

**CITY OF CASTLE ROCK  
GRANT No. G1200052**

## **CUMULATIVE IMPACTS ANALYSIS**

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### **City of Castle Rock's Shoreline Master Program**



Prepared for: Prepared for:  
The City of Castle Rock, on behalf of  
Cowlitz –Wahkiakum Council of Governments  
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# CUMULATIVE IMPACTS ANALYSIS

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## OF THE CITY OF CASTLE ROCK'S SHORELINE MASTER PROGRAM

### 1 INTRODUCTION

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This Cumulative Impacts Analysis assesses the proposed City of Castle Rock (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 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 Shoreline Analysis Report];
- (ii) reasonably foreseeable future development and use of the shoreline [Chapter 4 and Section 5.2 below, and Shoreline Analysis Report]; and
- (iii) beneficial effects of any established regulatory programs under other local, state, and federal laws.” [Chapter 6 below]

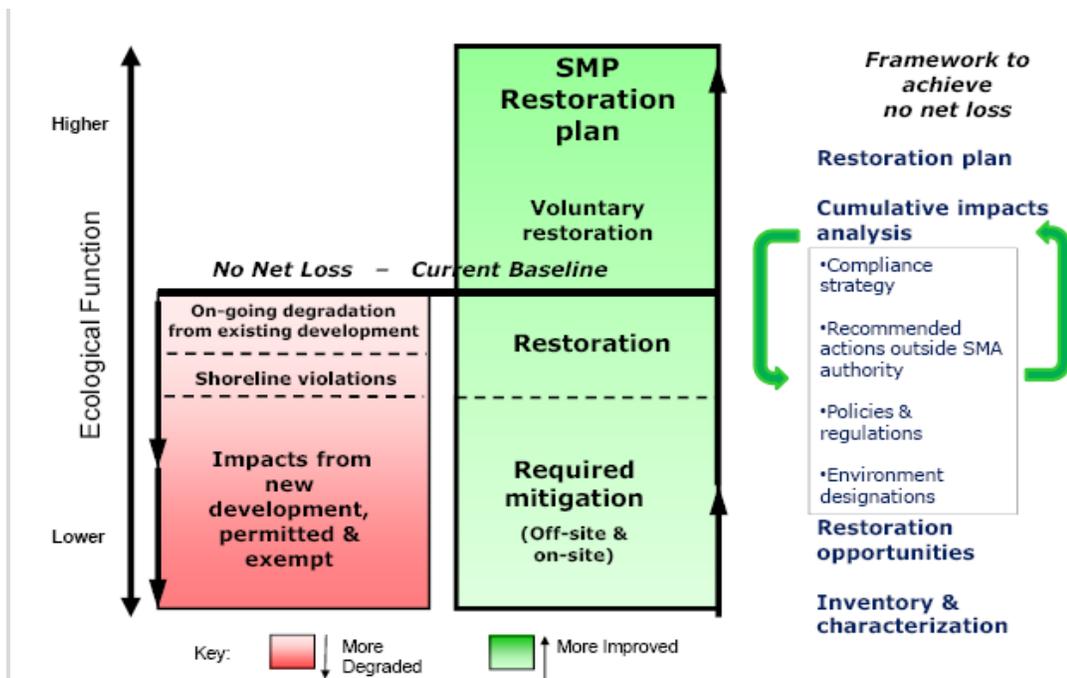


Figure 1-1. Framework to achieve no net loss of ecological function. Source: Department of Ecology

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 (The Watershed Company 2015), 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 mitigation 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 (The Watershed Company 2015) 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 will be required to 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 (The Watershed Company and Parametrix 2014). 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 valid 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.

Finally, Chapter 7 and 8 pull 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

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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 following analysis is quantitative. The analysis addresses only those shorelines within the City of Castle Rock'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 Castle Rock 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 Castle Rock was undertaken in order to better understand the type and extent of recent development actions occurring in the City's shoreline areas, and to help anticipate future trends in shoreline land use changes and shoreline modifications. The development permits reviewed were limited to those issued between 2001 and 2011.

Permits were classified by the type of shoreline use (e.g., residential, commercial) or shoreline modification (e.g., bank stabilization, boat launch) permitted. Where a single permit application involved multiple uses or modifications, a single permit was counted in each applicable use or modification category. Permits were recorded by year the permit was issued, rather than by the application date.

It is worth noting that shoreline exemptions are generally not captured in the permit data. Therefore, no data on the type and extent of development actions exempt from shoreline permits, such as single-family residential housing development or single-family residential bulkhead construction, are available. Moreover, any unpermitted development is not reflected in the data.

### **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**

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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.

Castle Rock is the northernmost City in Cowlitz County. The City is situated on the Cowlitz River, approximately 1 mile downstream from its confluence with the Toutle River. The City covers an area of 1.91 square miles, with a population of 1,982 people in the 2010 US Census. The City of Castle Rock and Cowlitz County have an Urban Growth Management agreement. The City's Urban Growth Area includes approximately 1.25 square miles of unincorporated land outside of shoreline jurisdiction, with a population of approximately 160 people. The City's shoreline jurisdiction comprises 170 acres and covers 6.6 miles of river and streams.

As a result of sediment deposition from the Toutle River, the Cowlitz River within the City of Castle Rock includes alluvial gravel bars on the inner bends of the River. The downtown core of the City of Castle Rock is surrounded by a levee.

Vegetation is limited to a relatively narrow forested riparian corridor along much of the City’s shoreline, including along Salmon Creek and Arkansas Creek. Although not confined by armoring or a levee, Salmon Creek borders the railway, and is artificially confined to its present course. A few notable areas of more substantial vegetation exist, including “The Rock” Community Park, which includes forested vegetation extending up to 500 feet from the river. There is little terrestrial habitat value outside of the narrow riparian corridor.

Dredge deposits are located throughout the City’s shoreline jurisdiction and have modified the shoreline condition from its natural state. Armoring has also been installed throughout much of the shoreline jurisdiction.

A summary of City shoreline characteristics is provided in Table 3-1.

Table 3-1. Summary of Shoreline Inventory for City of Castle Rock and Its Urban Growth Area.

Category	Summary of Shoreline Conditions
Comprehensive Plan Zoning <sup>1</sup>	Commercial: 1.1% HDR: 2.9% Heavy Commercial/ Light Industrial: 3.4% Industrial: 17.5% Mixed-use Commercial/ Industrial: 1.4% Public / Quasi-Public: 3.3% Recreational/Open Space: 42.8% River: 9.6% SFR: 6.1% Not Classified (e.g., Water, UGA): 11.2%
Current Land Use <sup>1</sup>	Public/Education/Assembly: 1.2% Recreation: 2.7% Single Family Residential: 8.8% Transportation: 5.2% Undeveloped Land: 39.1% Not Classified (e.g., Water, ROW): 41.4%
Impervious Surfaces	12.6%
Vegetation <sup>1</sup>	Cultivated: 3.1% Deciduous Forest: 2.2% Developed Open Space: 2.0% Evergreen Forest: 2.1% Grassland: 1.4% Developed: 28.1% Palustrine Emergent Wetland: 22.3% Palustrine Forested Wetland: 3.0% Palustrine Shrub/Scrub Wetland: 4.0%

Category	Summary of Shoreline Conditions
	Pasture/Hay: 23.5% Shrub/Scrub: 1.6% Unconsolidated Shore: 2.6%
Levees (County) and Armoring (Cities) (% of shoreline length)	Levees: 3,532 LF – 10.1% Armoring: 4.5%
Overwater Structures (#)	Riverine: Bridge: 2 Other:1
Floodplain, Floodway, and Channel Migration Hazard Area	Floodplain: 49.8% Floodway: 24.4% Channel migration zone area: 38.5%
Parks and Public Lands	12 acres – 6.7% (Castle Rock Fairgrounds, Lions Pride Community Park, Mt. St. Helens Motorcycle Club, The Rock Community Park, Al Helenberg Memorial Boat Launch)
Critical Areas	Wetlands: 17 acres – 10.1% Geologic Hazard Areas: <0 acres – 0.1% Priority Habitat Areas: Bald Eagle: 2 acres

<sup>1</sup> Only uses and coverages that occupy greater than 1% of the shoreline area are listed.

## 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.

As reported in the Shoreline Analysis Report (The Watershed Company and Parametrix 2014), over the past ten years, vacant lands and undeveloped lands decreased in the Castle Rock Assessment Unit (Table 4-1). Vacant lands across all land uses decreased by 10 acres, from 29 to 19 acres. The area of single family residential uses and recreational uses increased by three acres and four acres,

respectively. Some growth of single-family residential uses can be anticipated in the remaining vacant lands in the assessment unit in the foreseeable future.

Table 4-1. City of Castle Rock: land use change 2002-2012.

Category	2002	2012	Change in Total Acres
Undeveloped	72 ac.	65 ac.	-7
Single Family Residential	12.6 ac.	15.3 ac.	+2.7
Recreation	0.3 ac.	4.7 ac.	+4.4
Commercial	1.8 ac	0.5 ac	-1.3

A review of shoreline permit history over the past 10 years within the City of Castle Rock revealed only four projects; each of these was a public project. As a result of the City's ownership and stewardship of the majority of the City's shorelines, few private development permits are expected in the future.

## 4.2 Future 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 shoreline areas with the greatest likelihood for future development within the City include two dredge disposal sites on the western shore of the Cowlitz River, and the City's downtown area (in Shoreline Analysis Reaches 20, 22, and 21, respectively). At one of the dredge disposal sites, the Community Fair has discussed expanding and renovating facilities within shoreline jurisdiction. At the other dredge disposal site, new commercial development is likely. Within the downtown vicinity, a combination of commercial, residential, and public facility development is likely. Elsewhere in shoreline jurisdiction, lands are generally in public ownership, and land uses are unlikely to change or develop significantly in the foreseeable future. A discussion of the specific location of likely changes in land uses and modifications and the anticipated effects on ecological functions is included in Section 5.4.

## 4.3 Potential Use Conflicts

Castle Rock currently has no water oriented uses except for public recreation areas and access trails along levees. The industrial designated area in the southerly portion of the city is not likely to include water dependent uses given the lack of a commercial navigation channel. There are a few residences in the vicinity of this area, but these are not likely to be incompatible with future

industrial uses if appropriate site design provides for buffers or other means to reduce impacts.

## 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 5.2 evaluates where future land use changes are anticipated relative to proposed environment designations. Section 5.3 presents key general standards and regulations in the SMP intended to protect the ecological functions of the shoreline. Section 5.4 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 5.5, with a discussion of the potential beneficial effects of voluntary actions identified in the Shoreline Restoration Plan (The Watershed Company 2015).

### 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 shoreline environment designations are as follows:

- High-intensity
- Residential
- Recreation
- Aquatic

The proposed shoreline 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. Within this designation, priority should be given to water-dependent, water-related, and water-enjoyment uses. The designation is appropriate for those shoreline areas within incorporated municipalities that currently support or are planned for high-intensity uses related to commerce or transportation. Approximately 56.9 acres, or 33.0 percent, of the City's shorelines (see Figure 5-1) are designated High-intensity Environment.

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 within incorporated municipalities that are predominantly single-family or multi-family residential development or are planned and platted for residential development. Approximately 17.1 acres, or 9.9 percent, of the City's shorelines (see Figure 5-1) are designated Residential Environment.

The purpose of the **Recreation Environment** designation is to provide areas for recreational and public access opportunities. An additional purpose is to maintain and restore ecological functions to the area and preserve open space. The Recreation Environment is designated in those areas where public and private lands are devoted to or designated for recreation use, including parks, open space, and water-dependent uses which provide recreational moorage. Approximately 98.6 acres, or 57.1 percent, of the City's shorelines (see Figure 5-1) are designated Recreation Environment.

Finally, the **Aquatic Environment** designation is intended to protect, restore, and manage the unique characteristics and resources of aquatic areas. The Aquatic Environment designation is applied to waters and submerged lands in the City waterward of the ordinary high water mark of shorelines of the state.

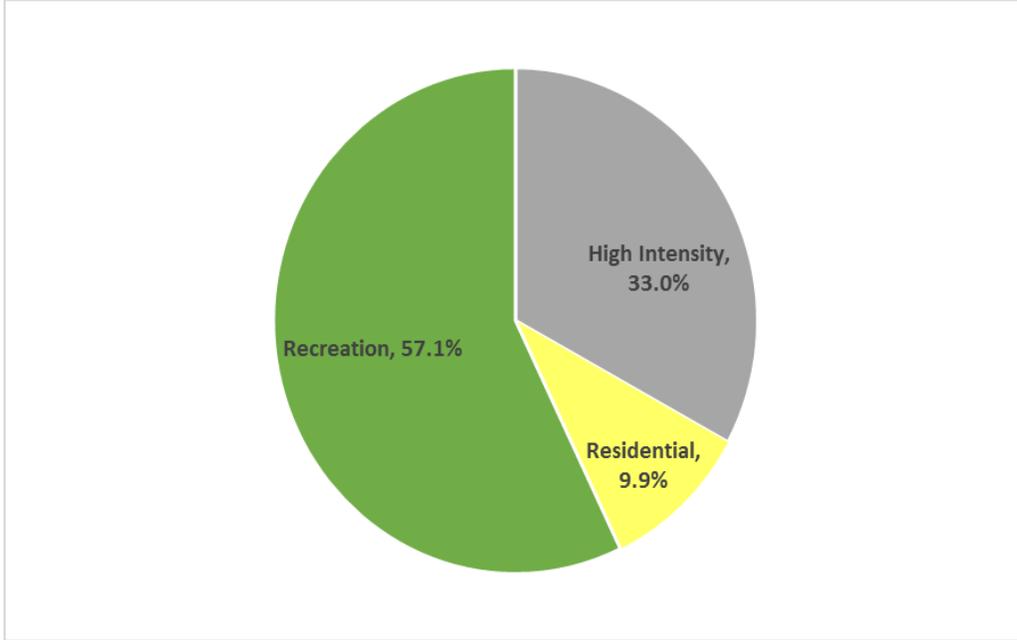


Figure 5-1. Distribution of Shoreline Environment Designations in the City of Castle Rock.

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.

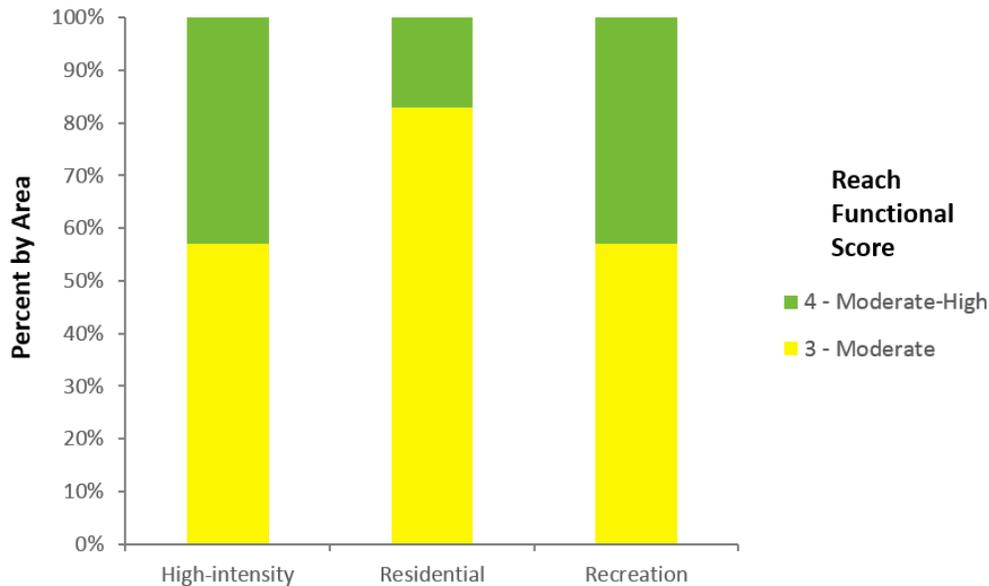


Figure 5-2. Distribution of Functional Scores among Proposed Castle Rock Environment Designations.

Ecological function scores were overall slightly lower for shorelines in the Residential designation than for those in the High-intensity and Recreation 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 Recreation designation makes up 56.1 percent of the shoreline, the amount of the Recreation designation with a “moderate-high” functional score is a more substantial part of the City’s shoreline (42.9 acres) than Figure 5-2 would indicate. Higher functioning shorelines in the High-intensity designation are the result of riparian vegetation presence along the Cowlitz River and Salmon Creek at the dredge disposal site at the south end of the City. This dredge disposal site has a wide area of multi-structured vegetation within shoreline jurisdiction. The vegetation is established on dredge spoil deposits placed there after the Mt. Saint Helen’s volcanic eruption. By their physical nature, the dredge spoils are highly susceptible to displacement from high water events. The dredge spoils site may receive additional spoils in the future.

## 5.2 Summary of Anticipated Future Land Use by Proposed Shoreline 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 5.4), as well as the provisions specific to that use or modification (see Section 5.5). 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

<b>Table Key:</b> P = May be permitted through SSDP or SLE SCUP = May be permitted through SCUP X = Prohibited N/A = Not Applicable	<b>Shoreline Environment Designations</b>			
	<b>High-Intensity</b>	<b>Residential</b>	<b>Recreation</b>	<b>Aquatic</b>
<b>Shoreline Uses</b>				
<b>Agriculture</b>	P	P	X	X
<b>Aquaculture</b>	P	P	P	P
<b>Boating Facilities</b>	P	P	P	P
<b>Marinas</b>	X	X	X	X
<b>Commercial</b>				
Water-dependent	P	P	X	P
Water-related	P	P	X	P
Water-enjoyment	P	P	P	P
Non-water-oriented	P	X	X	X
<b>Forest Practices</b>	P	X	X	X
<b>Industrial</b>				
Water-dependent	P	X	X	P
Other water-oriented	P	X	X	X
Non-water-oriented	P	X	X	X
<b>Institutional</b>	P	P	P	X
<b>In-stream structures</b>	P	P	P	P
<b>Mining</b>	SCUP	X	X	SCUP
<b>Recreation</b>				
Water-dependent	P	P	P	P
Other water-oriented	P	P	P	P
Non-water-oriented	P	P	P	X
<b>Residential</b>				
Single family	P	P	X	X
Multi-family	P	P	X	X
Floating or over-water residence, including live-	X	X	X	X

<b>Table Key:</b> P = May be permitted through SSDP or SLE SCUP = May be permitted through SCUP X = Prohibited N/A = Not Applicable	<b>Shoreline Environment Designations</b>			
	<b>High-Intensity</b>	<b>Residential</b>	<b>Recreation</b>	<b>Aquatic</b>
aboard vessels				
<b>Transportation</b>				
Bridges	P	P	P	P
Roads, Railroads, Trails	P	P	P	X
Parking (Accessory)	P	P	P	X
Parking (Primary Use)	X	X	X	X
<b>Utilities</b>	P	P	P	P
<b>Uses Not Specified</b>	SCUP	SCUP	SCUP	SCUP
<b>Modifications</b>				
<b>Shoreline Stabilization</b>	P	P	P	P
<b>Breakwaters and Groins</b>	SCUP	SCUP	SCUP	SCUP
<b>Fill / Excavation</b>	P	P	P	SCUP
<b>Dredging</b>				
Dredging	N/A	N/A	N/A	P
Dredge Disposal / Material Stockpiling	P	X	P	X
<b>Habitat and Ecological Enhancement</b>	P	P	P	P
<b>Flood Control Works</b>				
Modification of Existing Flood Control Works (including relocation further landward)	P	P	P	SCUP
New Flood Control Works	P	P	P	SCUP

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 Castle Rock by Shoreline Environment Designation.

<b>Proposed Shoreline Environment Designation</b>	<b>Anticipated Future Use</b>	<b>Factors Affecting Development Potential</b>
High-intensity	<p>Northern segments, east shore of Cowlitz River: The City's waterfront and downtown plans call for significant redevelopment and enhancements in this area.</p> <p>Northern segment, western shore of Cowlitz River: Given the larger parcel sizes and good transportation access, this area is likely to see new commercial development in the future.</p> <p>In the High-intensity shoreline along the eastern shore of Cowlitz River, the primary landowner may pursue new industrial development.</p>	<p>Across the entire designation, development would be limited by wetland and shoreline buffers.</p> <p>In the High-intensity shoreline along Salmon Creek, development is constrained by the freeway and rail line.</p> <p>In the High-intensity shoreline along the eastern shore of Cowlitz River at the southern edge of the city, development will be limited by current zoning.</p>
Residential	<p>North of PH10 bridge: There is potential for future development on both sides of the Cowlitz River. This development is expected to be of moderate density in the residential areas near downtown, and low density elsewhere.</p>	<p>The developable area near downtown is located behind existing levees, roads, or paths.</p>
Recreation	<p>North of the PH10 bridge: On the east side of the Cowlitz River, additional trail development may occur. On the west side of the Cowlitz River, the northernmost segment of this Shoreline Environmental Designation may see additional trail development. Immediately south of this area within the Recreation designation, there is potential for future development, particularly in the area across the river from unincorporated Cowlitz County shorelines.</p> <p>South of the PH10 bridge: On the west side of the Cowlitz River, development is expected at the fairgrounds. Development in other segments is expected to be limited to trails. On the east side of the Cowlitz River in this area, additional development is expected to be limited to trails.</p>	<p>Wetlands at the mouth of Arkansas Creek will limit development there.</p> <p>Future FWHCA buffers will be determined by Park Management Plan(s).</p>

### 5.3 General Regulations

General standards and shoreline use and development 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.

#### 5.3.1 Shorelines of State-Wide Significance

Cowlitz River shorelines within the City's jurisdiction are 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. 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 use or underdeveloped areas. c. Protect and preserve existing diversity of vegetation function 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. a. Evaluate the short-term economic gain or convenience of developments relative to the long-term and potentially costly impairments to the natural shoreline. b. Protect resources and values of shorelines of state-wide significance 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 ecosystem, including, but not limited to: stability, drainage, aesthetic values and water quality. b. All shoreline development should be located, designed,	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	constructed, and managed to avoid disturbance of and minimize adverse impacts to wildlife resources, including spawning, nesting, rearing and habitat areas and migratory routes. c. Restrict or prohibit public access onto areas which cannot be maintained in a natural condition under human use. d. Shoreline materials including, but not limited to, bank substrate, soils, beach sands and gravel bars should be left undisturbed by shoreline development. Gravel mining should be severely limited in shoreline areas. e. Preserve environmentally sensitive wetlands for use as open space or buffers and encourage restoration of currently degraded wetland areas. (A.)(4.)				

\*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.

### 5.3.2 No Net Loss of Ecological Functions

The SMP includes provisions that are intended to minimize impacts of development on shoreline ecological functions and processes. These provisions define required 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 Functions (6.1)	All shoreline use and development, including preferred uses and uses that are exempt from permit requirements, shall be located, designed, constructed, conducted, and maintained in a manner that maintains shoreline ecological functions, in accordance with the mitigation sequencing provisions 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,	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	food web support, and water quality maintenance. (B.)				
	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). In-water work 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 this 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
	Uses and development activities that comply with the provisions of the Castle Rock Comprehensive Plan and the Castle Rock Municipal Code may be permitted landward of levees, dikes, revetments, roads, railways, and rights-of-way in accordance with the provisions of the SMA and the SMP, including but not limited to the provisions requiring no net loss of ecological function and mitigation sequencing. (G.)	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.

### 5.3.3 Critical Areas within Shoreline Jurisdiction

The proposed SMP requires that activities within shoreline jurisdiction comply with the Shoreline Critical Areas Regulations found in Appendix B of the SMP. These regulations are based on the Castle Rock Municipal Code (CRMC) Chapter 18.10 and have been modified to comply with the provisions of the Washington State Shoreline Management Act.

### 5.3.3.1 General Provisions

The SMP includes provisions 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 B 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 their 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 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 B and other parts of this SMP conflict, the provisions most protective of ecological resources shall apply, as determined by the City. (D.)	X	X	X	X
	Unless otherwise stated, critical area buffers associated with jurisdictional shoreline area shall regulated in accordance with this SMP and Appendix B. (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.

### 5.3.3.2 Wetlands

Under the proposed SMP, buffers for wetlands in shoreline jurisdiction range from 40 feet to 225 feet (SMP Appendix B Section 2.5(A.)(4.)(Table 3)), depending on the wetland category (as determined by the Washington State Wetland Rating System for Western Washington (Ecology Publication #14-06-029, or as revised)) and the habitat score of the wetland.

Wetland buffer averaging (SMP Appendix B Section 2.5(A.)(6-7.)) is allowed provided specific criteria are met, including that averaging will not degrade

functions and/or values, and that the buffer width will not be reduced to less than 75 percent of the standard buffer width or 75 feet for Category I and II wetlands, 50 feet for Category III wetlands, and 25 feet for Category IV wetlands, whichever is greater.

### **5.3.3.3 Fish and Wildlife Habitat Conservation Areas**

The proposed SMP includes Fish and Wildlife Habitat Conservation Area buffers for all streams and waterbodies within shoreline jurisdiction. The proposed shoreline critical areas regulations apply shoreline buffers based on reach to all shoreline waterbodies (SMP Appendix B Section 3(B).(2.)(Table 8)). 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 (SMP Appendix B Section 3(B).(2.)(Table 7)).

Buffer averaging (SMP Appendix B Section 3(B).(5.)) is allowed provided specific criteria are met, including that averaging will not degrade functions and that the buffer width will not be reduced to less than 75 percent of the standard buffer width in any given location.

### **5.3.3.4 Frequently Flooded Areas**

Frequently flooded areas are regulated by CRMC 15.24, Flood Damage Prevention, which is incorporated into Appendix B of the SMP by reference (SMP Appendix B Section 4(B.)). These regulations limit what development may occur in the floodway (CRMC 15.24.310). 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 B Section 4(A.)).

### **5.3.3.5 Geologic Hazard Areas**

Geologically hazardous areas within shoreline jurisdiction include landslide hazard areas, erosion hazard areas, seismic hazard areas, mine hazard areas, and volcanic hazard areas (SMP Appendix B Section 5). 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 a variety of development standards that limit the potential impacts of development in landslide and erosion hazard 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 B Section 5(E.)(4.)(a.)).

### 5.3.3.6 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 B Section 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 (SMP Appendix B Section 6(B.)). For these regulated activities, hydrogeologic testing and site evaluation may be required (SMP Appendix B Section 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 B Section 6(C.)(3.)).

### 5.3.4 Flood Prevention and Flood Damage Minimization

In addition to flood hazard protections provided through shoreline critical areas regulations, the proposed SMP includes provisions 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 5.4.3 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. 4. Bridges, utility lines, public stormwater and wastewater facilities and their outfalls, and other public utility and	X			X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	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. 8. 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.)				
	Removal of materials for flood management purposes shall be consistent with an adopted flood hazard reduction plan in accordance with the mitigation sequencing provisions of the SMP and shall only be allowed if a biological and geomorphological study demonstrates a long-term benefit to flood hazard reduction. (D.)	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.

### 5.3.5 Shoreline Vegetation Conservation

The proposed SMP includes provisions 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			X	

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	provisions of the SMP and Shoreline Critical Areas Regulations to protect and maintain shoreline vegetation. (B.)				
	Vegetation may be removed or altered landward of shoreline buffers described in the SMP provided that there is no net loss of ecological function. (D.)			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 habitat 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	
	Limbing or crown thinning shall comply with the Tree Care Industry Association pruning standards, unless the tree is a hazard tree. 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	
	The clearing of non-native vegetation is allowed as is routine landscape maintenance and family gardening, when conducted using hand-held equipment. (I.)			X	
	Vegetation may be removed or altered landward of shoreline buffers described in the SMP 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.

### 5.3.6 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. 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 Plan, which identifies the <i>Stormwater Management Manual for the Puget Sound</i> , as approved by the City, as the guidance for the City’s program, and best management practices to prevent impacts to water quality and stormwater quantity that would result in a net loss of shoreline ecological 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 buffers. Low impact development facilities (which do not substantially change the character of the shoreline) such as vegetation filter strips, grass-lined swales, and vegetated bioretention and infiltration facilities, are encouraged in association with development allowed in shoreline jurisdiction. (B.)		X	X	
	Sewage management. To avoid water quality degradation, sewer service is subject to the following requirements: 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.

### 5.4 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 and 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 various 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.

#### **5.4.1 Shoreline Stabilization**

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

Within the City of Castle Rock, much of the City's infrastructure is contained within a ring dike that surrounds the City. Also, shorelines within the City have been altered by channel dredging to limit flood risk resulting from sediment accumulations following the eruption of Mount St. Helens. This dredging has

resulted in increased channelization of the River and creation of dredge disposal sites that further separate development from the River. As a result, the need for future shoreline stabilization is expected to be extremely limited.

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. Finally, any new or replacement structure must ensure that no net loss of functions is achieved.

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

Functions	Potential Impacts to Functions
Hydrologic	Increase in wave 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	Reduction in nearshore vegetation.
	Increased slope of the nearshore reduces shallow nearshore habitat area.

Table 5-10. Summary of key regulations related to shoreline stabilization that protect ecological function.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Stabilization (7.3.2)	Shall comply with the mitigation sequencing requirements of the SMP. Modified or enlarged shoreline stabilization proposals shall be treated as new. (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 in order for	X		X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	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.)				
	Shall be designed and constructed to be the minimum size necessary and to avoid or minimize stream channel direction modification, realignment and straightening or result in increased channelization of normal stream flows or impacts to sediment transport. (C.)	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 away from the shoreline edge before considering structural shoreline stabilization. Any new or expanded erosion control structures shall not result in a net loss of shoreline ecological functions. (E.)	X		X	X
	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
	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 erosion control structure will not result in a net loss of shoreline ecological functions. (H.)	X		X	X
	The construction of a shoreline stabilization structure, either "soft" or "hard" for the primary purpose of creating dry land is prohibited. (I.)	X		X	X
	Bioengineered projects shall be designed in accordance with best available science and incorporate a variety of native 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.

### 5.4.2 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 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. [Note that permit requirements are not specified in the SMP for instream 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 regulations related to breakwaters, groins, and instream structures that protect ecological functions.

Location in SMP	SMP Provisions 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 other specific public purpose. (A.)	X			X
	Shall be designed to protect critical areas and shall provide for mitigation according to the sequence defined in the SMP. (B.)	X			X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	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. (C.)	X			X
In-stream Structures (7.2.8)	Applications for new or permanent expansion of 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.

### 5.4.3 Flood Hazard Management Structures

Potential impacts from flood hazard management structures are summarized below in Table 5-13. Flood hazard management structures in the City of Castle Rock consist of a ring dike surrounding the City’s corps infrastructure. Much of the levee system is located outside of shoreline jurisdiction. 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. Impacts to ecological processes and functions, and priority fish and wildlife species and habitats, can be successfully mitigated; and d. Appropriate vegetation conservation actions are undertaken. (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 vegetation conservation areas, except for actions that increase ecological functions, unless there is no other feasible alternative to reduce flood hazard to existing development; 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 effected, including disruption of natural drainage flows and stormwater runoff. (5.)	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.

### 5.4.4 Fill and Excavation

Fill and excavation are commonly associated with development projects. Potential impacts from fill and excavation are summarized below in Table 5-15. Key regulations in the proposed SMP that address potential impacts to ecological functions are listed below in Table 5-16.

Table 5-15. Summary of potential impacts from fill and excavation

Functions	Potential Impacts to Functions
Hydrologic	Disruption of existing water runoff patterns due to topographical alterations.
	Alterations in flow patterns due to the loss of vegetation.
Water Quality	Increase in pollutants due to conversion of upland landscapes from native to non-native vegetation assemblages that require fertilizers or pesticides.
	Short-term increases in turbidity related to construction activities.
Vegetative/ Habitat	Loss of functions due to removal or disturbance.
	Increased temperatures due to vegetation removal.
	Reduction of insect and detritus input from clearing of upland vegetation.

Table 5-16. Summary of key regulations related to fill and excavation 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)	Fill and excavation are conditional uses in the Aquatic environment.	X	X	X	X
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. 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	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	fill are not feasible. (B.)				
	Fill is restricted in wetlands or Fish and Wildlife Habitat Conservation Areas in accordance with Critical Areas regulations. (C.)	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. (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 Dredging and Dredge Material Disposal

Dredging can have significant effects on sediment transport, short term effects on water quality, and by creating deep water, the act of dredging 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. As noted above, in the City of Castle Rock, 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. Dredging has resulted in channelization and 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 material disposal.

Functions	Potential Impacts to Functions
Hydrologic	Alteration of hydrologic and sediment processes.

Functions	Potential Impacts to Functions
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 regulations related to dredging and dredge material disposal 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)	Dredge disposal and dredge material stockpiling are prohibited uses in the Residential and Aquatic environments.	X	X	X	X
Dredging and Dredge Material Stockpiling (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 documented public need and where other feasible sites or methods are not feasible; and 6. When otherwise approved by state and federal agencies. (B.)	X	X	X	X
	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 maintenance of previously dredged or existing authorized location, depth, and width. (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	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	CERCLA habitat restoration project or, if approved through a shoreline conditional use permit, any other significant habitat enhancement project. (E.)				
Dredge Material Stockpiling (7.3.5)	Disposal of dredge material 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 or stockpiling must meet the following standards: 1. Demonstrated to not result in significant or ongoing adverse impacts to water quality, critical areas, flood holding capacity, natural hydrology, or significant plant communities; and 2. Improves wildlife habitat and benefits shoreline resources. (H.)	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.

### 5.4.6 Aquaculture

Potential impacts from aquaculture are summarized below in Table 5-19. The City does not have any existing aquaculture facilities, and new aquaculture facilities are permitted only in association with the restoration of native fish species in the Cowlitz River.. 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	Accidental introduction of non-native species or potential interactions between wild and artificially produced species.

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

Location in SMP	SMP Provisions 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 Cowlitz River. (A.)	X	X	X	X
	Non-commercial aquaculture undertaken for conservation or habitat restoration purposes is a preferred use. (B.)				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.

### 5.4.7 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 one public boat ramp, and given the channelized nature of the River within the City, few if any new overwater structures are anticipated. The SMP generally addresses boat and vessel facilities through measures that avoid, minimize and mitigate effects on sediment transport, water quality, and nearshore habitat (Table 5-22). The Shoreline Analysis Report noted the potential for a new marina at the existing dredge disposal site at the south end of the City. Such a marina would necessitate substantial dredging, fill, and stabilization, and would need to demonstrate mitigation sequencing and result in no net loss of functions if it were to be permitted.

Table 5-21. Summary of potential impacts from boat and vessel facilities, including marinas.

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).
Vegetative/	Increased shading in shallow-water habitat areas resulting from dock and pier construction can limit growth of aquatic vegetation and alter habitat for and

Functions	Potential Impacts to Functions
Habitat	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 regulations related to boat and vessel facilities, including marinas 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)	Marinas are prohibited in all environments.	X	X		X
Boating Facilities - General (7.2.3)(A.)	Shall be sited and designed in accordance with the mitigation sequencing provisions of the SMP. (1.)	X	X	X	X
	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 would minimize the obstruction of currents, alteration of sediment transport, and accumulation of drift logs and debris; f. New shoreline stabilization would 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 located as far landward as possible while still serving their intended purposes. (6.)(b.)	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			X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	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 minimized. (11.)				
Boating Facilities – Boat Launches (7.2.3)(B.)	Applicants must demonstrate that the size proposed is the minimum necessary to allow the use proposed. (2.)	X			X
	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 dock construction shall be permitted only when demonstrated to be necessary to support the intended primary water-dependent use. (2.)	X			X
	Extended moorage on waters of the state requires a lease or permission from WDNR. (3.)	X	X	X	X
Residential Moorage Facilities: Docks and Buoys (7.2.3)(D.)	Applicant shall demonstrate that a mooring buoy is not feasible to provide moorage. (2.)	X	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	X
	Docks shall be the minimum length required; shall minimize water cover; and shall use decking that is grated or clear translucent material. Floats shall not ground out. Pile spacing shall be maximum feasible and pile diameter shall be minimized. New or expanded covered moorage is prohibited. (4.)		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.

### **5.4.8 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.

Anticipated future use of the shoreline includes industrial and commercial development in the High-intensity Environment Designation. Industrial development would occur in an area previously used as a dredge disposal site, and development impacts would likely introduce significant new areas of impervious surfaces, roads, and traffic. Commercial development should be anticipated in the downtown areas designated as the High-intensity shoreline designation. Site-specific buffers are consistent with the area of existing vegetation. These buffer standards should help ensure that the existing intact riparian vegetation is maintained. Institutional development includes public uses such as schools or community centers, and would occur in the High-intensity Environment Designation.

Because the SMP requires enhancement of shoreline functions where non-water-dependent development of commercial, industrial, or institutional facilities is proposed in shoreline jurisdiction, a net improvement of functions may be anticipated if such development is approved.

Key regulations in the proposed SMP that address potential commercial, industrial, and institutional development impacts are listed below in Table 5-24. Specific standards for shoreline modifications also apply to such development, including clearing and grading, boat and vessel facilities, dredging and dredge material disposal.

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

<b>Functions</b>	<b>Potential Impacts to Functions</b>
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 regulations related to commercial, industrial, and institutional development that protect ecological functions.

<b>Location in SMP</b>	<b>SMP Provisions Providing Protection of Ecological Functions</b>	<b>Primary Function*</b>			
		<b>Hydrologic</b>	<b>Water Quality</b>	<b>Vegetation</b>	<b>Habitat</b>
Shoreline Environment Designations (Table 7-1)	Non-water-oriented commercial uses are prohibited in the Aquatic, Recreation, and Residential environments	X	X	X	X
	Water-dependent and water-related commercial uses are prohibited in the Recreation environment.	X	X	X	X
	Industrial uses are prohibited in the Residential and Recreation environments.	X	X	X	X
	Non-water-dependent industrial uses are prohibited in the Aquatic environment.	X	X	X	X
	Institutional uses are prohibited in the Aquatic designation.	X	X	X	X
Commercial (7.2.4)	New or expanded non-water-oriented commercial development may be allowed only when part of a mixed-use project including water-dependent uses and providing public access and ecological restoration; or navigability is severely limited at the site and development provides public access and ecological restoration. (C.)	X	X	X	X
	Commercial uses shall provide a significant public benefit with respect to the SMA, such as public access	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	and ecological restoration, where feasible. (D.)				
	Overwater 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, and will fully mitigate any unavoidable impacts to shoreline resources. (E.)	X			
Industrial (7.2.6)	New or expanded non-water-oriented industrial development may be allowed only when part of a mixed-use project including water-dependent uses and providing public access and ecological restoration; or navigability is severely limited at the site and development provides public access and ecological restoration. (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. Proposals for new industrial developments shall demonstrate the need for expansion into an undeveloped area. (E.)	X	X	X	X
	Only water-dependent elements of a proposal may encroach on required vegetated buffers, unless located waterward of a levee, dike, revetment, railway, road, or public right-of-way. (F.)			X	X
Institutional (7.2.7)	Non-water-oriented institutional development may be allowed only if navigability is severely limited and the use provides a significant public benefit such as public access and/or ecological restoration; or if the site is physically separated from the shoreline by another property or public right-of-way; or as part of a mixed-use development which provides significant public benefit such as public access and ecological restoration. (B.)	X	X	X	X
	Loading, service areas, and other accessory uses shall be located landward of a primary structure or underground whenever possible but shall in no case be waterward of the structure. (C.)	X	X	X	X
	New institutional development within shoreline jurisdiction shall be designed such that no new shoreline stabilization measures are necessary, and prohibited in	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	floodways and channel migration zones. (D.)				

\*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.

### 5.4.9 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 mining impacts are listed below in Table 5-25.

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 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	Mining is a conditional use in the High-Intensity and	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment Designations (Table 7-1)	Aquatic environments.				
	Mining is prohibited in the Residential and Recreation 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.

### 5.4.10 Recreational Development

The City of Castle Rock’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.

Land use change and anticipated future use data both suggest that some recreational development, especially trail development, could occur in the City’s shorelines. Potential impacts of any new recreational facilities would need to be avoided, minimized and mitigated, such that no net loss of functions would be

expected to result. 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 regulations related to recreational development that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designation (Table 7-1)	Non-water-oriented recreational uses are prohibited in the Aquatic environment.	X	X	X	X
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. (D.)	X	X	X	X
	New overwater structures for recreation use shall be allowed only when they accommodate water-dependent recreation use or facilities; or they provide access for the public to enjoy the shorelines of the state. (F.)	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.

### 5.4.11 Residential Development

Table 5-29 below describes the potential impacts of residential development. Land use change and anticipated future use data suggest that a limited amount of residential development may take place on City shorelines. In all but one of the areas designated as the Residential environment, either existing residential development is present along the shoreline or the Residential environment is located behind an existing levee with a paved path that limits existing shoreline functions. Therefore, potential effects of future residential development are expected to be limited.

Table 5-30 lists SMP provisions that help ensure that impacts 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).

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.
	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 regulations related to residential development that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Environment Designations	New floating residences are prohibited in all environments.	X	X		X
	Multi-family residential development is prohibited in the	X	X	X	X

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
(Table 7-1)	Recreation and Aquatic environments.				
	Single family residential development is prohibited in the Aquatic and Recreation environments.	X	X		X
Residential Development (7.2.11)	New residential construction 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. (A.)	X	X	X	X
	Residential structures 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	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.

### 5.4.12 Transportation Facilities, including Parking

Transportation facilities, particularly local roads, are common features along the City of Castle Rock’s shorelines. Transportation facilities and associated traffic tend to impair habitat and hydrologic connectivity, and stormwater runoff can have a substantial impact on water quality. Potential impacts from transportation facilities are summarized below in Table 5-31.

Based on available data, no major new transportation facilities are anticipated within shoreline jurisdiction. However, should transportation facilities be proposed, key regulations in the proposed SMP that would address potential impacts from transportation facilities are listed below in Table 5-32.

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

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).

Functions	Potential Impacts to Functions
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 regulations related to transportation facilities, including parking, 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)	Roads, railroads, trails, and accessory parking are prohibited in the Aquatic environment.	X	X		X
	Parking as a primary use is prohibited in all environments.	X	X	X	X
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; b. Avoid or minimize the need for shoreline stabilization; and c. Comply with the mitigation sequencing provisions of the SMP. (2.)	X	X	X	X
	New crossings over streams and wetlands 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	
	Lighting must be directed away from critical areas, unless necessary for public health and safety. (7.)				X
	Bridges shall provide the maximum length of clear spans feasible with pier supports	X			

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	to produce the minimum amount of deflection feasible. (8.)				
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
	Lighting must be directed away from critical areas, unless necessary for public health and safety. (3.)				X
	Elevated walkways shall be utilized where feasible to cross wetlands and streams instead of culverts. (4.)	X			X
Transportation and Parking – Parking (7.2.12)(C.)	Parking facilities allowed only as necessary to support an authorized use. Shall be located as far as possible from the ordinary high water mark and outside shoreline jurisdiction where possible. Parking in shoreline jurisdiction shall be located outside of critical areas and associated buffers where feasible. (1.)	X	X	X	X
	Lighting must be directed away from critical areas, unless necessary for public health and safety. (2.)				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.

### 5.4.13 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. Key regulations in the proposed SMP that address these impacts are listed below in 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

Functions	Potential Impacts to Functions
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 regulations related to utilities and public facilities that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Utilities Uses (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; 2. Utilization of existing corridors is not feasible. (A.)	X	X	X	X
	Overhead electrical transmission lines should be located outside of shoreline jurisdictional areas unless infeasible due to site constraints. (B.)			X	X
	Transmission, distribution, and conveyance facilities shall be located in existing rights of way and corridors or shall cross shoreline jurisdictional areas by the shortest, most direct route feasible, unless such route would cause significant environmental damage. (C.)		X	X	X
	Utility crossings of waterbodies shall be attached to bridges where feasible; otherwise, underground construction methods that avoid surface disturbance are preferred. (D.)	X	X	X	X
	All underwater pipelines transporting liquids intrinsically harmful to aquatic life or potentially harmful to water quality shall be equipped with automatic shut off valves. (E.)			X	X
	Structural utility buildings shall be located outside of shoreline jurisdiction unless no other feasible location exists. (F.)	X	X	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. (G.)	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.

### 5.4.14 Agriculture and Forest Practices

Potential impacts from agriculture and forest practices are summarized below in Table 5-35. Key regulations in the proposed SMP that address potential impacts from agriculture and forest practices are listed below in Table 5-36.

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
Shoreline Environment Designations (Table 7-1)	Forest Practices are prohibited in the Residential, Recreation, and Aquatic environments.	X	X	X	X
	Agriculture is prohibited in the Recreation and Aquatic environments.	X	X	X	X
Agriculture (7.2.1)	The use of tanks and troughs for animal watering is encouraged; allowing animals direct access to surface water is not permitted. If stream crossings are necessary, bridges, culverts, or ramps shall be used to enable animal crossings without damaging the streambed or banks and must conform to the requirements of the SMP. (C.)(1.)	X	X	X	X
	Surface water drainage and runoff shall be diverted away from animal confinement and waste storage sites. (C.)(2.)		X		
	Animal confinement areas shall be graded to slope away from surface water. (C.)(3.)		X		

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Gutters and downspouts shall be installed on roofs to prevent excess water from entering animal confinement areas. (C.)(4.)		X		
	Critical areas and their buffers or required setbacks shall not be used as animal confinement sites. (C.)(5.)	X	X	X	X
	Confinement lots, feeding operations, lot wastes, stockpiles of manure solids, manure lagoons, and storage of noxious chemicals are prohibited in shoreline jurisdiction. (C.)(6.)		X		X
Forest Practices (7.2.5)	For timber located within shoreline jurisdiction, Ecology or the City shall allow only selective commercial timber cutting so that no more than 30 percent of the merchantable trees may be harvested in any 10-year period. (C.)			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.

### 5.4.15 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 shoreline habitat and ecological enhancement 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 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: 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; and 5. Impacts to critical areas and buffers will be avoided, minimized, or mitigated in accordance with the mitigation sequencing provisions of the SMP. (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.

## 5.5 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 County prepared the *Shoreline Restoration Plan*, which identifies opportunities for voluntary restoration, enhancement, and protection actions. The *Shoreline Restoration Plan* also includes mandated dam mitigation that will improve shoreline functions over the current baseline condition.

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 County's *Shoreline Restoration Plan* (TWC 2015) 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. 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 within the City of Castle Rock's shorelines include restoration of side channel and off-channel habitats, and tributary enhancement, and riparian restoration. Within the City, eight site-specific projects have been identified.
- 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 PROGRAMS

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As mentioned in the Introduction, the Guidelines (in WAC 173-26-186(8)(d)) direct that an analysis of cumulative impacts should consider "beneficial effects of any established regulatory programs under other local, state, and federal laws." In accordance with this guidance, this section briefly discusses regulatory and other programs besides the SMP that may have beneficial effects on shoreline ecological functions.

## **6.1 City Regulations and Programs**

### **6.1.1 City of Castle Rock Zoning Code**

Title 17 of the Castle Rock Municipal Code is the City's zoning code. The zoning code establishes zoning districts, and, for each district, sets forth regulations addressing land use considerations such as permitted, conditional, and prohibited uses; building heights; building site dimensions; and lot coverage. The zoning code is a key determinant of the City's physical form, including within shoreline jurisdiction.

### **6.1.2 City of Castle Rock Stormwater Management Code**

Chapter 15.24 of the Castle Rock Municipal Code (CRMC) is Flood Damage Prevention. This chapter regulates development within the 100-year floodplain. CMRC 15.24.310 limits development that may take place within the floodway. CRMC 15.24.320 includes provisions to avoid short- and long-term adverse impacts associated with the destruction or modification of wetlands.

## **6.2 State Agencies/Regulations**

Aside from the Shoreline Management Act, State programs most pertinent to development in the City's shorelines include the State Hydraulic Code, the Growth Management Act, the State Environmental Policy Act, the Water Resources Act, and the 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. Washington 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**

The Washington Department of Natural Resources (WDNR) is charged with protecting and managing the use of State-owned aquatic lands. Toward that end, uses waterward of the ordinary high water mark require review to establish whether the project will be situated on State-owned aquatic lands. If so, the

project may be required to obtain an Aquatic Use Authorization from WDNR and enter into a lease agreement. Certain project activities on State-owned aquatic lands, such as single-family or two-party joint-use residential piers, 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 (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, or 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. No 303(d) waters are currently designated within the City.

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.

## **6.3 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](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 to "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

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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 recreation, residential, and industrial development. Impacts from these activities are expected to primarily result from upland development. 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.

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.

As described in Section 5, vegetation conservation standards, critical areas standards, and other standards relating to more common shoreline modifications (e.g., clearing and grading, shoreline stabilization) help to ensure that commonly

anticipated residential, recreational, and industrial uses will occur in such a way as to result in no net loss of ecosystem functions.

## 8 NET EFFECT ON ECOLOGICAL FUNCTION

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The proposed SMP is expected to maintain existing shoreline functions within the City of Castle Rock while accommodating the reasonably foreseeable future shoreline development. Other local, state and federal regulations, acting in concert with this SMP, will provide further assurances of maintaining shoreline ecological functions over time. The Shoreline Restoration Plan, and voluntary actions described therein, will ensure that incremental losses that could occur despite SMP provisions do not result in a net loss of functions, and these restoration actions may result in a gradual improvement in shoreline functions. This analysis can help inform the City of potential future shoreline impacts and the importance of specific proposed SMP provisions.

As discussed above, major elements of the SMP that ensure no net loss of 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.

Shoreline use and modification 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 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, implementation of the proposed SMP is anticipated to achieve **no net loss of ecological functions in the shorelines of the City of Castle Rock**. Voluntary actions identified and prioritized in the Shoreline Restoration Plan will provide the opportunity to enhance and restore shoreline functions over time.

## 9 REFERENCES

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