FINAL

Cumulative Impacts Analysis Component of the Shoreline Master Program Update for the City of Kent

September 2009

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FINAL REPORT

CUMULATIVE IMPACTS ANALYSIS COMPONENT OF THE SHORELINE MASTER PROGRAM UPDATE FOR THE CITY OF KENT

PROJECT TITLE: SHORELINE MASTER PROGRAM UPDATE
TASK 4.1: CUMULATIVE IMPACTS ANALYSIS

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1. INTRODUCTION

1.1 Shoreline Management Act Requirements

The Shoreline Management Act guidelines 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:

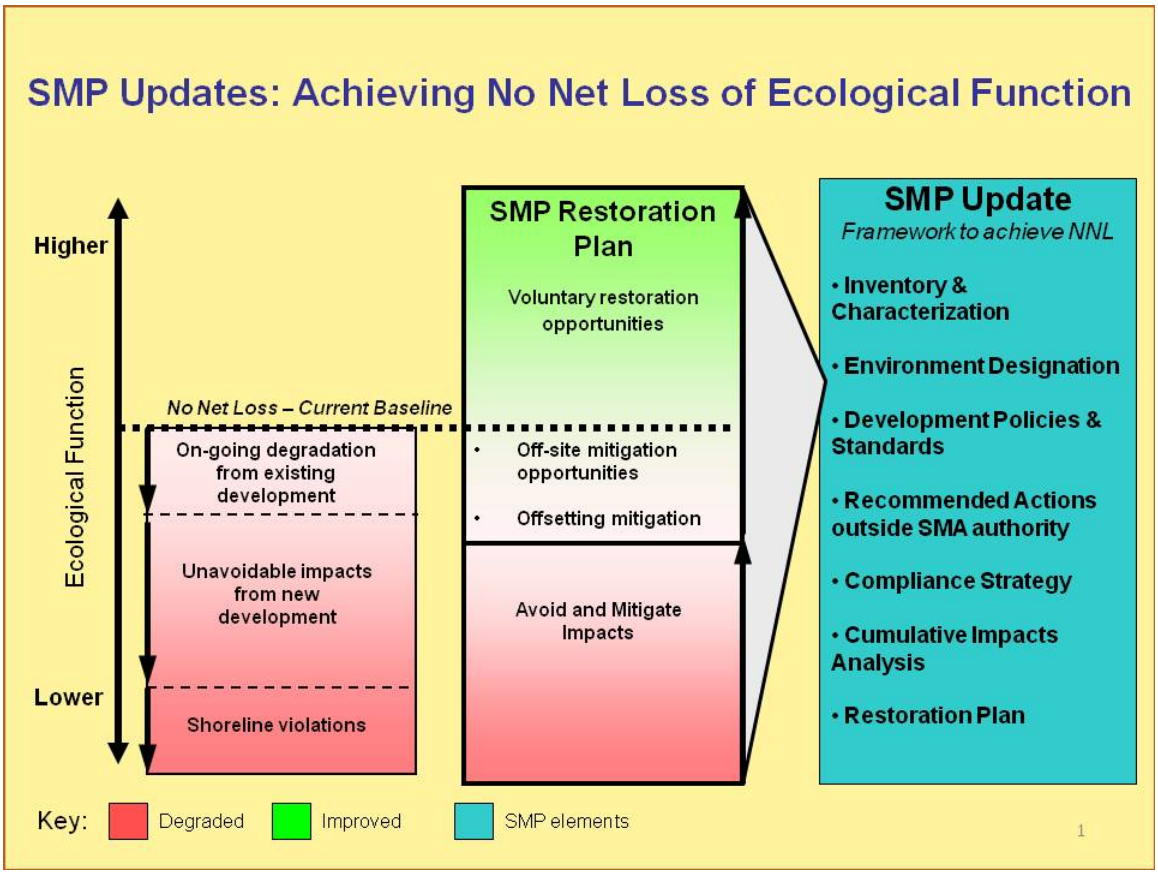
> "When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. 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 173-206-201(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 characterization and analysis 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;

(ii) reasonably foreseeable future development and use of the shoreline; and

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



Source: Department of Ecology

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

1.2 Methodology

Using the information, both textual and graphic, developed and presented in the *Final Shoreline Inventory and Analysis*, this cumulative impacts analysis was prepared consistent with direction provided in the Shoreline Master Program Guidelines as described above. 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. However, in many cases information about existing conditions and/or redevelopment potential was not available at a level that could be assessed quantitatively or the analysis would be unnecessarily complex to reach a conclusion that could be derived more simply. Further,

ecological function does not have an easy metric. For these reasons, much of the following analysis is more qualitative.

2. EXISTING CONDITIONS

The following summary of existing conditions is based on the *Final Shoreline Inventory and Analysis Report*. This discussion has been divided by waterbody and by proposed shoreline environment designations (see Appendix A of the SMP for a map of environment designations). Environment designations include Urban Conservancy – Open Space (UC-OS), Urban Conservancy – Low Intensity (UC-LI), Shoreline Residential (SR), High Intensity (HI), Natural Wetlands (NW), and Aquatic designations. The Shoreline Analysis Report includes an in-depth discussion of the topics below, as well as information about transportation, stormwater and wastewater utilities, impervious surfaces, and historical/archaeological sites, among others.

2.1 Green River

The Green River shoreline has a variety of uses, including parks, trails and open spaces (typically designated UC-OS); large scale industrial uses such as warehouses and office buildings (typically designated HI), residential areas consisting of single- and multi-family housing (typically designated SR), and agricultural activities (typically designated UC-LI, including the large area of floodway associated with the Mill Creek Auburn/Green River interaction). In addition, there are a number of wetlands associated with the Green River shoreline as a result of their presence in the floodplain. These wetlands are all designated Natural-Wetlands (NW). Land use conditions in each Green River segment can be found in Tables 7 through 10 in the *Final Shoreline Inventory and Analysis Report*. The performance of functions in the Green River shoreline is extremely variable, relating primarily to the presence or absence of levees and development throughout the corridor. Higher functioning areas in the City and the PAA, such as in the Horsehead Bend area and southward, have more open space, fewer levees, more vegetation, and less development. Detailed information about existing functions, including a performance rating of individual Green River functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.1 (Tables 14a and 14b) and 6.1, as well as on maps found in Appendix C (Figures 17a-c) of that report.

2.2 Big Soos Creek

The Big Soos Creek shoreline area in the City of Kent affects only five parcels within the City. Three of the parcels each contain a single-family residence (although jurisdiction generally encompasses only the yard areas of the properties, not the residences themselves), the fourth is part of King County's Soos Creek Park, and the fifth is owned by WSDOT. The collective performance of functions in the Big Soos Creek shoreline is mapped Medium High (see Figure 17d in Appendix C of the *Final Shoreline Inventory and Analysis Report*), because of its extensive vegetation, low level of shoreline modification, and low level of development. Based on the planned land use and the relatively high function level, the Big Soos Creek shoreline is designated as UC-LI. Detailed information about existing functions, including a performance rating of individual Big Soos Creek functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.2 (Table 15) and 6.2.

2.3 Lake Meridian

The Lake Meridian shoreline contains two major land uses: 1) Lake Meridian Park, which occupies a roughly 1,400-foot stretch of shoreline at the southeast corner of the lake (designated UC-OS); and 2) residential development, primarily single-family homes and a mobile home park (designated SR). The residential shoreline was mapped as collectively having Low Medium function because of its extensive development, low level of vegetation, and high percentage of overwater structures and armoring (see Figure 17e in Appendix C of the *Final Shoreline Inventory and Analysis Report*). The park earned a higher Medium rating for its low level of development and some natural space. Detailed information about existing functions, including a performance rating of individual Lake Meridian functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.3 (Table 16) and 6.3.

2.4 Lake Fenwick

Similar to Lake Meridian, the Lake Fenwick shoreline contains two major land uses: 1) Lake Fenwick Park, which occupies a roughly 700-foot stretch of shoreline along the west shore of the lake, and other forested open space (designated UC-OS); and 2) residential development, primarily single-family homes, located primarily on the northeast corner and southwest corner of the lake in the PAA (designated SR). The park and much of the residential shoreline was mapped as collectively having Medium High function because of its extensive vegetation and low level of alteration (see Figure 17f in Appendix C of the *Final Shoreline Inventory and Analysis Report*). The park earned a High rating for the same reasons, and because of the absence of shoreline modifications. Detailed information about existing functions, including a performance rating of individual Lake Fenwick functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.4 (Table 17) and 6.4, as well as on maps found in Appendix C of that report.

2.5 Green River Natural Resources Area Pond

The Green River Natural Resources Area (GRNRA) pond is a City-owned and managed water quality management facility that includes extensive habitat enhancement and wildlife viewing activities, as well as associated wetlands. The facility includes two human-constructed ponds connected by a weir that constitute an approximately 55-acre lake. The GRNRA pond and associated shorelands received a comprehensive Medium High ecological function rating because of its high habitat value and low level of development (see Figure 17b in Appendix C of the *Final Shoreline Inventory and Analysis Report*). However, the pond management and structures reduce its value. As restoration continues on the site, the GRNRA pond and shorelands will continue to improve in function. The entire shoreline area, including shorelands, is designated UC-OS. Detailed information about existing functions, including a performance rating of individual GRNRA functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.5 (Table 18) and 6.5.

2.6 Springbrook Creek

Most of the Springbrook Creek shoreline jurisdiction is zoned, planned and developed for Industrial use. However, narrow corridors between the stream and the adjacent developments are vegetated, and have been enhanced by the City. The developed area is designated as HI and the vegetated corridors are designated UC-OS. Overall, Springbrook Creek shoreline was rated

Low because of the proximity of adjacent development and presence of armoring and culvert at the north end (see Figure 17c in Appendix C of the *Final Shoreline Inventory and Analysis Report*). Detailed information about existing functions, including a performance rating of individual Springbrook Creek functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.6 (Table 19) and 6.6.

2.7 Jenkins Creek

The Jenkins Creek shoreline consists solely of the City's Armstrong Springs municipal watershed area. There are no structures located on the property within shoreline jurisdiction, and the shoreland area is a mix of upland and wetland forest. The Jenkins Creek shoreline received a collective High ecological function rating because of its high habitat value and low level of development (see Figure 17d in Appendix C of the *Final Shoreline Inventory and Analysis Report*). The entire shoreline area is designated UC-OS. Detailed information about existing functions, including a performance rating of individual Jenkins Creek functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.7 (Table 20) and 6.7.

2.8 Panther Lake

Panther Lake has been inventoried and analyzed by King County as part of its SMP update. The entire lake is in unincorporated King County, and within the City's PAA. King County gave the lake an overall High ecological function rating on the east shore, and a Medium High rating on the rest of the lake that has a higher level of modification related to low-density residential use (see Figure 17g in Appendix C of the *Final Shoreline Inventory and Analysis Report*). The low-density residential and critical areas/open space lands are designated as UC-LI. The remainder of the shoreline containing higher-density residential uses, most of which are outside of shoreline jurisdiction, is designated as SR. Detailed information about existing functions, including a performance rating of individual Panther Lake functions, can be found in the *Final Shoreline Inventory and Analysis Report*, Sections 5.8 (Table 21) and 6.8.

3. DEVELOPMENT POTENTIAL

Each waterbody was grossly divided into units (see Figures 3a-3h in the *Final Shoreline Inventory and Analysis Report*) at a reach or similar scale anticipated to match somewhat closely with the future development of the environment designations. For the most part, the unit breaks do correspond closely with a given environment designation, although additional complexity was added during environment designation development to divide Urban Conservancy into two designations and to recognize parallel environments, which are common along the Green River where the trail parallels development.

3.1 Green River

The following table is an excerpt of material included in Chapter 6 of the *Final Shoreline Inventory and Analysis Report*.

Table 1. Likely changes in Green River land use by sub-unit.

Sub-Unit	Likely Changes in Land Use
Green River Unit A – Open Space (Generally Aligned with the Urban Conservancy – Open Space or Urban Conservancy – Low Intensity Designations)	
A-1. Open space area on the east side of the river to the north and south of South 277th Street bounded by the City limits	This area is designated as Urban Separator (US), so therefore may redevelop with low density residential or clustered residential with the possibility of some low intensity commercial.
A-2. Foster Park is on the north side of the river generally west of the railroad line and east of the Valley Freeway (SR 167)	There are no likely changes in land use, except for minor park improvements and potentially some environmental restoration. The City should consider changing the land use designation to Open Space because it currently has an Industrial designation.
A-3. Riverview Park is on the north and east side of the river just west of the Valley Freeway (SR 167)	There are no likely changes in land use, except for minor park improvements and potentially some environmental restoration.
A-4. Undeveloped area on south river bank with tributary west of Valley Fwy (SR 167)	Land use change in this area is unlikely because most of the shoreland area is also a stream corridor. This area is designated AG-S, however, so some low intensity commercial development may occur.
A-5. The Riverbend Golf Complex	This area is unlikely to change as this is designated as OS (Open Space) in the Comprehensive Plan.
A-6. Golf course and open space on the south and west side of the river from the city limits south of W. Meeker St. to the industrial area north of the golf complex	The area that is designated OS (Open Space) is unlikely to change, but the area designated US (Urban Separator) has the potential to be redeveloped unless the land use designation is changed.
A-7. Open space on the west side of the river from Cottonwood Grove Park to the residential area approximately 2,400' north of S 228th Street	This area is designated as Urban Separator (US), so therefore may redevelop with low-density residential or clustered residential with the possibility of some low-intensity commercial.
A-8. Green River Natural Resource Area	This area is unlikely to change as it is in public ownership and used for water quality and natural resource purposes. The area is designated OS.
A-9. Valley Floor Community Park	The park is likely to remain a park, but will likely develop with more active uses, although perhaps not within shoreline jurisdiction. There are opportunities to increase public access and increase opportunities for water-dependent recreational uses when this park is improved. Environmental restoration should also be considered.
A-10. Green River Trail north of S 212th St and south of Russel Road	The Green River Trail corridor is unlikely to develop as it is designated OS. The underdeveloped industrial land may develop, but it is outside shoreline jurisdiction.
A-11. Future North Green River Park on the east shoreline just south of the City limits.	This area is unlikely to change land uses. The only changes might include some park improvements.
PAA-A-1. Area within the PAA and City Limits north and east of the river at the easternmost segment of the Green River shorelands within the City and PAA	The area that is designated OS (Open Space) is unlikely to change, but the area designated US (Urban Separator) has the potential to be redeveloped to low density residential or clustered residential unless the land use designation is changed..

Sub-Unit	Likely Changes in Land Use
Green River Unit B – High Intensity (Generally Aligned with the High Intensity Designation)	
B-1. Industrial area north of the river from commercial lot east of Central Ave, generally west and north to Foster Park	With the Industrial land use designation and predominance of industrial activities, it is likely that underdeveloped shoreline properties (approximately 1,000 feet of shoreline) will, over time, convert to large- to moderate-scale industrial uses.
B-2. Industrial area south of the river just east of the Valley Freeway (SR 167)	With the Industrial land use designation and predominance of industrial activities, it is unlikely that property in this area will change use.
B-3. Industrial area north of the river just east of the Valley Freeway (SR 167) located between Foster Park and Riverview Park	With the Industrial land use designation and predominance of industrial activities, it is unlikely that property in this area will change use.
B-4. Small industrial area north of the river between the Valley Freeway (SR 167) and SR 181.	With the Mixed Use (MU) land use designation and predominance of industrial activities, it is unlikely that property in this area will change use.
B-5. Industrial area located along Russell R. north of S. 228th St and south of the GRNRA	With the Industrial land use designation and predominance of industrial activities, it is unlikely that property in this area will change use. Russell Road is located in shoreline jurisdiction in this area. The comprehensive plan designation is OS (Open Space) in the Green River Trail corridor area.
B-6. Industrial area along east side of the river north of S 200th St.	It is unlikely that these relatively new facilities will change in the foreseeable future.
B-7. Industrial and commercial area east of SR 181 and south of SW 43rd St	The commercial parcel will likely develop in the near future. It is also likely that the single-family residence will redevelop into an industrial use at some point in the future. The hotel is unlikely to change because it appears to be a fairly new building.
PAA-B-1. Shorelands in the potential annexation area (PAA) generally south of the river and west of the Valley Freeway (SR 167)	This area is designated Industrial in King County's Comprehensive Plan so it is likely to remain in industrial use.
Green River Unit C – Residential (Generally Aligned with the Shoreline Residential Designation)	
C-1. Residential area north and west side of the Green River east of Central Ave	The Comprehensive Plan designation is Medium Density Multifamily and Mobile Home Park. There are no likely land use changes because the current land uses fit the comprehensive plan.
C-2. Residential area on north side of the river from one property west of SR 181 to the golf course at Russell Rd	There is little likelihood of a change in land use because the residences are relatively new and they are consistent with the MDMF (Medium Density Multifamily) land use designation.
C-3. Residential area on east side of River from James Street north to S. 228th Street	There is little likelihood of a change in land use because the residences are relatively new and they are consistent with the LDMF (Low Density Multifamily) land use designation.
C-4. Residential area on west side of River south of S 216 Street	There will be approximately 1,000 feet of new residential development with perhaps about 20 new homes in this segment. These new homes will all be separated from the shoreline by the existing frontage road, Frager Road.
C-5. Recreational Vehicle (RV) Campground (KOA) on east side of the river south of S. 212th St. and north of the GRNRA	This use is somewhat an anomaly in this area and so may change in spite of the current comprehensive plan designation. Because of the industrial uses around it, it may be developed as industrial although the GRNRA is a local amenity and so multifamily housing might be a possibility.

Sub-Unit	Likely Changes in Land Use
Green River Unit D – Agricultural (Generally Aligned with the Urban Conservancy — Low Intensity Designation)	
D-1. South of the river just west of Valley Freeway (SR 167)	This area is designated as AG-S and AG-R, so some agricultural-related low intensity commercial development may occur.
D-2. Agricultural activities on the west side of the river from Riverbend Golf Course to Cottonwood Grove Park	This area is designated as Urban Separator (US), so therefore may redevelop with low density residential or clustered residential with the possibility of some low intensity commercial.
D-3. Agricultural area on west side of river south of S. 212th Street	This area is being redeveloped into single-family houses. Since this area comprises approximately 2,000 linear feet of shoreline, it is conceivable that 20 to 40 new dwelling units might fall within shoreline jurisdiction. They would be separated from the shoreline by a frontage road.
D-4. Agricultural lands north of Valley Floor Community Park	This area is designated US (Urban Separator) and AG-R, so therefore may redevelop with low density residential or clustered residential with the possibility of some low intensity commercial

3.2 Big Soos Creek

This area is designated "Urban Separator," so therefore may redevelop with low-density residential or clustered residential with the possibility of some low-intensity commercial if part of a Planned Unit Development.

3.3 Lake Meridian

Unit A - Open Space (corresponding to the UC-OS environment designation) is unlikely to change because Lake Meridian Park is designated as OS (Open Space) in the Comprehensive Plan. The wetland area south of SR 516 currently designated in the City's Comprehensive Plan for single-family development is owned by the City of Kent and should likely be re-designated as Open Space. Unit C - Residential (corresponding to the SR environment designation) has a few lots that are either underdeveloped or could possibly be subdivided, although the effect on the overall land use would be minimal. The most likely development consists of modifications related to shoreline stabilization and piers and other overwater structures.

3.4 Lake Fenwick

Changes in land use around Lake Fenwick are unlikely within Kent jurisdiction or in the lands designated as "King Co. Other Parks/Wilderness" (corresponding to environment designations of SR and UC-OS). However, the residential-designated area within the PAA has the potential to redevelop and possibly increase in density (corresponding to an environment designation of SR).

3.5 Green River Natural Resources Area Pond

Changes in land uses are unlikely. This site is in public ownership and used for water quality and natural resource purposes (corresponding to an environment designation of UC-OS). There is a small utility property within shoreline jurisdiction.

3.6 Springbrook Creek

No changes in land use are anticipated as the adjacent land is fully developed (environment designation of HI) or protected (environment designation of UC-OS).

3.7 Jenkins Creek

No changes in land use are anticipated, as this land is protected for water supply purposes.

3.8 Panther Lake

The north, northeast, and southern tip of the lake are within the Urban Separator land use classification. This area may therefore redevelop with low-density residential or clustered residential with the possibility of some low intensity commercial (corresponding to the UC-LI environment designation). On the west side of the lake, in the area with a residential land use designation, there is approximately 1,200 linear feet within shoreline jurisdiction that is currently underdeveloped and therefore has the potential to develop into residential uses (corresponding to SR environment designation). The development pattern will likely be similar to the residential development along the southwest corner of the lake.

4. PROTECTIVE SMP PROVISIONS

4.1 Environment Designations

The first line of protection of the City's shorelines is the environment designation assignments (see map in Appendix A of the SMP). The Natural-Wetlands environment is the most restrictive, followed by the two Urban Conservancy environments (Open Space and Low Intensity). Only a few uses are allowed outright in either of these environments (primarily water-oriented uses), and several others are allowed only in special circumstances related to provision of public access or to enable restoration or as conditional uses. In some respects, the Shoreline Residential environment is as restrictive or more restrictive than the two Urban Conservancy environments. The most permissive environment is High-Intensity, which has only been assigned to those areas along the Green River and Springbrook Creek that are already developed with commercial or other uses. Most often, the High-Intensity environment is separated from the shoreline by a parallel Urban Conservancy-Open Space designation.

Tables 2 and 3 (Tables 6 and 5, respectively, in the SMP) below identify the prohibited and allowed uses and modifications in each of the shoreline environments, and clearly show a hierarchy of higher-impacting uses and modifications being allowed in the already highly altered shoreline environments, with uses more limited in the less developed areas. This strategy helps to minimize cumulative impacts by concentrating development activity in lower functioning areas that are not likely to experience function degradation with incremental increases in new development.

Table 2. Shoreline Use Matrix (Table 6 in Chapter 5.B. of the Shoreline Master Program)

P = May be permitted C = May be permitted as a conditional use only X = Prohibited; the use is not eligible for a variance or conditional use permit[12] N/A = Not applicable **SHORELINE USE**	**Natural-Wetlands**	**High-Intensity**	**Urban Conservancy - Open Space**	**Urban Conservancy - Low intensity**	**Shoreline Residential**	**Aquatic**
Agriculture	X	P[10]	P[10]	P	P[10]	X
Aquaculture	X	X	X	X	X	X
Boating facilities[14]	X	P	P	X	P	P
Commercial:						
Water-dependent	X	P	P[1]	P[9]	X	X
Water-related, water-enjoyment	X	P	P[1]	P[9]	X	X
Nonwater-oriented	X	C[4]	X	C[4, 9]	X	X
Flood hazard management	X	P	P	P	P	C
Forest practices	X	X	X	X	X	X
Industrial:						
Water-dependent	X	P	X	X	X	X
Water-related, water-enjoyment	X	P	X	X	X	X
Nonwater-oriented	X	P[4]	X	X	X	X
In-stream structures	C	C	C	C	C	C
Mining	X	X	X	X	X	X
Parking (accessory)	X	P	P[2]	P[2]	P	X
Parking (primary, including paid)	X	X	X	X	X	X
Recreation:						
Water-dependent	P[3]	P	P	P	P	P
Water-enjoyment	P[3]	P	P	P	P	X
Nonwater-oriented	X	P[4]	P[4]	C[4]	P	X
Single-family residential	X	X	X	P[8]	P	X
Multifamily residential	X	P	X	C	P	X
Land subdivision	P	P	P[5]	C	P	X
Signs:						
On premises	X	P	P[6]	C	X	X
Off premise	X	X	X	X	X	X
Public, highway	X	P	P	P	X	X
Solid waste disposal	X	X	X	X	X	X
Transportation:						
Water-dependent	X	P	P	P	C	P
Nonwater-oriented	X	P	C	C	P	C[7]
Roads, railroads	C[7]	P	P[7]	P[7]	P	C[7]
Utilities (primary)	C[7]	P	P[7]	P[7]	P	C[7]

Use Matrix Notes:

1. *Park concessions, such as small food stands, cafes, and restaurants with views and seating oriented to the water, and uses that enhance the opportunity to enjoy publicly accessible shorelines are allowed.*
2. *Accessory parking is allowed in shoreline jurisdiction only if there is no other feasible option, as determined by the City.*
3. *Passive activities, such as nature watching and trails, that require little development with no significant adverse impacts may be allowed.*

4. *Nonwater-oriented uses may be allowed as a permitted use where the City determines that water-dependent or water-enjoyment use of the shoreline is not feasible due to the configuration of the shoreline and water body or due to the underlying land use classification in the comprehensive plan.*
5. *Land division is only allowed where the City determines that it is for a public purpose.*
6. *Signs are allowed for public facilities only.*
7. *Roadways and public utilities are allowed if there is no other feasible alternative, as determined by the City, and all significant adverse impacts are mitigated.*
8. *Residences are allowed in shoreline jurisdiction only if it is not feasible, as determined by the City, to locate the building on the portion of the property outside shoreline jurisdiction.*
9. *Commercial uses are only permitted as part of a residential PUD of at least 100 acres, located within an SR zone, or at least 10 acres for residential PUDs located in other zones. Commercial uses shall be limited to those uses permitted by Title 15 KCC, as amended, in the neighborhood convenience commercial district.*
10. *Crop and tree farming only. See Section 15.04.130 KCC, as amended.*
11. *For the treatment of existing nonconforming development, see Chapter 7 Section E.*
12. *Development in channel migration zones is allowed only by conditional use permit where it can be shown that such development would not prevent natural channel migration. (Refer to the Channel Migration Zone Map, Figure No. 10.2 in the June 9, 2009 Final Shoreline Inventory and Analysis Report).*
13. *Uses noted as allowed in the Aquatic environment are allowed only if allowed in the adjacent upland environment.*
14. *Marinas are prohibited.*

Table 3. Shoreline Modification Matrix (Table 5 in Chapter 4.B. of the Shoreline Master Program)

P = May be permitted C = May be permitted as a conditional use only X = Prohibited; the use is not eligible for a variance or conditional use permit[12] N/A = Not applicable **SHORELINE MODIFICATIONS**	**Natural-Wetlands**	**High-Intensity**	**Urban Conservancy - Open Space**	**Urban Conservancy - Low Intensity**	**Shoreline Residential**	**Aquatic**
Shoreline stabilization:						
Environmental restoration/enhancement	P	P	P	P	P	P
Bioengineering	C	P	P	P	P	C
Revetments	X	P	C	C	P	C
Bulkheads	X	P	C	C	P	C
Breakwaters/jetties/rock weirs/groins	X	X	X	X	X	X
Dikes, levees	X	P	P	P	C	C
Clearing and Grading	X	P	P	P	P	NA
Dredging	N/A	N/A	N/A	N/A	N/A	C
Hazardous waste cleanup	P	P	P	P	P	P
Fill[1]	X	P	P	P[3]	P[3]	C[2]
Piers, docks[4]	X	P	P	P	P	P
Moorage piles and mooring buoys	X	X	X	X	X	X

Shoreline Modifications Matrix Notes:

1. *Fill in the floodplain must meet all federal, state, and local flood hazard reduction regulations.*
2. *Fill in aquatic areas for the purposes of shoreline ecological restoration may be allowed as a permitted use if the City determines that there will be an increase in desired ecological functions.*
3. *Disposal of dredge material within a channel migration zone shall require a conditional use permit (refer to the Channel Migration Zone Map, Figure No. 10.2 in the Inventory and Analysis Report).*
4. *New non-public piers and docks are prohibited on the Green River.*

4.2 General Goals, Policies and Regulations

The SMP contains numerous general policies, with supporting regulations (see SMP), intended to protect the ecological functions of the shoreline and prevent adverse cumulative impacts. These policies are summarized below.

- Critical areas within shoreline jurisdiction will be regulated per the critical areas regulations, which were developed using best available science (see **3.B.3** of the SMP and Chapter 11.06 of the KCC).
- All new development should provide adequate setbacks to protect or restore ecological functions and ecosystem-wide processes, consistent with the critical areas regulations.
- All significant adverse impacts to the shoreline should be avoided or, if that is not possible, minimized to the extent feasible (see **3.B.4**).
- Protect and, where appropriate, restore the physical integrity of ecological processes, including water and sediment transport and natural channel movement (**3.B.5.b.2.b**).
- Vegetation within the City shoreline areas should be enhanced over time to provide a greater level of ecological functions, human safety, and property protection (**3.B.11.b.1**).
- Protect water quality and natural groundwater movement (**3.B.12.b** and **3.B.5.b.2.c**).
- Protect fish, vegetation, and other life forms and their habitat vital to the aquatic food chain (**3.B.5.b.2.d**).

Setbacks have been established by environment designation and for specific uses as follows:

Table 4. Development Standards Matrix (Table 7 in Chapter 5.B. of the Shoreline Master Program)

DEVELOPMENT STANDARDS[1, 5] (Regulatory citation in parentheses)	Natural-Wetlands	High-Intensity	Urban Conservancy - Open Space	Urban Conservancy - Low Intensity	Shoreline Residential	Aquatic
Commercial Development *(Ch. 5 Sec. C.4)*						
Water-dependent setback	N/A	0	0	0	N/A	N/A
Water-related, water-enjoyment setback[4]	N/A	30'[2]	30'[2]	50'[2]	N/A	N/A
Nonwater-oriented setback[4]	N/A	70'[2]	70'[2]	100'[2]	N/A	N/A
Industrial Development *(Ch. 5 Sec. C.5)*						
Water-dependent *(Ch. 5. Sec C.5.c.9)*	N/A	0	N/A	N/A	N/A	N/A
Water-related and water-enjoyment[4] *(Ch. 5 Sec.C.5.c.9)*	N/A	50'[2]	N/A	N/A	N/A	N/A
Nonwater-oriented[4] *(Ch. 5. Sec. C.5.c.9)*	N/A	100'[2]	N/A	N/A	N/A	N/A

DEVELOPMENT STANDARDS[1, 5] (Regulatory citation in parentheses)	Natural-Wetlands	High-Intensity	Urban Conservancy - Open Space	Urban Conservancy - Low Intensity	Shoreline Residential	Aquatic
Accessory Parking *(Ch. 3 Sec. B.6)*						
Setbacks[4]	N/A	70'[2]	70'[2]	70'[2]	N/A[3]	N/A
Recreational Development						
Water-dependent park structures setback	N/A	0	0	0	N/A	N/A
Water-related, water-enjoyment park structures setback	N/A	20'	20'	20'	N/A	N/A
Nonwater-oriented park structures setback[4] *(Ch. 5 Sec. C.7.c.4)*	N/A	70'[2]	70'[2]	70'[2]	N/A	N/A
Miscellaneous						
New agricultural activities setback *(Ch. 5 Sec. C.2.c.4)*	N/A	N/A	N/A	20'[2]	N/A	N/A
Residential Development[4]	See regulations in Ch. 5 Sec. C.8.c					

Development Standards Matrix Notes:

1. *See Chapter 3 Section B.1.c.7 for setbacks to accommodate future Green River levee reconstruction.*
2. *The City may reduce this dimension if it determines that the type of development allowed within this SMP and other municipal, state, and federal codes cannot be accommodated within the allowed site development area by reconfiguring, relocating, or resizing the proposed development. Where the City reduces a requirement, compensatory mitigation, such as vegetation enhancement or shoreline armoring removal, must be provided as determined by the City.*
3. *See regulation 5.B.8.c for residential development standards.*
4. *The setback for all development, except water-dependent development, on the Green River not separated from the shoreline by a levee is 150 feet.*
5. *For height regulations, see Chapter 15.04 KCC, as amended, for the underlying zoning district.*

4.3 General Cumulative Impacts Assessment

The following table (Table 5) summarizes for each environment designation and corresponding waterbody the existing conditions, anticipated development, relevant Shoreline Master Program (SMP) and other regulatory provisions, and the expected net impact on ecological function. Certain special topics are discussed and analyzed in greater detail in Chapter 5 following the table. The discussion of existing conditions is based on the *Final Shoreline Inventory and Analysis Report*, and additional analysis needed to perform this assessment. The *Final Shoreline Inventory and Analysis Report* includes a more in-depth discussion of the topics below, as well as information about transportation, stormwater and wastewater utilities, impervious surfaces, and historical/archaeological sites, *among others.* Jenkins Creek is not included in the table as it is a protected watershed area and owned and managed by the City of Kent for drinking water.

In addition to the environment designations discussed in the following tables, the following designations will apply to those applicable areas of shoreline jurisdiction:

"Natural-Wetlands" Environment - The purpose of the "Natural-Wetlands" environment is to protect and restore all wetlands associated with shorelines by applying the City of Kent Critical Areas regulations. These systems require development restrictions to maintain the ecological

functions and ecosystem-wide processes. A "Natural-Wetlands" environment designation will be assigned to all wetlands in shoreline jurisdiction.

"Aquatic" Environment - The purpose of the "Aquatic" environment is to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high water mark. An "Aquatic" environment designation will be assigned to shoreline areas waterward of the ordinary high-water mark.

The critical areas regulations and the prohibition of most uses and modifications in the Natural-Wetlands environment ensure no net loss of ecological functions in this environment. Aquatic environment impacts are discussed in other sections below.

4.4 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 2004). However, SMP updates seek not only to maintain conditions, but to improve them:

> "…[shoreline master programs] include planning elements that when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county (WAC 173-26-201(c))."

The guidelines state that "master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program" (WAC 173-26-201(2)(f)). Pursuant to that direction, the City has prepared a Shoreline Restoration Plan, which is a non-regulatory chapter of the SMP (Chapter 8). .

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

The Shoreline Restoration Plan identifies a number of project-specific opportunities for restoration on both public and private properties inside and outside of shoreline jurisdiction, and also identifies ongoing City programs and activities, non-governmental organization programs and activities, and other recommended actions consistent with a variety of watershed-level efforts (**Sections 8.D** and **8.E**, see Appendix C in the SMP for the site-specific restoration opportunities map).

Table 5. General Cumulative Impacts Assessment.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
HIGH INTENSITY					
Green River (all or portions of segments B1-7 and PAA-B1 as described in SMP **Section 2.C.2.d** and Appendix A of the SMP)	These segments include areas generally dominated by commercial and industrial uses. This includes industrial areas just east and west of SR 167 (near SE 259th St.), along Russell Road between I-5 and SR 167, and near Briscoe Park (just south of S 180th St.). Uses are generally one-story buildings surrounded by surface parking lots. A majority of the buildings are separated from the shoreline by the Green River Trail corridor and Urban Conservancy – Open Space environment designation.	**Future Development:** It is likely that underdeveloped shoreline properties (approximately 1,000 feet of shoreline) will, over time, convert to large- to moderate-scale industrial uses. Remaining areas are built-out and thus unlikely to undergo extensive redevelopment. **Functions/Processes Impacted:** 1. Hydrology: Because of the position of the potential new development relative to the river and the levee, potential impacts are generally related to indirect effects of new impervious surface and stormwater management on hydrologic processes (see Table 14a of the *Final Shoreline Inventory and Analysis Report*). Per the analysis in Table 14a of the *Final Shoreline Inventory and Analysis Report*, hyporheic function currently is low because of past hydromodifications to the system. 2. Vegetation and habitat: Upland and aquatic habitat and vegetation functions related to the Green River shoreline would be largely unaffected by new and redevelopment. The function of all leveed Green River segments is likely to improve over time with implementation of levee improvements. Even in the most constrained portions of the High-Intensity environment, the reconstructed levee would likely include improved riparian vegetation on the waterward side, large woody debris, and possibly reduced bank slope or an increased levee setback. Reconstruction of levees to include benches can allow overbank flooding of the bench, thus contributing to restoration of ecological functions that protect and improve water quality and wildlife habitat.	SMP policies for the "High Intensity" environment (see **Section 2.C.2** in the SMP) state that: • "Developments in the 'High-Intensity' environment should be managed so that they enhance and maintain the shorelines for a variety of urban uses, with priority given to water-dependent, water-related, and water-enjoyment uses." • "In order to make maximum use of the available shoreline resource and to accommodate future water-oriented uses, shoreline restoration and/or public access, the redevelopment and renewal of substandard, degraded, obsolete urban shoreline areas should be encouraged." All private development would be subject to 140- or 150-foot setbacks depending upon whether a levee is present (140 feet if a levee is present and 150 feet if no levee is present) (SMP **Section 3.B.1.c.7**). All HI-designated areas and associated new and re-development on the Green River are located landward of the existing levee. The SMP (and by reference the critical areas regulations) prohibits projects that "cause significant ecological impacts… unless mitigated according to" standard mitigation sequencing outlined in **Section 3.B.4.c.4**. SMP **Sections 3.B.5** (Flood Hazard Reduction and River Corridor Management) and **3.B.12** (Water Quality and Quantity) have a number of provisions that will minimize adverse modifications to the river channel that might further impair water quality or water movement through the system. The Commercial Development standards (**Section 5.C.4.c.4**) stipulate that "All new commercial development proposals will be reviewed by the City for ecological restoration and public access opportunities. When restoration or public access plans indicate opportunities exist, the City may require that those opportunities are either implemented as	1. Any in- or over-water (including wetlands) proposals would require review not only by the City of Kent, but also by the Washington Department of Fish and Wildlife (WDFW), the U.S. Army Corps of Engineers (Corps), and/or the Washington Department of Ecology. Each of these agencies is charged with regulating and/or protecting streams, lakes, and wetlands, and would impose certain design or mitigation requirements on applicants. A project that includes stream, lake, or wetland fill would require Corps review and permitting. For similar projects along the Green River, a Biological Evaluation would be prepared to assess project impacts on listed fish and wildlife, and that document would be routed to U.S. Fish and Wildlife Service and National Marine Fisheries Service for Endangered Species Act review. These agencies would also impose certain design and mitigation requirements on a proposed project to minimize adverse impacts. 2. As mentioned in the *Final Shoreline Inventory and Analysis Report*, the City currently uses its 2002 *Kent Surface Water Design Manual*, which is an addendum to the *1998 King County Surface Water Design Manual*. The City will be updating its *Surface Water Design Manual* as part of the NPDES Phase II permit requirement. Both Ecology's 2005 *Stormwater Management Manual for Western Washington* and *King County's 2005 Surface Water Design Manual* will be evaluated as the NPDES Phase II permit requires that the City use minimum requirements that are equivalent to Ecology's manual. Use of the current and future updated stormwater manuals will ensure that stormwater management is effectively designed to minimize/eliminate construction- and operations-related stormwater runoff impacts and mitigate any potential remaining adverse affects. 3. The Natural Resources section of the Land Use chapter of the City of Kent's Comprehensive Plan contains a number of general and specific goals and policies that direct the City to permit and	Because of the developed nature of this environment and redevelopment pressures, unmitigated new development has the potential to further degrade the baseline condition. Strict implementation of the SMP and the critical areas regulations will be needed to minimize impacts, and is expected to result in the long-term improvement in ecological function. Specifically, requirements for stormwater management, minimization of impervious surface, and installation of native vegetation will help minimize and mitigate impacts. Further the planned implementation of the Green River levee reconstruction and numerous other projects under WRIA 9, the Green/Duwamish Ecosystem Restoration Project, and the King County Flood Control District, ensure that ecological function will be substantially improved in the long-term.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
			part of the development project or that the project design be altered so that those opportunities are not diminished." This is expected to result in moderate to substantial shoreline function improvements over time. The Industry regulations (SMP **Sections 5.C.5.1 and 8**) also require minimization of impervious surfaces, installation of native landscaping, and use of Low Impact Development (LID) techniques when appropriate.	condition development in such a way that the natural environment is protected, preserved and enhanced. Techniques suggested by the various policies to protect the natural environment include requiring setbacks from sensitive areas, preventing adverse alterations to water quality and quantity, preserving existing vegetation, educating the public, and mitigating necessary sensitive area impacts, among others. 4. The City of Kent will be implementing a long-term program to reconstruct the Green River levee so that it meets federal certification requirements for the 100-year flood. To the extent possible, the levee will be set back farther from the existing ordinary high water mark, floodplain benches will be installed with native riparian vegetation, and large woody debris will be incorporated into the toe and placed on the benches (SMP **Section 8.E.2.a**). While there may be short-term construction impacts and temporal loss of vegetation cover in some areas, the levee reconstruction projects in all cases will improve habitat function for salmonids, other aquatic life, and terrestrial wildlife that utilize riparian corridors. As further described in the SMP (**Sections 8.D.1-3, 13**), the City also is engaging in a number of projects implementing WRIA 9 actions and the Green/Duwamish Ecosystem Restoration Project (ERP). The ERP is cooperative effort between 16 local governments, Indian Tribes, the State of Washington, NOAA Fisheries Service, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and many other organizations and private citizens. Funding is certain for many of these projects, and the effect of those projects will also be to improve habitat function and other ecosystem-wide processes.	
Springbrook Creek	The two industrial parcels to either side of the stream are developed, with buildings between 100 and 200 feet from the ordinary high water mark, and parking areas 50 or more feet from the ordinary high water mark. Some riparian plantings and LWD have	**Future Development:** While the specific uses within the developed footprint of the Springbrook Creek shoreline may change, the impervious footprint is not expected to increase and remaining vegetation is not expected to be cleared or altered. **Functions/Processes Impacted:** No new impacts to functions or processes are expected, except possible improvements to adjacent stormwater runoff management which	Same as above for High Intensity – Green River, other than the setback discussion.	Same as items #1-3 above in High Intensity for Green River.	No net loss of ecological functions is expected as no alterations to the existing conditions in this environment along Springbrook Creek are likely to occur.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
	been installed by the City in the narrow strip of park land that parallels the creek on the east side.	may support improved water quality.			
URBAN CONSERVANCY – OPEN SPACE					
Green River (all or portions of segments A2-3, A5-6, A8-11 and PAA-A1, as well as parallel designations in segments B1, B3-5, C1-3, and C5 as described in SMP **Section 2.C.3.d** and as shown in Appendix A of the SMP)	These segments contain land areas in shoreline jurisdiction dominated by natural areas, trails, opens spaces, and parks. These areas include Foster Park, Riverview Park, the Riverbend Golf Complex, the Green River Natural Resources Area, Valley Floor Community Park, the Green River Trail, and the future North Green River Park.	**Future Development:** The only "development" likely is related to passive recreation improvements or restoration activities. **Functions/Processes Impacted:** Any new actions would either have no or negligible effect on ecological functions or would contribute to restoration of ecological functions. Similar to Green River shoreline areas designated High Intensity, the function of all leveed Green River segments is likely to improve over time with implementation of levee improvements. Reconstructed levees would likely include improved riparian vegetation on the waterward side, large woody debris, and reduced bank slope or an increased levee setback. Reconstruction of levees to include benches can allow overbank flooding of the bench, thus contributing to restoration of ecological functions that protect and improve water quality and wildlife habitat. Further, all private development would be subject to 140- or 150-foot setbacks depending upon whether a levee is present (140 feet if a levee is present and 150 feet if no levee is present). However, public development (roads and trails) could be located within the setback.	SMP policies for the "Urban Conservancy – Open Space" environment (**SMP Section 2.C.3**) state that: • "Water-oriented recreational uses should be given priority over nonwater-oriented uses. Water-dependent recreational uses should be given highest priority." • "Standards should be established for shoreline stabilization measures, vegetation conservation, water quality, and shoreline modifications within the 'Urban Conservancy-Open Space' designation to ensure that new development does not further degrade the shoreline and is consistent with an overall goal to improve ecological functions and habitat." The SMP (and by reference the critical areas regulations) prohibits projects that "cause significant ecological impacts… unless mitigated according to" standard mitigation sequencing outlined in **Section 3.B.4.c.4**. The most active floodplain/floodway areas in the UC-OS environment with potential for alteration are found in the southern portion of the City, in the Horsehead Bend area. SMP **Section 4.C.4.c** generally prohibits fills in the floodplain or floodway, except in special circumstances, thereby protecting basic hydrologic functions and processes. Further, the Recreational Development regulations (SMP **Section 5.C.7.c.3**) stipulate that "All new recreational development proposals will be reviewed by the City for ecological restoration and public access opportunities. When restoration or public access plans indicate opportunities exist for these improvements, the City may require that those opportunities are either implemented as part of the development project or that the project design be altered so that those opportunities are not	Same as items #1-4 above in High Intensity for Green River. In addition to levee restoration, several WRIA 9 projects are planned in UC-OS segments (see Restoration Projects map in Appendix C of the SMP, and descriptions located in SMP **Sections 8.D.13, 8.E.1**, and **8.E.2.a**). In addition, the City Parks, Recreation & Community Services Department engages in a number of restoration and outreach activities that are described in SMP **Section 8.D.9**.	The substantial presence of critical areas in this environment, combined with the limited pressure for any substantial new or re-development and the provisions of the SMP, ensures that environmental conditions in this environment will not be degraded relative to existing baseline. In fact, long-term plans for implementation of the Green River levee reconstruction and numerous other projects under WRIA 9, the Green/Duwamish Ecosystem Restoration Project, and the King County Flood Control District, ensure that ecological function will be substantially improved in the long-term.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
			diminished." This is expected to result in moderate to substantial shoreline function improvements over time.		
Lake Meridian (all of segment A as described in SMP **Section 2.C.3.d** and as shown in Appendix A of the SMP)	This segment is made up entirely of Lake Meridian Park, which occupies a roughly 1,400-foot stretch of shoreline at the southeast corner of the lake. The shoreline is primarily free of shoreline armoring, although it does contain the largest pier on the lake.	**Future Development:** The only "development" likely in Lake Meridian Park is related to passive recreation improvements or restoration activities (such as the recent outlet work). **Functions/Processes Impacted:** Any new actions would either have no effect on or contribute to restoration of ecological functions.	Same as above for Urban Conservancy – Open Space on the Green River, excluding the floodplain/floodway discussion.	Same as items #1-3 above in High Intensity for Green River. Phase I of the Lake Meridian Outlet Relocation project was recently completed by the City at the mouth of Lake Meridian, and Phases II and III will be completed in 2009 to restore the connection to Big Soos Creek (see Restoration Opportunities map in Appendix C of the SMP, and descriptions located in **Sections 8.D.2** and **8.D.12.c**). The City Parks, Recreation & Community Services Department engages in a number of restoration and outreach activities that are described in SMP **Section 8.D.9**.	The substantial presence of critical areas (stream outlet, adjacent wetlands) in this environment, combined with the limited pressure for any substantial new or re-development and the provisions of the SMP, ensures that environmental conditions in this environment will not be degraded relative to existing baseline.
Springbrook Creek (see SMP **Section 2.C.3.d** for segment description and Appendix A of the SMP for map)	This segment contains two narrow bands of riparian vegetation between the stream and the adjacent paved developed sites.	**Future Development:** No development is planned in these riparian corridors. The only anticipated activity is possibly further restoration and maintenance of native plantings. **Functions/Processes Impacted:** Any new actions would either have no net effect on or contribute to restoration of ecological functions.	The Vegetation Conservation regulations in SMP **Section 3.B.11** and the Critical Areas regulations adopted by reference effectively protect these narrow riparian corridors from adverse alterations.	Same as items #1-3 above in High Intensity for Green River. In 2004, the City restored habitat along Springbrook Creek stream banks, in and upstream of shoreline jurisdiction (see Restoration Opportunities map in Appendix C of the SMP, and description located in **Section 8.D.12.a**). As this vegetation continues to mature, the functions that vegetation provides will increase – including shade, organic input, possible large woody debris recruitment, and habitat for birds.	Conditions are expected to improve over time in this small segment as vegetation matures. No adverse alterations are anticipated.
Lake Fenwick (all or portions of segment A as described in SMP **Section 2.C.3.d** and as shown in Appendix A of the SMP)	This segment is made up entirely of two separate segments of Lake Fenwick Park on the north side of the lake. Lake Fenwick has very minimal shoreline modification, mostly in scattered short sections associated with a small fishing pier, the boardwalk trail crossing and a boat launch. Additional armoring is found along the shoreline adjacent to the parking lot, with vertical timbers and with inset steps for lake access.	**Future Development:** The only future "development" likely in Lake Fenwick Park is related to passive recreation improvements, maintenance, or restoration activities. **Functions/Processes Impacted:** Any new actions would either have no net effect on or contribute to restoration of ecological functions. Most of the activity is expected to be related to repairs and improvements to existing structures.	Same as above for Urban Conservancy – Open Space on the Green River	Same as items #1-3 above in High Intensity for Green River. To control an infestation of the highly aggressive aquatic plant Brazilian elodea, the City is introducing grass carp to the lake. If successful, the grass carp introduction will improve water quality and aquatic habitat (see Restoration Opportunities map in Appendix C of the SMP, and description located in **Section 8.D.12.d**). In addition, the City Parks, Recreation & Community Services Department engages in a number of restoration and outreach activities that are described in the SMP **Section 8.D.9**.	The substantial presence of critical areas (stream outlet, adjacent wetlands) in this environment, combined with the limited pressure for any substantial new or re-development and the provisions of the SMP, ensures that environmental conditions in this environment will not be degraded relative to existing baseline. Further, successful control of Brazilian elodea should improve aquatic habitat.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
	Other access points with no vegetation are armored with either timbers or boulders. Small gravel is found along the boat launch area with pre-cast concrete slabs in the water.				
URBAN CONSERVANCY – LOW INTENSITY					
Green River (all or portions of A1, A4, A7, D1-2, D4 and PAA-A1 as described in SMP **Section 2.C.4.d** and as shown in Appendix A of the SMP)	This segment consists of agricultural and agricultural support uses. Agricultural areas are primarily pasture land, and a large area at the south end of the City surrounding Mill Creek Auburn is within Green River/Mill Creek-associated floodway/floodplain.	**Future Development:** These areas have the potential to redevelop with low-density residential or low-intensity commercial (commercial is only allowed as part of a PUD; the site must be 100 acres in the SR-1 zone). UC-LI areas that are located in floodways are unlikely to have any new developments, and would be restricted to maintenance of existing primarily agricultural and some residential structures and uses. **Functions/Processes Impacted:** Development of the Urban Conservancy – Low Intensity segments currently in agriculture likely has the greatest potential for adverse impacts compared to potential development in other shoreline areas and environments. 1. Hydrology: Possible impacts to hydrologic processes via indirect effects of new impervious surface and stormwater management associated with low-density residential are the primary concern. In addition, several of the UC-LI segments are unleveed with high quality riparian vegetation (mostly in the PAA south of Horsehead Bend within North Green River Park). Activities that would remove that functioning vegetation corridor would have substantial adverse impacts to aquatic and upland habitat and bank stability. 2. Vegetation and habitat: Substantial areas of new impervious surface are possible, replacing vegetation (even if only seasonal crops). However, many of the UC-LI	SMP polices for the "Urban Conservancy – Low Intensity" environment (SMP Section 2.C.4) state that: • "Uses in the 'Urban Conservancy–Low Intensity' environment should be limited to those which are non-consumptive (i.e., do not deplete over time) of the shoreline area's physical and biological resources and uses that do not substantially degrade ecological functions or the rural or natural character of the shoreline area. Shoreline habitat restoration and environmental enhancement are preferred uses." • "Where allowed, commercial uses should include substantial shoreline restoration and public access." • "Preservation of ecological functions should have priority over public access, recreation, and development objectives whenever a conflict exists." The same comments as for High Intensity regarding stormwater management and mitigation sequencing apply here as well. The most active floodplain/floodway areas in the UC-LI environment with potential for alteration are found in the southern portion of the City, in the agricultural area on the south side of the river west of SR 167. SMP **Section 4.C.4.c** generally prohibits fills in the floodplain or floodway, except in special circumstances, thereby protecting basic hydrologic functions and processes. Further, the Commercial Development standards	Same as items #1-4 above in High Intensity for Green River. In addition to levee projects on the Green River, one other WRIA 9 project on Lower Mill Creek will be implemented by the City (see Table 11 and Appendix C in the SMP, as well as **Section 8.D.1**). The project would provide off-channel habitat during high river flows, enhance riparian habitat, increase low flow rearing habitat for juvenile salmonids, increase wetland areas and increase floodplain storage.	While there is pressure for new development on the Green River, SMP provisions, including setbacks, Restoration Plan project implementation; and levee reconstruction ensure that environmental conditions in this environment will not be degraded relative to existing baseline over the long term. It will be critical to evaluate projects on a site-specific and project-specific basis, however, and utilize the available impact minimization and protective provisions of the SMP.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
		segments are located along leveed portions of the Green River, reducing the potential direct adverse affects of riparian vegetation related to loss of organic inputs, large woody debris, water quality filtration, etc. As previously mentioned large areas of UC-LI are in the floodway and habitat-altering modifications are not expected. Similar to Green River shoreline areas designated High Intensity, the function of all leveed Green River segments is likely to improve over time with implementation of levee improvements. Reconstructed levees would likely include improved riparian vegetation on the waterward side, large woody debris, and reduced bank slope or an increased levee setback. Reconstruction of levees to include benches can allow overbank flooding of the bench, thus contributing to restoration of ecological functions that protect and improve water quality and wildlife habitat.	(SMP **Section 5.C.4.c.4**) stipulate, "All new commercial development proposals will be reviewed by the City for ecological restoration and public access opportunities. When restoration or public access plans indicate opportunities exist, the City may require that those opportunities are either implemented as part of the development project or that the project design be altered so that those opportunities are not diminished." This is expected to result in moderate to substantial shoreline function improvements over time. However, it is not certain without detailed site- and project-specific information whether that restoration would offset the impacts of an agriculture conversion to commercial or residential use. Residential Development is required to direct runoff to infiltration or detention/ treatment systems, which minimizes hydrologic and water quality impacts from those uses (SMP **Section 5.C.8.c.13**). Depending on the type of agricultural use being converted to residential use, water quality may improve because of a reduction or change in the type and/or method of chemical (pesticide, herbicide, fertilizer) application.		
Big Soos Creek (see Appendix A of the SMP for map)	Three of the five parcels in this segment contain single-family residences, the fourth is part of King County's Soos Creek Park, and the fifth is owned by WSDOT for stormwater facilities. Most of the shoreline area is wetland and floodplain.	**Future Development:** The segment may redevelop with low-density residential or clustered residential with the possibility of some low-intensity commercial. **Functions/Processes Impacted:** Because the residential setback on Big Soos Creek is 200 feet and much of the shoreline area is wetland and/or floodplain, any redevelopment is unlikely to have significant adverse affects on function. Very little further alteration of the shoreline area is expected.	Same as above for Urban Conservancy – Low Intensity on the Green River. Further, the residential setback on Big Soos Creek is 200 feet (SMP **Section 5.C.8.c.9**).	Any proposed alteration of shoreline that directly impacts wetlands or the stream would be reviewed by state and federal government agencies as well, adding an additional layer of impact and mitigation review and oversight.	Limited redevelopment pressure, critical areas regulations, and SMP provisions ensure that any development in shoreline jurisdiction of Big Soos Creek would not result in net loss of ecological function.
Panther Lake (all of segment A as described in SMP **Section 2.C.4.d** and as shown in Appendix A of the SMP)	This segment consists of low-density residential parcels in the northern and eastern portions of the lake and a small segment in the extreme southern portion of the lake. Panther Lake does not appear to have any shoreline modifications, with the	**Future Development:** This area may redevelop with low density residential, clustered residential, or possibly some low intensity commercial uses. **Functions/Processes Impacted:** Given the large percentage of Panther Lake shoreline that is wetland, new development within shoreline jurisdiction is expected to be limited. New developments will be reviewed and	Same as above for UC – Low Intensity on the Green River.	Effects from other local regulations are unknown at this time. Panther Lake is currently only in Kent's PAA, and is subject to King County's SMP. However, similar to the above information, direct wetland or lake impacts would also be regulated by state and federal agencies.	It is expected that King County's SMP will meet State requirements for no net loss of ecological function.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
	exception of the public boat launch.	permitted by King County under its updated SMP (adoption pending). Some impervious surface increases and some vegetation removal, however, is still likely and would have adverse affects potentially on water quality and habitat.			
SHORELINE RESIDENTIAL					
Green River (all or portions of C1-6 and D3 as described in SMP **Section 2.C.5.d** and as shown in Appendix A of the SMP)	This segment is composed of primarily multi-family residential units, along with the KOA RV campground and a small amount of small-lot single-family homes.	**Future Development:** Redevelopment of residential uses is possible. The potential for significant new development is very limited due to the extent of existing development. **Functions/Processes Impacted:** It's not likely that redevelopment would cause direct impacts or contribute to cumulative impacts because of its location on the opposite side of levees and trails. The levees and trails are located in other environment designations.	SMP policies for the "Shoreline Residential" environment (SMP **Section 2.C.5**) state that: • "Land division and development should be permitted only 1) when adequate setbacks or buffers are provided to protect ecological functions and 2) where there is adequate access, water, sewage disposal, and utilities systems, and public services available and 3) where the environment can support the proposed use in a manner which protects or restores the ecological functions." • "New residential development should be located and designed so that future shoreline stabilization is not required." The same comments as for High Intensity regarding stormwater management and mitigation sequencing apply here as well. Residential Development is required to direct runoff to infiltration or detention/ treatment systems, which minimize hydrologic and water quality impacts from those uses (SMP **Section 5.C.8.c.13**). All private development would be subject to 140- or 150-foot setbacks depending upon whether a levee is present (140 feet if a levee is present and 150 feet if no levee is present) (SMP Section **3.B.1.c.7**). All SR-designated areas and associated new and re-development on the Green River are located landward of the existing levee.	Any proposed alteration of shoreline that directly impacts wetlands or the river would be reviewed by state and federal government agencies as well, adding an additional layer of impact and mitigation review and oversight.	New and redevelopment has the potential to degrade the baseline condition. However, the combined, strict implementation of the SMP and the critical areas regulations should minimize impacts. If mitigation for potential setback reductions includes removal of substantial shoreline hardening and/or supplementation of native shoreline plantings, ecological function in developed residential areas could improve in the long term.
Lake Meridian (all of segment C as described in SMP **Section 2.C.5.d** and as	This segment is dominated by single-family homes, along with a mobile home park occupying	**Future Development:** This segment has several lots that are either underdeveloped or could possibly be subdivided. **Functions/Processes Impacted:** As	The applicable SMP policies for the "Shoreline Residential" environment are provided above in the Shoreline Residential – Green River discussion. The same comments as for High Intensity – Green	Any proposed alteration of shoreline that directly impacts wetlands or the lake would be reviewed by state and possibly federal government agencies as well, adding an additional layer of impact and mitigation	New and redevelopment has the potential to degrade the baseline condition. However, the combined, strict implementation of the

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
shown in Appendix A of the SMP)	approximately 300 feet of shoreline. Lake Meridian has been altered with a variety of armoring and alteration types, including piers, boatlifts, boathouses, and moorage covers. Approximately 90 percent of private residences have a dock.	described above, new development is typically accompanied by impervious surface increases and vegetation removal. On Lake Meridian, these alterations may degrade upland and aquatic wildlife habitat, and reduce lake water quality (if driveway runoff was directed untreated to the lake). Additional impacts could occur with associated new pier development (discussed separately below in Section 5.2).	River regarding stormwater management and mitigation sequencing apply here as well. Provisions for runoff management in the Residential Development section are the same as listed above under Shoreline Residential – Green River. A detailed discussion of effects of SMP provisions related to residential setbacks is presented below in Section 5.1. The regulations in SMP **Section 5.C.8.c** provide for a protective setback of 75 feet, and allowances for reductions that could occur only when paired with substantial restoration elements related to vegetation or shoreline hardening. A detailed discussion of effects of SMP provisions related to residential piers is presented below in Section 5.2. The regulations in SMP **Section 4.C.3.c** contain strict dimensional and materials standards. New and replacement shoreline stabilization is more likely on Lake Meridian than any of the other shoreline waterbodies. The regulations contained within SMP **Section 4.C.2.c** will considerably reduce the potential for new hard shoreline stabilization, and will likely result over time in conversions of existing hard structural stabilization to soft structural stabilization (see more detailed discussion below in Section 5.3).	review and oversight.	SMP and the critical areas regulations should minimize impacts. Lake Meridian has the most intense residential development along the shoreline compared to other waterbodies. Detailed assessment of the most common impacting activities is provided in Sections 5.1, 5.2 and 5.3 below. If mitigation for potential setback reductions includes removal of substantial shoreline hardening and/or supplementation of native shoreline plantings, ecological function in developed residential areas could improve in the long term.
Lake Fenwick (all of segments C and PAA-C as described in SMP **Section 2.C.5.d** and as shown in Appendix A of the SMP)	This segment includes approximately 700 feet of primarily undeveloped shoreline at the northeast corner of the lake which is in single-family ownership and the remaining southern portions of the lake shoreline which is dominated by single-family parcels. Several of the single-family homes found along the lake have a small floating dock and/or minor shoreline armoring.	**Future Development:** Residential parcels have the potential to redevelop and possibly increase in density. **Functions/Processes Impacted:** Except for a small section of Shoreline Residential environment separated from the lake by UC-OS, this segment is limited to the PAA and is governed by King County's SMP. Some impervious surface increases and some vegetation removal are likely and could have adverse affects on water quality and habitat.	The applicable SMP policies for the "Shoreline Residential" environment are provided above in the Shoreline Residential – Green River discussion. The same comments as for High Intensity – Green River regarding stormwater management and mitigation sequencing apply here as well. Provisions for runoff management in the Residential Development section are the same as listed above under Shoreline Residential – Green River.	Unknown at this time. This segment of Lake Fenwick is currently mostly in Kent's PAA, and is subject to King County's SMP.	It is expected that King County's SMP will meet State requirements for no net loss of ecological function.

Shoreline Segment	Existing Conditions	Likely Development / Functions or Processes Potentially Impacted	Effect of SMP Provisions	Effect of Other Development and Restoration Activities / Programs	Net Effect
Panther Lake (all of segment C as described in SMP **Section 2.C.5.d** and as shown in Appendix A of the SMP)	This segment is made up of two separate areas of single-family development, along a majority of the western portion of shoreline and small section in the southeast corner of the lake. Panther Lake does not appear to have any residential shoreline modifications.	**Future Development:** There is approximately 1,200 linear feet that is currently underdeveloped and therefore has the potential to develop into residential uses. **Functions/Processes Impacted:** New developments will be reviewed and permitted by King County under its updated SMP (adoption pending). Some impervious surface increases and some vegetation removal is likely and could have adverse affects on water quality and habitat.	Any development proposals or activities would be reviewed by King County under its new SMP until such time as the City annexes this area.	Unknown at this time. Panther Lake is currently only in Kent's PAA, and is subject to King County's SMP.	It is expected that King County's SMP will meet State requirements for no net loss of ecological function.

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5. "SHORELINE RESIDENTIAL" DEVELOPMENT IMPLICATIONS

In addition to the cumulative analysis presented in the tables above, this section will expand on several key areas of development/functions associated with redevelopment of the "Shoreline Residential" environment designation on Lake Meridian.

5.1 Residential Setbacks on Lake Meridian

With the possible exception of limited additional residential lands being acquired for public open space, land use in the Shoreline Residential environment is not expected to change over the next 20 years, although new residential development and substantial remodels are anticipated. Typically, development of vacant lots into residential uses would result in replacement of pervious, vegetated areas with impervious surfaces and a landscape management regime that often includes chemical treatments of lawn and landscaping. However, there are only a few lots which are underdeveloped that have this potential. These actions can have multiple effects on shoreline ecological functions, including:

- Reduction in ability of site to improve quality of waters passing through the untreated vegetation and healthy soils.
- Potential contamination of surface water from chemical and nutrient applications.
- Increase in surface water runoff due to reduced infiltration area and increased impervious surfaces, which can lead to excessive soil erosion and subsequent in-lake sediment deposition.
- Elimination of upland habitat occupied by wildlife that use riparian areas.

The original Shoreline Master Program had a minimum residential setback of 25 feet, although it could be increased to as much as 75 feet depending on the location of the adjacent residences (Table 6). Under the proposed SMP (Chapter 5, Residential Development), the minimum standard shoreline setback for lakefront properties will be 75 feet. A setback of greater than 75 feet will apply to those parcels with adjacent properties that have setbacks greater than 75 feet.

Table 6. Comparison of setbacks between the original and proposed SMP.

Shoreline Environment	Original SMP	Proposed SMP
Urban – Lake Residential (proposed Shoreline Residential)	25 ft standard (if there are no adjacent residences) Otherwise, average of adjacent setbacks; no greater than 75 ft	75 ft standard (if there are no adjacent residences) Otherwise, average of adjacent setbacks; no less than 75 ft.

Using a subset of existing data[1] from Lake Meridian, the average residential setback from the OHWM is 99.5 feet. Using the same data, the average lot is approximately 322 feet deep. A more detailed breakdown of the existing setbacks within this subset of Lake Meridian Shoreline Residential environment is provided in Table 7.

Table 7. Existing shoreline setback data for Lake Meridian.

Measure	Number of Waterfront Parcels	Percentage of Waterfront Parcels
Structures < 75 ft from OHWM (non-conforming)	6	15
Structures ≥ 75 ft. and ≤ 100 ft. from OHWM	20	50
Structures > 100 ft. from OHWM	13	32.5
Undeveloped Lots	1	2.5
Total Waterfront Parcels Studied	40	

For urban shorelines, the condition of nearshore environments, the amount of impervious surfaces, and the extent of chemical usage on lawns and landscaping, are better indicators of shoreline health than the amount of space between the shoreline and a structure. Currently most of that space for much of the shoreline, whether it is 20 feet or 100 feet wide, is mowed lawn with some ornamental landscaping, much of it presumably treated routinely or occasionally with pesticides, herbicides or fertilizers.

The significance of impervious surfaces on a lake environment where water quantity is not really a factor is very diminished given the residential uses. Single-family or multi-family homes generally have clean roof and sidewalk runoff, and driveways whether 50 square feet or 5,000 square feet are typically pollution-generating surfaces only to the extent that vehicle-related pollutants are deposited on them. Most single-family homes have between two and four vehicles, regardless of the driveway area and thus the correlation between driveway area and amount of pollution is not strong. An impervious surface standard has been set at 35% for single-family lots, with provisions for increasing that coverage to 50% with provision of substantial native vegetation along the shoreline. Those properties that choose to reduce their setback by using the shoreline enhancement incentive would be required to adhere to a shoreline vegetation management plan. The plan requires:

- The preparation of a shoreline revegetation plan;
- That native vegetation consist of a mixture of trees, shrubs, and groundcover designed to improve habitat functions;
- Limitations on the use of fertilizer, herbicides and pesticides as needed to protect lake water quality; and
- A monitoring and maintenance program.

[1] Forty (40) of the existing parcels were sampled, thirty-nine of which contained an existing residence. Ten (10) parcels each were selected from four separate quadrants of the lake (southeast, southwest, northwest, and northeast).

Relative to the existing condition, the implementation of the impervious surface increase measures would increase the amount of native vegetation (benefiting terrestrial and aquatic species) and decrease the amount of pesticides/herbicides entering the lakes. Over time, ecological functions will improve through implementation of the impact minimization and compensation measures that are part of approved impervious surface increases.

It is important that the impervious surfaces be separated from the waterbody to the extent that those surfaces replace vegetation, which can have a variety of ecological benefits. The setback provisions described above continue to maintain separation between the homes and the lake, leaving the nearshore area available for vegetation. However, because of the setback averaging limit, it is difficult to evaluate exactly where the average setback may fall after 20 years of development and redevelopment.

In summary, new residences and substantial remodels/additions are expected in the Shoreline Residential environment over the next 20 years. The protective setback and other measures in the SMP, including a requirement for shoreline vegetation when lot coverage exceeds 35%, will maintain or improve ecological functions of the shoreline over the long term, thereby resulting in no net loss of shoreline ecological function within the environment.

5.2 Overwater Structures

Overwater structures encompass a variety of uses, from in-water structures, such as fixed-pile piers, floating docks and platforms, to moorage covers, such as canopies and boathouses with associated boatlifts. It is difficult to determine exactly how many waterfront properties do not have a pier or pier access, particularly as many piers are located near property lines and thus it is possible that those may be shared with the adjacent property. Piers can adversely affect ecological functions and habitat in the following ways:

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

Table 8 outlines some of the primary differences between the original and proposed SMP (see Draft SMP Chapter 4, Over-Water Structures) provisions for piers.

Table 8. Comparison of key differences between original and proposed SMP provisions for new over-water structures.

Pier Feature	Original SMP	Proposed SMP
Length	120 ft	100 ft
Width	No larger than 50% of the lot width	4-ft walkway (first 30-ft) 6-ft remainder of pier 6-ft ell 2-ft finger

Pier Feature	Original SMP	Proposed SMP
		4-ft ramp connecting to pier
Deck material	No specification	All new and replacement piers must be fully grated.
Size	800 ft^2	420 ft^2 single-family residence 660 ft^2 joint-use by 2 residences 740 ft^2 joint-use by 3+ residences

Under the proposed SMP, new piers will be smaller and narrower than piers approved under the original SMP. New and replacement piers will also include light-transmitting decking material, which will reduce the effect of the overwater cover. Nevertheless, if new piers were the only pier-related activity in Lake Meridian, ecological function would still marginally decline. The decline would be due to an unavoidable net increase in in-water structures and overwater cover that cannot be mitigated.

However, pier repair and pier maintenance activities are more common, and it is anticipated that pier replacement proposals may become even more common as existing piers degrade or do not meet the property owner's needs in their current configuration or location. Under the proposed SMP, existing piers could be replaced at the same size as the existing pier, as long as the entire replacement pier contained light-transmitting decking material.

The Washington Department of Fish and Wildlife (WDFW) is typically requiring piers that are both smaller in overall size than average existing piers and also narrower in the nearshore area. However, WDFW will, on a case-by-case basis, consider replacement piers at the same size as the original pier if it can be thoroughly shown that the applicant has demonstrated a need for the pier, and that proper mitigation sequencing has been followed (avoidance, minimization, and mitigation). Grated decking is a mitigating factor that WDFW encourages. Any new or replacement pier would require a Hydraulic Project Approval (HPA) from WDFW, on whose guidelines the proposed SMP pier provisions are partially based. The combined effects of the City's proposed SMP and permit approvals from WDFW will likely result in a reduction over time of the net amount of overwater coverage, and an increase in the amount of light-transmitting decking.

A quantitative analysis is provided below (Table 9), based partially on Lake Meridian lake-wide trends and assumptions. This analysis assumes that 9 of the 12 existing properties on Lake Meridian without piers will add piers within the next 20 years. Also assumed is that 15 percent of all existing piers and 25 percent of the existing platforms will need replacement over the same time period. Assuming that all new and replacement pier structures will be fully grated, that replacement pier structures can be replaced at the same size as the existing pier, and that there may be up to eight new floating platforms, the total area of overwater structure may decline by 5.0 percent over this time period.

Table 9. Comparison of build-out conditions for overwater structures.

Pier Feature	Existing	Build-Out	Net Change	% Change
Number of Piers	125	134[1]	+9	+7.2
Average Length (ft)	60.5	60.5 – 63.2[2]	0 - 2.7	+4.4

Pier Feature	Existing	Build-Out	Net Change	% Change
Average Width (ft)	6.9	6.7[3]	-0.2	-2.9
Average Area of piers (ft^2)	511.2	505.1[4]	-61	-1.2
Total square footage of piers (ft^2)	63,905.5	59,584.3[5]	-4,321.2	-6.8
Total square footage of floating platforms (ft^2)	2,504.0	3,711.8[6]	+1,207.8	+48.2
Total square footage of covered moorage (ft^2)	4,859.0	4,373.5[7]	-485.5	-10.0
Total square footage of overwater structures (ft^2)	71,268.5	67,669.6	-3,598.9	-5.0

[1] Assumes that 9 of 12 existing properties without piers will construct a new pier over the next 20 years.
[2] Range based on 9 new piers at either 60.5 feet (current average) or 100 feet (maximum allowed without a variance)
[3] Assumes 9 new piers at 4 feet wide and replacement piers at 6.9 feet wide (current average).
[4] Assumes 9 new piers at 420 ft^2 each and 15 percent replacement of existing piers over 20 years (assumes replacement piers to be replaced at the same size - 511.2 ft^2 average).
[5] Assumes 9 new piers and 15 percent replacement piers are fully grated (grating is calculated to have 60 percent open space).
[6] Assumes 25 percent of existing platforms will be replaced with new 150 ft^2 platforms, plus there may be up to eight new 150 ft^2 platforms.
[7] Assumes that 10 percent of existing covered moorage will be removed over 20 years.

5.3 Shoreline Stabilization

New bulkheads typically have the following effects on ecological functions:

- Reduction in nearshore habitat quality for juvenile salmonids and other aquatic organisms. Specifically, shoreline complexity and emergent vegetation that provide forage and cover may be reduced or eliminated. Elimination of shallow-water habitat may also increase vulnerability of juvenile salmonids to aquatic predators.
- Reduction of natural sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and preserve shallow water conditions.
- Increase in wave energy at the shoreline if shallow water is eliminated, resulting in increased nearshore turbulence that can be disruptive to juvenile fish and other organisms.

Under the proposed SMP (see SMP Section 4.C.2), new shoreline stabilization would only be allowed once it has been determined that there is "the need to protect the development from destruction due to erosion caused by natural processes, such as currents, and waves, and boat wakes…" It must be demonstrated in a study prepared by a qualified professional that the proposed stabilization is the least harmful method to the environment. Replacement bulkheads must be installed in the same location as the existing bulkhead, or farther landward. Under no circumstances would a replacement bulkhead be allowed to encroach farther waterward. Finally, all shoreline stabilization and modification proposals must avoid impacts to the maximum extent practicable, and when impacts are unavoidable, must mitigate those impacts to achieve no net loss of ecological functions. Independent of regulations by other regulatory agencies, the proposed SMP ensures that shoreline stabilization projects will not degrade the baseline condition.

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

It is estimated that less than 8 percent of the existing lots on Lake Meridian are undeveloped. Therefore, the need for new shoreline stabilization is limited. As mentioned above, it must be demonstrated that there is a need to protect a proposed development from damage due to erosion caused by natural processes, such as currents, waves, or boat wakes.

The proposed SMP includes incentives for the removal of existing bulkheads. Those properties that remove bulkheads may be allowed a small waterfront deck or patio placed along the shoreline. Revegetation or preservation of existing vegetation along the shoreline is required at a 3:1 ratio based upon the size of the deck or patio. Removal of a bulkhead and installation of a deck/patio and shoreline vegetation requires adherence to the shoreline vegetation management plan provisions outlined in Section 3.1.

Over time, the combined effects of the City's proposed SMP, and permit approvals from the WDFW will likely result in a reduction over time of the net amount of hardened shoreline at the ordinary high water mark, an increase in shallow-water habitat, and an increase in shoreline vegetation.

6.0 NET EFFECT ON ECOLOGICAL FUNCTION

As described above in Chapter 4 and 5, the proposed SMP provides a substantially increased level of protection to shoreline ecological functions relative to the existing SMP. On its own, the proposed SMP, which includes the Shoreline Restoration Plan, is expected to protect and improve shorelines within the City of Kent while accommodating the reasonably foreseeable future shoreline development, resulting in no net loss of shoreline ecological function, and may improve ecological functions over time (see Section 3.0). State and federal regulations, acting in concert with this SMP, will provide further assurances of improved shoreline ecological functions over time.

As discussed above, major elements of the SMP that ensure no net loss of ecological functions fall into generally five categories: 1) environment designations (**Chapter 2**), 2) general provisions (**Chapter 3**), 3) shoreline modification provisions (**Chapter 4**), 4) shoreline use provisions (**Chapter 5**), and 5) Shoreline Restoration Plan (**Chapter 8**).

1. Environment designations: The Final Shoreline Inventory and Analysis Report provided the information necessary to assign environment designations by segment to each of the shoreline waterbodies (see **Chapter 2**). Shoreline uses and modifications were then individually determined to be either permitted (as substantial developments or conditional uses) or prohibited in each of those environment designations. The most uses and

modifications are allowed in descending order of potential impact in the High Intensity, Urban Conservancy – Low Intensity, Shoreline Residential, and Urban Conservancy – Open Space environments. The only uses allowed in the Natural-Wetlands environment are related generally to restoration, scientific studies and passive recreation, pursuant to the Critical Areas regulations adopted by reference in SMP **Section 3.B.3**).

2. General provisions: **Chapter 3** contains a number of regulations on a variety of topics that contribute to protection and restoration of ecological functions, including **Section 3.B.4** (Environmental Impacts), **Section 3.B.5** (Flood Hazard Reduction and River Corridor Management), **Section 3.B.11** (Vegetation Management), and **Section 3.B.12** (Water Quality and Quantity).

3. Shoreline modification provisions: **Chapter 4** contains a number of regulations on a variety of topics that contribute to protection and restoration of ecological functions, including **Section 4.C.2** (Shoreline Stabilization), **Section 4.C.2** (Overwater Structures), and **Section 4.C.6** (Shoreline Restoration and Ecological Enhancement). All of these shoreline modification regulations emphasize minimization of size of structures, and use of designs that do not degrade and may even enhance shoreline functions.

4. Shoreline use provisions: Regulations in **Chapter 5** focus on exclusion of uses that are incompatible with the existing land use and ecological conditions, and emphasize appropriate location and design of the various uses. These regulations also emphasize avoidance and minimization of ecological impacts via appropriate setbacks, protection and enhancement of vegetation, reduction of impervious surfaces and use of innovative designs such as LID techniques that do not degrade and may even enhance shoreline functions.

5. Shoreline Restoration Plan: The Shoreline Restoration Plan (**Chapter 8**) identifies a number of project-specific opportunities for restoration on both public and private properties inside and outside of shoreline jurisdiction, and also identifies ongoing City programs and activities, non-governmental organization programs and activities, and other recommended actions consistent with a variety of watershed-level efforts. The City is a very active agent for restoration along the City's shoreline waterbodies.

Of particular note is the SMP's consideration and facilitation of future plans to reconstruct the Green River levees in an environmentally beneficial way.

Given the above provisions of the SMP, including the Shoreline Restoration Plan, and the location of most existing and potential new and redevelopment relative to the Green River levee; the setback, shoreline modification and overwater structure provisions that apply to Lake Meridian; the absence of anticipated development or redevelopment on the Green River Natural Resources Area pond, Jenkins Creek, and Springbrook Creek; the residential setback and presence of critical areas along Big Soos Creek; and finally the limited expectation for new developments in the City portions of Lake Fenwick, **no net loss of ecological functions is projected in the City of Kent's shorelines**. As previously mentioned, Panther Lake, which is entirely within the City's PAA, is highly encumbered by critical areas, and has been evaluated

by King County as part of its SMP update, is also anticipated to experience no net loss of ecological functions under either King County's or the City's SMP.