feet of water depth. The maximum width for residential docks shall be limited to six (6) feet. (4.)(a.)	X	X		X
	New or expanded covered moorage is prohibited. (4.)(b.)	X	X		X
	Boating facilities shall be constructed of materials that will not adversely affect water quality or aquatic plants and animals over the long-term. Materials used for submerged portions, decking, and other components that may come into contact with water shall be approved by applicable state agencies for use in water. (4.)(c.)		X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Floats shall be constructed and attached so that they do not ground out on the substrate. A minimum of one foot of elevation above the substrate is required. (4.)(d.)	X	X	X	X
	Pile spacing shall be the maximum feasible to minimize shading and avoid a “wall” effect that would block or baffle wave patterns, currents, littoral drift, or movement of aquatic life forms, or result in structure damage from driftwood impact or entrapment, except as may be necessary to protect the public health and safety and comply with other provisions of this Program, as determined by the City. (4.)(e.)	X			X
	Piling diameter shall be sized to use the minimum possible while meeting the structural requirements of expected loads. (4.)(f.)	X			X
	Grating, or clear translucent material, shall cover the surface area of the pier and ramp waterward of the OHWM and all portions of float(s) not underlain by float tubs or other material that provides buoyancy. The open area of grating shall have a minimum of sixty percent (60 percent) open space, or as otherwise required by state or federal agencies during permit review, unless determined to be infeasible due to specific site or project considerations. Clear translucent material shall have greater than ninety percent (90 percent) light transmittance as rated by the manufacturer. (4.)(g.)			X	X
	Unavoidable impacts from new or expanded private boat moorage or launch construction shall be minimized and mitigated consistent with the requirements of the SMP. (5.)	X	X	X	X
	Moorage or launch structures shall not be allowed in critical freshwater aquatic habitats unless it can be established that the structure, including auxiliary impacts and established mitigation measures, will not be detrimental to the natural habitat or species of concern, and complies with the mitigation sequencing provisions of the SMP. (6.)		X		

* An “X” indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.8 Commercial, Industrial, and Institutional Development

Potential impacts from commercial, industrial, and institutional development are summarized below in Table 5-23. Shoreline designation standards in the

proposed SMP limit where and what type of development may occur. These standards help avoid potential use conflicts and appropriately locate high intensity development in shoreline areas with higher levels of existing alterations. Institutional development may include education facilities, state and regional transportation facilities, or medical care facilities.

Based on past land use trends data, a gradual increase in new commercial uses is anticipated to occur in the City's shoreline jurisdiction. A large existing dredge-disposal site could also be converted to industrial uses in the future. No institutional development is currently anticipated. Key regulations in the proposed SMP that address impacts from these types of development are listed below in Table 5-24. Specific standards for shoreline modifications also apply to commercial, industrial, and institutional development, including clearing and grading, boat and vessel facilities, dredging and dredge material disposal, and others. Additional discussion of the anticipated effects of commercial, industrial, and institutional development in the City is presented in Section 7.

Table 5-23. Summary of potential impacts from commercial, industrial, and institutional development.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
	Disruption of shoreline wetlands
Water Quality	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
	Water quality contamination from use and storage of toxic substances
	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
Vegetative/ Habitat	Reduced shoreline habitat complexity, increased water temperatures, and less LWD
	Loss of or disturbance to riparian habitat during upland development
	Lighting effects on both fish and wildlife in nearshore areas

Table 5-24. Summary of key commercial, industrial, and institutional use regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*

		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations (Table 7-1)	Water-dependent, water-related, and non-water-oriented commercial development are prohibited in the Urban Conservancy environment.	X	X	X	X
	Non-water-oriented commercial development is prohibited in the Residential environment.	X	X	X	X
	Water-related and non-water-oriented commercial development are prohibited in the Aquatic environment.	X	X	X	X
	Industrial uses are prohibited in the Residential and Urban Conservancy environments.	X	X	X	X
	Water-related and non-water-oriented industrial uses are prohibited in the Aquatic environment.	X	X	X	X
	Institutional development is prohibited in the Aquatic environment.	X	X	X	X
Commercial (7.2.4)	New or expanded non-water-oriented commercial development may be allowed only when it is part of a mixed-use project including water-dependent uses and provides public access and ecological restoration; navigability is severly limited at the site and the development provides public access and ecological restoration; or the site is physically separated from the shoreline by another property or public right-of-way. (C.)	X	X	X	X
	Commercial uses shall provide public access and ecological restoration where feasible. (D.)	X	X	X	X
	Over-water structures, or other structures waterward of the ordinary high water mark, are allowed only for those portions of uses that require over-water facilities or public access. Design shall not interfere with normal stream geomorphic processes or require additional future shoreline stabilization. (E.)	X			
Industrial (7.2.6)	New or expanded non-water-oriented industrial development may be allowed only when it is a part of a mixed-use project including water-dependent uses and provides public access and ecological restoration; navigability is severely limited at the site and the development provides public access and ecological restoration; or the site is physically separated from the shoreline by another property or public right-of-way. (C.)	X	X	X	X
	Industrial development and redevelopment should be encouraged to locate where environmental cleanup and restoration of the shoreline area can be incorporated prior to impacting undeveloped shoreline areas. (D.)	X	X	X	X
	Proposed developments shall maximize the use of existing industrial facilities and avoid duplication of dock or pier facilities before expanding into undeveloped areas or building new facilities. Shall demonstrate the need for expansion in to an undeveloped area. (E.)	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Only water-dependent elements of a proposal may encroach on required vegetated buffers. (F.)			X	X
Institutional (7.2.7)	Where allowed, nonwater-oriented institutional uses may be permitted: 1. If navigability is severely limited at the proposed site, and the institutional use provides a significant public benefit with respect to the SMA's objectives, such as providing public access and/or ecological restoration; or 2. If the site is physically separated from the shoreline by another property or public right-of-way; or 3. As part of a mixed-use development when a significant public benefit, such as public access and/or ecological restoration, is provided. (B.)	X	X	X	X
	Loading, service areas, and other accessory uses shall be located landward of a primary structure or underground whenever possible. (C.)	X	X	X	X
	New institutional development within shoreline jurisdiction: 1. Shall be designed such that no new shoreline stabilization measures are necessary; and 3. Shall be prohibited in floodways and channel migration zones. (D.)	X	X	X	X

* An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.9 Mining

Mining is the removal of sand, soil, minerals, and other earth materials for commercial or economic use. The potential impacts of mining generally depend on the type and scale of mining activity. Potential impacts from mining are summarized below in Table 5-25.

No mining activity is currently anticipated within the City's shoreline jurisdiction. In the proposed SMP, mining is identified as a conditional use in all shoreline environment designations. Key regulations in the proposed SMP that address potential aquaculture impacts are listed below in Table 5-26.

Table 5-25. Summary of potential impacts from mining.

Functions	Potential Impacts to Functions
Hydrologic	Alteration in hydrologic and sediment processes potentially leading to erosion, channel incision, head cutting, and/or channelization of a river upstream or downstream from the mining location.
	Loss of floodplain habitat associated with armoring and levees to isolate pits from

Functions	Potential Impacts to Functions
	the river channel (Rivers).
Water Quality	Reduction in water quality from turbidity and dredge material disposal.
Vegetative/ Habitat	Disruption of benthic community.
	Simplification of in-channel habitats (Rivers/Streams).
	Potential to strand fish during pit capture events (Rivers).

Table 5-26. Summary of key regulations related to mining that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations (Table 7-1)	Mining is a conditional use in all shoreline environments.	X	X	X	X
Mining (7.2.9)	To be approved, must demonstrate no adverse impact to the structural integrity of the shoreline that would change existing aquatic habitat or flow characteristics; and no changes in hydraulic processes to or from adjacent waterbodies that would damage aquatic habitat, shoreline habitat, or groundwater. (B.)	X	X	X	X
	Mining waterward of the ordinary high water mark may be permitted only when demonstrated that: 1. Removal of sand and gravel or other materials will not adversely affect natural gravel transport or other stream processes; 2. Proposed activities will not have significant adverse impacts on habitat for priority species and will not cause a net loss of shoreline ecological functions. (C.)	X	X	X	X
	After completion of mining activities: 3. Backfill materials used in site reclamation shall be natural materials; 4. Reclamation shall prevent future erosion and sedimentation. Topography of the site shall be restored to contours compatible with surrounding shoreline area; 6. All exposed areas shall be revegetated with self-sustaining plants suitable to the immediate shoreline environment. (D.)	X	X	X	X

*An “X” indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.10 Recreational Development

The City of Kelso's shorelines offer a variety of recreational opportunities, both formal and informal. The potential impacts of recreational uses generally depend on the type and intensity of the use. Active uses, which may require structural development such as boat ramps, boardwalks, and concession facilities, are expected to have a greater impact than passive uses, such as hiking trails. Potential impacts from recreational development are summarized below in Table 5-27.

Within the City of Kelso, development of low intensity trails may be anticipated in the Urban Conservancy designation. Key regulations in the proposed SMP that address potential impacts from recreational development are listed below in Table 5-28.

Table 5-27. Summary of potential impacts from recreational development.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
Water Quality	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
	Increase in pesticide and fertilizer use
	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
Vegetative/ Habitat	Reduced shoreline habitat complexity, increased water temperatures, and less LWD
	Loss of or disturbance to riparian habitat during upland development
	Lighting effects on both fish and wildlife in nearshore areas

Table 5-28. Summary of key recreational use regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations (Table 7-1)	Non-water-oriented recreational development is prohibited in the Urban Conservancy and Aquatic environments.	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Recreational Development (7.2.10)	Only water-dependent or water-enjoyment elements of a proposed recreational use may encroach on required vegetated buffers. (C.)			X	X
	Parking areas shall be located outside of shoreline jurisdiction, unless infeasible, in which case parking facilities should be sited on the landward side of recreational development and levees/dikes, if present, in accordance with the mitigation sequencing of the SMP. (D.)	X	X	X	X
	New overwater structures for recreation use shall be allowed only when 1. They accommodate a water-dependent recreation use or facility; or 2. They provide access for the public to enjoy the shorelines of the state; and 3. The resulting impacts to critical areas and the associated buffer are fully mitigated. (F.)	X	X	X	X

* An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.11 Residential Development

Table 5-29 below describes the potential impacts of residential development. Land use trends indicate that some additional single-family and multi-family development is likely to occur in shoreline jurisdiction. Table 5-30 lists SMP provisions that help ensure that impacts from residential development within the City are avoided, minimized, or mitigated to avoid a net loss of functions. Many shoreline modifications may be considered accessory to residential development; however, such modifications are not addressed in this subsection, but are addressed in other subsections of this document (e.g. shoreline stabilization). Additional discussion of the likely effects of residential development is presented in Section 7.

Table 5-29. Summary of potential impacts from residential development.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
Water Quality	Increase in contaminants (e.g. metals, petroleum hydrocarbons) and decrease in infiltration potential associated with the use and creation of new impervious surfaces
	Water quality contamination from failed septic systems

Functions	Potential Impacts to Functions
	Increase in pesticide and fertilizer use
	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
Vegetative/ Habitat	Reduced shoreline habitat complexity, increased water temperatures, and less LWD
	Loss or disturbance of riparian habitat during upland development

Table 5-30. Summary of key residential use regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations (Table 7-1)	Residential development is prohibited in the Aquatic environment.	X	X	X	X
	New floating residences are prohibited in all shoreline environments.	X	X	X	X
Residential Development (7.2.11)	New residential development shall comply with the shoreline buffer provisions established in Appendix C of the SMP. (A.)	X	X	X	X
	New residential development including subdivisions, short plats, new appurtenances and accessory uses and structures shall: 1. Be designed such that no new shoreline stabilization measures are necessary for the life of the structure; 3. Be prohibited in floodways and channel migration zones. (B.)	X	X	X	X
	Residential appurtenances, accessory uses, and facilities serving a residential structure shall be located outside setbacks, critical areas, and buffers unless otherwise allowed by the SMP. (C.)	X	X	X	X
	New residential lots shall be configured such that new structural flood hazard reduction and shoreline stabilization measures will not be required during the life of the development or use. (D.)	X		X	X
	Clustering of residential units, as permitted by the City, is permitted where minimization of physical and visual impacts to the shoreline can be achieved. (E.)	X	X	X	X

* An “X” indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.12 Transportation Facilities

Transportation facilities, particularly roads, highways, and railroads, are common features along the City of Kelso's shorelines. The Southwest Washington Regional Airport is also a prominent transportation facility located within the City's shorelines. The impervious surfaces and traffic associated with transportation facilities tend to impair habitat and hydrologic connectivity, and resulting stormwater runoff can have a substantial impact on water quality. Potential impacts from transportation facilities are summarized below in Table 5-31.

Permit trends within the City indicate that activities relating to the maintenance of transportation infrastructure occur relatively frequently in shoreline jurisdiction. Key regulations in the proposed SMP that address potential impacts from transportation facilities are listed below in Table 5-32.

Table 5-31. Summary of potential impacts from transportation facilities.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
Water Quality	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
Vegetative/ Habitat	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
	Fish passage impacts associated with stream crossings

Table 5-32. Summary of key transportation facility regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations (Table 7-1)	Accessory parking is prohibited in the Aquatic environment.	X	X	X	X
Transportation and Parking (7.2.12)	Facility lighting shall be directed away from critical areas unless necessary for public health and safety. (D.)				X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Transportation and Parking – Roads, Railroads, and Bridges (7.2.12)(A.)	New or expanded roads or railroads shall demonstrate the need for a shoreline location and that no feasible upland alternative outside the shoreline is available. (1.)	X	X		X
	New or expanded facilities must be demonstrated to: a. Minimize impacts to critical areas and associated buffers and minimize alterations to the natural or existing topography to the extent feasible; and b. Avoid or minimize the need for shoreline stabilization. (2.)	X	X	X	X
	New crossings over streams shall be avoided, but where necessary shall utilize bridges rather than culverts to the extent possible. (3).	X			X
	All excavation materials and soils exposed to erosion by all phases of road, bridge, and culvert work shall be stabilized and protected by seeding and mulching both during and after construction. (5.)	X	X	X	
	Crossings over wetlands and associated buffers shall be avoided and minimized whenever feasible. If avoidance is not feasible, bridges that do not obstruct the movement of surface or groundwater shall be utilized unless fill and compensatory mitigation will produce equal or greater ecological functions. (6.)	X			X
	Bridges shall provide the maximum length of clear spans feasible with pier supports to produce the minimum amount of deflection feasible. (8.)	X			
Transportation and Parking – Non-motorized Facilities (7.2.12)(B.)	Shall be located outside of critical areas and their associated buffers or in the outer 25 percent of the critical area buffer. (2.)	X	X	X	X
	Elevated walkways shall be utilized where feasible instead of culverts to cross wetlands and streams. (3.)	X			X
Transportation and Parking – Parking (7.2.12)(C.)	Allowed only as necessary to support an authorized use. Shall be set back as far as possible from the ordinary high water mark and located outside shoreline jurisdiction where possible. Shall be located outside of critical areas and associated buffers. (1.)	X	X	X	X

* An “X” indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.13 Utilities

Utility infrastructure is commonly needed as an accessory for other shoreline uses, particularly residential development. Potential impacts from utility infrastructure are summarized below in Table 5-33. The proposed SMP requires that this type of development ensures no net loss of functions (Table 5-34).

Table 5-33. Summary of potential impacts from utilities and public facilities.

Functions	Potential Impacts to Functions
Hydrologic	Where utilities require shoreline armoring, associated hydrologic impacts are likely
	Erosion at stormwater outfall locations can alter sediment transport processes
	Increase in stormwater runoff and discharge in association with more impervious surfaces
Water Quality	Potential for contaminant spill or leakage
	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
Vegetative/ Habitat	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing

Table 5-34. Summary of key utility infrastructure and public facility regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Utilities (7.2.13)	New or expanded non-water-dependent utilities or parts thereof may be located within shoreline jurisdiction only if: 1. No alternative location outside of shoreline jurisdiction is feasible; and 2. Utilization of existing corridors is not feasible. (A.)	X	X	X	X
	Overhead electrical transmission lines shall be located outside of shoreline jurisdictional areas unless infeasible due to site constraints. (C.)			X	X
	Transmission, distribution, and conveyance facilities shall be located in existing rights of way and corridors whenever feasible. (D.)		X	X	X
	Utility crossings of waterbodies shall be attached to bridges where feasible; otherwise, underground construction methods that avoid surface disturbance are preferred and shall cross shoreline jurisdictional areas by the shortest,	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	most direct route feasible, unless such route would cause significant environmental damage. (E.)				
	All underwater pipelines transporting liquids intrinsically harmful to aquatic life or potentially harmful to water quality shall be equipped with automatic shut off valves. (F.)			X	X
	Stormwater outfalls may be placed below the ordinary high water mark to reduce scouring. New outfalls and modifications to existing outfalls shall be designed and constructed to avoid impacts to existing native aquatic vegetation attached to or rooted in substrate. (H.)	X	X		X
	Existing facilities such as the City's Municipal Water System and Sewer System, that are located landward of a levee, may be improved in accordance with the mitigation sequencing provisions contained in the SMP. (I.)	X	X	X	X

* An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.14 Agriculture and Forest Practices

In the proposed SMP for the City of Kelso, outdoor agriculture is a prohibited use in all shoreline environment designations; indoor agriculture is a permitted use in the High-intensity environment designation; and forest practices are prohibited in all shoreline environment designations. Potential impacts from agriculture and forest practices are summarized below in Table 5-35.

Table 5-35. Summary of potential impacts from agriculture and forest practices.

Functions	Potential Impacts to Functions
Hydrologic	Reduced infiltration associated with forestry actions resulting in flashier hydrology.
	Agricultural irrigation activities reduce summer low flows in streams.
Water Quality	Increased erosion from removal of trees or tilling of soil.
	Erosion and fine sediment from logging roads.
	Potential for contaminant and nutrient loading of surface waters from agricultural practices.
Vegetative/ Habitat	Reduction in forest cover associated with forestry actions and conversion of lands to agricultural uses.

Table 5-36. Summary of key regulations related to agriculture and forest practices that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Agriculture (7.2.1)	New or expanded agriculture is a prohibited use activity within shoreline jurisdiction. (B.)	X	X	X	X
	Preparatory work associated with the conversion of land to non-agriculture uses and/or developments shall be consistent with the policies and regulations for the proposed non-agriculture use and the general provisions of the SMP, including vegetation conservation. (C.)	X	X	X	X
Forest Practices (7.2.5)	Due to the lack of timber harvest potential within the City's shoreline jurisdiction, forest practices activities are not applicable to the City of Kelso, and are prohibited. (A.)	X	X	X	X
	Forestry practices for preparatory work associated with the conversion of land to non-forestry uses and/or developments shall be consistent with the policies and regulations for the proposed non-forestry use and the general provisions of the SMP, including vegetation conservation. (B.)	X	X	X	X

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.5.15 Shoreline Habitat and Ecological Enhancement Projects

Potential impacts from shoreline habitat and ecological enhancement projects are primarily related to construction, and would therefore be expected to be temporary. Potential impacts from such projects are summarized below in Table 5-37. Regulations in the proposed SMP are intended to minimize these impacts while ensuring that projects maximize benefits to shoreline ecological functions and are successful in the long-term. Key regulations that address potential impacts from shoreline habitat and ecological enhancement projects are summarized below in Table 5-38.

Table 5-37. Summary of potential impacts from shoreline habitat and ecological enhancement projects.

Functions	Potential Impacts to Functions
Hydrologic	Temporary changes to stream flow due to construction activities.
Water Quality	Short-term increases in turbidity related to construction activities.
Vegetative/ Habitat	Temporary loss of functions due to removal or disturbance.

Table 5-38. Summary of key regulations related to shoreline habitat and ecological enhancement projects that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations (Table 7-1)	Shoreline habitat and ecological enhancement is permitted in all environments.	X	X	X	X
Shoreline Habitat and Ecological Enhancement Projects (7.3.6)	Long-term maintenance and monitoring shall be included in restoration or enhancement projects. (A.)	X	X	X	X
	Shall be designed using scientific and technical information and implemented using best management practices. (B.)	X	X	X	X
	Shall demonstrate that there will be a specific ecological improvement, and the following: 1. Spawning, nesting, or breeding fish and wildlife habitat conservation areas will not be adversely affected; 2. Water quality will not be degraded; 3. Flood storage capacity will not be degraded; 4. Streamflow will not be reduced; 5. Impacts to critical areas and buffers will be avoided, minimized, or mitigated in accordance with the mitigation sequencing provisions of the SMP; and 7. The project is consistent with the types and purposes of restoration information provided in the SMP Restoration Plan, Appendix D. (C.)	X	X	X	X

*An "X" indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or, more likely, that the provision has a secondary or indirect effect on the function.

5.6 Shoreline Restoration Plan

As discussed above, one of the key objectives that the SMP must address is "no net loss of ecological shoreline functions necessary to sustain shoreline natural resources" (Ecology 2011). Although the implementation of restoration actions to

restore historic functions is not required by SMP provisions, the guidelines state that "master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program" (WAC 173-26-201(2)(f)). Pursuant to that direction, the City prepared the Shoreline Restoration Plan, which identifies opportunities for voluntary restoration, enhancement, and protection actions.

The Restoration Plan represents a long-term vision for restoration that will be implemented over time, resulting in a gradual improvement over the existing conditions. Although the SMP is intended to achieve no net loss of ecosystem functions through regulatory standards, practically, despite required practices to follow mitigation sequencing to avoid, minimize, and compensate for impacts on a site-specific scale, an incremental loss of shoreline functions may still occur at a cumulative level. These losses may occur through minor, exempt development, illegal development, failed mitigation efforts, or a temporal lag between the loss of existing functions and the realization of mitigated functions. The Restoration Plan, and the voluntary actions described therein, can be an important component in making up that difference in ecological function that would otherwise result.

The City's Shoreline Restoration Plan (TWC 2013) identifies planned, site-specific, restoration projects, as well as ongoing and potential outreach and incentive programs to improve shoreline functions and processes. The Shoreline Restoration Plan also identifies several agencies and non-profit organizations are active in restoration in Cowlitz County and the City of Kelso. Major Shoreline Restoration Plan components that will contribute to an improvement in ecological functions are summarized below:

- Site specific projects to restore ecological processes and eliminate barriers. Projects include, among others:
    - Restoring side-channel habitats and tributary connections (four projects);
    - Improving instream complexity (two projects);
    - Restoring floodplain connectivity (two projects);
    - Restoring riparian vegetation (six projects); and
    - Reducing the effects of shoreline armoring (two projects).

- Using programmatic approaches and teaming with key partners in education and outreach, as well as project implementation.
- Identifying funding sources to implement projects.

6 EFFECTS OF OTHER REGULATORY PROGRAMS

6.1 City of Kelso Regulations and Programs

6.1.1 City of Kelso Zoning Code

The City of Kelso's zoning code (KMC Title 17) establishes zone classes, and development standards, including setbacks, residential densities and minimum lot sizes.

6.1.2 City of Kelso Stormwater Management

The City developed and is presently implementing a program to identify, treat, and monitor stormwater runoff and pollution within the City. The City completed Phase II of its Stormwater Management Plan in 2008 and its Municipal Stormwater Illicit Discharge Detection and Elimination Program (IDDEP) in 2011. Also in 2011, the City released a Stormwater Municipal Operations and Maintenance Manual, as well as a Low Impact Development (LID) report in coordination with the City of Longview. The Operations and Maintenance Manual outlines the City maintenance standards for Operations and Parks departments and incorporates Ecology's Stormwater Management Manual for Western Washington (Volume IV). It also details best management practices and schedules for ongoing maintenance and repair of City facilities, including street sweeping, de-icing, and ditch maintenance. The LID report identifies barriers to implementing LID within the City, and establishes a path forward to requiring LID implementation. The City is also engaged in stormwater outreach and education, including market surveys and development of outreach materials.

6.2 State Agencies/Regulations

Aside from the Shoreline Management Act, State regulations most pertinent to development in the City's shorelines include the State Hydraulic Code, the Growth Management Act, State Environmental Policy Act, tribal agreements and case law, Water Resources Act, and Salmon Recovery Act. A variety of agencies (e.g., Washington Department of Ecology, Washington Department of Fish and

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

Depending on the nature of the proposed development, State regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. A summary of some of the key State regulations and/or State agency responsibilities follows.

6.2.1 Washington Department of Natural Resources

Washington Department of Natural Resources (WDNR) is charged with protecting and managing use of State-owned aquatic lands. Toward that end, water-dependent uses waterward of the ordinary high water mark require review by WDNR to establish whether the project is on State-owned aquatic lands. If WDNR has jurisdiction, the project may be required to obtain an Aquatic Use Authorization from WDNR and enter into a lease agreement. Certain project activities, such as single-family or two-party joint-use residential piers, on State-owned aquatic lands are exempt from these requirements. WDNR recommends that all proponents of a project waterward of the ordinary high water mark contact WDNR to determine jurisdiction and requirements.

6.2.2 Washington Department of Ecology

The Washington Department of Ecology may review and condition a variety of project types, including any project that needs a permit from the U.S. Army Corps of Engineers (see Section 6.3), any project that requires a shoreline conditional use permit or shoreline variance, and any project that disturbs more than 1 acre of land. Project types that may trigger Ecology involvement include pier and shoreline modification proposals and wetland or stream modification proposals, among others. Ecology's three primary goals are to: 1) prevent pollution, 2) clean up pollution, and 3) support sustainable communities and natural resources (http://www.ecy.wa.gov/about.html). Their authority comes from the State Shoreline Management Act, Section 401 of the Federal Clean Water Act, the Water Pollution Control Act, the Federal Coastal Zone Management Act of 1972, the State Environmental Policy Act, the Growth Management Act, and various RCWs and WACs of the State of Washington.

Section 303(d) of the Clean Water Act requires the state to develop a list of waters that do not meet water quality standards. A Total Maximum Daily Load, or TMDL, must be developed for impaired waters.

Also as a component of the Clean Water Act, in Washington State, the Department of Ecology has been delegated the responsibility by the U.S. Environmental Protection Agency for managing implementation of the NPDES program.

6.2.3 Washington Department of Fish and Wildlife

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

6.2.4 State Forest Practices Act

Activities related to growing, harvesting, or processing timber are regulated under Washington's State Forest Practices Act (WAC 222) administrated by Washington State DNR and are not regulated under the SMA unless the land is being converted to another use besides growing trees or the commercial harvest is within 200 feet of a shoreline of statewide significance and exceeds the harvest limits established in the SMA. Conversions must comply with the provisions in the SMP for the new use.

6.2.5 Surface Mining Act

The Surface Mining Act is a reclamation law administered by WA DNR that requires a permit for each mine that: 1) results in more than 3 acres of mine-related disturbance, or 2) has a high-wall that is both higher than 30 feet and steeper than 45 degrees. The DNR is responsible for reviewing and approving site reclamation plans to achieve the following goals:

- Segmental or progressive reclamation;
- Preservation of the topsoil;
- Slope restoration such that high-walls are rounded in plan and section for all mines;
- Stable slopes;

- Final topography that generally comprises sinuous contours, chutes and buttresses, spurs, and rolling mounds and hills, all of which blend with adjacent topography to a reasonable extent; and
- Effective revegetation with native multi-species ground cover and trees depending on the municipality-approved subsequent use designated for the site.

6.3 Federal Agencies/Regulations

Federal regulations most pertinent to development in the City's shorelines include the Endangered Species Act, the Clean Water Act, and the Rivers and Harbors Appropriation Act. Other relevant federal laws include the National Environmental Policy Act, Anadromous Fish Conservation Act, Clean Air Act, and the Migratory Bird Treaty Act. A variety of agencies (e.g., U.S. Army Corps of Engineers [Corps], National Marine Fisheries Service, U.S. Fish and Wildlife Service) are involved in implementing these regulations, but review by these agencies of shoreline development in most cases would be triggered by in- or over-water work, or discharges of fill or pollutants into the water. Depending on the nature of the proposed development, federal regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. A summary of some of the key federal regulations and/or agency responsibilities follows.

6.3.1 Clean Water Act, Section 404

Section 404 of the federal Clean Water Act provides the Corps, under the oversight of the U.S. Environmental Protection Agency, with authority to regulate "discharge of dredged or fill material into waters of the United States, including wetlands" (http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf). The extent of the Corps' authority and the definition of fill have been the subject of considerable legal activity. However, it generally means that the Corps must review and approve many activities in shoreline waterbodies, and other streams and wetlands. These activities may include wetland fills, stream and wetland restoration, and culvert installation or replacement, among others. Similar to Washington State Environmental Policy Act (SEPA) requirements, the Corps is interested in avoidance, minimization, restoration, and compensation of impacts.

6.3.2 Rivers and Harbors Act, Section 10

Section 10 of the federal Rivers and Harbors Appropriation Act of 1899 provides the Corps with authority to regulate activities that may affect navigation of "navigable" waters. Proposals to construct new or modify existing in-water structures (including piers, marinas, bulkheads, breakwaters), to excavate or fill,

or to "alter or modify the course, location, condition, or capacity of" these navigable waterbodies must be reviewed and approved by the Corps.

6.3.3 Federal Endangered Species Act (ESA)

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

7 Summary Potential for Cumulative Impacts

As discussed previously, WAC 173-26-186(8)(d) directs local SMPs to evaluate and consider cumulative impacts of "reasonably foreseeable future development on shoreline ecological functions." The most commonly anticipated changes in shoreline development involve residential, commercial, and industrial development. These activities include upland development, and may also include the development of overwater structures and/or shoreline stabilization. As directed by the WAC, the policies and regulations in the proposed SMP are designed to ensure that cumulative impacts do not result in a net loss of ecological functions. Using the information presented in previous chapters, this chapter focuses on the most probable types of development in the County, and synthesizes the information from Chapters 3 through 6 to assess anticipated cumulative impacts.

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

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

In addition to regulations that avoid, minimize, and mitigate for potential impacts from less common uses and modifications, the proposed SMP includes specific regulations that require these types of developments to demonstrate on an individual basis that proposed projects will not result in a loss of ecological functions. Because these developments will be required to demonstrate no net loss on an individual basis, these types of projects will generally not be addressed in great detail in this cumulative impacts analysis.

7.1 Residential Development

As described in Chapter 4, based on past land use trends, the density of residential development is expected to increase over time as infill development continues, particularly on the Coweeman River.. Residential development is expected to occur as a combination of new development and redevelopment and/or expansion of existing structures.

Under the proposed SMP for the City of Kelso, single-family residential development is exempt, meaning that it does not require a shoreline substantial development permit. Yet exempt development must still be carried out in compliance with policies and standards of the SMP. The residential use and development of shoreline uplands generally involves impacts to shoreline ecological functions that result from the replacement of pervious, vegetated areas with impervious surfaces and/or a landscape management regime that includes chemical treatments of lawn and landscaping.

The proposed SMP adopts critical area regulations specific to shoreline jurisdiction (SMP Appendix C). These regulations include shoreline reach-specific FWHCA buffers that account for existing conditions on residential shorelines, and propose appropriate buffers to maintain existing functions. For the rare cases in which new development is permitted within shoreline buffers, such development must demonstrate no net loss of ecological functions through mitigation sequencing.

When any new development occurs on the shoreline, the proposed SMP requires that buffers not meeting optimal vegetative conditions are enhanced and monitored over a five-year period. These standards ensure that the quality of the vegetation within the undeveloped buffer area will be enhanced where development occurs.

In addition to buffer standards, other SMP standards are essential to avoiding a loss of functions from residential development. These standards include stormwater standards consistent with the City's adopted stormwater plans. Although docks and shoreline stabilization measures may also be associated with residential development, neither docks nor shoreline stabilization are

anticipated with residential development in the City of Kelso given the lack of these features associated with existing development and the standards included in the proposed SMP to discourage development of these features.

In summary, potential ecological impacts of residential development and redevelopment in the City of Kelso will be sufficiently minimized by proposed buffer, vegetation, and stormwater standards, such that no net loss of ecological functions is anticipated from future residential development.

7.2 Commercial and Industrial Development

From 2002 to 2012, commercial uses increased within the City, while the area of industrial uses decreased. A continued shift from industrial to commercial uses may be anticipated. Commercial and industrial uses have similar potential effects on shorelands and shoreline waterbodies. Primary impacts associated with upland commercial and industrial development relate to a potential reduction in stormwater infiltration resulting from increased impervious surface coverage and an increase in potential for water quality degradation resulting from increased traffic and the potential use and storage of chemicals.

High-intensity-designated shorelands with potential for new commercial and industrial development are located on the Coweeman River. On the right bank, any new development would be separated from the river by the levee and an existing paved trail; therefore, new commercial development would not be expected to have a significant effect on shoreline functions. On the left bank, in Shoreline Analysis Reach 32, the proposed buffer in the High-intensity designation is 50 feet wide or extends from the ordinary high water mark to the boundary of the existing roadside operational area. This buffer, combined with applicable wetland buffer standards, will protect the existing vegetation at the site. In Shoreline Analysis Reach 36, the 100-foot buffer for non-water-dependent vegetation will ensure that buffer functions from the existing intact vegetation are maintained.

Although analysis of past permits indicates a decreasing trend in the area of shoreline industrial development, potential for new industrial development does exist. Proposed buffers are sufficient to maintain existing vegetation, and the SMP could require enhancement of existing buffers in areas that are presently degraded. In addition, future industrial development would be subject to the vegetation conservation standards of the SMP, which require any adverse impacts to shoreline vegetation be mitigated.

The shoreline along the Columbia River at the southern edge of the City provides significant off-channel habitat, and due to its location at the confluence of two major rivers is likely a particularly significant transition area for rearing and

migrating salmonids. The proposed SMP designates this Urban Conservancy shoreline and assigns a 150-foot buffer for water-oriented uses and a 200-foot buffer for non-water-oriented uses. These buffers, combined with the Urban Conservancy environment designation, would likely protect existing functions.

Shoreline designation standards in the proposed SMP, as well as City zoning standards, limit where and what type of commercial and industrial development may occur. These standards help avoid potential use conflicts and generally locate high intensity development in shoreline areas with higher levels of existing alterations.

In addition to siting areas of commercial and industrial uses, the proposed SMP requires mitigation sequencing and limits the encroachment of water-dependent uses into the regulatory buffer to the minimum necessary. All non-water-dependent uses must be located outside of the buffer, and they must improve shoreline functions and provide public access if they are to be located in shoreline jurisdiction.

In addition to SMP standards, new commercial and industrial developments will be subject to the City's stormwater management regulations.

8 Net Effect on Ecological Function

This Cumulative Impacts Analysis indicates that future growth in the City of Kelso's shorelines is likely to consist of minor growth in residential and commercial uses.

The City of Kelso is currently on the process of updating its Comprehensive Land Use Plan. Since 1980, the City has experienced virtually no population growth, approximately 700 people over a thirty-five year period. No significant population growth is projected for the foreseeable future.

Any future development has the potential to impact specific shoreline functions. This analysis can help inform the City of potential future shoreline impacts and the importance of specific proposed SMP provisions.

The proposed SMP is generally expected to maintain existing shoreline functions within Kelso while accommodating the reasonably foreseeable future shoreline development. Other local, state and federal regulations, acting in concert with

this SMP, will provide further support for maintaining shoreline ecological functions over time.

As discussed above, major elements of the SMP that help maintain ecological functions fall into the following general categories: 1) environment designations (Section 5.4), 2) general policies and regulations (Section 5.5, Section 6), 3) shoreline use and modification provisions (Sections 7.2 and 7.3, respectively). The Shoreline Restoration Plan identifies ongoing and planned voluntary restoration that will provide an opportunity to improve shoreline conditions over time.

Environment designations: The Shoreline Analysis Report and existing zoning and comprehensive plan designations provided the information necessary to assign environment designations by segment to each of the shoreline waterbodies.

General provisions: General standards in the SMP include regulations that provide the basis for achieving no net loss of shoreline functions, such as mitigation sequencing, water quality standards, vegetation conservation standards, and critical areas regulations.

The City's critical areas regulations (KMC 18.20) apply within and outside of shoreline jurisdiction. These regulations are amended in the proposed SMP for application to shoreline areas (see SMP Appendix C). Critical area regulations ensure that vegetated buffers are retained on wetlands, fish and wildlife habitat areas (including all shorelines), and geological hazard areas. The City's flood hazard regulations require that vegetation, flood capacity, and water quality are maintained, and that where feasible, buildings are located outside of the floodway. Combined these regulations help ensure that the most sensitive areas of the City's shorelines are protected.

Shoreline modification and use provisions: Shoreline uses were individually determined to be either permitted (as substantial developments or conditional uses) or prohibited in each environment designation. The most uses and modifications are allowed in areas with the highest level of existing disturbance.

Shoreline modification regulations emphasize minimization of size of structures, and use of designs that do not degrade and may even enhance shoreline functions. Use regulations prohibit uses that are incompatible with the existing land use and ecological conditions, and emphasize appropriate location and design of the various uses.

Shoreline Restoration Plan: The Shoreline Restoration Plan identifies a number of project-specific opportunities for restoration, and also identifies ongoing

programs and activities, restoration partners, and recommended actions consistent with a variety of watershed-level efforts.

Given the above provisions of the SMP, including the key features listed above, and careful analysis of subsequent project-specific development proposals in accordance with the mitigation sequencing provisions in the SMP**,** implementation of the proposed SMP is anticipated to achieve **no net loss of ecological functions in the shorelines of the City of Kelso.** Voluntary actions identified and prioritized in the Shoreline Restoration Plan will provide the opportunity to enhance and restore shoreline functions over time.

9 REFERENCES

Ecology. 2005. 2005 Stormwater Manual for Western Washington.

The Watershed Company and Parametrix. 2014. Draft Shoreline Analysis Report for the Shorelines of Cowlitz County and the Cities of Castle Rock, Kalama, Kelso, and Woodland. Prepared for the Cowlitz-Wahkiakum Council of Governments.

The Watershed Company. 2013. Draft Shoreline Restoration Plan for Shorelines in Cowlitz County and the Cities of Castle Rock, Kalama, Kelso, and Woodland. Prepared for Cowlitz-Wahkiakum Council of Governments.

Washington Department of Ecology. 2011. Shoreline Master Program Guidelines. Chapter 173-26 WAC, Part III.