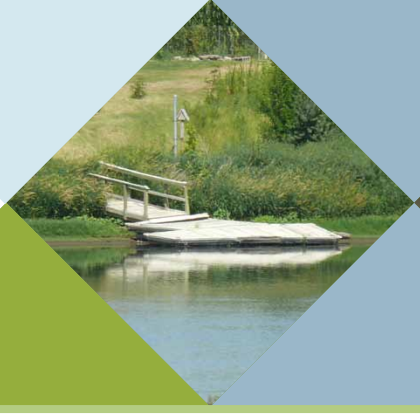
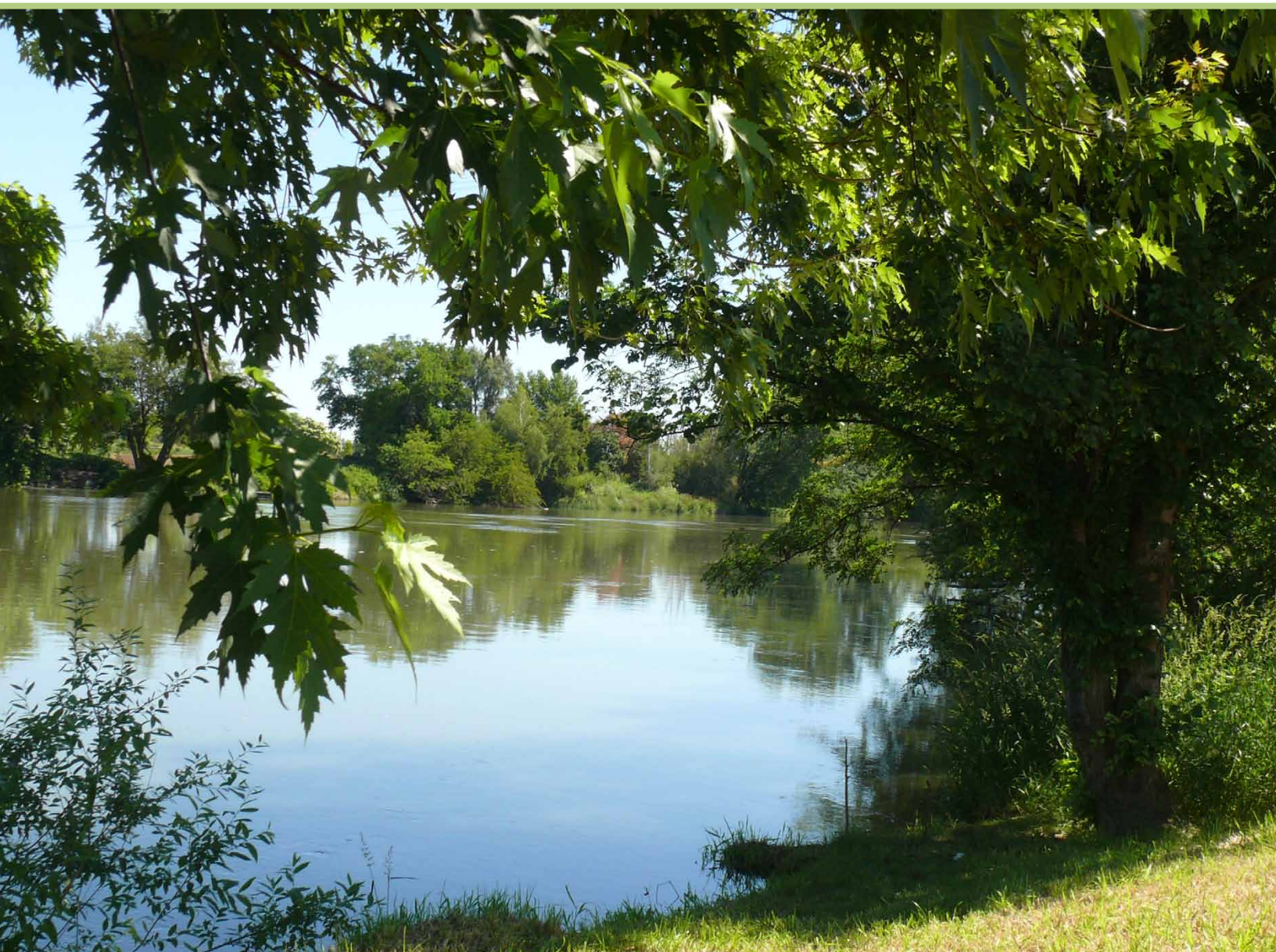
CCW 1.4



Cumulative Impacts Analysis for Benton County's Shoreline Master Program

APRIL 2014



BENTON COUNTY
GRANT NO. G1200022

CUMULATIVE IMPACTS ANALYSIS

FOR THE BENTON COUNTY SHORELINE MASTER PROGRAM

Prepared for:

Benton County Planning Department
1002 Dudley Avenue
Prosser, WA 99350

Prepared by:

THE WATERSHED COMPANY
750 Sixth Street South
Kirkland . WA 98033
p 425.822.5242
f 425.827.8136
watershedco.com

BERK
STRATEGY | ANALYSIS | COMMUNICATIONS
2025 First Avenue, Suite 800
Seattle WA 98121

April 20, 2014

This report was funded in part through a grant from the Washington Department of Ecology.

The Watershed Company Reference Number:
120209

Printed on 30% recycled paper.

Cite this document as:

The Watershed Company and BERK. April 2014. Cumulative Impacts Analysis for Benton County's Shoreline Master Program. Prepared for the Benton County Planning Department, Prosser, WA

The Watershed Company Contacts:
Amy Summe/Sarah Sandstrom

BERK Contact:
Lisa Grueter

TABLE OF CONTENTS

Page #

1 Introduction 1

1.1 Background and Purpose 1
1.2 Approach 3

2 Summary of Existing Conditions 3

2.1 Columbia River 4

2.1.1 Environmental 4
2.1.2 Land Use 5

2.2 Yakima River 7

2.2.1 Environmental 7
2.2.2 Land Use 9

3 Reasonably Foreseeable Future Development 11

3.1 Residential Growth 13
3.2 Industrial 15
3.3 Hanford Reach 15

4 Effects of Established Regulatory Programs 16

4.1 Current County Regulations and Programs 16

4.1.1 Critical Areas Regulations 16
4.1.2 Zoning Code 17
4.1.3 Hydrology Manual 17

4.2 State Agencies/Regulations 17

4.2.1 Washington Department of Natural Resources 17
4.2.2 Washington Department of Ecology 18
4.2.3 Washington Department of Fish and Wildlife 18

4.3 Federal Agencies/Regulations 18

4.3.1 Clean Water Act 19
4.3.2 Rivers and Harbors Act, Section 10 20

4.3.3 Federal Endangered Species Act (ESA) 20
4.3.4 McNary Shoreline Management Plan 20
4.3.5 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 21
4.3.6 Pacific Northwest Electric Power Planning and Conservation Act 21

5 Cumulative Impacts with Application of the SMP 22

5.1 Environment Designations 23
5.2 Effects of Critical Areas Regulations 26

5.2.1 Wetlands 26
5.2.2 Rivers and Creeks 27

5.3 Effects of SMP Standards on Commonly Occurring Foreseeable Uses . 27

5.3.1 Mitigation Sequencing 28
5.3.2 Unregulated, Illegal and Exempt Development 28
5.3.3 Residential Development 29
5.3.4 Industrial Development 31
5.3.5 Recreational Development 33
5.3.6 Transportation 34
5.3.7 Utilities 34

5.4 Shoreline Restoration Plan 35

6 Net Effect on Ecological Function 36

LIST OF FIGURES

Page #

Figure 1-1. Framework for achieving no net loss of shoreline ecological functions (Source: Department of Ecology) 2
Figure 2-1. Current Land Use Acres – Columbia River Shoreline Parcels 6
Figure 2-2. Current land use acres – Yakima River shoreline parcels. 10
Figure 5-1. Distribution of Upland Environment Designations by Area 25
Figure 5-2. Distribution of reach functional scores by environment designation 26

LIST OF TABLES

Page #

Table 2-1. Reach ranking order from highest to lowest function for the Columbia River based on mean reach scores (L= Low function, M=Medium function, H= High function). 5
Table 2-2. Reach ranking order from highest to lowest function for the Yakima River based on mean reach scores. (L= Low function, M=Medium function, H= High function). 8
Table 3-1. Benton County Shoreline Vacant and Subdividable Lands 12
Table 3-2. Reasonably Foreseeable Future Residential Development in Benton County's Shoreline Jurisdiction 14
Table 3-3. Reasonably Foreseeable Future Residential Development in Parcels that are Partially within Shoreline Jurisdiction 14
Table 4-1. Category 5 Waterbodies (Impaired) by River and WRIA 19
Table 4-2. Category 4 Waterbodies with a TMDL by River and WRIA 20
Table 5-1. Environment designation criteria 23
Table A-1. Summary of general SMP provisions that protect ecological functions. A-1
Table A-2. Summary of potential impacts from agriculture. 3
Table A-3. Summary of key agriculture regulations that protect ecological functions. 3
Table A-4. Summary of potential impacts from aquaculture. 4
Table A-5. Summary of key regulations related to aquaculture that protect ecological functions. 4
Table A-6. Summary of potential impacts from boating facilities and private moorage. 5
Table A-7. Summary of key regulations related to boating facilities and private moorage that protect ecological functions. 5
Table A-8. Summary of potential impacts from breakwaters, jetties, and groins. 7
Table A-9. Summary of key regulations related to breakwaters, jetties, and groins that protect ecological functions. 7
Table A-10. Summary of potential impacts from commercial development. 8
Table A-11. Summary of key commercial use regulations that protect ecological functions. 8
Table A-12. Summary of potential impacts from dredging and dredge material disposal. 9
Table A-13. Summary of key dredge and dredge disposal regulations that protect ecological functions. 10
Table A-14. Summary of potential impacts from fill. 11
Table A-15. Summary of key regulations pertaining to fill that protect ecological functions. 11
Table A-16. Summary of potential impacts from industrial development. 12

Table A-17. Summary of key regulations related industrial development that protect ecological functions. 12
Table A-18. Summary of potential impacts from instream structures. 13
Table A-19. Summary of key regulations related to instream structures that protect ecological functions. 14
Table A-20. Summary of potential impacts from mining. 15
Table A-21. Summary of key mining regulations that protect ecological functions. 15
Table A-22. Summary of potential impacts from recreational development. 16
Table A-23. Summary of key recreational use regulations that protect ecological functions. 16
Table A-24. Summary of potential impacts from residential development and accessory development. 17
Table A-25. Summary of key residential use regulations that protect ecological functions. 17
Table A-26. Summary of potential impacts from shoreline stabilization. 18
Table A-27. Summary of key shoreline stabilization regulations that protect ecological functions. 19
Table A-28. Summary of potential impacts from transportation facilities. 19
Table A-29. Summary of key transportation facility regulations that protect ecological functions. 20
Table A-30. Summary of potential impacts from utilities. 21
Table A-31. Summary of key utility infrastructure regulations that protect ecological functions. 21

CUMULATIVE IMPACTS ANALYSIS

BENTON COUNTY SHORELINE MASTER PROGRAM

1 INTRODUCTION

1.1 Background and Purpose

This Cumulative Impacts Analysis (CIA) is a required element of the Shoreline Master Program (SMP) update process. The State Master Program Approval/Amendment Procedures and Master Program Guidelines (SMP 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 CIA is intended to demonstrate that an SMP will not result in degradation of shoreline ecological functions over a 20-year planning horizon. This CIA can help the County make adjustments where appropriate in its proposed SMP if there are potential gaps between maintaining and degrading ecological functions.

In accordance with the SMP Guidelines, this CIA addresses the following:

i. "current circumstances affecting the shoreline and relevant natural processes [Chapter 2 below and *Final Shoreline Analysis Report for Shorelines in Benton County: Yakima and Columbia Rivers* (The Watershed Company and BERK 2013)];

ii. reasonably foreseeable future development and use of the shoreline [Chapter 3 below and *Shoreline Analysis Report*]; and

iii. beneficial effects of any established regulatory programs under other local, state, and federal laws." [Chapter 4 below]

The CIA assesses the policies and regulations in the draft SMP to determine whether no net loss of ecological function will be achieved as new development occurs. The baseline against which changes in ecological function are measured is the current shoreline conditions documented in the *Final Shoreline Analysis*

Report for Shorelines in Benton County: Yakima and Columbia Rivers (The Watershed Company and BERK 2013). For those projects or activities that result in degradation of ecological functions, the required mitigation must return the resultant ecological function back to the baseline. This is illustrated in Figure 1-1.

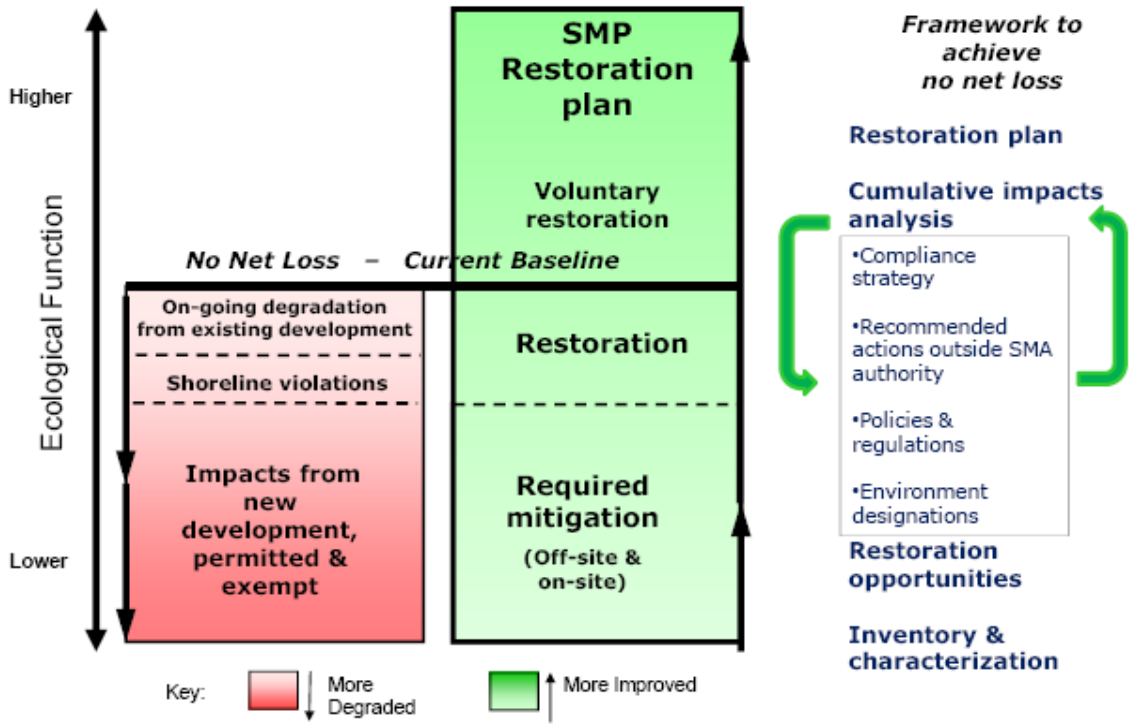


Figure 1-1. Framework for achieving no net loss of shoreline ecological functions (Source: Department of Ecology)

Despite SMP regulations that require avoidance, minimization, and mitigation for any unavoidable losses of function, some uses and developments cannot be fully mitigated. This could occur when mitigation is out-of-kind, meaning that it offsets a loss of function through an approach that is not directly comparable to the proposed impact. A loss of functions may also occur when impacts are sufficiently minor on an individual level, such that mitigation is not required, but are cumulatively significant. Unregulated activities (such as operation and maintenance of existing legal developments) may also degrade baseline conditions. Additionally, the Benton County SMP applies only to activities in shoreline jurisdiction, yet activities upland of shoreline jurisdiction or upstream in the watershed may have offsite impacts on shoreline functions.

Together, these different project impacts may result in cumulative, incremental, and unavoidable degradation of the overall baseline condition unless additional restoration of ecological function is undertaken. Accordingly, the Shoreline Restoration Plan is intended to be a source of ecological improvements implemented voluntarily that may help bridge a gap between minor cumulative, incremental, and unavoidable damages and no net loss of shoreline ecological functions.

1.2 Approach

This CIA was prepared consistent with direction provided in the SMP Guidelines as described above. Existing conditions were first evaluated using the information, both textual and graphic, developed and presented in the *Shoreline Analysis Report* (TWC and BERK). Likely development identified in the *Shoreline Analysis Report* (TWC and BERK) was addressed further to understand the extent, nature, and general location of potential impacts.

The effects of likely development were then evaluated in the context of SMP provisions, as well as other related plans, programs, and regulations. For the purpose of evaluating impacts, areas with a likelihood of high densities of new development or redevelopment were evaluated in greatest detail. Cumulative impacts were analyzed quantitatively where possible. A qualitative approach was used where specific details regarding redevelopment likelihood or potential were 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.

2 SUMMARY OF EXISTING CONDITIONS

The following summary of existing conditions is based on the *Final Shoreline Analysis Report for Shorelines in Benton County: Yakima and Columbia Rivers* (The Watershed Company and BERK 2013). The Columbia and Yakima Rivers are the only two shoreline waterbodies in the County. More detailed information on specific shoreline areas is provided in the *Shoreline Analysis Report*.

2.1 Columbia River

2.1.1 Environmental

Within Benton County, the Columbia River flows through the Alkali-Squilchuck WRIA and the Rock-Glade WRIA. Other than the Yakima River, tributaries to the Columbia River within Benton County are small, ephemeral streams that flow through steep, confined canyons. Within Benton County, rainfall is limited, and generally less than 10 inches per year. Annual peak discharges occur in the spring (April to June) and generally result from snowmelt in the interior subbasin.

Within Benton County, McNary Dam impounds water, forming Lake Wallula, which extends upstream to the Hanford site and to Ice Harbor Dam on the Snake River. Below McNary Dam, Lake Umatilla is formed by the John Day Dam, approximately 110 miles downstream. Dam operations have reduced the frequency of spring freshets, which historically helped maintain floodplain habitat connectivity and aided the migration of juvenile salmon. Over-bank flows and associated large woody debris (LWD) recruitment and sediment transport processes have been substantially reduced.

Today, the Columbia basin supports significant water-dependent commercial and industrial uses, ports, transportation, and urban population centers. In these developed areas, riprap and docks have replaced riparian vegetation, and rip rap revetments now comprise a significant portion of the reservoir shorelines. Historic and ongoing dredging operations are responsible for maintaining a viable navigation channel to support five deep-water ports, which transport 30 million tons of goods annually.

As the last free-flowing reach on the Columbia River, the Hanford Reach is extremely valuable for aquatic resources. Groundwater at the Hanford Nuclear Site has become contaminated from past operation and on-site storage of nuclear waste. As contaminated groundwater moves toward the Columbia River, it poses risks to water quality in downstream reaches.

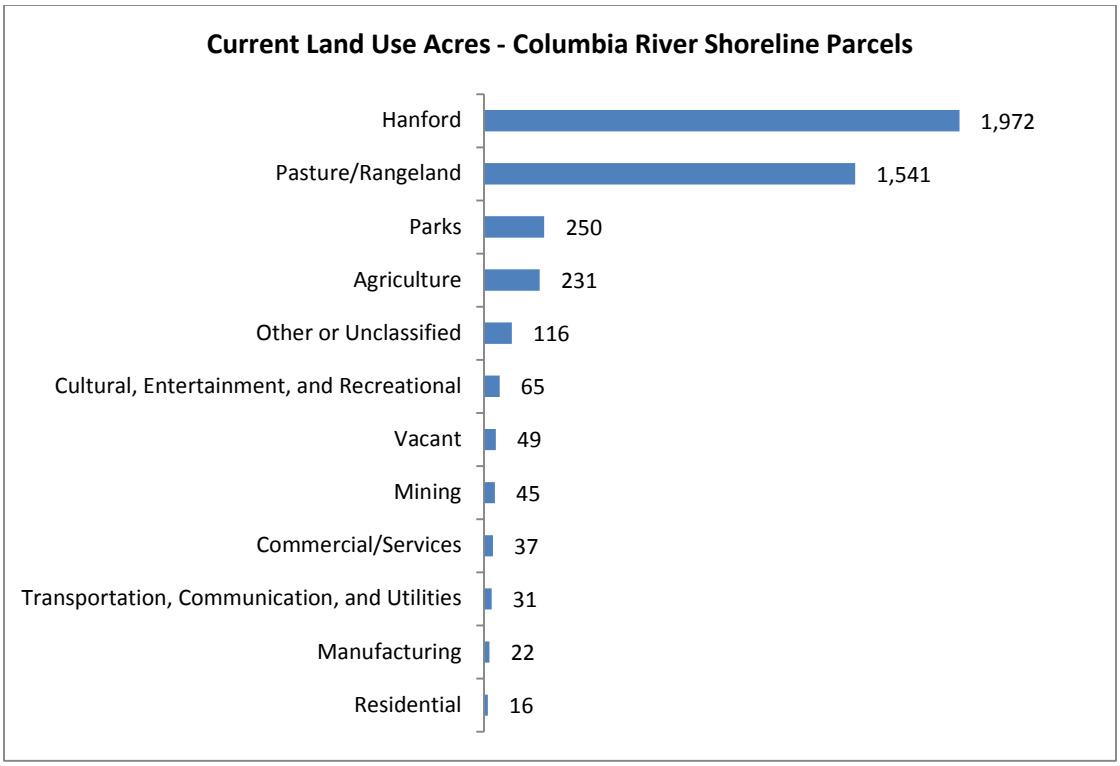
A qualitative reach ranking of hydrologic, vegetative, habitat, and hyporheic functions provided a broad scale description of the highest and lowest functioning Columbia River reaches within the County's shoreline jurisdiction. A summary of the scoring of ecological function results from the Analysis is included in Table 2-1.

Table 2-1. Reach ranking order from highest to lowest function for the Columbia River based on mean reach scores (L= Low function, M=Medium function, H= High function).

Reach Number/ Name		Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
			Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
C3	UNWR	1	M	H	H	H	H	H	H	H	H	H
C10	Two Rivers (Park)	2	H	H	H	M	M	M	H	H	H	H
C14	Hanford	3	H	H	H	M	H	M	H	H	M	M
C8	Hover	4	M	H	M	H	H	M	H	M	H	M
C5	Plymouth	5	H	H	H	M	M	M	M	H	M	M
C2	Lake Umatilla	6	M	M	M	M	L	L	H	M	H	H
C15	Priest Rapids	7	M	M	M	M	M	M	L	M	L	L
C1	Crow Butte Park	8	M	L	M	M	M	M	L	M	L	L
C4	Plymouth Ag	9	L	L	M	M	M	M	L	L	L	M
C13	North Richland UGA	9	M	L	L	M	L	M	L	M	L	M
C9	Finley Industrial	11	L	M	L	L	M	L	M	M	L	L
C6	McNary	12	L	L	L	L	M	L	L	L	L	L
C7	Columbia Ag	13	L	L	L	L	L	L	L	M	L	L
C10	Two Rivers (Residential)	13	L	L	L	L	M	L	L	L	L	L
C11	North Finley	15	L	L	L	L	L	L	L	L	L	L
C12	Kennewick UGA	15	L	L	L	L	L	L	L	L	L	L

2.1.2 Land Use

Development on the Columbia River in Benton County is primarily centered on the Tri-Cities area of Kennewick, Richland, and Pasco. On the Hanford reservation, the majority of land along the Columbia River is undergoing cleanup. The remainder of the Columbia River shorelands is used as pasture/rangeland, agriculture and parks (Figure 2-1).



Source: Benton County Assessor, The Watershed Company, and BERK 2012

Figure 2-1. Current Land Use Acres – Columbia River Shoreline Parcels

Water-Oriented Uses

Along the Columbia River, water-dependent uses include the McNary Dam, docks and barges supporting agricultural and industrial transport, and recreational boat launches. Water-related uses include hydroelectric production, irrigation pumping stations, and canals and ditches supporting agricultural operations and domestic water supplies. Water-enjoyment uses are varied and include parks and open space, trails, and camping facilities.

Transportation and Utilities

Transportation facilities in unincorporated Benton County include a network of state and County roads, railroads, and bridges. There is about 1.9 miles of trails. Interstate freeways include highways 82 and 182. State routes include State Routes (SR) 14, 22, 24, 221, 224, 225, 240, 395 and 397. Bridges cross the Columbia River on SR 24 (Vernita), I-82, I-182 and SR 395 (Pioneer Memorial Bridge), and SR 397 (Benton-Franklin Intercounty Bridge). Major collectors, minor arterials and County roads provide access to agricultural, industrial, commercial, and residential areas along the Columbia River.

Railroad service includes the BNSF Railway, which runs along the Yakima River in part, and turns at the Columbia River serving Finley, Plymouth, Paterson and other south county lands. The Tri-City short haul railroad serves Hanford from Richland. The Central Washington short-haul railroad serves western Benton County.

Parks and open space along the Columbia River includes the Hanford Reach, Two Rivers Park (County 159 acres), Hover Park (County 175 acres), Wallulla Gap Preserve (County 110 acres), Plymouth Park (Corps), the Umatilla National Wildlife Refuge (UNWR), McNary National Wildlife Refuge (McNary NWR), and Crow Butte Park. Outside of the Hanford Reach, the largest acreage is for the Umatilla NWR.

2.2 Yakima River

2.2.1 Environmental

The Yakima River basin is characterized by a diverse landscape. Precipitation is highly variable across the basin, ranging from approximately 7 inches per year in the eastern portion in Benton County to over 140 inches per year near the crest of the Cascades (Yakima Subbasin Planning Board 2004). Watershed hydrology is primarily derived from snowmelt from the Cascade Mountains.

The federal government authorized the Yakima Irrigation Project in 1905, which resulted in the construction of five storage reservoirs. Today, there are six major diversion dams (Easton, Roza, Tieton, Wapato, Sunnyside, and Prosser) on the Yakima and its tributaries which form reservoirs. In addition, a smaller, run-of-the-river diversion dam is located at Horn Rapids. The Yakima River Basin is over-appropriated, meaning that surface water rights exceed available water supply (Ecology 2012). Any new demands for consumptive water uses would add to the existing water deficit in the basin (Ecology 2012). Groundwater pumping may also alter river-aquifer exchanges, affecting surface water rights (Vaccaro 2011).

The Yakima River is also impaired by high water temperatures. Historically, the riparian zone of the lower Yakima River was predominantly composed of willows and cottonwoods. Even historically, the effect of this vegetation on shade and temperature regulation of the river was likely limited given the width and orientation of river (Appel et al. 2011). Cool water sources from groundwater exchange (particularly agricultural groundwater returns during

summer months) help limit the thermal gains in the lower Yakima River. Groundwater from the Horse Heaven Hills region, as well as localized springs, is particularly significant in the upper reaches of the Yakima River in Benton County (Prosser to Benton City) (Vaccaro 2011).

The lower Yakima River is impaired by several pesticides, as well as temperature, pH, and dissolved oxygen (see additional discussion in Section 4.3.2 below).

In many areas of the Yakima River in and upstream of Benton County, river channels have been leveed, armored, realigned, and shortened, restricting or eliminating natural river-floodplain interactions. As upstream sources of large woody debris (LWD) have decreased, LWD and the associated instream habitat diversity in the lower Yakima channel have also dwindled. Islands capture LWD during high flows, and they are significant features for the formation of diverse habitats in the lower Yakima River (Appel et al. 2011).

A qualitative reach ranking of hydrologic, vegetative, habitat, and hyporheic functions provided a broad scale description of the highest and lowest functioning Yakima River reaches within the County's shoreline jurisdiction. A summary of results from the Analysis is included in Table 2-2.

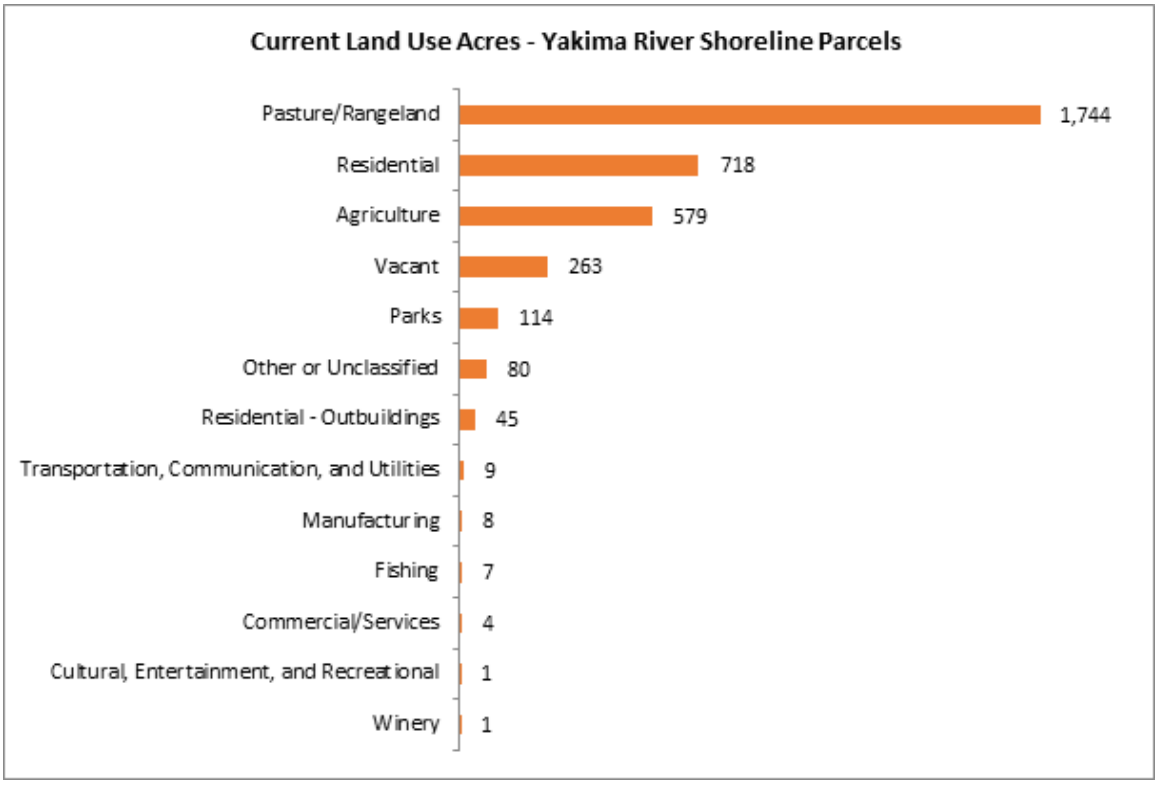
Table 2-2. Reach ranking order from highest to lowest function for the Yakima River based on mean reach scores. (L= Low function, M=Medium function, H= High function).

Reach Number/ Name		Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
			Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
Y3	Barker	1	H	M	H	H	H	H	H	H	H	H
Y10	Prosser UGA Chandler	2	H	M	M	H	H	H	H	M	M	H
Y11	Prosser UGA West	3	L	H	H	M	M	M	H	L	M	H
Y7	Benton City UGA		M	M	M	M	M	H	M	M	M	H
Y4	Harrington	5	M	M	M	M	M	M	M	M	M	H

Reach Number/ Name		Rank	Hydrologic			Vegetative			Habitat		Hyporheic	
			Moderation of sediment transport	In-stream habitat features	Attenuating flow energy	LWD and organic matter recruitment	Filtration of upland inputs	Bank stabilization	Wetland/riparian habitat	Space and conditions supporting wildlife	Water storage and filtration	Support of vegetation
Y8	OIE	6	M	M	L	M	M	M	L	M	H	H
Y1	Richland UGA		M	NA	NA	M	M	M	M	M	NA	NA
Y9	Prosser UGA East		M	H	L	M	M	M	L	H	M	M
Y6	River Road	9	M	M	M	M	M	M	L	L	M	H
Y5	Horn Rapids		M	M	L	M	M	M	M	H	L	M
Y2	Riverside	11	M	M	L	M	M	L	M	L	L	L
Y12	Byron Road	12	M	L	M	L	L	M	L	L	L	M

2.2.2 Land Use

Approximately one third of the Yakima watershed is in private ownership. Land use along the Yakima River tends to be pasture/rangeland and agriculture similar to the Columbia River, but there is more residential and vacant land along the Yakima River and less park land than along the Columbia River (Figure 2-2).



Source: Benton County Assessor, The Watershed Company, and BERK 2012

Figure 2-2. Current land use acres – Yakima River shoreline parcels.

Water-Oriented Uses

Along the Yakima River, water-dependent uses include a recreational boat launch at Horn Rapids County Park (note: the portion on State-owned aquatic lands is not under DNR agreement), dams at Horn Rapids and Prosser, wastewater outfalls, and fish screens on diversion pumps (Benton County 2012).

Water-related uses include irrigation pumping stations and a discharge channel and settling pond installed by the Yakama Indian Nation Fisheries Program (Benton County 2012).

Water-enjoyment uses include parks and open space, a boat launch, and trails.

Transportation and Utilities

Major interstate and state routes crossing the Yakima River or along the river include SR 22, I-82, SR 224, SR 225, and SR 240. County roads crossing the Yakima River or within shoreline jurisdiction include, but are not limited to, OIE (Old Inland Empire) Highway, Twin Bridges Road, Harrington Road, Riverside Drive, Byron Road, North River Road, Demoss Road, and Benton City Road.

Utilities within shoreline jurisdiction would include water systems, electrical power systems such as the Ashe-Slatt Transmission Line crossing west of Benton City, natural gas lines such as in the Prosser vicinity, fiber optic cables along the Yakima River near Prosser, and several irrigation district facilities (e.g. Roza Irrigation District).

Parks and Open Space

Existing parks and open space along the Yakima River include Horn Rapids Park and Rattlesnake Mountain Shooting Facility.

3 REASONABLY FORESEEABLE FUTURE DEVELOPMENT

This section estimates potential future development within and along the shorelines of Benton County. Consistent with the State Guidelines (WAC 173-26-201), this estimate will identify reasonably foreseeable future development over the next 20 years. The estimate was derived using a land capacity analysis method which identified the total (or gross) vacant and underutilized land area and applied discount factors such as removing shoreline buffers (critical areas), future infrastructure (rights-of-way and public facilities), and lands unlikely or unable to develop (e.g. market factor and zoning).

The analysis considered both the area within shoreline jurisdiction only (shoreline) and the total area of all parcels that touch the shoreline jurisdiction (shoreline parcels). The analysis included vacant parcels identified by the Benton County Assessor information and underutilized parcels, which are parcels where zoning allows subdivision and higher density development. Parcels were considered as potentially subdividable if the parcel was two times larger than the minimum lot size of the zone. The results of the analysis are presented for each shoreline environment designation. Table 3-1 shows the area of vacant and subdividable lands in the shorelines and shoreline parcels.

Table 3-1. Benton County Shoreline Vacant and Subdividable Lands

Shoreline Environment Designation	Acres Vacant		Acres Subdividable	
	Shoreline	Shoreline Parcels	Shoreline	Shoreline Parcels
Columbia River				
Conservancy	5.7	8.9	106.3	1,566.4
Hanford	-	-	0.02	-
Natural	-	-	70.9	625.4
Residential	0.4	2.3	-	-
Rural	7.3	35.3	95.1	2,019.2
Rural Industrial	35.1	74.9	25.2	124.7
Columbia Total	**48.6**	**121.3**	**297.5**	**4,335.7**
Yakima River				
Conservancy	10.2	15.1	1,365.2	1,566.4
Residential	12.1	27.1	1.4	-
Rural	214.8	519.8	946.6	625.4
Urban	23.1	50.7	-	-
Yakima Total	**260.2**	**612.6**	**2,313.2**	**2,191.9**
Grand Total	**308.7**	**733.9**	**2,610.7**	**6,527.6**

The majority of zoning in the shoreline and shoreline parcels is Rural Land 5 (91.5% in shoreline and 61.2% in shoreline parcels). The Rural Lands 5 zone permits residential development at a low density of one dwelling unit per 5 acres. Because of the preponderance of Rural Lands 5 zoning and the general surrounding land use, single-family residential development was assumed to be the predominant development type.

Zoning and proposed shoreline environment designations control the availability of land for residential development in the shoreline jurisdiction. Residential development is not allowed in the Heavy Industrial zone. Likewise, residential development is not allowed on the Hanford Reservation. Lastly, residential development is prohibited in the Rural Industrial shoreline designation. These factors are incorporated into the residential analysis in assessing the potential for residential development.

A small area of the shoreline that is vacant or underutilized is zoned for Heavy Industrial (Hover and Finley Industrial reaches). Residential development is not allowed in this zone. These parcels comprise 40.8 acres in shoreline jurisdiction and 83.8 acres in shoreline parcels. The potential for industrial development was

analyzed for this section. Also, the McNary Dam and surrounding federal lands are zoned GMA Ag by the County, which allows residential development at low densities. The Rural Industrial shoreline designation was applied to these lands and the dam itself. No residential development would be possible in this location and, therefore, roughly 60 acres within the Rural Industrial designation was removed from the area of potential residential development.

A deduction for shoreline buffers was based on the proposed shoreline buffers in the Draft SMP. The assumed buffers are for nonwater-oriented uses. Water-dependent uses do not have buffers required and many water-related uses have required buffers smaller than the buffers required for nonwater-oriented uses. The buffer deductions range from 100 to 25 percent depending on the shoreline environment designation. Because the shoreline jurisdiction comprises roughly 10 percent of the area of shoreline parcels, a blanket deduction of 5 percent was utilized as a reasonable factor for the analysis of whole parcels touching the shoreline. The analysis also assumed a 30 percent discount for roads and other public purposes. Allowed residential densities in residential areas were applied and an industrial floor area ratio of 40 percent was used. Lastly, a market factor of 25 percent was deducted because some percentage of property owners would not be interested in developing during the planning period.

3.1 Residential Growth

As noted, a majority of the Columbia River vacant and underutilized shorelines and shoreline parcels are zoned as GMA Agricultural (65 and 93 percent respectively) with other areas zoned designated as Rural Lands 5 (18 and 5 percent respectively), and Heavy Industrial (16 and 2 percent respectively). The vast majority of the Yakima River shorelines and shoreline parcels are zoned Rural Lands 5 (both 99 percent), with small areas of GMA Agricultural, Rural Lands 1, and Heavy Industrial.

Relatively less land along the Columbia River is vacant or able to be further subdivided compared to developed property or land with a particular use or activity. Along the Yakima River shoreline, there are approximately 260 vacant acres (612 acres in shoreline parcels), as well as land that could be further subdivided. Along the Columbia River shoreline, there are approximately 49 vacant acres (121 acres in shoreline parcels), as well as land that could be further subdivided. Results of the residential analysis by shoreline environment designation are shown in Tables 3-2 and 3-3.

Table 3-2. Reasonably Foreseeable Future Residential Development in Benton County's Shoreline Jurisdiction

	Total Acres[1]	Acres Residential Allowed[2]	Net Acres: Buffer Reduction	Net Acres: Infrastructure Deduction	Potential New Units
Columbia River					
Conservancy	111.96	106.27	-	-	-
Hanford	0.02	-	-	-	-
Natural	70.89	70.89	-	-	-
Residential	0.46	0.45	0.22	0.16	0.03
Rural	102.48	102.48	51.24	35.87	3.65
Rural Industrial	60.27	-	-	-	-
Yakima River					
Conservancy	1,375.48	1,375.48	343.87	240.71	48.14
Residential	13.54	13.54	6.77	4.74	1.94
Rural	1,161.32	1,161.32	580.66	406.46	83.72
Urban Transition Area	23.05	19.97	14.98	10.48	60.89
Total	**2,919.48**	**2,850.40**	**997.74**	**698.42**	**198.38**
Total with Market Factor (25% Reduction)					**148.79**

Notes:
[1] Total Acres indicates the total acres of land within the shoreline jurisdiction;
[2] Acres Residential Allowed indicates the number of acres within zoning districts and shoreline environment designations that allow residential development.

Table 3-3. Reasonably Foreseeable Future Residential Development in Parcels that are Partially within Shoreline Jurisdiction

	Total Acres[1]	Acres Residential Allowed[2]	Net Acres: Buffer Reduction	Net Acres: Infrastructure Deduction	Potential New Units
Columbia River					
Conservancy	1,575.29	1,566.43	1,450.43	1,015.30	50.76
Hanford	-	-	-	-	-
Natural	625.45	625.45	594.17	415.92	20.80
Residential	2.39	2.25	2.14	1.50	0.30
Rural	2,054.46	2,054.46	1,951.74	1,366.22	87.42
Rural Industrial[3]	199.57	124.67	61.16	42.81	2.14
Yakima River					
Conservancy	2,018.02	2,018.02	1,917.12	1,341.98	268.40
Residential	30.13	30.13	28.63	20.04	7.52
Rural	4,609.50	4,609.50	4,379.03	3,065.32	622.71
Urban Transition Area	50.67	41.00	38.95	27.27	158.36
Total	**11,165.47**	**11,071.91**	**10,426.36**	**7,296.35**	**1,218.40**
Total with Existing Units (128 units)					**1,346.40**
Total with Market Factor (25% Reduction) + Existing Units					**1,041.8**

Notes:
[1] Total Acres indicates the total acres of land within shoreline jurisdiction;
[2] Acres Residential Allowed indicates the number of acres within zoning districts and shoreline environment designations that allow residential development.
[3] The acreage comprised of the McNary Dam was deducted from the area of parcels that touch the Rural Industrial designation. It is assumed that the dwelling units associated with Rural Industrial designation would occur outside of the shoreline jurisdiction on GMA AG property and therefore would not strictly be governed by Rural Industrial requirements.

As shown in Tables 3-2 and 3-3, nearly all of the estimated 149 potential new residential units would occur in the Yakima River shoreline (97 percent). Within all of the shoreline parcels that touch shoreline jurisdiction, there was the potential for 939 new residences. Approximately 82 percent of those would occur along the Yakima River. There is virtually no potential for residential growth within shoreline jurisdiction on the Columbia River (less than 4 units). There is potential for new residential development and subdivision near, but outside, shoreline jurisdiction.

3.2 Industrial

There is potential for new light and heavy industrial development along the Columbia River shorelines within reaches C8 and C9 (Hover and Finley Industrial). Shoreline areas zoned for heavy industrial uses are located in the Conservancy and Rural Industrial designations. The results of the analysis showed a potential for between 160,535 and 728,063 square feet of new development, with the smaller number potentially occurring in shoreline jurisdiction and the larger number representing development both within and immediately adjacent to shoreline jurisdiction. All of the potential industrial development within shoreline jurisdiction would be located in the Rural Industrial designation. According to the Draft SMP, nonwater-oriented development in the Conservancy designation is required to comply with a 200-foot buffer from the OHWM. This would preclude industrial development within the Conservancy shoreline environment designation. A buffer does not apply to water-dependent industrial uses within the shoreline buffer of either shoreline environment designation.

3.3 Hanford Reach

A Comprehensive Land Use Plan has been developed for the Hanford site by the U.S. Department of Energy. It was evaluated in an Environmental Impact Statement (EIS) in 1999 and a revised record of decision was issued in 2008. The future land use pattern promotes preservation and conservation, research and development, and industrial. Some focused areas of recreation are also

anticipated, such as along the Columbia River at the Vernita Terrace. About 125 acres are planned for high-intensity recreation (some concepts explored in the EIS included a museum, golf course, and RV park) and 334 acres are planned for low-intensity recreation (examples studied in the EIS included sport fishing and day-use activities).

4 EFFECTS OF ESTABLISHED REGULATORY PROGRAMS

4.1 Current County Regulations and Programs

All development activity within the County is required to comply with the Benton County Code (BCC). Provisions in the BCC that potentially affect how future development is implemented and the extent of potential ecological impacts include critical area regulations, zoning, and stormwater management standards in the Hydrology Manual. The following are descriptions of these relevant regulations and how they help to maintain shoreline functions.

4.1.1 Critical Areas Regulations

County critical area regulations, which will continue to apply outside of shoreline jurisdiction after adoption of the SMP, require buffers of 50 feet for creeks and 100 feet for rivers[1] (BCC 15.20). The regulations require wetland buffers between 25 and 200 feet based on wetland classification (BCC 15.15.060). For agricultural ditches, ponds, and channels (classified as Category V wetlands), the County requires a buffer sufficient to maintain water quality. The County's Critical Areas and Resources regulations also apply to geologic hazards (BCC 15.35), frequently flooded areas (BCC 15.30), critical aquifer recharge areas (BCC 15.25), and mineral resource areas (BCC 15.45). An additional body of regulations governing flood damage prevention (BCC 3.26) is intended to protect human welfare and limit flood-related financial damages, but also has incidental benefits to protection of ecological functions.

[1] The river buffer will be obsolete after adoption of the SMP.

4.1.2 Zoning Code

County zoning standards direct the location of uses, building bulk, and scale. These standards are important in planning for future growth and focusing development in a sustainable manner.

4.1.3 Hydrology Manual

The Benton County Hydrology Manual and Drainage Design Review Procedure direct the County to evaluate how proposed stormwater drainage facilities will affect flooding, erosion, and groundwater quality. By reviewing drainage, flooding, and erosion, the County helps to avoid development that will have an adverse impact on hydrologic conditions.

4.2 State Agencies/Regulations

Aside from the Shoreline Management Act, State regulations most pertinent to moderation of ecological impacts of development in the County's shoreline include the State Hydraulic Code, the Growth Management Act, State Environmental Policy Act (SEPA), tribal agreements and case law, and Water Resources Act. A variety of agencies (e.g., Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Natural Resources) are involved in implementing these regulations or managing state-owned lands. The Department of Ecology reviews all shoreline projects that require a shoreline permit, but has specific regulatory authority over Shoreline Conditional Use Permits and Shoreline Variances. Other agency reviews of shoreline developments are typically triggered by in- or over-water work, discharges of fill or pollutants into the water, or substantial land clearing. During the comprehensive SMP update, the County has considered other State regulations to ensure consistency as appropriate and feasible with the goal of streamlining the shoreline permitting process. A summary of some of the key State regulations by agency responsibilities follows.

4.2.1 Washington Department of Natural Resources

Projects on state-owned aquatic lands may be required to obtain an Aquatic Use Authorization from Washington Department of Natural Resources (WDNR) and enter into a lease agreement. WDNR will review lease applications to determine if the proposed use is appropriate, and to ensure that proposed mitigation for impacts to aquatic resources are sufficient.

WDNR is also responsible for administering the Surface Mining Act. The Act requires a permit for each mine that: 1) results in more than 3 acres of mine-related disturbance, or 2) has a high-wall that is both higher than 30 feet and steeper than 45 degrees. A reclamation plan is required that describes how the site will be restored following mining activity to maintain stable slopes, diverse landscape features, and dense, native vegetation. In coordination with SMP standards, the Act helps ensure that mining activities do not result in long-term adverse effects on shoreline functions.

4.2.2 Washington Department of Ecology

The Washington Department of Ecology may review and condition a variety of project types, including any project that needs a permit from the U.S. Army Corps of Engineers (see below), any project that requires a Shoreline Conditional Use Permit or Shoreline Variance, and any project that disturbs more than 1 acre of land. Project types that may trigger Ecology involvement include pier and shoreline modification proposals and wetland or stream modification proposals, among others. Ecology's three primary goals are to: 1) prevent pollution, 2) clean up pollution, and 3) support sustainable communities and natural resources (http://www.ecy.wa.gov/about.html). Ecology may comment on local SEPA review if it is an agency of jurisdiction.

Per a 1994 Memorandum of Understanding (MOU) between the County and Ecology, Ecology also retains overall and final review and approval authority over Hanford projects requiring shoreline management permit actions.

4.2.3 Washington Department of Fish and Wildlife

The Washington Department of Fish and Wildlife (WDFW) has the authority to review, condition, and approve or deny "any construction activity that will use, divert, obstruct, or change the bed or flow of State waters." Practically speaking, these activities include, but are not limited to, installation or modification of piers, shoreline stabilization measures, culverts, and bridges. WDFW typically conditions such projects to avoid, minimize, and/or mitigate for damage to fish and other aquatic life, and their habitats.

4.3 Federal Agencies/Regulations

Federal review of shoreline development is in most cases triggered by in- or over-water work, or discharges of fill or pollutants into the water. Depending on the nature of the proposed development, federal regulations can play an

important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. A summary of some of the key federal regulations follows.

4.3.1 Clean Water Act

Section 404 of the federal Clean Water Act requires the Corps to regulate "discharge of dredged or fill material into waters of the United States, including wetlands." The Corps reviews and approves wetland fills, stream and wetland restoration, and culvert installation or replacement, among others. For any of the above projects, the Corps requires mitigation sequencing documenting avoidance, minimization, restoration, and compensation of impacts.

Section 303(d) of the Clean Water Act requires the state to develop a list of waters that do not meet water quality standards. Shoreline waterbodies and the impaired water quality parameters in Benton County are listed in Table 4-1. A Total Maximum Daily Load, or TMDL, must be developed for impaired waters. Table 4-2 provides a list of those waterbodies and water quality parameters for which a TMDL is in place. In 1997, Ecology published a total maximum daily load (TMDL) for the lower Yakima River - *Lower Yakima River Suspended Sediment TMDL* (Joy and Patterson 1997). Since the completion of the TMDL, entities and organizations throughout the watershed have worked to improve irrigation practices and limit the transport of fine sediment into streams and irrigation return drains. These efforts have been successful in reducing pesticide concentrations and turbidity in the Yakima River for aquatic life; however, DDT remains on the 303(d) list (Category 5) for the more stringent human health standard. Efforts to maintain and improve water quality, including managing irrigation and erosion are expected to continue in the lower Yakima watershed, and water quality parameters are expected to continue to improve over time.

Table 4-1. Category 5 Waterbodies (Impaired) by River and WRIA

River	WRIA	PCB	DDT/DDE	Other Chemicals, including pesticides	Dissolved Oxygen	pH	Temperature	Dioxin
Columbia	Rock-Glade 31						X	
	Alkali-Squilchuck 40							
Yakima	Lower Yakima 37	X	X	X	X	X	X	X

Table 4-2. Category 4 Waterbodies with a TMDL by River and WRIA

River	WRIA	Turbidity	Total Dissolved Gas	Dioxin	Instream Flow
Columbia	Rock-Glade 31		X	X	
	Alkali-Squilchuck 40			X	
Yakima	Lower Yakima 37	X			X

4.3.2 Rivers and Harbors Act, Section 10

Proposals to construct new or modify existing in-water structures (including piers, marinas, bulkheads, breakwaters), to excavate or fill, or to "alter or modify the course, location, condition, or capacity of" navigable waterbodies must be reviewed and approved by the Corps. Similar to its authorities under Section 404, the Corps may condition development to avoid, minimize, and mitigate for impacts to navigation, access, and ecological functions.

4.3.3 Federal Endangered Species Act (ESA)

Section 9 of the Endangered Species Act prohibits "take" of federally listed species (see Tables 3-1 and 3-2 in the *Shoreline Analysis Report*), and this prohibition applies to all parties anywhere that those listed species may be found, both in and outside of shoreline jurisdiction. Per Section 7 of the ESA, the Corps must consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service on any projects that fall within Corps jurisdiction (e.g., Section 404 or Section 10 permits) that could affect species listed under the Federal Endangered Species Act. These agencies ensure that the project includes impact minimization and compensation measures for protection of listed species and their habitats.

4.3.4 McNary Shoreline Management Plan

The majority of the Lake Wallula shoreline, located above McNary Dam, is owned and managed by the Corps. In 2012, the Corps updated a 1983 plan for management and permitting of private use on Lake Wallula and Corps-managed lands with frontage on Lake Wallula (http://www.nww.usace.army.mil/Portals/28/docs/programsandprojects/msmp/MSMP-Final_121211.pdf). Most of Benton County's unincorporated shoreline

area governed by the McNary Shoreline Management Plan is designated as "Protected Lakeshore," with a couple locations designated either "Prohibited Access," "Public Recreation," or "Limited Development." The latter two designations are found in the Finley area. The updated plan provides criteria for design and construction of existing private docks (including "special status" docks, or "grandfathered" docks), new community and private docks, and vegetation modification. The plan does not apply to public docks. The plan allows for a total of 100 private docks on Lake Wallula, including existing docks, assigning priority to new community docks that jointly serve multiple users. As of July 2013, only 11 new, private docks can be permitted in areas designated under the McNary Shoreline Management Plan for "Limited Development." Since Benton County only composes a portion of the McNary Shoreline Management Plan management area, some portion of the 11 possible docks is expected to occur in unincorporated Benton County. In addition to SMP standards, any new docks constructed on Lake Wallula must comply with standards of the McNary Shoreline Management Plan. These standards are substantively consistent with the dock standards proposed in the Benton County SMP.

4.3.5 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Commonly known as Superfund, CERCLA establishes requirements for closed and abandoned hazardous waste sites; liability for releases of hazardous waste at these sites; and a fund to provide for cleanup when no responsible party can be identified. The Hanford site is subject to long-term CERCLA provisions, which are expected to reduce the risk of groundwater and surface water contamination over time.

4.3.6 Pacific Northwest Electric Power Planning and Conservation Act

The Northwest Power and Conservation Council is responsible for establishing (1) a regional conservation and electric power plan and (2) a program to protect, mitigate, and enhance fish and wildlife. As a member of the Yakima Subbasin Fish and Wildlife Planning Board (Yakima Subbasin Planning Board), Benton County contributed to the preparation of the Yakima Subbasin Plan in 2004. The Subbasin Plan describes the most effective ways that the Council and the Bonneville Power Administration (BPA) can meet their obligations in the Yakima Subbasin to mitigate the impacts on fish and wildlife resources from the

construction and operation of the Federal Columbia River Power System (FCRPS). Because dam impacts are ongoing and integrated into the analysis of the environmental baseline conditions, as mitigation for dam impacts is implemented, the environmental baseline conditions are expected to improve (see Shoreline Restoration Plan for more specific description of proposed actions).

4.4 Yakama Nation

As part of an 1855 treaty with the federal government, the Yakama Nation has a 1.2-million-acre reservation along the Yakima River and has retained rights to fish and construct temporary fish-curing buildings at all "usual and accustomed places" outside of the reservation (the "ceded area" totaling more than 12 million acres), as well as to hunt, gather roots and berries, and pasture horses and cattle upon "open and unclaimed land." While the boundaries of the reservation do not extend into Benton County, the ceded area includes a large portion of Benton County, including most of the Yakima and Columbia Rivers. The Yakama Nation has programs and projects, and will comment on other parties' programs and projects, to further protect and restore sites of interest (including sensitive fish and wildlife resources) and importance to the Nation.

5 CUMULATIVE IMPACTS WITH APPLICATION OF THE SMP

This section describes how, based on the foreseeable development, the proposed SMP protects shoreline functions. The following components of the SMP are integral to ensuring no net loss of shoreline functions. Each of these components is discussed in further detail below.

- Shoreline environment designations are based on existing shoreline conditions. Allowed uses focus high-intensity development in areas with a high level of existing alterations, while limiting future uses in areas where ecological functions and processes are more intact.
- SMP standards require applicants to avoid, minimize, and then compensate for unavoidable impacts to shoreline functions. Where SMP standards do not provide specific, objective measures that clarify

avoidance, minimization, and mitigation measures, a mitigation sequencing analysis is required.

- Shoreline critical areas regulations are consistent with recommended state guidance to maintain ecological functions.
- Specific policies and regulations government shoreline uses and modifications ensure that potential impacts are regulated to avoid a net loss of ecological function, while also meeting the requirements of the Shoreline Management Act pertaining to public access, prioritization of shoreline uses, and private property rights.

5.1 Environment Designations

The assignment of environment designations can help minimize cumulative impacts by concentrating development activity in lower functioning areas or areas with more intensive existing development that are not likely to experience significant function degradation with incremental increases in new development or redevelopment. According to the SMP Guidelines (WAC 173-26-211), the assignment of environment designations must be based on the existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through a comprehensive plan.

Consistent with SMP Guidelines, the County's environment designation system is based on the existing use pattern, the biological and physical character of the shoreline, and community interests. The *Shoreline Analysis Report* provided information on shoreline conditions and functions that informed the development of environment designations. The proposed environment designations include: Urban Transition Area, Rural Industrial, Residential, Rural, Hanford, Conservancy, Natural, and Aquatic, generally listed in order by decreasing intensity of allowed use. Criteria for each environment designation are provided in Table 5-1.

Table 5-1. Environment designation criteria

Environment Designation	Classification Criteria
Urban Transition Area	Urban Growth Areas, where high intensity land-uses, including residential, commercial, recreational and industrial development or supporting utilities and transportation exist or are planned for in the future or where there is existing or planned development that is compatible with maintaining or restoring the ecological functions of the area

Environment Designation	Classification Criteria
Rural Industrial	Industrial or commercial areas of intensive rural development if they currently support concentrations of commerce, transportation, power production, or navigation; or are suitable and planned for intensive water-oriented uses
Residential	Predominantly single-family residential development or are planned and platted for residential development
Rural	Areas characterized by: agricultural lands and low density residential uses; commercial agriculture potential; parallel infrastructure that limits shoreline functions
Hanford	Areas located in the U.S. Department of Energy's Hanford site
Conservancy	Parks, public lands, and open space suitable for public access and recreation. Areas with higher functioning shorelines with potential for restoration.
Natural	Ecologically intact representing an important, irreplaceable ecological function or process, of particular scientific or educational interest, or part of the Umatilla National Wildlife Refuge.
Aquatic	Areas waterward of the ordinary high-water mark.

Approximately 62 percent of the shoreline area within Benton County occurs in the Natural, Conservancy, and Hanford environment designations (Figure 1), where allowed uses are generally limited to open space, recreation, public access, and agriculture. In the Hanford designation, limited areas of disturbance for heavy and light industry, energy generation and transmission, research and development are also anticipated. The Rural designation, which composes another third of shoreline jurisdiction, allows for low-density residential and agricultural development, and this designation composes one-third of shoreline jurisdiction. Those environment designations that allow for higher intensity development and a broad range of potential shoreline uses (i.e. Residential, Rural Industrial, and Urban Transition Area) collectively compose less than five percent of the County's shoreline area (Figure 5-1).

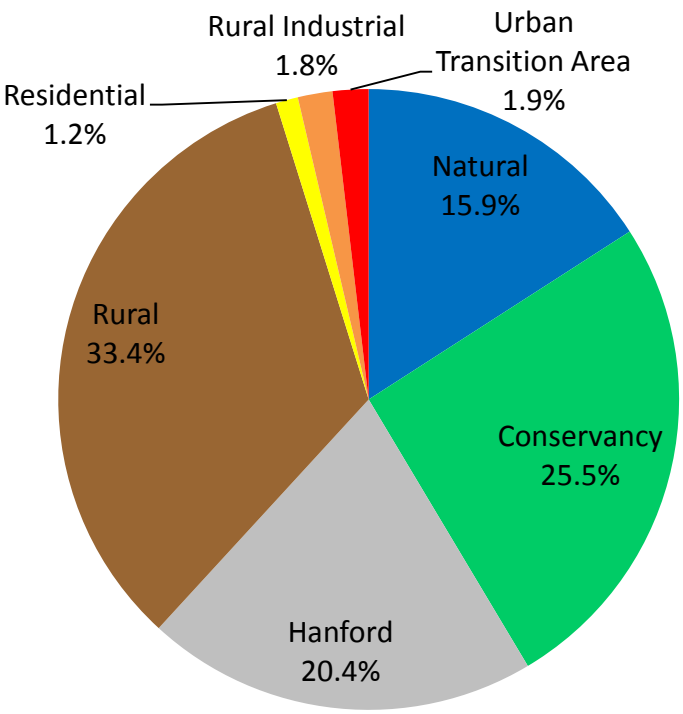


Figure 5-1. Distribution of Upland Environment Designations by Area

Through its allowed and prohibited uses, Benton County's proposed SMP generally minimizes cumulative impacts by concentrating development activity in existing disturbed areas with lower ecological functions compared to other reaches within the County. Figure 5-2 demonstrates that higher functioning shoreline reaches are typically assigned to the Natural, Conservancy and Hanford designations, where allowed uses are limited. Lower functioning reaches occur in the Rural, Residential and Rural Industrial designations. Those existing disturbed shorelines are not likely to experience significant function degradation with incremental increases in new development. In the Urban Transition Area designation, scores are typically moderate, and this reflects the undeveloped nature of many of the areas planned for future growth in the County.

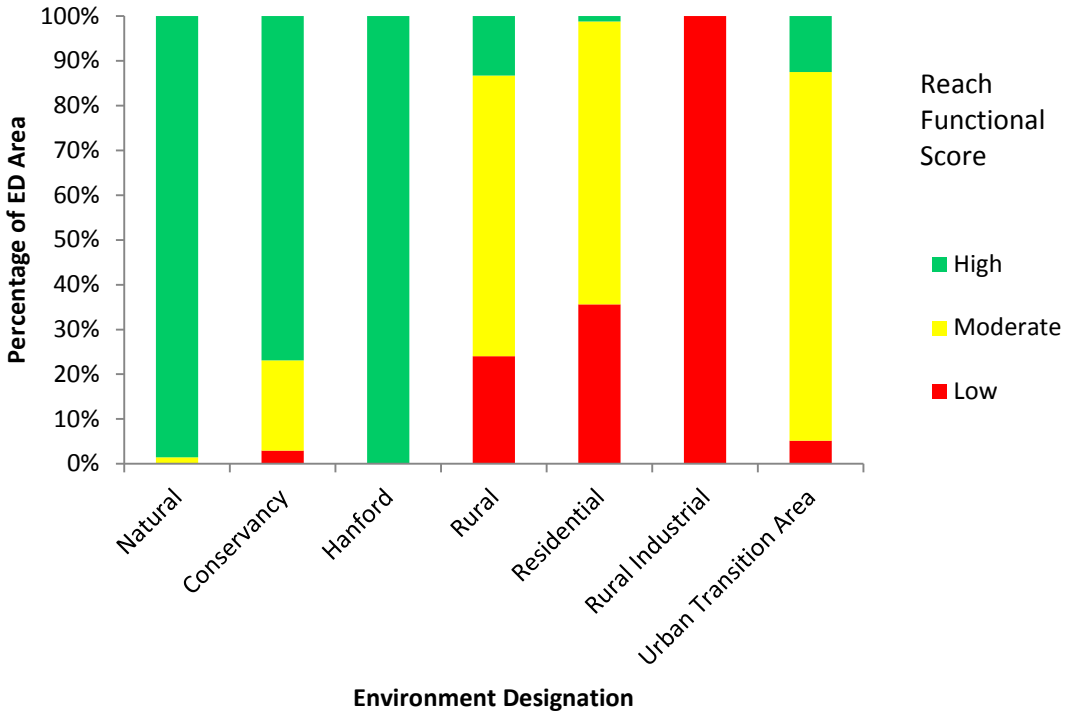


Figure 5-2. Distribution of reach functional scores by environment designation

5.2 Effects of Critical Areas Regulations

The SMP includes policies and regulations to avoid cumulative effects to critical areas. Mitigation sequencing is required for all shoreline critical areas, including wetlands, rivers and creeks, critical aquifer recharge areas, frequently flooded areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. SMP regulations proposed for wetlands, rivers, and creeks include standard buffer areas, which are discussed in greater detail below.

5.2.1 Wetlands

The County's wetland standards require mitigation sequencing for impacts to wetlands and wetland buffers. The proposed wetland buffer widths are consistent with Ecology's "*Wetlands and CAO Updates: Guidance for Small Cities (Eastern Washington Version)*," revised October 2012, which relies on the most current technical and scientific information available. Buffer averaging may be permitted to improve wetland protection, provided that the averaging will not result in degradation of the wetland's functions (BCC XX.06.020(e)(6)). Wetlands occur relatively infrequently within the County's shorelines. Most wetlands in the County's shorelines are either protected by a conservation easement (Barker

Ranch) or are a part of a park or preserve (e.g., Two Rivers, Umatilla National Wildlife Refuge, Hover Park, Plymouth Park). As a result, development pressure surrounding the County's shoreline-associated wetlands is relatively low. The proposed SMP standards should ensure that wetland functions are maintained over time.

5.2.2 Rivers and Creeks

The proposed SMP establishes buffer and setback regulations developed to be consistent with existing conditions, as assessed in a reach-level analysis conducted as part of the *Shoreline Analysis Report* (TWC and BERK 2013). Additional discussion of the implications of specific buffer and setback regulations in relation to anticipated shoreline uses is included in Section 5.3, below.

For non-shoreline tributaries within shoreline jurisdiction, either a 50-foot or 100-foot buffer applies, depending on whether the tributary is a fish-bearing stream (BCC XX.06.030(a)). This approach ensures that riparian functions are maintained at ecologically significant confluence areas.

Within regulated buffer areas, only limited, minimally invasive modifications are allowed, including a 4-foot-wide trail to the water, water-dependent uses and certain accessories, and required surface water management measures (e.g., energy dissipaters) that cannot be located elsewhere (BCC XX.06.030(d &e)).

5.3 Effects of SMP Standards on Commonly Occurring Foreseeable Uses

The SMP contains numerous shoreline use regulations (see BCC XX.07) intended to protect the ecological functions of the shoreline and prevent adverse cumulative impacts. As discussed previously, WAC 173-26-186(8)(d) directs local SMPs to evaluate and consider cumulative impacts of "reasonably foreseeable future development on shoreline ecological functions." Although future development may include other less common types of development, the location, timing, and impacts of less common uses and development projects are less predictable. WAC 173-26-201(3(d)(iii) states:

> *For those projects and uses with unanticipatable or uncommon impacts that cannot be reasonably identified at the time of master program development, the master program policies and regulations should use the permitting or conditional*

> *use permitting processes to ensure that all impacts are addressed and that there is not net loss of ecological function of the shoreline after mitigation.*

As directed by the WAC, the SMP requires that less common shoreline uses and uses with unpredictable effects demonstrate that proposed projects will not result in a loss of ecological functions. Therefore, these types of projects will generally not be addressed in great detail in this analysis. Rather, a complete review of the potential impacts of shoreline uses and modifications and the SMP standards that manage the resulting impacts is included in Appendix A.

Results of the analysis of foreseeable future development in Section 3 indicate that the most commonly anticipated changes in shoreline development involve residential, industrial, and recreational development. These activities include upland development, and may also include the development of overwater structures, shoreline stabilization, utilities, and/or access roads. The following sections summarize how these potential activities may impact ecological functions, and how SMP provisions address those potential effects to avoid cumulative impacts. The likely effects of unregulated, illegal, and exempt development are also addressed below.

5.3.1 Mitigation Sequencing

The proposed SMP includes general regulations requiring projects to be designed, located, sized, constructed and maintained to achieve no net loss of shoreline ecological functions (BCC XX.05.020(a)). Mitigation sequencing standards apply to all projects in shoreline jurisdiction. In some cases, specific provisions are applied by the SMP that stipulate objective standards for avoiding (e.g., placement), minimizing (e.g., size, materials, and design standards), and compensating for unavoidable impacts (e.g. specific planting requirements). Where these objective standards are not specified in the SMP, a description of the analysis of mitigation sequencing is required with any shoreline application (BCC XX.05.020(c & d)). The application of mitigation sequencing standards should help ensure that shoreline uses and modifications achieve no net loss of shoreline ecological functions.

5.3.2 Unregulated, Illegal and Exempt Development

Unregulated Uses

Unregulated shoreline activities include activities that are not “development” and do not require any sort of shoreline permit, including a shoreline exemption.

Typically, these unregulated activities involve everyday maintenance and use of shoreline lands in conjunction with an approved land use (e.g., applying fertilizer in a residential yard, driving a car on a road along the shoreline, using a boat that is moored at a dock or launched at a boat ramp). Because these activities are associated with legally permitted land uses, the potential effects of these unregulated uses are addressed in concert with the analysis of land uses below.

Illegal Uses

Illegal activities are expected to occur infrequently in shoreline jurisdiction. Based on anecdotal information, illegal shoreline modifications within the County may include unpermitted shoreline stabilization measures on the Yakima River and vegetation clearing. Where illegal actions are identified, they are required to be rectified. Where illegal actions are not recognized, they may result in an incremental loss of shoreline functions. These incremental losses are expected to be offset by mitigation requirements for replacement stabilization structures and boating facilities that result in minor improvements over time (see Appendix A), as well as by voluntary restoration actions identified in the Shoreline Restoration Plan.

Exempt Development

Development and activities that are exempt from requirements for a shoreline substantial development permit are specified in WAC 173-27-040. The SMP explicitly states that development qualifying for a shoreline exemption must still comply with all SMP policies and regulations. Because the SMP provides specific design standards for many exempt developments (such as shoreline stabilization to protect a residence, or a dock) and require that all exempt development types avoid, minimize, and compensate for shoreline impacts, exempt development is not expected to result in a net loss of shoreline functions.

5.3.3 Residential Development

Within Benton County, residential development could occur as new development on existing single-family lots, redevelopment of existing residences, or through subdivision of large lots. The land use analysis indicated that 4 new single-family residences (SFRs) could be developed in shoreline jurisdiction on the Columbia River, and 194 new SFRs could be developed in shoreline jurisdiction along the Yakima River.

A summary of potential effects of residential development on shoreline ecological functions is described in Appendix A. Potential effects of shoreline modifications that may be considered accessory to residential development, including private moorage, shoreline stabilization, accessory utilities, and access roads, are also addressed in general terms in Appendix A.

The SMP addresses the potential impacts of residential development through regulations that guide the siting of new structures, require conservation of vegetation, and help to maintain water quality conditions through stormwater and sewage management requirements (Appendix A). Vegetation conservation standards that establish standard vegetated buffer widths are particularly important for maintaining vegetative, hydrologic, and water quality functions of the shoreline despite increasing development.

The majority of lands available for new residential development are located in the Rural designation, particularly along the Yakima River. As noted in Section 5.1, most lands in the Rural designation are in agricultural use, and many of these lands do not have structures along the shoreline. In the Rural designation on the Columbia River, the mean width of functioning vegetation is just 14 feet, and on the Yakima River, it is 107 feet. By establishing a proposed standard buffer width of 100 feet for nonwater-related uses in the Rural designation (BCC XX.06.030(a)), the proposed SMP is expected to maintain existing ecological functions for shorelines along the Columbia and Yakima Rivers despite even significant residential development potential.

In the Residential designation, shoreline buffer and setback provisions include a "no-touch" buffer (with appropriate exceptions), as well as a setback where limited modifications are allowed (BCC XX.06.030(a)). The buffer and setback standards were established to be generally consistent with existing conditions in the Residential designation in each waterbody; specifically, the regulatory buffer width is similar to the existing average width of functional vegetation and the regulatory buffer width combined with the setback width is similar to the existing average width of structural setbacks in the designation. This approach promotes the maintenance of existing riparian habitat through the buffer standards and maintenance of water quality functions by having more intensive development farther from the shoreline.

Where subdivision is feasible within shoreline jurisdiction, resulting lots will be required to provide a buildable area that will meet SMP standards, including

buffers; and resulting lots may not require shoreline stabilization or structural flood protection measures (Appendix A).

Shoreline stabilization measures are occasionally associated with residential development in Benton County. Stabilization measures have potentially significant impacts on sediment transport processes and instream habitat. Through its strict permitting criteria, the proposed SMP substantially limits the development of new shoreline stabilization structures. The proposed SMP ensures that new and replacement structures evaluate and implement the stabilization approach with the least potential for impacts to shoreline functions (Appendix A). Mitigation for unavoidable impacts from new or replacement stabilization measures would be required through mitigation sequencing.

Private residential docks occur on the Columbia and Yakima Rivers in Benton County, although they are relatively uncommon on the Yakima River. As identified in Section 4.3.4, as of July 2013, the McNary Shoreline Management Plan allows for an additional 8 residential docks on the Columbia River in Lake Wallula (spans Columbia and Walla Walla Counties as well), and the Plan provides specific standards that any new docks must meet. The proposed SMP dock standards are generally consistent with the McNary Shoreline Management Plan for the Columbia River, as well as WDFW standard requirements for docks on the Columbia and Yakima Rivers. Dock standards require specific measures to avoid, minimize and mitigate effects on sediment transport, water quality, and shoreline habitat (Appendix A). Any dock replacements will be required to meet the standards for a new dock under the SMP. This provision is expected to help to improve conditions related to overwater structures as docks are replaced over time.

In summary, residential development is expected to occur along the County's shorelines. The proposed SMP includes regulations that will maintain riparian functions and ensure that shoreline functions are not degraded from changes in stormwater, as well as in- and over-water structures that may be associated with increased residential development.

5.3.4 Industrial Development

Industrial development is most likely in the Finley industrial area (Rural Industrial shoreline environment designation) and in the Richland UGA (Urban Transition Area shoreline environment designation). Both of these areas have

existing high-intensity industrial development interspersed with undeveloped lands. Potential impacts from the infill of industrial development in these areas may include increased stormwater runoff, impaired water quality associated with contaminants found on those impervious surfaces or applied to the landscape and erosion from vegetation clearing, and a loss of riparian and limited wetland habitats (Appendix A).

Consistent with SMP guidelines, the proposed SMP establishes a preference for water-dependent industrial development (rather than nonwater-related industrial development). Water-dependent industrial development may have a number of specific potential effects on shoreline functions.

- First, water-dependent uses do not have a required setback, so riparian vegetation functions may be affected by new water-dependent development. Consistent with BCC XX.05.030 (Shoreline Vegetation Conservation) of the SMP, any unavoidable removal of vegetation that would cause adverse impacts to the shoreline would require mitigation and monitoring.

- Second, water-dependent industrial development may affect shoreline functions through the need for new overwater structures, stabilization, in-water structures, or new or maintenance dredging of the shoreline. The proposed SMP requires mitigation sequencing for all of the above activities. For example, new development must be sited to avoid, then minimize the need for new or maintenance dredging. Similarly, the size of overwater structures must be the minimum necessary for the approved use. Where impacts remain, they must be mitigated and monitored.

Where nonwater-dependent industrial development is proposed within shoreline jurisdiction as a part of a mixed-use development or where navigation is already severely limited, public access or ecological restoration must be provided (BCC XX.07.080(c)). Additionally, nonwater-dependent development must comply with required buffers (the greater of 50 feet or the City's required buffer in the Urban Transition Area and 50 or 100 feet in the Rural Industrial area depending on whether the development is water-related). These provisions help to maintain remaining riparian vegetation and allow for a possibility that new industrial development will provide some improvement of existing shoreline functions.

Most new industrial developments are expected to result in an increase in impervious surface coverage. The proposed SMP requires that new development and re-development manage short-term and long-term stormwater runoff to avoid and minimize potential adverse effects on shoreline ecological functions. Any development would need to comply with the Benton County Hydrology Manual or approved equivalent, and best management practices (BMPs) are required for any development.

In summary, although infill industrial development may occur in specific locations along the County's shoreline, the SMP standards address the likely impacts of such development and require mitigation for any anticipated impacts.

5.3.5 Recreational Development

Benton County's shorelines offer a variety of active and passive recreational opportunities. Particularly on the Columbia River, recreation is a predominant shoreline land use. As noted in the *Shoreline Analysis Report* (TWC and BERK 2013), potential future recreational development in the County includes water access, a primitive campground, and restrooms at Hover Park; as well as trail development connecting parks along the Columbia and Yakima Rivers.

The potential impacts of recreational uses generally depend on the type and intensity of the use. Active uses, which may require structural development such as boat ramps, boardwalks, and concession facilities, are expected to have a greater impact than passive uses, such as hiking trails (Appendix A).

For water-oriented public access and recreation facilities in the Conservancy designation, specific design and management standards are proposed that address impervious surfaces, vegetation, chemical applications, and lighting (BCC XX.06.030(e)(4)). These standards provide flexibility to design public access and recreation facilities that meet the demands of water-oriented uses, while minimizing and mitigating for effects on shoreline functions.

In addition to potential impacts from upland development, boat ramps, overwater structures, and associated shoreline stabilization are also expected to be associated with recreational development. The SMP establishes a requirement that new boat ramps be approved only where existing facilities do not meet the present demand (BCC XX.07.030(j)(1)). In cases where new boat ramps or overwater structures are approved, they will need to be designed to avoid and

minimize potential impacts to water quality, sediment transport, and shoreline vegetation (Appendix A).

In summary, shoreline recreational development is expected to continue along the County's shorelines. This development will be managed by the SMP to ensure that both upland and in-water impacts are avoided, minimized, and mitigated to result in no net loss of shoreline functions.

5.3.6 Transportation

Roads and railroads are common features along the County's shoreline. Both roads and railroads tend to impair habitat and hydrologic connectivity, and stormwater runoff can have a substantial impact on water quality conditions (Appendix A). The majority of anticipated transportation-related work involves maintenance and repair of the existing network of transportation infrastructure. The proposed SMP establishes standards to guide ongoing maintenance of the existing transportation infrastructure, as well as development of new infrastructure.

Proposed SMP standards require that new highways and railroads are constructed outside of shoreline jurisdiction where feasible (Appendix A). Where routing a road or railroad outside of jurisdiction is not possible, the SMP provides design standards to avoid and minimize potential impacts. Mitigation would be required for impacts resulting from clearing and grading, dredging or fill, shoreline stabilization, or vegetation removal, any of which might be related to development of transportation infrastructure. In summary, no net loss of shoreline functions is anticipated to result from the maintenance or development of transportation uses.

5.3.7 Utilities

Based on the permit analysis conducted as a part of the Shoreline Analysis, nearly half of the total shoreline permit applications in the County in the last twenty years were related to new utility infrastructure. The majority of these permit applications (seven out of twelve) were for new fiber optics cables. The demand for additional fiber optics cables in the County is unknown. Where the location is noted in the permit database, crossings occur on existing bridges, and this trend is consistent with the proposed SMP standard requiring utilities to be located within existing transportation or utility corridors or existing cleared areas to the greatest extent feasible (BCC XX.07.160(d)). This standard, in addition to

standards requiring no net loss of functions, and restoration of disturbed areas (see Appendix A) should help ensure that utilities do not result in a net loss of functions.

5.4 Shoreline Restoration Plan

One of the key objectives that the SMP must address is "no net loss of ecological functions necessary to sustain shoreline natural resources" (Ecology 2011). Although the implementation of restoration actions to restore historic functions is not required by SMP provisions, the SMP 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)).

The *Shoreline Restoration Plan* (TWC 2013) represents a long-term vision for restoration that will be implemented over time, resulting in a gradual improvement over the existing conditions. Although the SMP is intended to achieve no net loss of ecological functions through regulatory standards alone, practically, an incremental loss of shoreline functions at a cumulative level may occur through minor, exempt development; illegal development; failed mitigation efforts; or a temporal lag between the loss of existing functions and the realization of mitigated functions. The *Shoreline Restoration Plan*, and the voluntary actions described therein, can be an important component in making up that difference in ecological function.

Major *Shoreline Restoration Plan* components that are expected to contribute to improvement in ecological functions in the foreseeable future are summarized below:

- Design and implementation or recently identified restoration opportunities on the Columbia River, including restoration of off-channel habitats, restoring instream complexity, and enhancing connectivity to small tributaries.
- Implementation of management strategies to improve thermal refugia at the mouth of the Yakima River.
- Water star grass management.

- Coordination with landowners to implement voluntary riparian and floodplain enhancement projects through acquisition, easement, or conservation agreements.
- Irrigation improvements, including fish screening, water conservation, and improving water quality of return flows.
- Changes to dam management to maintain more natural flow regimes.
- Ongoing management and mitigation measures to minimize impacts of ongoing Columbia River dam operations.

6 NET EFFECT ON ECOLOGICAL FUNCTION

This CIA indicates that future growth is likely to be targeted in specific environment designations, waterbodies, and shoreline reaches. This analysis can help inform the County of potential future shoreline impacts and the importance of specific proposed SMP provisions.

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

As discussed above, major elements of the SMP that ensure no net loss of ecological functions fall into four general categories: 1) environment designations, 2) general policies and regulations, 3) shoreline critical areas regulations, and 4) shoreline use and modification provisions. The *Shoreline Restoration Plan* identifies ongoing and planned voluntary restoration that will provide an opportunity to improve shoreline conditions over time.

Environment designations: The *Benton County Shoreline Analysis Report* provided the information necessary to assign environment designations by segment to each of the shoreline waterbodies (see **BCC XX.04**).

General provisions: **The Comprehensive Plan element of the SMP** contains a number of goals and policies pertaining to the protection and restoration of ecological functions. **BCC XX.05** includes regulations relating to the adopted policies. These regulations include provisions that provide the basis for achieving no net loss of shoreline functions, such as mitigation sequencing and vegetation conservation standards.

Shoreline modification and use provisions: **BCC XX.07** contains a number of regulations that contribute to protection and restoration of ecological functions. Shoreline uses and modifications were individually determined to be either permitted (as substantial developments or conditional uses) or prohibited in each environment designation. The most uses and modifications are allowed in areas with the highest level of existing disturbance.

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

Critical Areas Regulations: The County's shoreline critical areas regulations (**BCC XX.06**) apply within shoreline jurisdiction. Shoreline critical area regulations ensure that vegetated buffers are retained on wetlands, fish and wildlife conservation areas (including all shorelines), and geologically hazardous areas. The County's flood hazard regulations require that vegetation, flood capacity, and water quality are maintained, and that where feasible, buildings are located outside of the floodway. Combined, these regulations help ensure that the most sensitive areas of the County's shorelines are protected.

Shoreline Restoration Plan: 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 County programs and activities, restoration partners, and recommended actions consistent with a variety of watershed-level efforts.

Given the above provisions of the SMP, including the key features listed above, implementation of the proposed SMP is anticipated to achieve **no net loss of ecological functions in the shorelines of Benton County.** Voluntary actions identified and prioritized in the *Shoreline Restoration Plan* will provide the opportunity to enhance and restore shoreline functions over time.

7 REFERENCES

Appel, M., R. Little, H. Wendt, M. Nielson. 2011. Assessment of the Lower Yakima River in Benton County, Washington. Produced in cooperation with the Yakima Basin Fish and Wildlife Recovery Board.

Benton County. 2012. Shoreline Permits 1971-2012. Benton County Planning Department. Prosser, WA.

Vaccaro, J.J. 2011. River-Aquifer Exchanges in the Yakima River Basin, Washington, Scientific Investigations Report 2011-5026. U.S. Geological Survey.

Washington State Department of Ecology (Ecology). 2012. Focus on Mitigation in the Yakima Basin. Publication No. 12-11-024.

Yakima Subbasin Fish and Wildlife Planning Board (Yakima Subbasin Planning Board). 2004. Yakima Subbasin Plan. Prepared for Northwest Power and Conservation Council. 1038 pp.

APPENDIX A

Summary of Potential Impacts and SMP Standards that Help Maintain No Net Loss of Functions

TABLE OF CONTENTS

A-1 General Standards 1
A-2 Agriculture 2
A-3 Aquaculture 3
A-4 Boating Facilities and Private Moorage 4
A-5 Breakwaters, Jetties and Groins 6
A-6 Commercial Development 8
A-7 Dredging and Dredge Material Disposal 9
A-8 Fill 10
A-9 In-Stream Structures 12
A-10 Industrial 12
A-11 Mining 14
A-12 Recreation 16
A-13 Residential 17
A-14 Shoreline Stabilization 18
A-15 Transportation 19
A-16 Utilities 20

This appendix provides brief summaries of potential changes in shoreline uses and modifications, the potential impacts of those changes, and how SMP standards address these impacts to avoid a net loss of functions. Those use provisions relating to commonly anticipated development are discussed in greater detail in the body of the County's Cumulative Impacts Analysis (CIA).

A-1 General Standards

The following general standards help to ensure that shoreline functions are maintained for all shoreline uses and modifications.

Table A-1. Summary of general SMP provisions that protect ecological functions.

Location in SMP	Key SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environmental Protection XX.05.020	Ecological Functions. Uses and developments must be designed, located, sized, constructed and maintained to achieve no net loss of shoreline ecological functions. (a)	X	X	X	X
	Mitigation Requirement. If a proposed shoreline use or development is not entirely addressed by specific, objective standards in the SMP, then the mitigation sequencing analysis is required. (c)	X	X	X	X
	Mitigation sequencing is required. (d)	X	X	X	X
Shoreline Vegetation Conservation XX.05.030	Vegetation clearing must be limited to the minimum necessary. The County may require minor site plan alterations to achieve maximum tree retention. (d)			X	
	Where vegetation removal results in adverse impacts to shoreline functions, a supplemental mitigation plan is required. (e)			X	
	Mitigation is required for tree removal. (g)			X	
	Removal of invasive species and replanting with native plants is encouraged. (j and k)			X	
Water Quality, Stormwater, and Nonpoint Pollution XX.05.040	Do not degrade ecological functions. Incorporate measures to protect and maintain surface and groundwater quantity and quality, so that there is no net loss of ecological functions. (a)		X		
	New development and re-development shall manage stormwater runoff in compliance with the Benton County Hydrology Manual. If thresholds are not met to trigger compliance, best management practices (BMPs) must still be employed. (c)	X	X		

Location in SMP	Key SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Sewage management. Any existing septic system or other on-site system that fails or malfunctions will be required to connect to an existing municipal sewer service system if feasible, or make system corrections approved by Benton-Franklin Health District. Any new development will be required to connect to an existing municipal sewer if feasible, or install an approved on-site septic system. (d)		X		
Flood Hazard Management XX.05.060	New development, including the subdivision of land, shall not be permitted if it is reasonably foreseeable that the development or use would require structural flood hazard reduction measures within the channel migration zone or floodway. (e)	X			

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

A-2 Agriculture

As described in the *Shoreline Analysis Report* (TWC and BERK 2013), the predominant current land use in the County's shoreline jurisdiction is agriculture, including pasture and rangeland. Agricultural uses can have a number of potential impacts to shoreline functions, as summarized in Table A-2. Ongoing agriculture is not regulated under the SMA, and ongoing uses are not expected to degrade ecological functions relative to existing conditions. Based on recent land use trends and available land in shoreline jurisdiction, it is unlikely that significant areas of new agriculture will be developed in shoreline jurisdiction. However, where new agricultural uses occur in shoreline jurisdiction, the proposed SMP includes standards to minimize potential ecological effects. These regulations ensure that new agricultural uses implement best management practices, including vegetated buffers (Table A-3). Additionally, any water diversions must be consistent with State and Federal requirements (Table A-3).

Table A-2. Summary of potential impacts from agriculture.

Functions	Potential Impacts to Functions
Hydrologic	Agricultural irrigation from wells may affect ground water.
	Direct irrigation withdrawals may affect base flows.
Water Quality	Increased erosion from removal of trees or tilling of soil.
	Potential for livestock waste, pesticides, herbicides, and fertilizers to enter waterbodies through runoff.
Vegetative/ Habitat	Reduction in native and riparian cover associated with conversion of lands to agricultural uses.
	Unscreened irrigation diversion can entrap small fish.

Table A-3. Summary of key agriculture regulations that protect ecological functions.

Location in SMP	Key SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment Designation	Agriculture is a shoreline conditional use in the Natural designation, and it is prohibited in the Hanford designation.		X	X	X
Agriculture XX.07.010	Feed lots and stockyards are prohibited. (d)		X		
	New agricultural activities and facilities shall utilize best management practices. (e)	X	X	X	X
	Vegetative buffers will be maintained for purposes of erosion control and riparian vegetation protection. (f)		X	X	
	Diversion of water for agricultural purposes shall be consistent with federal and state water rights laws and rules. (g)		X		

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

A-3 Aquaculture

No aquaculture uses in the County are currently operated; however, aquaculture standards included in the SMP are designed ensure that if any salmon recovery-related aquaculture activities are proposed, the SMP would facilitate that use. Potential impacts from aquaculture are summarized below in Table A-4. Key

regulations in the proposed SMP that address potential aquaculture impacts are listed below in Table A-5.

Table A-4. Summary of potential impacts from aquaculture.

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

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

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment Designation	Commercial aquaculture is prohibited in all designations, except for Rural and Rural Industrial, in which it is a conditional use.	X	X		X
Aquaculture XX.07.020	Aquaculture facilities must be designed and located to avoid: • The spreading of disease to native aquatic life; • Introducing new non-native species; • Conflicting with navigation and other water-dependent uses; • A net loss of ecological functions • Impacting the aesthetic qualities of the shoreline (a)		X		X
	Aquaculture structures and activities that do not require a waterside location must be located landward of the shoreline buffers required by this SMP. (c)			X	X

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

A-4 Boating Facilities and Private Moorage

Boating facilities typically include upland impervious surfaces along with in- and over-water structures. Potential impacts from these structures are summarized below in Table A-6. Standards relating to boating facilities and

private moorage are designed to ensure that such facilities avoid, minimize, and mitigate for potential impacts (Table A-7). Where applicable, specific design standards are proposed.

Table A-6. Summary of potential impacts from boating facilities and private moorage.

Functions	Potential Impacts to Functions
Hydrologic	Alteration of currents and sediment transport.
Water Quality	Increase in contaminants (e.g. metals, petroleum hydrocarbons) associated with the use of boating facilities and private moorage structures.
	Leaching of chemical treatments associated with overwater structures.
Vegetative/ Habitat	Increased shading in shallow-water habitat areas resulting from dock and pier construction can limit growth of aquatic vegetation and alter habitat for and behavior of aquatic organisms, including juvenile salmon.
	Disturbance of riparian vegetation.
	Simplification of shallow-water habitat by boat launch facilities.

Table A-7. Summary of key regulations related to boating facilities and private moorage that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Boating Facilities and Private Moorage Structures (XX.07.030)	For all new residential development of two or more waterfront dwelling units, only community docks may be allowed. (b)(3)			X	X
	No more than one private, non-commercial dock is permitted per platted or subdivided residential shoreline lot. (b)(4)			X	X
	Design, construction, and use must: minimize degradation of aquatic habitats; not impede any juvenile or adult salmonid life stage; and not enhance habitats used by potential salmonid predators. (b)(7)				X
	All boating facilities must be the minimum size necessary and be designed to avoid and minimize potential adverse impacts. All unavoidable adverse impacts must be mitigated. (b)(8)	X	X	X	X
	New and expanded facilities must be located to minimize the need for new or maintenance dredging and to eliminate the need for new shoreline stabilization, if feasible. (c)(3 and 4)	X			
	Boating facilities shall be built with materials that do not leach preservatives or other chemicals. (d)		X		

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	SMP standards require that piers, ramps, and floats avoid damaging shallow water habitats; are the minimum size necessary; and are fully grated. (e)			X	X
	Specific dimensional standards for residential docks help avoid and minimize potential impacts. (g)	X	X	X	X
	Industrial, commercial, recreational, and aquaculture facilities must minimize the size of overwater and in-water structures and associated stabilization measures. (h)	X		X	X
	Dimensional standards and best management practices for water quality apply to new, enlarged, or replacement marinas. (i)				
	New public boat launch ramps may be approved only if they provide public access to waters that are not adequately served by existing access facilities. (j)(1)	X	X	X	X
	Boat launch ramps must be located where there is adequate water mixing and flushing and where water depths are adequate to eliminate or minimize the need for dredging or filling. Boat launch ramps must be located to minimize the obstruction of currents, alteration of sediment transport, and the accumulation of drift logs and debris. (j)(4)	X	X		X

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

A-5 Breakwaters, Jetties and Groins

Breakwaters, jetties and groins are usually intended to alter currents or to deflect or dissipate wave energy. These structures have the potential to cause unintended impacts on natural bank erosion, sediment transport processes, and habitat. Potential impacts from these structures are summarized below in Table A-8.

Based on proposed SMP standards (Table A-9), few, if any, new breakwaters, jetties, or groins should be anticipated. Where new structures are permitted,

they would need to demonstrate no net loss on an individual project basis. Infrequent repair and replacement of existing structures may be expected, and mitigation sequencing would apply for these structures.

Table A-8. Summary of potential impacts from breakwaters, jetties, and groins.

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

Table A-9. Summary of key regulations related to breakwaters, jetties, and groins that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment designation	Breakwaters, jetties, and groins are permitted when they are designed to restore ecological functions.	X			X
	Breakwaters, jetties, and groins may be permitted as a shoreline conditional use to maintain an existing water-dependent use.	X			X
	For all other uses, breakwaters, jetties, and groins are either prohibited or a conditional use.	X			X
Breakwaters, Jetties, and Groins XX.07.040	New, expanded or replacement structures shall only be allowed if they will not result in a net loss of shoreline ecological functions and that they support water-dependent uses, public access, shoreline stabilization, or other specific public purpose. (a)	X			
	Shall be limited to the minimum size necessary. (b)	X			X
	Must be designed to protect critical areas, and shall implement mitigation sequencing. (c)	X	X		
	Proposed designs for new or expanded structures shall be designed by qualified professionals, including both an engineer and a biologist. (d)	X	X	X	X

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

A-6 Commercial Development

New commercial development was not identified as potentially occurring within shoreline jurisdiction within the foreseeable future. Common effects of commercial development include increased impervious surfaces, increased traffic, and vegetation clearing (Table A-10). The proposed SMP includes provisions requiring commercial uses to ensure that these facilities do not result in a net loss of shoreline ecological functions (Table A-11).

Standards for shoreline uses and modifications elsewhere in the proposed SMP also apply to commercial development, including vegetation conservation, boating facilities, and dredge and fill, among others.

Table A-10. Summary of potential impacts from commercial development.

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

Table A-11. Summary of key commercial use regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Commercial Standards	Commercial development in shoreline areas shall be designed, located, and constructed to achieve no net loss of ecological functions. (a)		X		X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
XX.07.050	Nonwater-related uses shall only be permitted if they are part of a mixed-use development or where navigability is severely limited, and the proposed development will provide significant public benefit with respect to public access or ecological restoration. (d)	X	X	X	X

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

A-7 Dredging and Dredge Material Disposal

Dredging can have significant effects on sediment transport, short-term effects on water quality, and by creating deep water, dredging can eliminate valuable shallow-water edge habitat. Potential impacts from dredging and dredge material disposal are summarized below in Table A-12. The proposed SMP requires mitigation of the impacts from dredging and dredge disposal, to help ensure that no net loss of functions is achieved on a project-by-project basis (Table A-13).

Table A-12. Summary of potential impacts from dredging and dredge material disposal.

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

Table A-13. Summary of key dredge and dredge disposal regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment Designation	Dredging for water-dependent uses is a conditional use in the Conservancy, Natural, and Hanford designations.	X	X		X
	Disposal of dredge material inside the CMZ is a conditional use.	X	X		X
Dredging XX.07.060	New development must be sited and designed to avoid or, if that is not possible, to minimize the need for new and maintenance dredging. (b)	X	X		X
	Dredging and dredge material disposal must avoid or minimize significant ecological impacts. Impacts that cannot be avoided must be mitigated. (c)	X	X		X
	Dredging for the primary purpose of obtaining fill material is prohibited, except when the material is necessary for the restoration of ecological functions. (e)	X			X
Dredge Material Disposal XX.07.060	Dredge disposal within shoreline jurisdiction is permitted only if: • Shoreline functions and processes will be preserved, restored or enhanced; and • Erosion, sedimentation, floodwaters or runoff will not increase adverse impacts to functions and processes or property. (f)	X			
	Dredge material disposal in open waters may be approved only when authorized by applicable state and federal agencies, and when land disposal is infeasible, less consistent with this SMP, or prohibited by law. (g)	X			X

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

A-8 Fill

Fill within the floodway, floodplain, or channel migration zone can alter natural processes, affecting downstream functions. Potential impacts from fill are summarized below in Table A-14. The proposed SMP requires physical, chemical, and biological evaluation of the impacts of proposed dredging, as well as avoidance, minimization, and mitigation of the impacts from dredge disposal

and fill, to help ensure that no net loss of functions is achieved on a project-by-project basis (Table A-15).

Table A-14. Summary of potential impacts from fill.

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

Table A-15. Summary of key regulations pertaining to fill that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment Designation	Fills waterward of the OHWM require a Shoreline Conditional Use Permit, except to restore shoreline functions.	X	X		X
Fill XX.07.070	All fills shall be located, designed and constructed to protect shoreline ecological functions and ecosystem-wide processes, including channel migration. Any adverse impacts to shoreline ecological functions must be mitigated. (a)	X	X	X	X
	All fills, except fills for the purpose of shoreline restoration, must be designed to be the minimum size necessary; to fit the topography of the site; to not adversely affect hydrologic conditions or increase the risk of slope failure. (d)	X	X		
	A temporary erosion and sediment control (TESC) plan, including BMPs shall be provided for all proposed fill activities. Disturbed areas shall be immediately protected from erosion using weed-free straw, mulches, hydroseed, or similar methods, and revegetated, as applicable. (f)		X	X	

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

A-9 Industry

The potential effects of industrial development along the County's shorelines are addressed in Section 5.3.4 of the CIA. Tables A-16 and A-17 summarize the potential impacts and the SMP provisions relating directly to industrial development. Standards for shoreline uses and modifications elsewhere in the proposed SMP also apply to industrial development, including boating facilities, and dredge and fill, among others.

Table A-16. Summary of potential impacts from industrial development.

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

Table A-17. Summary of key regulations related industrial development that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Industrial Development XX.07.080	Industrial and port development shall be located, designed, constructed, and operated in a manner that minimizes impacts to the shoreline. (b)	X	X	X	X

	Nonwater-related uses shall only be permitted if they are part of a mixed-use development or where navigability is severely limited, and the proposed development will provide significant public benefit with respect to public access or ecological restoration. (d)	X	X	X	X

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

A-10 In-Stream Structures

Potential impacts from in-stream structures are summarized in Table A-18. Small and large-scale in-stream structures intended to produce energy and/or moderate flooding are found in Benton County, including McNary Dam, Prosser Dam, and the Chandler Canal Diversion. There are also a number of irrigation diversion and discharge structures in the Columbia and Yakima Rivers. In 2009 and 2010, the County authorized 17 permit exemptions for upgrading pump intake screens to comply with NMFS and WDFW standards. Diversions of water from one basin to another to support improved seasonal flow conditions may require in-stream structures. Regulations accommodate anticipated new diversion structures, as well as repair/maintenance and possible expansion of existing projects, while protecting ecological functions (Table A-19).

Table A-18. Summary of potential impacts from instream structures.

Functions	Potential Impacts to Functions
Hydrologic	Alteration in flows.
Water Quality	Effects to circulation and associated changes in water quality.
Vegetative/ Habitat	Migration barriers and stranding potential for aquatic species.
	Instream habitat alterations.

Table A-19. Summary of key regulations related to instream structures that protect ecological functions.

Location in SMP	SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Instream Structures XX.07.090	In-stream structures must provide for the protection and preservation of ecosystem-wide processes, ecological functions, and cultural resources. (a)	X	X		X
	Natural in-water features, such as snags, uprooted trees, or stumps, shall be left in place unless it can be demonstrated that they are actually causing bank erosion or higher flood stages or pose a hazard to navigation or human safety. (e)	X			X

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

A-11 Mining

Commercial mining has the potential to significantly impact erosion processes, water quality, and instream habitat (Table A-20). Based on Assessor data, commercial mining is underway on one 45-acre parcel along the Columbia River touching shoreline jurisdiction; however, the parcel and mining activity are located upland of a railroad line and not between the railroad and the river. There are no current mining activities along the Yakima River according to Assessor information.

Any proposals for new mineral extraction, unless specifically designed to create, restore, or enhance habitat for priority species, would require a Shoreline Conditional Use Permit, which requires that the project demonstrate no net loss on an individual and cumulative basis, and requires review and approval from Ecology.

Recreational gold mining may occur in the Yakima River, and any such mining would need to comply with WDFW's recreational mining guidelines (Table A-21).

Because any new mining application will be required to demonstrate no net loss on an individual project basis, no net loss of shoreline ecosystem functions is

expected from mining uses. See Table A-21 for a summary of key SMP provisions.

Table A-20. Summary of potential impacts from mining.

Functions	Potential Impacts to Functions
Hydrologic	Channel bank and bed instability upstream and downstream through accelerated erosion, river channelization, channel incision, disruption in sediment transport
	Pit capture of gravel mining pits adjacent to the river, resulting in stranding of fish during floods
Water Quality	Reduction in water quality from turbidity and material disposal
Vegetative/ Habitat	Reduction in riparian and emergent vegetation

Table A-21. Summary of key mining regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment Designation	Mining is either prohibited or requires a Shoreline Conditional Use Permit, unless mining creates, restores, or enhances habitat for priority species, in which case it is permitted.	X	X	X	X
Mining XX.07.100	Recreational mining consistent with the requirements of the WDFW's Gold and Fish Pamphlet is allowed subject to shoreline permitting requirements. Otherwise recreational mining must obtain a Shoreline Conditional Use Permit. (a)	X	X	X	X
	Mining proposals shall be consistent with the Washington Department of Natural Resources Surface Mine Reclamation standards. (c)	X	X	X	X
	Mining shall result in no net loss of functions, which includes avoidance and mitigation of adverse impacts during the course of mining and reclamation. (d)	X	X	X	X
	Mining waterward of the OHWM will not be allowed unless removal of specified quantities of materials at specific locations will not adversely affect the natural processes of gravel transportation for the system as a whole; and the permitted activities will not have significant adverse impacts to habitat nor cause a net loss of ecological functions. (e)(1&2)	X	X	X	X

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

A-12 Recreation

The potential effects of recreational development along the County's shorelines are addressed in Section 5.3.5 of the CIA. Tables A-22 and A-23 summarize the potential impacts and the SMP provisions relating directly to recreational development. Standards for shoreline uses and modifications elsewhere in the proposed SMP also apply to recreational development, including boating facilities, among others.

Table A-22. Summary of potential impacts from recreational development.

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

Table A-23. Summary of key recreational use regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Recreation-General XX.07.110	Recreational development shall demonstrate achievement of no-net-loss of ecological functions. (a)	X	X	X	X
	The location, design, and operation of recreational facilities shall be consistent with the purpose of the environment designation. (c)	X	X	X	X

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

A-13 Residential

The potential effects of residential development along the County's shorelines are addressed in Section 5.3.3 of the CIA. Tables A-24 and A-25 summarize the potential impacts and the SMP provisions relating directly to residential development. Standards for shoreline uses and modifications elsewhere in the proposed SMP also apply to residential development, including boating facilities, shoreline stabilization, stormwater, and vegetation conservation, among others.

Table A-24. Summary of potential impacts from residential development and accessory development.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
Water Quality	Increase in contaminants (e.g. metals, petroleum hydrocarbons) and decrease in infiltration potential associated with the use and creation of new impervious surfaces
	Water quality contamination from failed septic systems
	Increase in pesticide and fertilizer use
	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
Vegetative/ Habitat	Reduced shoreline habitat complexity and increased water temperatures
	Loss or disturbance of riparian habitat during upland development

Table A-25. Summary of key residential use regulations that protect ecological functions.

Location in SMP	Key SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Environment Designation	Residential uses are prohibited in the Hanford and Rural Industrial designations, and single-family residential development is a conditional use in the Natural designation.	X	X	X	X
Residential XX.07.120	Applications for new shoreline residences shall ensure that shoreline stabilization and flood control structures are not necessary to protect proposed residences. (c)	X			X
	Parking areas shall be located upland of the uses they serve. (e)		X	X	

Location in SMP	Key SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Residential development shall be sufficiently set back from steep slopes and shorelines vulnerable to erosion so that structural improvements, including bluff walls and other stabilization structures, are not required to protect such structures and uses. (f)	X			
	Residential development shall be designed, configured and developed in a manner that assures that no net loss of ecological functions. (g)	X	X	X	X

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

A-14 Shoreline Stabilization

New shoreline stabilization has the potential to significantly impact hydrologic and sediment processes, and nearshore habitat (Table A-26). Standards relating to shoreline stabilization are designed to ensure that development first avoid the need for stabilization, and where stabilization is necessary, that potential impacts are minimized and mitigated (Table A-27).

Table A-26. Summary of potential impacts from shoreline stabilization.

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

Table A-27. Summary of key shoreline stabilization regulations that protect ecological functions.

Location in SMP	Key SMP Provisions Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Stabilization XX.07.140	New development must be located and designed to avoid the need for future shoreline stabilization, if feasible. This includes subdivisions and development adjacent to steep slopes. (a)	X		X	X
	New development that would require shoreline stabilization that would cause significant impacts to adjacent or down-current properties and shoreline areas is prohibited. (b)	X		X	X
	All proposals for shoreline stabilization structures, both individually and cumulatively, must not result in a net loss of ecological functions, and must be the minimum size necessary. Soft approaches shall be used unless demonstrated not to be sufficient to protect primary structures, dwellings, and businesses. (c)	X		X	X

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

A-15 Transportation

The potential effects of transportation facilities along the County's shorelines are addressed in Section 5.3.6 of the CIA. Tables A-28 and A-29 summarize the potential impacts and the SMP provisions relating directly to transportation development. Standards for shoreline uses and modifications elsewhere in the proposed SMP also apply to transportation development, including shoreline stabilization, stormwater, and vegetation conservation, among others.

Table A-28. Summary of potential impacts from transportation facilities.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
	Potential for crossings to limit passage of flood flows. [Note: limited potential for this impact to occur as new river crossings are not anticipated]
Water Quality	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
Vegetative/ Habitat	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing

Functions	Potential Impacts to Functions
	Fish passage impacts associated with stream crossings. [Note: limited potential for this impact to occur as new crossings are not anticipated]

Table A-29. Summary of key transportation facility regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Transportation Facilities XX.07.150	Where other options are available and feasible, new roads, road expansions or railroads shall not be built within shoreline jurisdiction. If subdivisions are being proposed, new road placement shall be evaluated at the time of the plat application, or site development planning. (a)	X	X	X	X
	When railroads, roads or road expansions are unavoidable in shoreline jurisdiction, proposed transportation facilities shall be planned, located, and designed to avoid and minimize impacts and maintain existing shoreline function. (b)	X	X	X	X
	Shoreline crossings and culverts shall be designed to minimize impact to riparian and aquatic habitat and shall allow for fish passage. (d)	X		X	X
	Crossings that are to be used solely for access to private property shall be designed, located, and constructed to provide access to more than one lot or parcel of property, where feasible, to minimize the number of crossings. (e)	X	X	X	X
	Parking facilities in shorelines are not a preferred use and shall be allowed only as necessary to support an authorized use and when minimizing environmental and visual impacts. (i)	X	X	X	X
	When a new or expanded roadway or new or expanded parking facility is proposed, the County may condition the proposal to provide a maintenance plan that promotes best management practices to achieve no-net-loss of shoreline ecological function. (l)	X		X	X

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

A-16 Utilities

Utilities can have a substantial, often linear impact on shoreline vegetation and habitat (Table A-30). The proposed SMP requires that primary utilities ensure no

net loss of functions (Table A-31). Primary utility facilities may be developed to supply existing undeveloped areas with utilities; however, these are not expected to be a common new development or to upgrade utilities to existing developed areas. The effects of the SMP on utilities development are discussed in Section 5.3.7 of the CIA.

Table A-30. Summary of potential impacts from utilities.

Functions	Potential Impacts to Functions
Hydrologic	Where utilities require shoreline armoring, associated hydrologic impacts are likely
	Erosion at stormwater outfall locations can alter sediment transport processes
Water Quality	Potential for contaminant spill or leakage
	Unfiltered stormwater or sewage discharge into shoreline waterbodies will degrade water quality conditions.
Vegetative/ Habitat	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing

Table A-31. Summary of key utility infrastructure regulations that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Utilities XX.07.160	Utility projects within shoreline jurisdiction shall be designed to achieve no-net-loss of shoreline ecological function. (a)	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	If an underwater location is necessary, the design, installation and operation of utilities shall minimize adverse ecological impacts.(b)	X	X		X
	Where utility corridors must cross shoreline jurisdiction, such crossings shall be designed to take the shortest, most direct route feasible, unless such a route would result in loss of ecological function, disrupt public access to the shoreline, or obstruct visual access to the shoreline. (c)			X	X
	Utility projects within shoreline jurisdiction shall be located within existing transportation or utility corridors or existing cleared areas to the greatest extent feasible. (d)			X	X
	Utility production and processing facilities, such as power plants and sewage treatment plants, or parts of those facilities that are nonwater-oriented shall not be allowed in shoreline areas unless it can be demonstrated that no other feasible option is available. (e)			X	X
	Upon completion of utility system installation, and any maintenance project, the disturbed area shall be regraded to compatibility with the natural terrain and replanted to prevent erosion and provide appropriate vegetative cover. (f)			X	

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