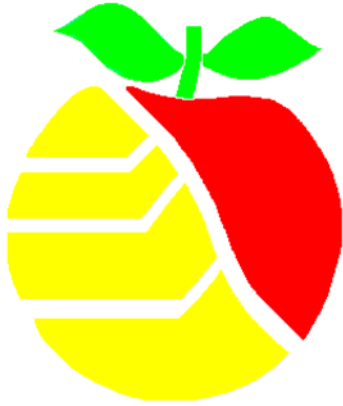


Appendix H

Cumulative

Impacts

Analysis



FINAL DRAFT

**CUMULATIVE IMPACTS
ANALYSIS**

For City Of Wenatchee Shorelines



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



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WORKING DRAFT

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CUMULATIVE IMPACTS ANALYSIS

CITY OF WENATCHEE

1 INTRODUCTION

1.1 Shoreline Management Act Requirements

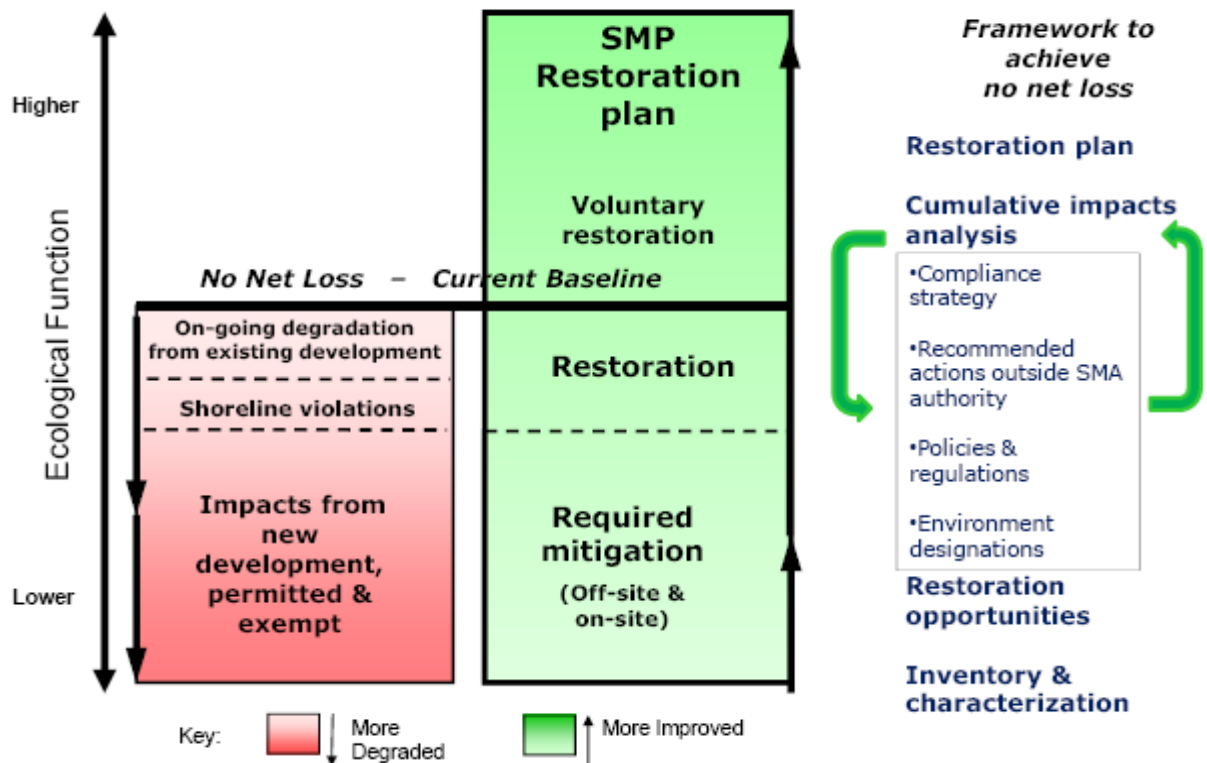
The Shoreline Management Act guidelines require local shoreline master programs to regulate new development to “achieve no net loss of ecological function.” The guidelines (WAC 173-26-186(8)(d)) state that, “To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts.”

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

“When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. The concept of “net” as used herein, recognizes that any development has potential or actual, short-term or long-term impacts and that through application of appropriate development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist. Where uses or development that impact ecological functions are necessary to achieve other objectives of RCW 90.58.020, master program provisions shall, to the greatest extent feasible, protect existing ecological functions and avoid new impacts to habitat and ecological functions before implementing other measures designed to achieve no net loss of ecological functions.” [WAC 173-26-201(2)(c)]

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

- (i) current circumstances affecting the shorelines and relevant natural processes [Chapter 2 below and Shoreline Analysis Report];
- (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 5 below]



Source: Department of Ecology

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

1.2 Methodology

Using the information, textual and graphic, developed and presented in the *Shoreline Analysis Report*, this cumulative impacts analysis was prepared consistent with direction provided in the Shoreline Master Program Guidelines as described above. To the extent that existing information was sufficiently detailed and assumptions about possible new or re-development could be made with reasonable certainty, the following analysis is quantitative. However, in many cases information about existing conditions and/or redevelopment potential was not available at a level that could be assessed quantitatively or the analysis would be unnecessarily complex to reach a conclusion that could be derived more simply. Further, ecological function does not have an easy metric. For these reasons, much of the following analysis is more qualitative.

Analysis of cumulative impacts is generally limited to areas that fall within the proposed shoreline jurisdiction; however, because floodplains, channel migration zones, and rivers are closely interconnected and may not be captured within shoreline jurisdiction, the area outside of the immediate shoreline jurisdiction was considered in determining effects for areas with mapped channel migration zones and for Shorelines of Statewide Significance.

The Aquatic shoreline environment is not evaluated individually in this CIA. Most development activities do not occur below the ordinary high water mark (OHWM), more typically occurring in the adjacent upland shoreland environments. However, shoreline modifications below the OHWM, such as docks and bank armoring, usually occur in conjunction with adjacent upland development and were evaluated in this analysis.

To estimate potential changes in land use along the shoreline, a land capacity analysis was conducted projecting growth over a 20-year timeframe. The land capacity analysis estimates development that may occur in the future along shorelines given draft shoreline use environments and development standards. The method to determine shoreline land capacity is summarized below.

1. Determine shoreline use boundaries. The land capacity analysis includes all lands within shoreline jurisdiction, generally 200 feet upland of the ordinary high water mark, associated wetlands, the floodway, and up to 200 feet of floodway-contiguous floodplain where present. Additionally, in two cases parcels partially included in jurisdiction and extending beyond are included:
 - Channel migration zone areas, since rivers may move over time; and
 - Shorelines of Statewide Significance, due to the importance of these waterbodies and the ecosystem-wide processes emphasized in WAC 173-26-251.

2. Compile City land capacity analyses. Based on adopted Comprehensive Plan and City planner input, assumptions about vacant, partially used, and under-utilized properties have been compiled.
3. Determine land status. The analysis estimates developable acres by City, Urban Growth Area (UGA), and Watershed Inventory Analysis Area (WRIA). The developable acres are also sorted by waterbody, shoreline environment designation, and future land use/zoning category. Developable acres include: 1) vacant (no building value); 2) partially used (e.g. single-family properties containing one home, but the land can be further subdivided); or 3) under-utilized (land value exceeds building value on multifamily, commercial or industrial properties).
4. Deductions. Constraints such as critical areas, shoreline buffers, rights of way, and infrastructure are deducted from gross acres. Market factor reductions, which account for land that may not be available (e.g. owner does not wish to develop), are also included.
5. Densities or floor area ratios are applied to the net buildable acres to estimate total future dwellings or commercial/industrial square feet.
6. Public and mineral lands. Due to the different purposes for public lands/land trusts and mineral lands, typical assumptions regarding dwelling and commercial/industrial density were not applied. However, because these shoreline properties could be altered due to a variety of public purposes such as recreation, utilities, or resource extraction, acres estimates are provided for each WRIA and City/UGA, as appropriate.

Appendix B provides a detailed matrix of assumptions and maps illustrating the categories of land status, including the three buildable categories as well as public and land trust properties.

Based on the results of the quantitative analysis of anticipated development, a qualitative analysis was performed to determine how foreseeable growth patterns might result in impacts to shoreline functions. A qualitative evaluation of potential impacts associated with possible future development, including upland development, overwater structures, shoreline armoring, mining, and aquaculture, was conducted at a County-wide level. For each waterbody with anticipated development within shoreline jurisdiction, effects were evaluated in terms of hydrologic, shoreline vegetation, hyporheic, and habitat functions. A qualitative analysis was performed to determine how applicable regulations related to each of the impacts identified, and what, if any regulations should be added or expanded to create more protection.

2 SUMMARY OF EXISTING CONDITIONS

The Shoreline Analysis Report included an evaluation of existing conditions in the City of Wenatchee. The sources and limitations of the data are listed in Table 9 of the Shoreline Analysis Report. Several types of data, including geology, soils, vegetation, impervious surface coverage, provide a regional characterization of existing conditions, but are not appropriate for a local or parcel based quantitative evaluation of existing conditions. Other data, including critical areas, may require a site-specific study to confirm the presence or absence of mapped features. Data gaps in the inventory data include aquifer recharge areas and shoreline stabilization. For a complete assessment of data limitations, assumptions, and data gaps, see Section 3 of the SMP. The following tables (Tables 1-9) provide a summary of existing conditions by waterbody.

2.1 Stemilt/Squilchuck - Colockum (WRIA 40a/b)

WRIA 40a/b is dominated by resource lands, including commercial agriculture and commercial forestry. Residential and industrial uses tend to be congregated closer to the Columbia River and other waterbodies in the eastern portion of the WRIA (RH2 Engineering, Inc. 2007). According to the U.S. Fish and Wildlife Service’s National Wetlands Inventory (NWI) information, as much as 17% of the total shoreline area may be wetlands. Geologically hazardous areas as mapped by Washington Department of Natural Resources (DNR) are common, particularly around the three reservoirs, which are considered to have 100% geohazard coverage. A summary table (Table 1) provides further details on each waterbody’s shoreline characteristics.

Table 1. Summary Table of Basic Characteristics of Each Shoreline Waterbody in WRIA 40a/b

Jurisdictional Streams/Lakes	Area of Upland Shoreline Jurisdiction (acres)	Major Existing Land Uses ¹	Ownership Profile ²	Vegetation Profile ³	Critical Area/Priority Habitat or Species (PHS) ⁴ Presence	Presence of Impaired Waterbodies (303d list)? Yes/No	Category 4 and 5 listed	Area (square feet) and Percent Coverage of Overwater structures
Streams/Rivers								
Columbia	413.66	Government/Utility	Private 64%	Scrub/shrub 55%;	PHS mule deer	No		18,852

Jurisdictional Streams/Lakes	Area of Upland Shoreline Jurisdiction (acres)	Major Existing Land Uses ¹	Ownership Profile ²	Vegetation Profile ³	Critical Area/Priority Habitat or Species (PHS) ⁴ Presence	Presence of Impaired Waterbodies (303d list)? Yes/No Category 4 and 5 listed	Area (square feet) and Percent Coverage of Overwater structures
River		32%, Undeveloped 24%, Natural Resources 14%, Single Family Residential 11%, Agriculture 11%, Manufacturing/Industrial 6%, Transportation 2%, No Category <1%	Public (Federal, County, PUD) 36%	evergreen forest 11%; deciduous forest 7%	PHS elk PHS riparian zone PHS cliffs/bluffs PHS fish FEMA floodplain 21% wetland 8.5% geohazard		sf <1%

¹ Major existing land use is reported by acres located in shoreline jurisdiction rather than full parcels. “Government/Utility” includes governmental services, utilities, and other transportation and communication utilities.

² Acres of shoreline owned by public or private entities. Public includes municipal, County, PUD, state, and federal lands.

³ Three dominant types listed. Consult Shoreline Analysis Report maps for distribution and other types. See Table 9 of the Shoreline Analysis Report for data limitations.

⁴ PHS = Priority Habitat or Species as identified by WDFW

⁵ Owned by the Stemilt Project irrigation purveyor.

2.2 Wenatchee (WRIA 45)

Government/utility uses and resource lands (forestry, agriculture, other natural resources) dominate along a majority of the 75 shorelines under review. Shorelines with a wider mix of uses, such as residential, commercial, industrial, recreation, or other uses, include:

- Chiwaukum Creek
- Chumstick Creek
- Columbia River
- Chiwawa River
- Colchuck Lake
- Fish Lake

- Icicle Creek
- Lake Wenatchee
- Mission Creek
- Nason Creek
- Peshastin Creek
- Wenatchee River
- White River

According to the NWI information, as much as 39% of the total shoreline area may be wetlands. Floodplains and a few geohazard areas are also documented in the WRIA. Channel migration zone mapping identified broad areas of potential channel migration along the Wenatchee River at the outlet from Lake Wenatchee, at the confluence with Icicle Creek, just south of the City of Leavenworth, and at the confluence with the Columbia River. Broad channel migration zones were also identified at the mouth of the White River and the Little Wenatchee River.

A summary table (Table 2) provides further details on each waterbody's shoreline characteristics.

Table 2. Summary Table of Basic Characteristics of Each Shoreline Waterbody in WRIA 45, Outside of Cities and their Urban Growth Areas.

Jurisdictional Streams/Lakes	Area of Upland Shoreline Jurisdiction (acres)	Major Existing Land Uses ⁴	Ownership Profile ²	Vegetation Profile ³	Critical Area/Priority Habitat or Species (PHS) ⁵ Presence	Presence of Impaired Waterbodies (303d list)? Yes/No Category 4 and 5 listed	Area (square feet) and Percent Coverage of Overwater structures
Streams/Rivers							
Wenatchee River	4,070.47	Government/ Utility (51%), Forestry (18%), Open Space (17%), Other Residential (5%), Undeveloped (4%), Natural Resources (2%), Single Family Residential (2%), Cultural/Recreation/	Private 64% Public (Federal, State, County) 36%	Evergreen forest 28%; scrub/shrub and low-intensity development 12% each	Heritage Point bald eagle (4) Heritage Point great blue heron (2) Heritage Point great Columbia spire snail (3) Heritage Point mountain sucker (1)	Yes: 4A-Temperature; 4C Instream flow; 5: pH	22,444 sf <1%

Jurisdictional Streams/Lakes	Area of Upland Shoreline Jurisdiction (acres)	Major Existing Land Uses ⁴	Ownership Profile ²	Vegetation Profile ³	Critical Area/Priority Habitat or Species (PHS) ⁵ Presence	Presence of Impaired Waterbodies (303d list)? Yes/No Category 4 and 5 listed	Area (square feet) and Percent Coverage of Overwater structures
		Assembly (1%)			Heritage Point osprey (16) Heritage Point Umatilla dace (2) PHS mule deer PHS aspen stand PHS riparian zone PHS wetlands PHS cliffs/bluffs PHS fish 49% wetland FEMA floodplain Floodway Channel migration zone Flood zone 0.2% geohazard		

¹ There is no parcel-based current land use data for numerous waterbodies that are 100% in Federal ownership.

² Acres of shoreline owned by public or private entities. Public includes municipal, County, PUD, state, and federal lands.

³ Three dominant types listed. Consult Shoreline Analysis Report maps for distribution and other types. See Table 9 of the Shoreline Analysis Report for data limitations.

⁴ Major existing land use is reported by acres located in shoreline jurisdiction rather than full parcels. “Government/Utility” includes governmental services, utilities, and other transportation and communication utilities.

⁵ PHS = Priority habitats and species as identified by WDFW

2.3 City of Wenatchee

The City of Wenatchee and its UGA are located along the banks of the Columbia River at the confluence of the Wenatchee River. Wenatchee is the largest city in Chelan County and is the primary center for jobs. Along the shorelines of the two rivers, current land uses are dominated by government/utility and open space. In the Wenatchee UGA north of the City, the Columbia River is closely bordered by industrial development, Highway 97, and railroads. Vegetation in this area is patchy, generally consisting of a narrow strip of shrubs. Shoreline vegetation becomes more consistent south of Highway 2, where it is composed of a mix of shrubs and deciduous trees. West of the confluence, the Wenatchee River is closely bordered by the railroad on the south side of the river, which limits vegetated area and channel processes.

Open space and park area within shoreline jurisdiction include about 120 acres. Shoreline vegetation and habitat functions are variable among the many shoreline parks. Several park areas include overwater and in-water structures, including boat launches and piers. Wetlands at Confluence State Park provide some of the best shoreline habitat in the City for birds, amphibians and small mammals. These shoreline habitats are also significant for fish as they occur at an ecologically significant position at the confluence of two major rivers. South of the confluence along the Columbia River, Walla Walla Point Park has the potential to provide off-channel habitat for small fish during high river flows; however, the lack of vegetative complexity in the off-channel area minimizes the likely value of such functions. Other parks, such as Riverfront Park, include moderately well vegetated shoreline areas. In commercial and industrial areas toward the southern end of the City, development, roads and the railroad are located adjacent to the River, and shoreline vegetation is sparse.

Shorelines in the City of Wenatchee and its UGA contain 253 acres of priority habitats, consisting of bald eagle, bighorn sheep, mule deer, and priority riparian zones concentrations. All of the City's shorelines contain priority fish species. According to the NWI information, as much as 38% of the total shoreline area may be wetlands. However, this figure is high because of the inclusion of some of the mainstem Columbia River as wetland. No information was available regarding presence of geologically hazardous areas in the City of Wenatchee.

A summary table (Table 9) provides further details on each waterbody's shoreline characteristics.

Table 3. Summary Table of Basic Characteristics of Each Shoreline Waterbody in the City of Wenatchee and its Urban Growth Area.

Jurisdictional Streams/Lakes	Area of Upland Shoreline Jurisdiction (acres)	Major Existing Land Uses ¹	Ownership Profile ²	Critical Area/Priority Habitat or Species (PHS) ³ Presence	Presence of Impaired Waterbodies (303d list)? Yes/NO Category 4 and 5 listed	Area (square feet) and Percent Coverage of Overwater Structures
Columbia River	177.78	Open Space (30%), Government/Utility (26%), Manufacturing/ Industrial (9%), No Category (9%), Commercial (8%), Transportation (5%), Single Family Residential (4%), Other Residential (4%), Agriculture (4%), Undeveloped Land (1%)	Private 60% Public (PUD, Municipal) 40%	PHS bald eagle PHS bighorn sheep PHS mule deer PHS riparian zone FEMA floodplain 19% wetland	No (Cat 2)	10,432 sf, <1%
Wenatchee River	104.27	Open Space (59%), Government/Utility (20%), Undeveloped (14%), Single Family (5%), Agriculture (3%), Commercial (1%), No Category (<1%)	Private 69% Public (PUD) 31%	Heritage Point osprey PHS mule deer PHS riparian zone FEMA floodplain CMZ 70% wetland	Yes: 4A-Temperature; 5-pH	4,746 sf, 1%

¹ Major existing land use is reported by acres located in shoreline jurisdiction rather than full parcels. “Government/Utility” includes governmental services, utilities, and other transportation and communication utilities.

² Acres of shoreline owned by public or private entities. Public includes municipal, County, PUD, State, and federal lands.

³ PHS = Priority habitat or species as identified by WDFW

3 ANTICIPATED DEVELOPMENT

The tables below (Tables) provide a summary of the likely development potential within the proposed environment designations for each shoreline waterbody within each WRIA, City, and Urban Growth Area. As explained in Section 1.2, the land capacity analysis includes all lands within shoreline jurisdiction, generally 200 feet upland of the ordinary high water mark, associated wetlands, the floodway, and up to 200 feet of floodway-contiguous floodplain where present. Additionally, in two cases parcels partially located in jurisdiction and extending beyond are included:

- Channel migration zone areas, since rivers may move over time; and
- Shorelines of Statewide Significance, due to the importance of these waterbodies and the ecosystem-wide processes emphasized in WAC 173-26-251.

For this reason, most of the cells in the following Tables contain two numbers. The first number represents acreage, square feet or units in the “study area,” which includes the shoreline jurisdiction as well as the remainder of any parcels that extend outside of jurisdiction if they are located in CMZs or are on Shorelines of Statewide Significance. The second number (in parentheses) represents just the acreage, square feet or units in shoreline jurisdiction. In many cases, the numbers are identical where a waterbody is not a Shoreline of Statewide Significance and does not contain CMZs that extend outside` of shoreline jurisdiction.

It is important to note that this analysis is intended to give an overall picture of the potential for development along shorelines, but is not an exact predictor of which parcels may develop or redevelop. In addition, the analysis does not provide a “rate” of development.

3.1 Stemilt/Squilchuck - Colockum (WRIA 40a/b)

Based on the land capacity analysis, approximately 52 single-family dwellings and 7,779,530 square feet of industrial uses could occur in the WRIA shorelines, principally along the Columbia River, and typically outside shoreline jurisdiction. Within shoreline jurisdiction only, about half of the dwellings (26) could be developed and about a third of the industrial square feet (2,326,197). Industrial development would occur in Urban and Rural shoreline designations along the Columbia

River. Residential development would occur in Urban, Rural, and Conservancy designations along the Columbia River, Cortez Lake, and Colockum Creek. Agricultural-commercial land is found along several shorelines.

Table 4. Potential for Future Development in WRIA 40a/b.

Environment Designation / Waterbody (rivers followed by lakes)	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Jurisdiction)	Net Acres- Vacant in Study Area (Jurisdiction)	Net Acres- Partially Used/ Underused in Study Area (Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Multi-Family Units in Study Area (Jurisdiction)	Commercial Sq Ft in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)	Net Public Use Acres in Study Area (Jurisdiction)	Net Resource Acres in Study Area (Jurisdiction)
Urban										
Columbia River	183.65	1278.30 (81.50)	510.15 (25.15)	68.17 (14.68)	0	0	0	7,237,949 (5,427,707)	369.90 (12.43)	2.06 (0.18)
Rural										
Columbia River	102.17	174.48 (25.10)	42.58 (5.22)	59.10 (4.54)	6 (6)	0	0	466,077 (466,077)	4.26 (3.55)	32.06 (1.69)
Conservancy										
Columbia River	124.86	1,274.73 (5.93)	88.32 (0.05)	526.65 (0.02)	33 (7)	0	0	0	656.63 (5.86)	5.05 (0.04)

3.2 Wenatchee (WRIA 45)

Shorelines in Wenatchee WRIA 45 are largely in public use, at over 80% of the shoreline study area, and these public lands tend to be classified as resource uses such as forestry and to a lesser extent, agriculture and mineral. On developable lands in the study area, up to 451 dwellings could be developed, mostly in the Rural designation, though only 85 are expected in shoreline jurisdiction. Commercial and industrial square footage of approximately 190,670 and 274,990 square feet, respectively, could be developed in the study area, with only 26,740 and 102,640 square feet, respectively estimated in shoreline jurisdiction. These non-residential uses are mostly planned along the Wenatchee and Columbia Rivers.

Table 5. Potential for Future Development in WRIA 45.

Environment Designation / Waterbody (rivers followed by lakes)	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Jurisdiction)	Net Acres- Vacant in Study Area (Jurisdiction)	Net Acres- Partially Used/ Underused in Study Area (Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Multi-Family Units in Study Area (Jurisdiction)	Commercial Sq Ft in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)	Net Public Use Acres in Study Area (Jurisdiction)	Net Resource Acres in Study Area (Jurisdiction)
Urban										
Wenatchee River	74.94	97.34 (25.43)	5.67 (0.88)	1.63 (0.43)	3 (1)	0	0	0	54.10 (11.67)	47.8 (8.8)
Columbia River	27.49	16.96 (3.61)	3.07 (2.77)	0	0	0	0	32,096 (28,917)	13.89 (0.84)	0
Wenatchee River	512.23	655.54 (18.06)	169.28 (3.84)	166.16 (3.87)	27 (2)	0	63,603 (16)	0	84.32 (3.25)	239.5 (3.3)
Natural										
Wenatchee River	1,523.95	2,676.13 (12.76)	167.12 (8.57)	11.60 (0.00)	16 (0)	0	535 (0)	0	2,482.20 (2.99)	2,499.39 (2.97)

3.3 City of Wenatchee

The broader shoreline study area in Wenatchee could support up to 307 single- and multi-family dwellings, 23,190 commercial square feet, and 221,635 square feet of industrial space. Within shoreline jurisdiction alone, the development potential drops dramatically to about 59 multi-family dwellings and 4,565 square feet of commercial. The industrial development would remain the same in shoreline jurisdiction as for the whole study area at 221,635 square feet. Private development within shoreline jurisdiction is anticipated to be less due to a sizable number of acres in public use, though public properties could be modified to alter current or add new recreation facilities.

Table 6. Potential for Future Development in the City of Wenatchee.

Environment Designation / Waterbody	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Jurisdiction)	Net Acres- Vacant in Study Area (Jurisdiction)	Net Acres- Partially Used/ Underused in Study Area (Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Multi-Family Units in Study Area (Jurisdiction)	Commercial Sq Ft in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)	Net Public Use Acres in Study Area (Jurisdiction)
High Intensity									
Columbia River	38.49	86.68 (25.44)	20.60 (8.24)	9.74 (2.11)	0	302 (59)	23,193 (4,565)	221,636 (221,636)	19.62 (9.73)
Shoreline Residential									
Wenatchee River	1.28	1.71 (0.18)	0	0.45 (0)	5 (0)	0	0	0	
Waterfront Park									
Columbia River	48.36	25.36 (6.99)	0	0	0	0	0	0	25.36 (6.99)
Urban Conservancy									
Columbia River	11.80	19.84 (5.72)	0	1.36 (0.04)	0	0	0	0	18.47 (5.67)
Wenatchee River	8.55	6.01 (0.80)	0	0	0	0	0	0	6.01 (0.80)

3.3.1 Wenatchee UGA

Within the unincorporated Wenatchee UGA, minimal residential development is expected at 60 single-family units in the study area, but only 2 in shoreline jurisdiction. The shoreline area would see some industrial development of around 100,000 square feet in the study area, dropping to just over 50,000 square feet in shoreline jurisdiction. Much of the study area is devoted to public use acres, which may see some additional recreational uses over time.

Table 7. Potential for Future Development in the Wenatchee City-Associated UGA.

Environment Designation / Waterbody	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Jurisdiction)	Net Acres- Vacant in Study Area (Jurisdiction)	Net Acres- Partially Used/ Underused in Study Area (Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Multi-Family Units in Study Area (Jurisdiction)	Commercial Sq Ft in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)	Net Public Use Acres in Study Area (Jurisdiction)
High Intensity									
Columbia River	78.94	83.48 (22.03)	2.21 (1.60)	1.63 (0.80)	0	0	0	59,020 (37,029)	13.26 (4.15)
Shoreline Residential									
Wenatchee River	3.95	3.77 (1.19)	1.67 (1.01)	0	4 (2)	0	0	0	0.66 (0.05)
Waterfront Park									
Columbia River	10.75	0	0	0	0	0	0	0	0
Urban Conservancy									
Columbia River	44.18	30.23 (8.53)	0	0	0	0	0	0	30.23 (8.53)
Wenatchee River	72.59	81.86 (13.44)	0	7.41 (0.91)	56 (0)	0	0	40,421 (13,543)	74.45 (12.52)

4 PROPOSED SMP PROVISIONS

In its Shoreline Master Program Handbook, Ecology identified the following components of SMP provisions as potential means to help achieve no net loss of ecological functions.

- **Establish appropriate shoreline environment designations.** The environment designations must reflect the inventory and characterization. A shoreline landscape that is relatively unaltered should be designated Natural and protected from any use that would degrade the natural character of the shoreline.
- **Prohibit uses** that are not water-dependent or preferred shoreline uses. For example, office and multi-family housing buildings are not water-dependent or preferred uses.
- **Require that all future shoreline development**, including water-dependent and preferred uses, is carried out in a manner that limits further degradation of the shoreline environment.
- **Require buffers and setbacks.** Vegetated buffers and building setbacks from those buffers reduce the impacts of development on the shoreline environment.
- **Establish strong policies and regulations.** Policies and regulations will define what type of development can occur in each shoreline environment designation, determine the level of review required through the type of shoreline permit, and set up mitigation measures and restoration requirements.
- **In all cases, require mitigation sequencing.** The SMP must include regulations that require developers to follow mitigation sequencing: avoid impacts, minimize impacts, rectify impacts, reduce impacts over time, compensate for impacts, monitor impacts and take corrective measures.

The proposed SMP provisions described below implement the above guidance to the extent consistent with each community's local Comprehensive Plan and vision, facilitating the County and Cities' achievement of the no net loss standard.

4.1 Environment Designations

The first line of protection of the County and City’s shorelines is the environment designation assignments. Appendix A of this Cumulative Impacts Analysis identifies the prohibited and allowed uses and modifications in each of the shoreline environments for each local jurisdiction.

Each table clearly shows a hierarchy of higher-impacting uses and modifications being allowed in the already highly altered shoreline environments, with uses more limited in the less developed areas either through prohibition or a requirement for a Conditional Use Permit. This strategy helps to minimize cumulative impacts by concentrating development activity in lower functioning areas that are not likely to experience significant function degradation with incremental increases in new development.

4.1.1 County

Consistent with WAC Shoreline Master Program Guidelines, the County’s environment designation system was based on the existing use pattern, the biological and physical character of the shoreline, and community interests. In order to maintain consistency with the recently updated critical areas regulations, which include shoreline-specific buffers based on the current environment designation system, the County retained its original system of four upland environment designations in the proposed SMP. These include Natural, Conservancy, Rural, and Urban, listed in order by increasing level of use (See Figures 1-11). An Aquatic environment designation was added, consistent with Ecology’s Guidelines.

In general, Natural was the recommended designation when impervious surface percentages were very low; when wetlands and floodplain percentages were high; when vegetation was primarily forest, scrub-shrub or various types of wetlands; and when the function score was 3.0 or greater.

Conservancy was the most common recommended environment designation in the County, and was applied to lands when impervious surface percentages were low (often less than 10); when wetlands and floodplain percentages were low to moderate (absence of these does not indicate alteration or poor function); when vegetation was primarily forest, scrub-shrub or various types of wetlands; and when function scores were typically in the mid- to high 2s.

Rural usually had higher impervious surface percentages and higher percentages of vegetation in the “developed” categories compared to the Conservancy environment. Land use is typically agricultural, low-density residential, or other more intense uses. Function scores were often in the low 2s or high 1s.

Urban was the least frequently recommended environment designation in the unincorporated County areas, and was limited to some “limited areas of more intensive rural development” (LAMIRD) and UGAs not associated with an incorporated city (e.g., most of Malaga, and parts of Peshastin and Manson).

Stemilt/Squilchuck- Colockum (WRIA 40 A/B)

Much of the area along the Malaga Alcoa Highway in the Malaga community is designated as a LAMIRD. The majority of the LAMIRD area was designated as Urban use. Other shorelines along the Columbia River and its tributaries were designated as either Conservancy or Rural environments. Most of the lakes in the Chelan County portion of WRIA 40 are operated as reservoirs, and accordingly, these reservoirs were assigned a Conservancy environment designation. Figure 1 illustrates the distribution of shoreline environment designations within the WRIA. High functioning shoreline areas are concentrated in the Conservancy environment; whereas, low functioning habitats occur in the Urban environment (Figure 2).

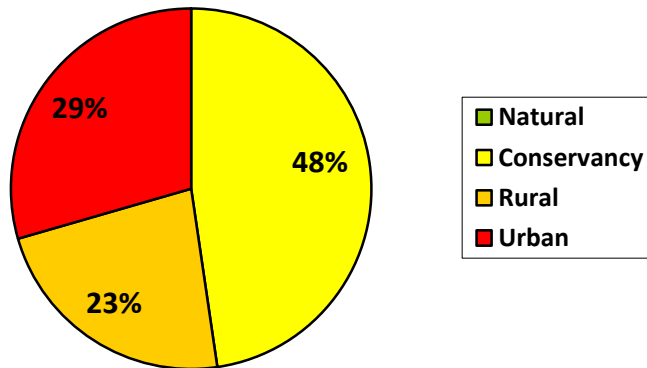


Figure 1. Distribution of Shoreline Environment Designations in WRIA 40

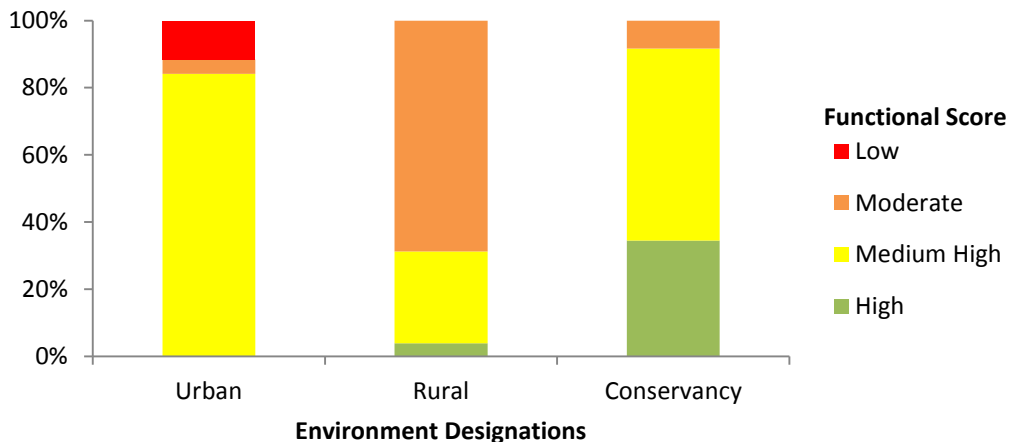


Figure 2. Distribution of Shoreline Functional Scores among Environment Designations in WRIA 40

Wenatchee (WRIA 45)

Environment designations are predominantly Natural, particularly in waterbodies upstream from the City of Leavenworth. Rural and Conservancy environments predominate in the waterbodies between the Cities of Leavenworth and Wenatchee. The Urban environment designation is limited to the Peshastin UGA. Figure 3 illustrates the distribution of shoreline environment designations within the WRIA. Figure 4 shows a clear pattern of more highly functioning shoreline areas in the more protective environment designations (Conservancy and Natural) and lower scoring shoreline areas in the more permissive environments (Rural and Urban).

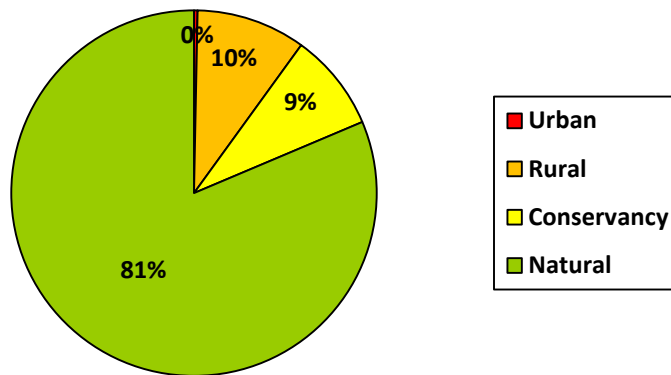


Figure 3. Distribution of Shoreline Environment Designations in WRIA 45

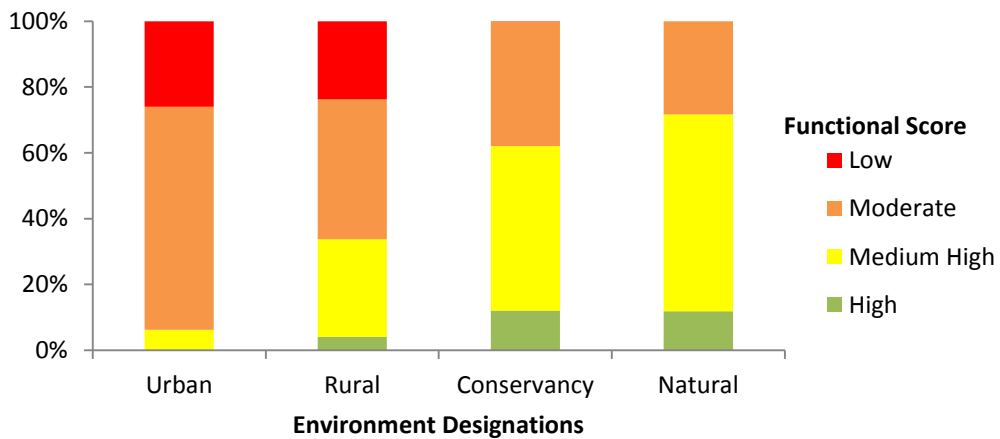


Figure 4. Distribution of Shoreline Functional Scores among Environment Designations in WRIA 45

4.1.2 City of Wenatchee

The City of Wenatchee’s environment designations include Aquatic, Waterfront Park, Shoreline Residential, Urban Conservancy, and High Intensity (Figure 5). The Waterfront Park designation covers most of the northern Columbia River shorelines of the City, and the High Intensity environment covers most of the southern Columbia River City shoreline. The Urban Conservancy environment includes parkland with significant natural functions. Very little Shoreline Residential is present in the City, and is located upland of an intervening environment designation in all cases. The Urban Conservancy environment includes nearly all of the high functioning shorelines within the City (Figure 6). Lower functioning shorelines are concentrated in the High Intensity and Shoreline Residential environments.

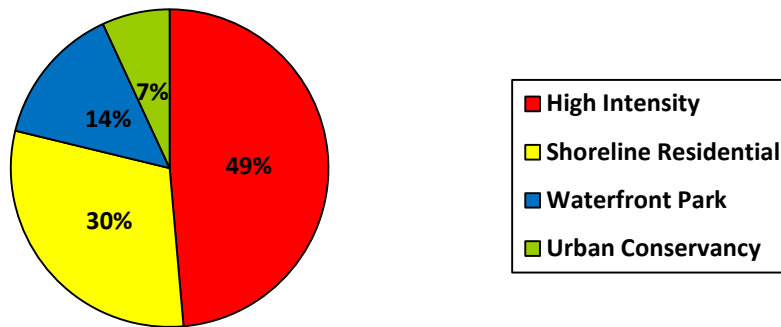


Figure 5. Distribution of Shoreline Environment Designations in the City of Wenatchee

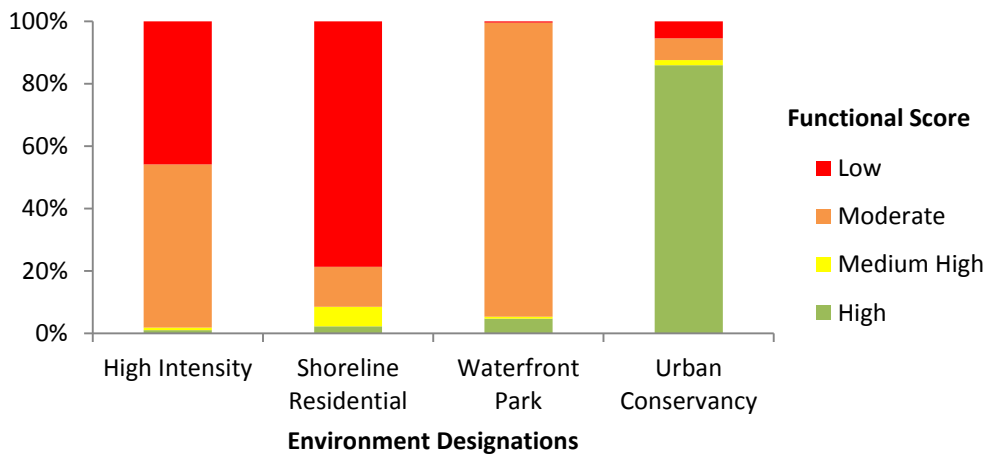


Figure 6. Distribution of Shoreline Functional Scores among Environment Designations in the City of Wenatchee

4.1.3 City-Associated Urban Growth Areas

Environment designations within the County’s Urban Growth Areas were classified to be consistent with the City’s designations with which they are associated. County environment designation classifications and use regulations apply in the UGAs of Manson and Peshastin, which are not associated with an incorporated City. A discussion of the Manson and Peshastin UGAs was included in the summary of County environment designations.

Wenatchee UGA

The Urban Conservancy environment occupies over 50% of the shoreline area within the Wenatchee UGA (Figure 7). This area is primarily composed of wetlands and natural shorelines that occur along and upstream of the mouth of the Wenatchee River, as well as portions of the Columbia River in the northern and southern UGA areas. Significant shoreland areas along the Columbia River at the northern and southern ends of the UGA were designated High Intensity and contain industrial development and railroad uses. Figure 8 shows how shoreline functions are distributed among the different shoreline environments. Low functioning shoreline areas are focused in the High Intensity environment and higher functioning areas occur in the Shoreline Residential and Urban Conservancy environments.

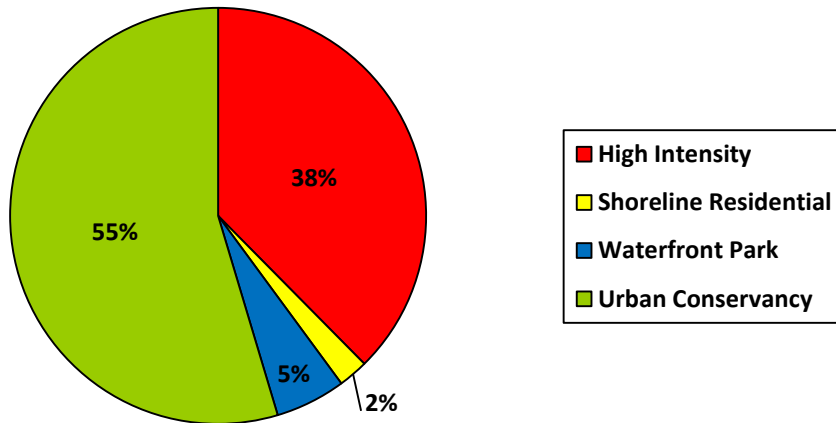


Figure 7. Distribution of Shoreline Environment Designations for Unincorporated Areas in the City of Wenatchee’s UGA

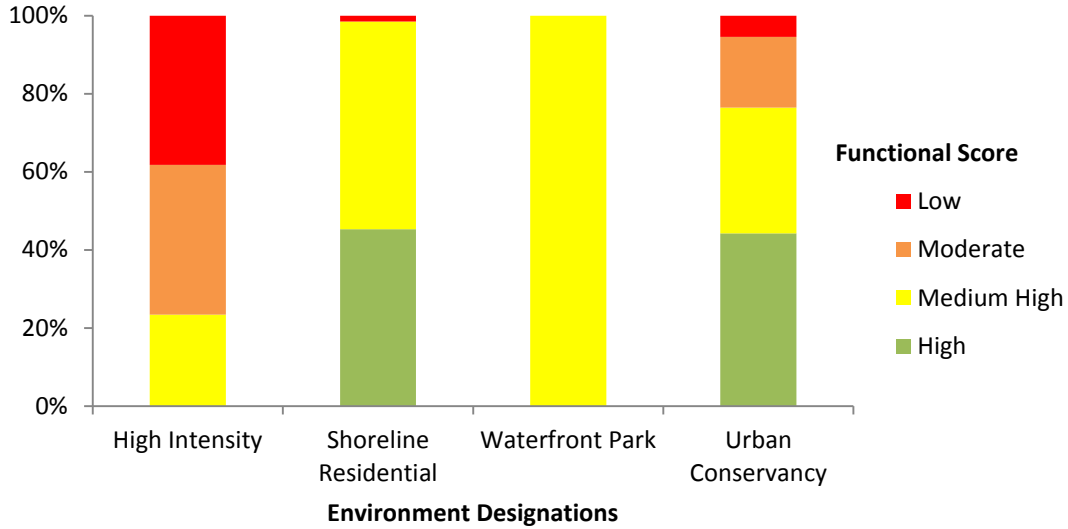


Figure 8. Distribution of Shoreline Functional Scores among Environment Designations in Unincorporated Areas of City of Wenatchee's UGA

4.2 General Policies and Regulations

The SMP contains numerous general policies, with supporting regulations (see SMP Chapter 4), intended to protect the ecological functions of the shoreline and prevent adverse cumulative impacts. The General Policies and Regulations chapters apply to all activities, uses and modifications. These regulations are summarized below in Table 21, including an indication of which function or functions the regulation helps to protect.

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Table 8. Summary of Key SMP General Regulations that Protect Ecological Functions.

Shoreline Ecological Functions ¹				SMP Regulations Providing Protection for Ecological Functions
Hydrologic	Water Quality	Shoreline Vegetation	Habitat	
X	X	X	X	4.2.2.A & C Mitigation sequencing is required
X	X	X	X	4.2.2.B Mitigation is required for all projects that have adverse impacts on shoreline ecological functions
X	X	X	X	4.2.2.D Local jurisdictions are responsible for weighing cumulative effects of all uses and development, including exempt development. Local jurisdictions shall prohibit projects that result in unmitigated, adverse cumulative impacts.
X				4.3.2.D Specific uses permitted in the floodplain and channel migration zone include: 1. Actions that protect or restore the ecological processes or functions; 2. Forest practices; 3. Existing and ongoing agricultural practices; 4. Public utility and transportation structures where no other feasible alternative exists; 5. Repair and maintenance to an existing use or structure, provided that channel migration is not further limited, or flood hazards increased, and that such actions do not cause significant ecological impacts. 6. Development in cities and UGAs where existing structures prevent active channel movement and flooding. 7. Modification or addition to an existing nonagricultural legal use, provided that channel migration is not further limited, or flood hazards increased, and that such actions do not cause significant ecological impacts. 8. Measures to reduce excessive shoreline erosion that is accompanied by mitigation of impacts.
		X	X	4.5.2.C Tree removal required to be replaced at 1:1 ratio and 2:1 ratio for non-hazard significant tree
X	X	X	X	4.5.2.E Unauthorized vegetation removal requires restoration plan.
		X	X	4.5.2.F One view corridor, limited to 25 percent of the width of the lot frontage, or 25 feet, whichever distance is less, may be permitted per lot with the submittal of a restoration plan. Whenever possible, view corridors shall be located in areas dominated with non-native vegetation and invasive species.
		X	X	4.5.2.J.2 Standard buffer reduction requires mitigation plan for reductions up to 25 percent of the buffer.
		X	X	4.5.2.K Maximum buffer reduction requires mitigation plan for reductions up to 50 percent of the buffer. Additional report requirements include no net loss of ecological functions, mitigation sequencing, and demonstration of development's spatial needs.
X	X			4.6.2.A Shoreline use and development shall incorporate measures to protect and maintain surface and groundwater quantity and quality in accordance with all applicable laws. (WAC 173-26-221(6)(b)(i))
X	X			4.6.2.B New development shall provide stormwater management facilities and implement low impact development in accordance with the current Stormwater Management Manual for Eastern Washington (WAC 173-26-221(6)(b)(ii)).
X	X			4.6.2.D Best management practices (BMPs) for control of erosion and sedimentation shall be implemented for all development in shoreline jurisdiction through an approved temporary erosion and sediment control (TESC) plan.
X	X			4.6.2.F All development shall connect to city sewer system.
X	X			4.6.2.G All materials that may come in contact with water shall be constructed of materials, such as untreated or approved treated wood, concrete, approved plastic composites or steel, that will not adversely affect water quality or aquatic plants or animals.

¹ Only primary effects of ecological functions are identified. Many actions may have indirect effects on each ecological function category.

4.3 Shoreline Uses and Modifications

The SMP contains numerous shoreline modification and use policies and supporting regulations (see SMP Chapter 5) intended to protect the ecological functions of the shoreline and prevent adverse cumulative impacts. Key shoreline use and modification regulations that help protect ecological functions are summarized below in Table 9, including an indication of which function or functions the regulations helps to protect.

Table 9. Summary of Key SMP Shoreline Use and Modification Regulations that Protect Ecological Functions.

Shoreline Ecological Functions ¹	Specific Shoreline Use or Modification	Potential Direct and Indirect Impacts to Shoreline Function	SMP Regulations Providing Protection for Ecological Functions	Related Watershed Restoration Efforts Underway or Planned (See Section 4.5)			
					Boating	Use	Vegetation
X	X	X	X	All	See below	5.3.2.C; 5.6.2.A; 5.11.2.D; 5.13; 5.17.2.A; 5.18.2.A; 5.19.2.B; 5.20.2.I	Refer to section 4.5
	X	X		Aquatic		5.2.2.A Siting and design requirements that emphasize protecting and restoring priority habitat and species	•
						5.2.2.K Trash and unauthorized fill removal required.	
X		X	X	Aquaculture	Hydrologic alterations; Diversion of streamflow; Nutrient enrichment; Potential competition with native populations	5.4.2.A.3 Aquaculture sites shall be selected to avoid and minimize the need for and degree of floodplain or floodway alteration, channel migration zone alteration, shoreline stabilization, native vegetation removal, and/or wetland alteration. Non-commercial aquaculture operations may be required to submit a site alternatives analysis.	• Upper Columbia Salmon Recovery Plan - Conservation hatcheries
			X		Potential for fisheries enhancement from conservation hatcheries managed to enhance native salmonid populations	5.4.2.B Aquaculture that involves substantial aquatic substrate modification or sedimentation through dredging, trenching, digging, or other similar mechanisms, shall not be permitted in areas where the proposal would have long-term adverse impacts on important fish or wildlife habitats.	
			X			5.4.2.G No introduced species without state approval.	
	X		X			5.4.2.J If uncertainty exists regarding potential impacts of a proposed aquaculture activity, and for all experimental aquaculture activities, baseline and periodic operational monitoring by a qualified professional may be required, at the applicant's expense, and shall continue until adequate information is available to determine the success of the project and/or the magnitude of any probable significant adverse environmental impacts.	
		X	X	Boating Facilities	Alteration of submerged aquatic vegetation, nearshore habitat, predator/prey relationships, and benthic community assemblages; Reduction in shoreline vegetative functions; Alteration of hydrologic processes; Alteration of sediment transport processes; Water quality impacts from facility construction, boat use and maintenance	5.5.2.A.1 New boating facilities are not allowed over areas of aquatic or emergent vegetation unless not other options are available or the facility would result in a net improvement of shoreline ecological functions.	• Upper Columbia Salmon Recovery Plan- Reduce negative species interactions in Columbia River (focused on predator control)
X			X			5.5.2.A.2 New boating facilities are not allowed in the channel migration zone, in areas that would require dredging, where a flood hazard will be created, or where impacts to shoreline ecological functions and processes cannot be mitigated. Expansions of existing boating facilities should be designed to minimize the need for new or maintenance dredging.	
	X		X			5.5.2.A.3 Moorage at new or expanded boating facilities must be located at depths to prevent prop scour.	
X						5.5.2.A.4 Boating facilities to be located and designed to avoid the need for shoreline stabilization. If stabilization is necessary, only the minimum needed is permitted.	
X	X	X	X			5.5.2.B.1 Dimensional standards for boating facilities are established to minimize effects on ecological function. Standards minimize the width of piers, establish acceptable moorage depth, establish decking standards (Columbia River and Lake Wenatchee only), and limit the number of slips that may be created per associated dwelling unit.	
X			X			5.5.2.B.2 Launch ramps must be designed to minimize effects on hydrologic and sediment transport processes.	
X						5.5.2.B.3 New over-water residences, including floating homes, shall be prohibited.	
		X	X			5.5.2.C.3 Covered moorage, including watercraft lift canopies, is prohibited.	
	X					5.5.2.E.1 and 2 Discharge of solid waste (including fish waste) or sewage into a waterbody is prohibited. Boating facilities are to provide garbage or litter receptacles. Marinas must provide restroom and sewage disposal facilities (pump out, holding, and/or treatment facilities).	
	X					5.5.2.E.4 New, expanded, and reconfigured marinas are required to provide fail-safe facilities and procedures for receiving, storing, dispensing, and disposing of oil or hazardous products, as well as a spill response plan for oil and other products.	
	X					5.5.2.F.1 and 2 Applicants for new or expanded boating facilities must provide assessment of demand, identification and adverse impact evaluation, and a mitigation plan.	
X		X	X			5.5.2.F.4 New boat launch facilities are allowed only if existing facilities do not meet public demand.	

Shoreline Ecological Functions ¹					Specific Shoreline Use or Modification	Potential Direct and Indirect Impacts to Shoreline Function	SMP Regulations Providing Protection for Ecological Functions	Related Watershed Restoration Efforts Underway or Planned (See Section 4.5)			
o	er	Qu	Ve	ce							
X					Breakwaters, Jetties, Groins, Weirs, Barbs and other in-water structures	Disruption of hydrologic and sediment processes; In-water habitat alteration Alteration of hydrologic processes; Alteration of sediment transport processes; Alteration of instream habitats; Erosion	5.6.2.B Groins are prohibited except as a component of a professionally designed community or public beach management program that encompasses an entire reach for which alternatives are infeasible, or where installed to protect or restore shoreline ecological functions or processes 5.6.2.C The size of breakwaters, jetties, groins weirs and barbs shall be limited to the minimum necessary. 5.6.2.D Jetties and breakwaters are prohibited except as an integral component of a professionally designed marina. Where permitted, floating, portable or submerged breakwater structures, or smaller discontinuous structures, are preferred where physical conditions make such alternatives with less impact feasible. 5.6.2.F Professional Design required 5.6.2.I 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.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan: Channel reconfiguration through installation of weirs, barbs, and boulders to increase habitat diversity . 			
X											
X	X										
X		X	X								
X	X		X								
X	X			X	Dredging	Disruption of sediment, hydrologic, and floodplain processes; Water quality impairments- turbidity and heavy metals; Floodplain habitat disturbance; Disturbance of benthic substrate/ organisms; Disturbance of nearshore habitat	5.8.2.A Dredging is only allowed as part of environmental cleanup and restoration, for essential public services when no alternative is feasible, maintenance for agriculture purposes, and for utilities under specific circumstances. 5.8.2.B Disposal of dredged material within the channel migration zone is discouraged and requires a conditional use permit. 5.8.2.C Disposal of dredge material in open waters is only allowed when permitted by state and federal agencies and then only when land disposal is infeasible or near shore disposal part of a program to restore or enhance shoreline ecological functions and processes is not feasible. 5.2.8.D A detailed analysis of purpose, existing conditions, potential impacts, proposed dredging methods, frequency, and duration, quantity of dredge material, and plans for disposal and maintenance.	<ul style="list-style-type: none"> Wenatchee River Channel Migration Zone Study- 24 sites identified for preservation, enhancement, and restoration of off-channel habitats and riparian vegetation. 			
X	X		X								
X	X		X								
X	X		X								
X	X		X								
X	X			X							
X			X	X	Fill and excavation	Disruption of sediment, hydrologic, and floodplain processes; Water quality impairments- turbidity and heavy metals; Floodplain habitat disturbance; Disturbance of benthic substrate/ organisms	5.9.2.B Fill and excavation within wetlands, floodways, channel migration zones, or waterward of the OHWM are only permitted under the following conditions: 1. Water-dependent uses, public access, and cleanup and disposal of contaminated sediments; 2. Disposal of dredged material conducted in accordance with the Dredged Material Management Program of WA DNR and/or the Dredged Material Management Office of the Corps; 3. Expansion or alteration of transportation facilities of statewide significance where alternatives to fill are infeasible; or 4. Ecological restoration or enhancement. Except for an ecological restoration project, fills waterward of the OHWM require a conditional use permit. 5.9.2.C Fills or excavation shall not be located where shoreline stabilization will be necessary to protect materials placed or removed. 5.9.2.F All fill and excavation proposals require temporary erosion and sediment control (TESC) plan, including BMPs.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan – Outreach on functions of wetlands; Update NWI based on known wetlands Wenatchee River Channel Migration Zone Study- 24 sites identified for preservation, enhancement, and restoration of off-channel habitats and riparian vegetation. 			
X											
	X										
	X				Industrial Uses	Water contamination; Reduced vegetative functions	5.11.2.B Nonwater-oriented industrial uses are allowed only if the site is physically separated from the shoreline by another property or public right-of-way prior to adoption of this SMP. On properties fronting the shoreline, new nonwater-oriented industrial development is prohibited, unless it provides a significant public benefit and it is part of a mixed-use project that includes water-dependent uses or navigability is severely limited at the proposed site. 5.11.2.C Accessory nonwater-dependent industrial development must be upland of the water-dependent or water-related portions of the development and comply with shoreline environment buffers for nonwater-oriented uses. 5.11.2.D Industrial development and redevelopment are encouraged to locate where environmental cleanup and restoration of the shoreline area can be incorporated. Federal and state requirements for hazardous materials clean up or management shall be addressed.	<ul style="list-style-type: none"> Wenatchee TMDL- point and nonpoint source reductions; incentives for riparian restoration 			
	X										
	X			X							

Shoreline Ecological Functions ¹				Specific Shoreline Use or Modification	Potential Direct and Indirect Impacts to Shoreline Function	SMP Regulations Providing Protection for Ecological Functions	Related Watershed Restoration Efforts Underway or Planned (See Section 4.5)
Soil	Water Quality	Vegetation	Bank				
X	X	X	X	Mining	Disruption of sediment, hydrologic, and floodplain processes; Water quality impairments- turbidity and heavy metals; Floodplain habitat disturbance; Disturbance of benthic substrate/ organisms	5.13. Mining is prohibited.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan- habitat acquisitions and conservation easements, projects to improve off-channel habitat (levee removal, side channel reconnection, and floodplain restoration)
X	X	X	X	Private moorage facilities	Alteration of submerged aquatic vegetation, nearshore habitat, predator /prey relationships, and benthic community assemblages; Reduction in shoreline vegetative functions; Alteration of hydrologic processes; Alteration of sediment transport processes; Water quality impacts from boat use and maintenance	5.14. Private Moorage facilities are prohibited.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan- Reduce negative species interactions in Columbia River (focused on predator control)
	X			Recreational Uses	Water quality impacts from pesticides/ fertilizers and boat use and maintenance	5.15.2.E Best management practices must be employed to prevent chemical contamination from the use of pesticides, fertilizers, or other chemicals.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan –Riparian habitat planting; host workshops on pesticide use in Entiat watershed Wenatchee TMDL- point and nonpoint source reductions; incentives for riparian restoration
X			X	Residential Development	Reduced infiltration; Reduced shoreline vegetative functions; Water quality impacts from fertilizers/ pesticides/ household wastes; Impacts from accessory uses	5.16.2.B.2 Design to prevent the need for new hard or soft shoreline stabilization or flood hazard reduction measures.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan – habitat acquisitions and conservation easements; host workshops on pesticide use and riparian vegetation benefits in Entiat watershed; landowner assistance in riparian planting Wenatchee TMDL- point and nonpoint source reductions; incentives for riparian restoration
	X	X	5.16.2.B.3 Cluster development to avoid critical areas and to preserve natural features and minimize physical impacts.				
	X		X			5.16.2.D Over-water residences, liveaboards, and floating homes are prohibited.	

Shoreline Ecological Functions ¹					Specific Shoreline Use or Modification	Potential Direct and Indirect Impacts to Shoreline Function	SMP Regulations Providing Protection for Ecological Functions	Related Watershed Restoration Efforts Underway or Planned (See Section 4.5)
Soil	Water Quality	Vegetation	Structure	Bank				
X				X	Shoreline Stabilization Hydrologic and sediment transport alterations; Simplification of nearshore habitat; Reduction in shoreline vegetative functions	5.18.2.A, 5.18.2.E The SMP provisions establish a preference for soft structural shoreline stabilization over hard structural stabilization.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan – streambank protection through habitat acquisitions; conduct Nason watershed evaluation; projects to improve off-channel habitat (levee removal, side channel reconnection, and floodplain restoration) Wenatchee River Channel Migration Zone Study- 24 sites identified for preservation, enhancement, and restoration of off-channel habitats and riparian vegetation. Entiat Tributary Assessment- Identified opportunities to restore channel and floodplain complexity in the lower 26 miles of the Entiat River 	
X				X		5.18.2.B.1 New and enlarged shoreline stabilization is not permitted unless a geotechnical analysis indicates that is needed to protect an existing structure from erosion caused by currents or waves.		
X				X		5.18.2.B.4 Shoreline stabilization is allowed to protect ecological restoration projects or hazardous substance remediation.		
X				X		5.18.2.C.3 Replacement of greater than 50 percent or 35 feet is not considered repair and maintenance and must be designed and reviewed as a replacement to meet the provisions of a new stabilization measure; see 5.18.2.D.		
X				X		5.18.2.D Replacement of shoreline stabilization measures must meet the same standards as new stabilization measures, except that a geotechnical analysis is not required for replacement with an “softer” stabilization approach. Replacement of hard stabilization structures may not occur further waterward than the existing structure. Some fill waterward of the OHWM is permitted to provide enhancement of shoreline ecological functions.		
X		X		X		5.18.2.E Establishes standards for the minimization and mitigation of stabilization impacts. Mitigation measures include: improving substrate conditions waterward of the OHWM and planting native vegetation along the shoreline.		
X				X		5.18.2.F.3 Fill behind hard structural shoreline stabilization is limited to 1 cubic yard per linear foot.		
	X	X		X	Transportation and Parking Water quality impacts (heavy metals and oils); Fish passage barriers; Reduced infiltration; Reduced vegetative functions	5.19.2.B.3 New roads and railroads must be setback from the OHWM the maximum feasible.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan – Culvert removals and upgrades, road reconstruction, removal, and drainage upgrades WDFW Fish Passage Inventory for Colockum Creek, Stemilt Creek, and Squilchuck Creek- Assessment of fish passage barriers 	
	X	X				5.19.2.I Parking facilities shall be outside shoreline jurisdiction unless no feasible location to support the planned primary use exists.		
		X		X	Utilities Reduced vegetative functions; Habitat disturbance	5.20.2 Provisions to minimize the ecological impact of utilities through location, design, and restoration of any disturbed areas.	<ul style="list-style-type: none"> Upper Columbia Salmon Recovery Plan –Riparian habitat planting 	

¹ Only primary effects of ecological functions are identified. Many actions may have indirect effects on each ecological function category.

4.4 Critical Areas

The SMP contains policies and regulations governing critical areas found within shoreline jurisdiction (see SMP Appendix B) intended to protect the ecological functions of the shoreline and prevent adverse cumulative impacts. Buffer requirements included in these regulations are generally consistent with the jurisdictions’ critical areas regulations that apply outside of shoreline jurisdiction. In the City-associated UGAs, the County will apply the Cities’ SMP regulations except that the County’s critical areas regulations will be applied to any critical areas. These regulations are summarized for the County and Cities in Table 10.

Table 10. Summary of Shoreline Critical Area buffer requirements.

Jurisdiction	Wetland Rating System	Stream Classification System	Buffer Width (feet)			
			Wetlands	Low Impact Land Use	Moderate Impact Land Use	High Impact Land Use
City of Wenatchee	Ecology E. WA- (2004/2007)	None	Cat 1	50-100	75-150	100-200
			Cat 2	50-100	75-150	100-200
			Cat 3	40-75	60-110	80-150
			Cat 4	25	40	50
			Streams	General protection standards for fish and wildlife habitat conservation areas, no dimensional standards for buffers. Buffer requirements may be established on a case by case basis.		

4.4.1 City of Wenatchee

The City allows for a reduction of buffer width and buffer averaging, provided that the buffer is reduced by no more than 25%, and a special site analysis/report demonstrates that the adjacent land will remain extensively vegetated, is topographically remote from the wetland, and that no direct or indirect adverse impacts on the regulated wetlands are reasonably likely as a result of the buffer reduction (Appendix B, City of Wenatchee, 7.1.1.C.3). Buffer averaging may be allowed, provided that no other buffer reduction options are used, and 1) buffer averaging improves wetland protections functions or 2) buffer averaging is needed in order to accommodate otherwise permitted development, and the averaged buffer will not result in degradation of the wetland’s function (Appendix B, City of Wenatchee, 7.1.1.C.5).

Critical areas regulations relating to Geologically Hazardous Areas (Appendix B, City of Wenatchee, 7.4) require a site analysis and establish specific development

standards to avoid and minimize the potential for future hazards that may require stabilization measures. Similarly, site analysis and development standards are identified for Fish and Wildlife Habitat Conservation Areas. No specific buffer widths have been established; rather buffer requirements may be established on a case by case basis (Appendix B, City of Wenatchee, 7.5).

4.5 Shoreline Restoration Plan

As discussed above, one of the key objectives that the SMP must address is “no net loss of ecological shoreline functions necessary to sustain shoreline natural resources” (Ecology 2004). However, SMP updates seek not only to maintain conditions, but to improve them:

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

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

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

The Shoreline Restoration Plan identifies a number of project-specific opportunities for restoration on both public and private properties inside and outside of shoreline jurisdiction, and also identifies ongoing City programs and activities, non-governmental organization programs and activities, and other recommended actions consistent with a variety of watershed-level efforts.

Major shoreline restoration opportunities for the City that could contribute to achievement of no net loss of ecological functions or improvement in ecological functions are summarized below.

4.5.1 County

Many of the watershed planning and salmon recovery efforts in the County are administered by the Chelan County Natural Resources Department (CCNRD). Current activities include Wenatchee River Watershed (WRIA 45) planning and implementation, Squilchuck/Stemilt Watershed (WRIA 40a) planning and implementation, a County-wide salmon recovery grant program through Washington Salmon Recovery Funding Board, and habitat conservation plan development under the Federal Endangered Species Act (Chelan County website). CCNRD is also a partner with the Cascadia Conservation District (CCD) in the planning and implementation of the Entiat (WRIA 46) watershed plan, and the early planning stages of the Lake Chelan (WRIA 47) watershed plan. Each completed plan has established goals and objectives and includes a list of restoration opportunities. Funding is available to implement priority restoration opportunities through the watershed planning act, grant funding (e.g., Salmon Recovery Funding Board (SRFB), Aquatic Lands Enhancement Account (ALEA), Bullitt Foundation, Washington Wildlife and Recreation Program (WWRP), Bonneville Environmental Foundation Watershed Program) and funding commitments from various implementation entities (e.g., Ecology, Bonneville Power Administration (BPA)).

Upper Columbia Salmon Recovery Board

The CCNRD supports regional salmon recovery efforts and the Upper Columbia Salmon Recovery Board (UCSRB). The *Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan* (UCSRB 2007) provides a regionally and federally accepted framework for implementing coordinated recovery actions, while providing a “roadmap” towards implementation of priority habitat actions. The UCSRB has successfully completed single-project-focused actions that 1) reopen tributary habitat, 2) preserve key habitat areas, and 3) protect countless fry and smolt from entrainment in irrigation diversions. One recent project success story, sponsored by the CCNRD, includes the Nason Creek Oxbow Reconnection project in the upper Wenatchee valley (located between mile post 0.83 and 1.33 on Highway 207). This project reconnected a half-mile-long oxbow (secondary channel) by installing two 12-foot-wide fish-friendly culverts. The reconnection restored access to 21.7 acres of off-channel refuge, rearing and over-wintering habitat for juvenile salmonids.

While these single-project-focused actions contribute to recovery efforts, there is an increasing focus on implementing “large-scale, multi-year, multi-million dollar recovery activities” (UCSRB 2009). The UCSRB is currently updating their comprehensive, coordinated and strategic approach to reflect this new focus. The implementation plan that the CCNRD works from can be found online at <http://www.ucsrb.com/theplan.asp>. Implementation actions pertain to: water

quantity and quality, water temperature extremes, habitat diversity and quantity, obstructions, riparian/floodplain, sediment, diversions, species interactions, depleted nutrients, nutrient limitations, and ecosystem function. Examples of actions found in the implementation plan are included in Table 22, above.

WRIA 40 a/b

The Washington Department of Fish and Wildlife (WDFW) completed a *Diversion Screening and Fish Passage Inventory Report for Colockum Creek, Stemilt Creek and Squilchuck Creek* in 2006. The goal of the inventory was to 1) assess unscreened or inadequately screened surface water diversions and 2) identify fish passage barriers and to assess the potential available habitat gain for each feature. Data obtained from the diversion screening and fish passage inventory and concurrent habitat survey allowed for ranking and prioritization of projects. A recommended first step would be to complete a detailed implementation plan for fish passage barrier projects in the three creeks.

WRIA 45

Wenatchee River Channel Migration Zone Study

CCNRD conducted a *Wenatchee River Channel Migration Zone Study-Phase I and II* to provide the technical foundation and to quantify physical and biological mechanisms linked to the salmonid habitat limiting factors, and prioritize potential habitat restoration, enhancement, and preservation actions. Twenty-four restoration sites were selected for preservation, enhancement, or restoration. The sites included areas that could be preserved because of their existing high-quality habitat adjacent to the Wenatchee River, and their need for additional off-channel habitat and riparian vegetation. The CCNRD has made it a goal to restore and protect these 24 sites.

No timetable or implementation strategy specific to the 24 sites listed in the CMZ study exists. Rather, the sites will be considered as viable options for restoration and preservation activities discussions. Funding for restoration and preservation projects may differ, as some public funds and private entities may be available for funding.

Upper Valley Plan

A Steering Committee and the Chelan County PUD partnered to develop a vision plan with opportunities for the upper Wenatchee River valley, including the communities of Leavenworth, Peshastin, Dryden, Cashmere, and Monitor. They identified goals, objectives and a list of potential river access sites and fisheries enhancement opportunities along the Wenatchee River.

The plan identifies opportunity sites in:

- **Leavenworth:** at the Leavenworth National Fish Hatchery; Blackbird Island; Icicle Creek/Wenatchee River confluence; irrigation projects; Wenatchee River habitat work; Icicle Loop Trail; potential interpretive trail at an old railbed site east of Leavenworth; gateway for “back roads” scenic drive; and Trout Unlimited projects.
- **Peshastin:** at an old mill site; mill intake station; old railroad corridor; Kiwanis Park; Main Street; a historic log structure; Peshastin Creek/Wenatchee River confluence; and at railroad bridge and sandy beach.
- **Dryden:** at a beaver pond site; dam site; powerhouse site; old school site; downtown Dryden; old dump site and public access above railroad and between railroad and SR 2.
- **Cashmere:** at the Chelan Co. museum; a fishing hole on the north shore of the Wenatchee R.; Old Mill; Raft Park and CCPUD kiosk; a flood area below Bethlehem construction; Goodwin Bridge; and Devil’s Gulch mountain bike area.
- **Monitor:** at Sleepy Hollow viewpoint; Green Bridge; gateway for “back roads” scenic drive; irrigation site; Monitor Bridge; riparian area; Chelan Co. Park; Wenatchee Foothills trail.

Implementation of the Upper Valley Plan includes establishing a non-profit, conducting community and agency coordination meetings and identifying and procuring funding. Potential funding sources may include teaming with organizations such as the Chelan-Douglas Land Trust, Washington State Department of Transportation, The Audubon Society, and CENRD.

Washington Department of Ecology Total Maximum Daily Load (TMDL)

The U.S. Environmental Protection Agency (EPA) has approved a TMDL (the Wenatchee River Watershed Dissolved Oxygen and pH Total Maximum Daily Load Water Quality Improvement Plan (TMDL) (Ecology 2009). The TMDL identified three water bodies in the project area exceeding dissolved oxygen standards and six exceeding pH standards. The timeline for compliance with water quality standards is 10 years from TMDL approval, or 2019. Fifty specific activities and goals are identified in the TMDL. They include supporting and regional phosphorus reduction activities, addressing point and nonpoint source activities, facility planning and design, monitoring activities, and habitat improvements.

Timelines for the three phases of TMDL implementation are summarized in Table 11.

Table 11. TMDL implementation timeline

Phase/Target	Definition	Timeline
Phase 1	Point and nonpoint source reductions, data collection and model calibration	2009-2013
Target 1	50% nonpoint source loading reduction	2014
Phase 2	Modification of load and wasteload allocations (if needed); identification of additional nonpoint source reductions	2014-2015
Phase 3	Additional load reductions implemented	2015-2019
Target 2a	NPDES compliance	2019
Target 2b	Reduction in remaining nonpoint source loading	2019
Final Target	Water quality standards achieved	2019

Dissolved oxygen and pH data will be collected every five years to monitor progress toward the goals. Adaptive management will be employed to ensure that goals are achieved. Compliance monitoring will continue after compliance with water quality standards is achieved.

Funding sources include the CCD, which is a current recipient of a Centennial Clean Water Fund grant for TMDL activities; CCNRD, which provides incentive payments for implementation of riparian restoration activities; NRCS, which provides technical assistance to farmers and ranchers and may also be a funding source; and a number of jurisdictions and entities, including Chelan County, the Chelan County PUD, and the Cities of Wenatchee, Leavenworth, and Cashmere, have all shown interest in investigating sources of nonpoint source phosphorus loading.

4.5.2 City of Wenatchee

Wenatchee Parks (Riverfront and Confluence State Parks)

Reduction of shoreline armoring, removal of non-native vegetation, native revegetation, shoreline stabilization, and the addition of interpretive nature and/or historical signs. Enhance and maintain the habitat along the south Confluence State Park wetland area.

General

The City of Wenatchee continues to accomplish the goals established in the *Wenatchee Waterfront Sub-Area Plan* (2003). Restoration-related elements of the park/open space/recreation implementation opportunities include: Waterfront Park and shoreline enhancement and the development of an environmental education center/urban agricultural center. Shoreline ecological functions would benefit from reducing shoreline armoring, improving shoreline stabilization, and removing invasive vegetation. A combination of vegetation and bioengineering techniques could be provided to secure the shoreline from excessive erosion.

5 OTHER REGULATORY PROGRAMS

5.1 Effects of Current County and City Regulations

5.1.1 Critical Areas Regulations

Critical Areas Regulations prepared under the Growth Management Act and adopted through City ordinance apply to designated critical areas outside of shoreline jurisdiction. Wenatchee has a set of critical area regulations that dictate protection of environmentally sensitive areas, including wetlands, streams (fish and wildlife habitat conservation areas), geologically hazardous areas, frequently flooded areas, and aquifer recharge areas. All regulations use a version of the Department of Ecology’s Eastern Washington Wetland Rating System.

Table 12 summarizes critical areas regulations for the City.

Table 12. Critical Areas Regulations Outside of Shoreline Jurisdiction.

Jurisdiction	Date of Last Update	Wetland Rating System	Stream Classification System	Buffer Width (feet)			
				Wetlands	Low Impact Land Use	Moderate Impact Land Use	High Impact Land Use
City of Wenatchee	2009	Ecology E. WA- (2004/2007)	None	Cat 1	50-100	75-150	100-200
				Cat 2	50-100	75-150	100-200
				Cat 3	40-75	60-110	80-150
				Cat 4	25	40	50
				Streams	General protection standards only for fish and wildlife habitat conservation areas, no dimensional standards for buffers. Buffer requirements may be established on a case by case basis.		
Title No. Chapter 12.08.130-170 Wetlands; Crit. Aq. Recharge Areas; Freq. Flooded Areas; Geo. Haz Areas; Fish & Wildlife Hab. Cons. Areas							

5.1.2 City of Wenatchee

Comprehensive Plan: The *Planning to Blossom 2025 Wenatchee Urban Area Comprehensive Plan* provides for urban land use designations in the City and UGA, and addresses other important elements such as capital facilities (e.g. parks and recreation). The *Waterfront Subarea Plan* is a part of the City’s Comprehensive Plan and guides the development of the Columbia River waterfront. The Comprehensive Plan may be updated no more frequently than on an annual basis.

Zoning Code: Wenatchee City Code Title 10 (as amended) contains the City’s zoning standards which regulate land in the city limits related to uses, building bulk, scale, and location, and other design considerations. Until land is annexed, the County is responsible for permitting in the UGA. However, the County has a

Memorandum of Understanding with all the Cities, including Wenatchee, regarding the adoption and use of the City zoning and zoning standards for review of proposals in the City's UGA.

Floodplain Regulations: Chapter 2.05 of the Wenatchee City Code (WCC) addresses flood hazard prevention. These regulations apply to lands identified as "special flood hazard areas" on the federal Flood Insurance Rate Maps (FIRM). Standards for preventing flood hazards are provided for all types of special flood hazard areas located in the City, including requirements for anchoring, construction methods and materials, utilities, design standards for residential and nonresidential construction, including manufactured homes, and recreational vehicles and crawlspaces. No "special flood hazard areas" occur within shoreline jurisdiction.

Additional specific standards are provided for "shallow flooding areas," which generally corresponds to those areas that experience sheet flow between depths of 1 to 3 feet outside of a defined channel. Despite being in the City code, presently, the City does not have any A1-30 zones. WCC 12.08.150 of the critical areas code contains complementary regulations for frequently flooded areas.

Stormwater Regulations: The City of Wenatchee has developed many control measures required for stormwater management programs, since the federal National Pollutant Discharge Elimination System (NPDES) requirements went into effect in 2003. All development within the City is required to control stormwater such that it doesn't damage adjoining properties, route to City system if capacity is available, extend City infrastructure in accordance with the *Planning to Blossom 2025 Wenatchee Urban Area Comprehensive Plan* (2007), and will provide water quality treatment for all construction activities. All commercial development must address water quality on site and some must be capable of detaining stormwater in flood events. The City also routinely sweeps streets to help keep debris out of the storm drain system. Most of the City of Wenatchee is connected to the stormwater collection system that discharges directly into local waters. The City of Wenatchee presented a policy in the Comprehensive Plan to establish review requirements so that all development projects do not adversely impact the rate and amount of runoff into adjacent waters or lands.

5.2 State Agencies/Regulations

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

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

Depending on the nature of the proposed development, State regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. During the comprehensive SMP update, the City will consider 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 and/or State agency responsibilities follows.

Washington Department of Natural Resources: Washington Department of Natural Resources (WDNR) is charged with protecting and managing use of State-owned aquatic lands. Toward that end, water-dependent uses waterward of the ordinary high water mark require review by WDNR to establish whether the project is on State-owned aquatic lands. In Lake Chelan, for example, WDNR has authority over aquatic lands waterward of the 1079-foot elevation. In the Columbia River, WDNR has authority over activities extending into the original (pre-dam) channel. If WDNR has jurisdiction, the project may be required to obtain an Aquatic Use Authorization from WDNR and enter into a lease agreement. Certain project activities, such as single-family or two-party joint-use residential piers, on State-owned aquatic lands are exempt from these requirements. WDNR recommends that all proponents of a project waterward of the ordinary high water mark contact WDNR to determine jurisdiction and requirements.

Chelan County Public Utility District: Although the Chelan County PUD is not a State agency, it does act like an agency in its review and denial or approval of certain projects on the Columbia River (Rocky Reach and Rock Island Reservoirs) and in Lake Chelan (Chelan Reservoir).

Rocky Reach Reservoir (Lake Entiat): Construction of Rocky Reach Dam began in 1956. The PUD's "jurisdiction" over reservoir shorelines originates with "right-to-flood" easements, sold to the PUD by the original property owners along the river. These easements extend to elevations that were projected to be reached by a catastrophic or extreme flood event of similar magnitude to an 1894 flood. These elevations will not likely be reached by flood waters with current management of the dams consistent with USACE and Federal Energy Regulatory Commission (FERC) requirements. Based on flood-water elevations of

the 1894 flood, the original easements were obtained by the PUD. They extend up to elevations significantly higher than the reservoir's standard operating levels. These elevations were illustrated on a set of maps labeled Exhibit K, and the maps' elevations are now generally known as the K line. As part of the hydroelectric project relicensing in the 1990s, the PUD resurveyed and recalculated anticipated flood elevations taking into consideration more recent upstream dams and their reservoirs' storage capacities, and illustrated newer anticipated flood elevations on a series of maps labeled Exhibit G. These newer maps show the "G line" is generally lower in elevation than the K line, except in areas near the dam, where the G and K lines both are 711 feet above sea level. (This is the lowest level for these lines, as rivers flow downhill.) Subsequent to the new designed G line some property owners (who signed a new easement agreement with the PUD) can build down to the new G line at their own risk, using the area above the G line, within the upper area of the original K line easement, for residential purposes. As part of federal requirements, portions of parcels lying below the K or G line may not be modified through grading, filling, excavating, clearing, or other activities, without written approval of the PUD and the federal agency which licenses hydroelectric projects. Exceptions are allowed for some docks or irrigation pumps, with the owner's understanding that construction of those structures is at the owner's risk.

Rock Island Reservoir: Rock Island Dam was originally constructed in 1933, and then modified in 1953 and 1979. The current project boundary for the Rock Island Hydroelectric Project, as licensed with the Federal Energy Regulatory Commission (FERC), is delineated on a set of maps labeled Exhibit G. The PUD owns the majority of land within the project boundary on the Rock Island reservoir. Similar to the restrictions on the Rocky Reach Reservoir, alteration of the land within the project boundary is restricted. The PUD maintains and operates a number of parks on its land along the Rock Island Reservoir. The 1976 Lake Chelan Project Exhibit R Recreation Plan identified seven sites on the Rocky Reach Project for recreational development. Three were completed by the Chelan PUD and opened to the public in the late 1970s, one in the 1980s and three in the 1990s. The parks include: Rocky Reach Dam Site, Orondo Park, Entiat Park, Lincoln Rock State Park (Eastbank), Daroga State Park, Chelan Falls/Powerhouse Parks, and Beebe Bridge Parks.

Chelan Reservoir: The Chelan dam was completed in 1927, and was recently relicensed in 2006. As part of dam management, Lake Chelan is flooded, by right and by obligation, to 1,100 feet above sea level during summer months to accommodate private and public recreational uses.

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>). Their authority comes from the State Shoreline Management Act, Section 401 of the Federal Clean Water Act, the Water Pollution Control Act, the Federal Coastal Zone Management Act of 1972, the State Environmental Policy Act, the Growth Management Act, and various RCWs and WACs of the State of Washington.

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

Watershed Planning Act: The Watershed Planning Act of 1998 (Chapter 90.82 RCW) was passed to encourage local planning of local water resources, recognizing that there are citizens and entities in each watershed that “have the greatest knowledge of both the resources and the aspirations of those who live and work in the watershed; and who have the greatest stake in the proper, long-term management of the resources.” Chelan County and partners in the County have taken advantage of the available funding for watershed planning to complete the watershed management plans for the Entiat watershed (WRIA 46) in 2004, the Wenatchee watershed (WRIA 45) in 2006, and the Stemilt/Squilchuck watershed (WRIA 40a) in 2007. The Chelan watershed does not yet have a watershed management plan; although, a draft Lake Chelan sub-basin plan was completed for the Northwest Power & Conservation Council in 2004. WRIA 40b (the Alkali Squilchuck, which includes Colockum Creek is located primarily in Kittitas County) also does not have a watershed management plan.

State Forest Practices Act: Activities related to growing, harvesting, or processing timber are regulated under Washington's State Forest Practices Act (WAC 222) administered by Washington State DNR and are not regulated under

the SMA unless the land is being converted to another use besides growing trees or the commercial harvest is within 200 feet of a shoreline of statewide significance and exceeds the harvest limits established in the SMA. Conversions must comply with the provisions in the SMP for the new use.

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

- segmental or progressive reclamation;
- preservation of the topsoil;
- slope restoration such that highwalls are rounded in plan and section for all mines;
- stable slopes;
- final topography that generally comprises sinuous contours, chutes and buttresses, spurs, and rolling mounds and hills, all of which blend with adjacent topography to a reasonable extent;
- effective revegetation with native multi-species ground cover and trees depending on the municipality-approved subsequent use designated for the site.

5.3 Federal Agencies/Regulations

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

Section 404: Section 404 of the federal Clean Water Act provides the Corps, under the oversight of the U.S. Environmental Protection Agency, with authority to regulate "discharge of dredged or fill material into waters of the United States, including wetlands" (<http://www.epa.gov/owow/wetlands/pdf/>)

reg_authority_pr.pdf). The extent of the Corps' authority and the definition of fill have been the subject of considerable legal activity. However, it generally means that the Corps must review and approve many activities in shoreline waterbodies, and other streams and wetlands. These activities may include wetland fills, stream and wetland restoration, and culvert installation or replacement, among others. Similar to Washington State Environmental Policy Act (SEPA) requirements, the Corps is interested in avoidance, minimization, restoration, and compensation of impacts.

Section 10: Section 10 of the federal Rivers and Harbors Appropriation Act of 1899 provides the Corps with authority to regulate activities that may affect navigation of “navigable” waters. The Columbia River and Lake Chelan are designated navigable waters. Accordingly, proposals to construct new or modify existing in-water structures (including piers, marinas, bulkheads, breakwaters), to excavate or fill, or to “alter or modify the course, location, condition, or capacity of” these waterbodies must be reviewed and approved by the Corps.

Federal Endangered Species Act (ESA): Section 9 of the ESA prohibits “take” of listed species. Take has been defined in Section 3 as: “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The take prohibitions of the ESA apply to everyone, so any action of the City that results in a take of listed fish or wildlife would be a violation of the ESA and exposes the City to risk of lawsuit. 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.

Clean Water Act: The federal Clean Water Act has a number of programs and regulatory components, but of particular relevance to the City is the National Pollutant Discharge Elimination System (NPDES) program. In Washington State, the Department of Ecology has been delegated the responsibility by the U.S. Environmental Protection Agency for managing implementation of this program. The City of Wenatchee is engaged in compliance with the NPDES Phase II Municipal Stormwater General Permit requirements that address stormwater system discharges to surface waters.

Federal Power Act: Under the Federal Power Act, the Federal Energy Regulatory Commission (FERC) is responsible for licensing nonfederal hydropower projects on navigable waterways and federal lands. The Commission's staff prepares an environmental analysis of every new and relicensed hydropower proposal to

ensure that environmental impacts are weighed in the location, design, and ongoing use of hydropower dams.

6 SUMMARY OF POTENTIAL IMPACTS OF LIKELY DEVELOPMENT AND EFFECTS OF SMP

WAC 173-26-186(8)(d) guides local master programs to evaluate and consider cumulative impacts of “reasonably foreseeable future development on shoreline ecological functions.” The most commonly anticipated changes in shoreline development involve residential, commercial, and industrial development. These activities include upland development, and may also include the development of overwater structures and/or shoreline stabilization. As directed by the WAC, the policies and regulations in the proposed SMP are designed to ensure that cumulative impacts do not result in a net loss of ecosystem functions. A discussion of the general potential impacts of these anticipated developments and the countywide effects of the SMP are provided in Sections 6.1-6.3, below.

Potential development is not limited to residential, commercial and industrial uses; however, the location, timing, and impacts of less common uses and development projects are less predictable. WAC 173-26-201(3)(d)(iii) provides guidance that “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.” Potential uses and projects with less predictable implementation and impacts include such activities as aquaculture and mining. In addition to regulations that avoid, minimize, and mitigate for potential impacts from these less common developments, the proposed SMP includes specific regulations that require these types of developments to demonstrate on an individual basis that proposed projects will not result in a loss of ecological functions. Because these developments will be required to demonstrate no net loss on an individual basis, these types of projects will generally not be addressed in great detail in this cumulative impacts analysis.

6.1 Summary of Potential Impacts Associated with Upland Development and Effects of SMP

6.1.1 General

The most commonly anticipated changes in shoreline use involve residential, commercial, and industrial development. These developments and developments accessory to these uses, including utility and transportation infrastructure, generally involve impacts to shoreline functions, which typically result from the replacement of pervious, vegetated areas with impervious surfaces and/or a landscape management regime that includes chemical treatments of lawn and landscaping. These actions have multiple potential effects on shoreline ecological functions, including:

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

The amount of space between the shoreline and a structure is an excellent quick evaluation of shoreline condition. The extent of native vegetation and the amount of impervious surfaces are often important indicators of shoreline function since these factors influence the quantity of stormwater runoff reaching shorelines. Changes in vegetation are a significant consideration when evaluating the net effects of development on shoreline ecological function. The conservation of riparian vegetation is critical to the ecological functions of the watercourses and waterbodies in the City of Wenatchee. Riparian vegetation provides filtration of upland contaminants, bank stability, shading of waterbodies, habitat complexity (both aquatic and terrestrial), a source of terrestrial insect prey for fish, and increased water storage potential.

Table 26 identifies the potential impacts of specific likely changes in development in the City of Wenatchee and the primary anticipated effects of the SMP.

Table 13. Summary of Potential Impacts Associated with Upland Development in Shoreline Jurisdiction.

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP
River/Stream			
Hydrologic (includes hyporheic)	<ul style="list-style-type: none"> • Additional residential development within existing pockets of residential uses • Commercial and industrial development • Improvement and expansion of transportation and utility infrastructure • Creation of more parks/public access sites 	<ul style="list-style-type: none"> • Modification of flow regimes and channel migration with construction of buildings, roads, or recreational-use structures • Increased runoff from added impervious surface and vegetation loss, increased potential for localized flooding, increased erosion and reduced groundwater recharge • Reduced groundwater recharge combined with increased stormwater runoff rates means higher high flow volumes and lower seasonal low flow rates 	<ul style="list-style-type: none"> • Shoreline environment designations to concentrate development in least sensitive areas • Development restrictions in floodplains and channel migration zones • Shoreline crossings for utilities and transportation to be designed to minimize ecological impacts • Mitigation standards for vegetation clearing
Water quality		<ul style="list-style-type: none"> • Increase in runoff and associated water quality impacts • Increase in runoff and associated water quality impacts with the creation of new impervious surfaces • Vegetation loss reduces filtration of excess nutrients, sediments and pollutants during hyporheic exchange. 	<ul style="list-style-type: none"> • Provisions to maintain surface and groundwater quality • Standards for stormwater management and low impact development • BMPs to minimize erosion • Require connection to City Sewer • Industrial development encouraged to locate where environmental cleanup and restoration can be incorporated. • Vegetated buffer standards
Shoreline vegetation		<ul style="list-style-type: none"> • Decrease in shoreline/riparian vegetation • Vegetation loss increases the potential for erosion, 	<ul style="list-style-type: none"> • Vegetated buffer standards • Mitigation standards for vegetation clearing

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP
		bank instability, turbidity, higher water temperatures <ul style="list-style-type: none"> • Vegetation loss reduces refuge and foraging opportunities for fish and wildlife • Vegetation loss produces less LWD for habitat forming processes 	
Habitat		<ul style="list-style-type: none"> • Loss of or disturbance to riparian habitat • Loss of instream habitat complexity, less LWD for habitat forming processes • Vegetation loss reduces terrestrial insect subsidies 	<ul style="list-style-type: none"> • Provisions to locate and design utilities and transportation infrastructure to avoid sensitive areas and restore disturbed areas • Vegetated buffer standards • Mitigation standards for vegetation clearing

Provisions in the proposed SMP guide future development and redevelopment to avoid, minimize, and mitigate for shoreline impacts caused by upland development. As described in Section 4.2 and summarized in Table 13, provisions in the proposed SMP address potential impacts to vegetative, habitat, water quality, and hydraulic functions. The following specific use provisions also help to avoid a net loss of shoreline function from upland development:

- Limit conversion of forest lands to minimum necessary
- Design subdivisions of land so that newly developed lots will be able to comply with SMP requirements and not require a Shoreline Variance.
- Locate, design, and mitigate for roads and utilities servicing upland development.
- Locate industrial development where environmental cleanup and restoration of the shoreline area can be incorporated. Address federal and state requirements for hazardous materials clean up or management.

In addition to the above provisions, vegetation conservation and shoreline buffer regulations are critical to maintaining and/or improving the functions of existing riparian vegetation. It is important that impervious surfaces be separated from the waterbody to the extent that those surfaces replace vegetation. In the

proposed SMP, shoreline buffer standards were established specific to each local jurisdiction and environment designation. Specific shoreline buffers will be discussed below in Section 7. Wetland buffers found in each jurisdiction's shoreline critical areas regulations also limit the effects of development on shoreline-associated wetlands.

In general, new residential, commercial, and industrial development is expected within shoreline jurisdiction in the City of Wenatchee over the next 20 years. Standards for stormwater control, vegetation conservation, mitigation, buffers, and other measures in the SMP, will help maintain ecological functions of the shoreline over the long term.

6.1.2 Ongoing Agriculture

Ongoing agricultural activities are not regulated by the SMA and are therefore not subject to the provisions in the proposed SMP. New agricultural activities are largely exempt from shoreline substantial development permits but must comply with other provisions in the SMP, including implementing best management practices. Agricultural activities are expected to continue in the lower river valleys throughout the unincorporated County.

6.1.3 Forestry

Forestry and timber management on non-federal and non-tribal lands are regulated under the State Forest Practices Act (Chapter 76.09 RCW) and are not regulated under the SMA unless the land is being converted to another use besides growing trees or the commercial harvest is within 200 feet of a Shoreline of Statewide Significance and exceeds the harvest limits established in the SMA. Conversions must comply with the provisions in the SMP for the new use. Along Shorelines of Statewide Significance, commercial timber harvest may not exceed 30% of the timber volume in a ten-year period. Forestry is the predominant use in the upper watersheds of Chelan County and does not affect shorelines within the City of Wenatchee.

6.1.4 Upland Development outside of Shoreline Jurisdiction

Although SMP regulations only apply within shoreline jurisdiction, development outside of shoreline jurisdiction may influence shoreline ecological functions. The potential impacts of development outside of shoreline jurisdiction tend to be more indirect than impacts within shoreline jurisdiction; nevertheless, their potential effects can be significant, and include the following:

- Reduced infiltration potential on hillslopes and in headwater areas increases surface flows and reduces groundwater storage. This increases peak flows and flashiness of shoreline waterbodies, and may result in channel incision and reduced instream channel complexity.
- Increased impervious surfaces and reduced infiltration increases runoff of untreated waters and the potential for water quality degradation through the introduction of herbicides, pesticides, and heavy metals, and other toxic compound to the shoreline waterbody.
- Elimination of upland wildlife corridors.
- Development in channel migration zones and floodplains is inherently susceptible to damage. Efforts to protect new developments have the potential to isolate floodplains and prevent channel migration, thereby interfering with shoreline processes.

Because SMP provisions do not apply to upland areas, other local regulations, including zoning codes, critical areas regulations, floodplain regulations, and stormwater regulations, as well as applicable state and federal regulations will guide development in those areas. Specifically, critical areas regulations for erosion hazards, included in geologically hazardous areas, are expected to limit future development in channel migration zones. Despite these regulations and the spatial separation from the shoreline, developments near shoreline jurisdiction may have some impacts to shoreline functions. For those areas where extensive development is anticipated in the study area, but outside of shoreline jurisdiction, particular attention should be paid during review of those projects under other regulations to ensure that the upland impacts are fully mitigated and no net loss of functions is achieved.

6.2 Summary of Potential Impacts Associated with Overwater Structures and Effects of SMP

Overwater structures can adversely affect ecological functions and habitat in the following ways:

- Alter patterns of light transmission to the water column, affecting macrophyte growth and altering habitat for and behavior of aquatic organisms, including juvenile salmon and other prey species and the composition and diversity of benthic organisms.
- Interfere with long-shore movement of sediments, altering substrate composition and development.
- Contribute to contamination of surface water from chemical treatments of structural materials, as well as indirect effects of boat use and maintenance.
- Clearing of shoreline vegetation to accommodate docks reduces shoreline vegetative functions.

Table 14 identifies the potential impacts of specific likely changes in development in the City of Wenatchee and a summary of the effects of SMP provisions.

Table 14. Summary of Potential Impacts Associated with Over-water Structures in Shoreline Jurisdiction.

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP Provisions
River/Stream (Primarily Columbia River)			
Hydrologic (includes hyporheic)	<ul style="list-style-type: none"> • Creation of more parks/public access sites – construction of over-water structures associated with access and water recreation • Construction of new bridges for transportation corridors 	<ul style="list-style-type: none"> • Modification of flow regimes and channel migration with construction of docks, ramps, bridges, or other recreational-use structures • Repair of existing bridges and replacing culverts with bridges could reduce flow impacts, channel constraints, and fish passage barriers 	<ul style="list-style-type: none"> • Boating facilities prohibited in channel migration zones, areas that would require dredging, or flood hazard zones • Shoreline crossings to be designed for the least ecological impact
Water quality	<ul style="list-style-type: none"> • Repair/reconstruction of existing bridges and culverts 	<ul style="list-style-type: none"> • Water quality impacts associated with construction of docks and other in-water structures (e.g., spills, harmful materials use) • Water quality impacts from uses associated with new docks (e.g., motor boat use and maintenance) • Water quality impacts associated with stormwater generated on new bridges 	<ul style="list-style-type: none"> • Toxic wood preservatives are prohibited
Shoreline vegetation		<ul style="list-style-type: none"> • Alterations of aquatic vegetation communities • Reduction in riparian vegetation to accommodate new overwater structures • Loss of riparian vegetation increases the potential for erosion, bank instability, turbidity, higher water temperatures 	<ul style="list-style-type: none"> • New boating facilities and moorage structures are prohibited over aquatic or emergent vegetation • Mitigation standards for new structures may include planting of shoreline vegetation • Mitigation required for vegetation removal
Habitat		<ul style="list-style-type: none"> • Alteration of predator/prey dynamics of aquatic species 	<ul style="list-style-type: none"> • Dimensional standards to minimize extent of

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP Provisions
		<ul style="list-style-type: none"> • Increasing migration obstacles for juvenile salmonids • Less LWD for habitat forming processes • Reduction in benthic invertebrates 	<p>overwater cover</p> <ul style="list-style-type: none"> • Decking standards to maximize light penetration • Skirting and walled structures prohibited
Lake (Primarily Lake Chelan and Lake Wenatchee)			
Hydrologic	<ul style="list-style-type: none"> • Creation of more parks/public access sites with associated over-water structures • Increased construction of single-family or community docks associated with existing or new residential use • Repair or replacement of existing piers 	<ul style="list-style-type: none"> • Potential interference with movement of sediments, altering substrate composition and development 	<ul style="list-style-type: none"> • Boating facilities and moorage structures are prohibited in channel migration zones, areas that would require dredging, or flood hazard zones.
Water quality		<ul style="list-style-type: none"> • Water quality impacts associated with construction of docks and other in-water structures (e.g., spills, harmful materials use) • Water quality impacts associated with related uses of new docks (e.g., boat maintenance and operation) 	<ul style="list-style-type: none"> • Toxic wood preservatives are prohibited
Shoreline vegetation		<ul style="list-style-type: none"> • Alterations of aquatic vegetation communities • Loss of riparian vegetation area • Loss of riparian vegetation increases the potential for erosion, bank instability, turbidity, higher water temperatures 	<ul style="list-style-type: none"> • New boating facilities and moorage structures are prohibited over aquatic or emergent vegetation • Mitigation standards for new structures may include planting of shoreline vegetation • Mitigation required for vegetation removal
Habitat		<ul style="list-style-type: none"> • Increased shading in nearshore lake habitat areas resulting from dock and pier construction can affect macrophyte growth, and alter habitat for and behavior of aquatic organisms • Nighttime lighting effects 	<ul style="list-style-type: none"> • Dimensional standards to minimize extent of overwater cover • Decking standards to maximize light penetration • Skirting and walled structures prohibited

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP Provisions
		on both fish and wildlife <ul style="list-style-type: none"> • Loss of habitat for benthic community, less LWD for habitat complexity 	

SMP standards are designed to minimize the extent of overwater structures, particularly in the nearshore area, which is critical to many small fish, including salmonids. SMP standards prohibit skirting, walled structures, and several toxic preservatives that could otherwise impair water circulation, light attenuation, and water quality. The SMP provides specific dimensional criteria for boating facilities and moorage to minimize the effects of overwater structures, particularly within the nearshore area. For water bodies, the proposed SMP also requires grated decking on piers, ramps, and floats in the area not underlain by float tubs. Together, these design standards minimize the area in which light transmission is affected, thereby limiting the potential impacts of new docks on the aquatic ecosystem. The SMP also provides standards for lighting overwater structures, which helps avoid behavioral impacts to aquatic species at night. In addition to limits on design, siting, and dimensions, the proposed SMP guides the location of boating facilities to minimize any ecological impacts. Furthermore, this SMP prohibits private boating and moorage facilities.

In addition to local shoreline permit requirements, both WDFW and the Corps require permits for the installation, replacement, and repair of overwater structures. Mitigation measures for overwater structures encouraged by WDFW include the installation of grated decking, removal of unused piles (especially those formerly treated with creosote), reduction of pile size and quantity, and general reduction in overall square footage of cover. As part of efforts to minimize and compensate for impacts, mitigation in the form of native shoreline planting is often required. Any new or replacement structure would require a Hydraulic Project Approval (HPA) from WDFW and a Section 10 Rivers and Harbors Act permit from the Corps of Engineers. Because of the presence of listed salmonids, a Corps permit would also entail consultation with the National Marine Fisheries Service to comply with the Endangered Species Act. These agencies would likely require similar mitigation measures noted above for WDFW.

Expansion, reconfiguration, and repair of the existing overwater structures are expected. New structures will need to comply with strict regulations to minimize and mitigate impacts. Where existing shoreline vegetation is

degraded, mitigation measures proposed for new private moorage facilities are expected to offset the impacts of new overwater structure development. Where existing overwater structures are common, dimensional, material, and design standards are expected to reduce the individual impacts of structures compared to existing conditions. Overall, the improvements gained through repair and replacement over time, and mitigation associated with any new overwater structures are expected to achieve no net loss of ecosystem functions.

6.3 Summary of Potential Impacts Associated with Shoreline Stabilization and Effects of SMP

Shoreline stabilization measures typically have the following effects on ecological functions compared to natural shorelines:

- Reduced connectivity between floodplain and river, leading to reduced channel migration potential, floodplain habitat diversity, and floodplain functions.
- Reduction in nearshore habitat quality for juvenile salmonids and other aquatic organisms. Specifically, shoreline complexity from downed wood and emergent vegetation that provide forage and cover may be reduced or eliminated. Elimination of shallow-water and off-channel habitats reduces opportunities for small fish to find refuge from predators and from high flows.
- Reduction of natural sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and preserve shallow water conditions.
- Increase in wave energy at the shoreline if shallow water is eliminated, resulting in increased nearshore turbulence that can be disruptive to juvenile fish and other organisms.

Similar to overwater structures, the impacts of shoreline stabilization will vary seasonally in reservoirs, where water levels fluctuate widely. It can be assumed that direct impacts of shoreline stabilization (e.g., habitat changes, sediment recruitment effects, and effects on wave energy) are not significant during periods when the water levels have significantly receded. On the other hand, certain other indirect effects of shoreline stabilization, such as vegetation clearing to accommodate new structures, are less closely related to fluctuating water levels, and impacts are likely to occur year-round.

Repairs and replacements of existing bulkheads perpetuate the conditions described above. Table 15 identifies the potential impacts of specific likely changes in development in Chelan County.

Table 15. Summary of Potential Impacts Associated with Shoreline Stabilization in Shoreline Jurisdiction.

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP Provisions
River/Stream			
Hydrologic (includes hyporheic)	New, replaced, and repaired shoreline modification such as bulkheads for shoreline residential uses, parks and public access sites, and other water dependent uses	<ul style="list-style-type: none"> • Reduction in LWD recruitment and other organic material as shoreline habitats are altered • Modification of flow regimes and channel migration Reduction in floodplain function leads to higher peak flows, less groundwater recharge, and greater sediment scour, erosion, and channel migration downstream • Reduction of natural sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and preserve shallow water conditions. 	<ul style="list-style-type: none"> • Residential development to avoid the need for future stabilization or flood control • Demonstration of need to protect primary structure required for new stabilization • Mitigation requirements include improving substrate conditions waterward of OHWM
Water quality		<ul style="list-style-type: none"> • Water quality impacts associated with construction • Reduction in floodplain connectivity reduces floodplain filtration potential • Removal of shoreline vegetation increases water temperatures 	<ul style="list-style-type: none"> • Mitigation requirements include planting native vegetation
Shoreline vegetation		<ul style="list-style-type: none"> • Potential associated vegetation loss increases potential for erosion, turbidity, higher water temperatures potential 	<ul style="list-style-type: none"> • Mitigation requirements include planting native vegetation
Habitat		<ul style="list-style-type: none"> • Reduction in shoreline complexity and emergent vegetation that provides forage and cover • Reduced floodplain connectivity limits off-channel refuge for fish during high flows • Reduction of natural 	<ul style="list-style-type: none"> • Preference for soft-shoreline stabilization • Mitigation requirements include improving substrate conditions waterward of OHWM and planting native vegetation

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP Provisions
		sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and preserve shallow water conditions <ul style="list-style-type: none"> • Elimination of shallow-water habitat may also increase vulnerability of juvenile salmonids to aquatic predators 	
Lake			
Hydrologic	<ul style="list-style-type: none"> • New, replaced, and repaired shoreline modification such as bulkheads for shoreline residential uses, parks and public access sites, and other water dependent uses 	<ul style="list-style-type: none"> • Increase in wave energy at the shoreline if shallow water is eliminated, resulting in increased nearshore turbulence that can be disruptive to juvenile fish and other organisms. • Disruption of shoreline wetlands • Shoreline scour from downward force of waves hitting bulkheads 	<ul style="list-style-type: none"> • Residential development to avoid the need for future stabilization or flood control • Demonstration of need required for new stabilization • Mitigation requirements include improving substrate conditions waterward of OHWM
Water quality		<ul style="list-style-type: none"> • Water quality impacts associated with construction • Removal of shoreline vegetation increases erosion and water temperatures 	<ul style="list-style-type: none"> • Mitigation requirements include planting native vegetation
Shoreline vegetation		<ul style="list-style-type: none"> • Potential associated vegetation loss increases potential for erosion, turbidity, higher water temperatures 	<ul style="list-style-type: none"> • Mitigation requirements include planting native vegetation
Habitat		<ul style="list-style-type: none"> • Reduction in nearshore habitat quality- shoreline complexity and emergent vegetation that provides forage and cover may be reduced or eliminated • Reduction of natural sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and 	<ul style="list-style-type: none"> • Preference for soft-shoreline stabilization • Mitigation requirements include improving substrate conditions waterward of OHWM and planting native vegetation

Shoreline Function	Major Types of Anticipated Future Development Likely to Affect Shoreline Function	Potential Impacts to Shoreline Function	Effects of SMP Provisions
		preserve shallow water conditions <ul style="list-style-type: none"> • Elimination of shallow-water habitat may also increase vulnerability of juvenile fish to aquatic predators 	

The SMP sets standards for new and repaired shoreline armoring, as well as conditions and uses where new shoreline armoring is allowed or prohibited. Under the proposed SMP, new developments must be designed and sited to avoid the need for structural shoreline stabilization wherever feasible. Residential subdivisions must be designed so that shoreline stabilization will not be required. Structural shoreline stabilization is not allowed except to protect restoration projects, or unless a geotechnical analysis demonstrates that it is necessary to protect a primary structure from erosive action caused by currents, waves, or other waterward processes.

Where structural stabilization is necessary, the SMP establishes a preference for soft structural stabilization and requires that the size of the structure be minimized to the greatest extent possible. Together, these measures should successfully minimize the extent of new shoreline stabilization, and may result in a reduction or softening of existing stabilization measures. Finally, the SMP requires mitigation for stabilization impacts. Mitigation measures include improving substrate conditions waterward of the OHWM and planting native vegetation along the shoreline. These measures are expected to mitigate for the changes in shoreline gradient associated with stabilization and to ensure that shoreline vegetative functions are maintained, or in some cases, improved.

Both the Corps and the WDFW have jurisdiction over new shoreline stabilization projects and repairs or modifications to existing shoreline stabilization. Where actions may affect federally threatened or endangered species, the Corps must consult with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (NMFS) regarding potential Endangered Species Act issues. As part of those agencies' efforts to minimize and compensate for shoreline stabilization-related impacts, the federal agencies require mitigation, frequently through the implementation of native shoreline planting plans. Further, NMFS requires additional impact compensation measures for many bank modification projects,

including angling the face of the structure landward to reduce wave turbulence, and/or shifting the structure as far landward as feasible.

Over time, the combined effects of the proposed SMP, implementation of the Shoreline Restoration Plan, permit reviews from the WDFW and the Corps, and planned restoration actions are expected to result in a reduction or softening of existing stabilization structures, and any new stabilization structures that are permitted will be accompanied by appropriate minimization and mitigation measures to offset shoreline impacts.

6.4 Summary of Potential Impacts Associated with Mining and Dredging and Effects of SMP

Mining and dredging operations are conducted to serve several distinct objectives in Chelan County and Washington State. Channel dredging may be conducted for flood control, navigation, utility installation, the construction or modification of essential public facilities and regional transportation facilities, and/or restoration. Gravel bar mining may occur for flood control purposes. Metals mining and floodplain gravel mining are also conducted for commercial resource extraction.

Each of the practices identified above has potential impacts on ecological and physical river processes, summarized below.

Dredging:

- Simplification of in-channel habitats.
- Disruption of benthic community.
- Reduction in shallow-water habitat.
- Alteration in channel hydrologic and sediment processes.
- Reduction in water quality from turbidity and in water dredge material disposal.

Metals mining:

- Water quality contamination from mine tailings, which often include high levels of dissolved metals and cyanide complexes.
- In-water gold mining disturbs the substrate, potentially disturbing benthic communities and temporarily results in increased turbidity.

Floodplain gravel mining:

- Alteration of hydrologic and sediment transport processes, potentially leading to erosion, channel incision, head cutting, and/ channelization of a river upstream or downstream from the mining location.
- Potential to strand fish during pit capture events.

- Loss of floodplain habitat associated with armoring and levees to isolate pits from the river channel.

The SMP includes provisions to ensure that impacts are avoided, minimized and mitigated through the design, location, construction, maintenance, and reclamation actions.

The following is a more in-depth discussion of the potential effects of floodplain gravel mining and approaches to minimizing and mitigating impacts. Gravel pits from commercial mining in floodplains and channel migration zones have the potential to alter hydrologic and sediment transport processes and result in habitat simplification. If a channel shifts course into a gravel pit, a process known as “pit capture,” it has the potential to cause channel bank and bed instability upstream and downstream through accelerated erosion, river channelization, channel incision, disruption in sediment transport, and degradation of habitat, including benthic invertebrate assemblages and salmon spawning habitat, upstream and downstream of a pit (Norman et al. 1998, Cluer 2009). Pit capture may present stranding hazards for native fish species, and gravel pits may provide warm water predator habitat (Cluer 2009).

Despite potential negative impacts of gravel mining, “Careful siting, planning, limiting mining, a thorough hydrogeological analysis, use of alternative resources, and innovative reclamation can mitigate and reduce some mining impacts (Norman et al. 1998).” Potential approaches to minimize ecological impacts include modification of pit design and restoration strategies to provide diverse off-channel habitats (e.g., emergent marsh, open water, and forested areas) that can benefit fish and other aquatic species (Norman 1998, Cluer 2009). Wide, topographically higher, and thickly vegetated buffers could be considered to minimize interactions between the river and mining pit (Norman 1998).

The proposed SMP prohibits mining.

In addition to the SMP, mining is regulated by other County, State, and Federal regulations. In-water mining requires a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW); however, WDFW does not have jurisdiction over floodplain mining until after an avulsion has occurred. The Surface Mine Reclamation Act, administered by Washington Department of Natural Resources, generally requires extensive hydrologic analysis, which outlines management measures to limit channel erosion and avulsion, and which requires mines to be reclaimed immediately after each segment is mined.

Given the mining is prohibited in this SMP, mining operations are not expected to result in a loss of ecological functions.

7 CUMULATIVE IMPACTS ON ECOLOGICAL FUNCTION

In addition to the relevant regulations discussed in those sections above which apply to the City, the City developed regulations specific to local conditions, plans, and interests. The following discussion will build on the discussion of potential impacts and effects of SMP regulations from Section 6 to present a summary analysis of how planned development is likely to affect existing conditions on a local scale in light of local SMP regulations, other regulations (Section 5), and planned restoration (Section 4.5).

7.1 Unincorporated Chelan County

The proposed SMP designates shoreline buffers for unincorporated Chelan County as the larger of the standard riparian buffer (see Table 16 below) and the common line setback. The common line setback is measured by averaging the setbacks of structures existing on adjacent waterfront lots. The County's approach of using the larger of the riparian buffer and the common line setbacks ensures that new development will protect existing ecological functions, and will not progressively encroach on the shoreline in existing developed areas. The County's vegetated buffer requirements also help minimize the effects of development outside of shoreline jurisdiction on shoreline ecological functions.

Table 16. Environment-specific riparian buffer widths for unincorporated Chelan County.

Location	High Intensity (feet)	Low Intensity (feet)
Natural/Conservancy Environments	250	200
Rural Environment	150	100
Urban Environment	100	75
Lower Lake Chelan Basin (all environments) ¹	50	25

In addition to shoreline buffer standards, provisions in the proposed SMP require tree retention and mitigation for unavoidable removal of trees. This provision helps to ensure that vegetation in the shoreline environment will be maintained.

The County's shoreline critical areas regulations also provide development standards to ensure that the unique ecological functions of wetlands, geologically hazardous areas, frequently flooded areas, and critical aquifer recharge areas are maintained.

7.1.1 Stemilt/Squilchuck - Colockum (WRIA 40a/b)

The Stemilt/Squilchuck – Colockum basin lies in the southern part of the County and is largely rural in character with housing focused around Malaga and rural industrial businesses along the Columbia River. There are also occasional orchards and farms, and vegetation is primarily composed of scrub-shrub, evergreen, and deciduous forests. Development potential is limited by shoreline critical areas regulations in areas with cliffs and bluffs along the Columbia River and wetland areas within shoreline jurisdiction. In the western part of the basin, there are several lakes and reservoirs that qualify as shorelines of the state surrounded by large forested parcels. There is little public land along many of the shorelines.

Anticipated development along shorelines is relatively low in the Chelan County portion of WRIA 40. Within shoreline jurisdiction, only approximately 26 new single-family residential developments and approximately 6,000 square feet of industrial development are anticipated (Table 17). Industrial development would occur in Urban and Rural shoreline designations along the Columbia River. Residential development is expected to occur along the Urban environment of Cortez Lake, which is already a highly developed residential area. Some residential development is also anticipated in the Rural and Conservancy designations along the Columbia River in shoreline jurisdiction. The majority of the shoreline in Meadow Lake is composed of forestry resource lands, so forestry-related state and federal regulations will minimize effects of those activities. Because of the Conservancy designation and associated buffers, little activity is expected around reservoirs.

Table 17. Summary of waterbodies with likely residential, commercial, and industrial development in shoreline jurisdiction in WRIA 40a/b.

Waterbody / Environment Designation	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Shoreline Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)
Urban				
Columbia River	183.65	1278.30 (81.50)	0	7,237,949 (5,427,707)
Cortez Lake	33.24	18.37 (18.37)	13 (13)	0
Rural				
Columbia River	102.17	174.48 (25.10)	6 (6)	466,077 (466,077)

Waterbody / Environment Designation	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Shoreline Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)
Conservancy				
Columbia River	124.86	1,274.73 (5.93)	33 (7)	0

The overall extent of anticipated development and associated impacts is relatively low in WRIA 40a/b, and the overall development intensity will not change significantly. SMP buffer regulations will limit development to the outer portion of shoreline jurisdiction, and provisions to conserve vegetation and maintain water quality will avoid degradation of shoreline functions.

7.1.2 Wenatchee (WRIA 45)

Shorelines in the Wenatchee watershed (WRIA 45) are largely in public use and classified as resource uses such as forestry and to a lesser extent, agriculture and mineral. These ongoing resource uses are primarily regulated by existing local, state, and federal regulations. No development is anticipated in the Natural environment designation in WRIA 45, which occupies 86% of shoreline jurisdiction in the watershed. Likely future development is focused on the Wenatchee River, which is presently characterized by approximately 12% low-intensity development.

Approximately 85 single-family residential developments are expected, primarily amidst existing low-density residential development in the Rural environment on the Wenatchee River. Many more residential developments are anticipated in the broader study area (451 total).

Commercial and industrial development of approximately 26,740 and 102,640 square feet, respectively, may occur (Table 18). These non-residential uses are focused along the Wenatchee River in the Rural environment and the Columbia River in the Conservancy environment; significantly more commercial and industrial development may be expected in the study area outside of shoreline jurisdiction. Commercial and industrial development on the Wenatchee River is expected in areas with existing, under-utilized development zoned Rural Commercial and Rural Industrial. Buffers ranging from 100 to 150 feet will be required for redevelopment of these areas. On the Columbia River, industrial development is anticipated on vacant lands that are zoned Industrial, and a 200-

to 250-foot buffer will apply. Shoreline buffers and stormwater standards will limit potential impacts on shoreline functions.

Table 18. Summary of waterbodies with likely residential, commercial, and industrial development in shoreline jurisdiction in WRIA 45.

Waterbody / Environment Designation (rivers followed by lakes)	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Shoreline Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Commercial Sq Ft in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)
Urban					
Wenatchee River	74.94	97.34 (25.43)	3 (1)	0	0
Rural					
Chiwawa River	57.07	29.93 (17.77)	16 (8)	0	0
Chumstick Creek	211.92	30.02 (30.02)	1 (1)	0	0
Nason Creek	48.32	29.65 (10.35)	2 (1)	0	0
Peshastin Creek	266.94	361.18 (75.96)	13 (4)	36,277 (1,282)	0
Wenatchee River	1,085.45	1,824.47 (294.84)	221 (52)	53,693 (14,424)	123,744 (27,571)
Fish Lake	12.03	4.93 (4.93)	1 (1)	0	0
Lake Wenatchee	182.45	130.95 (39.89)	37 (14)	0	0
Conservancy					
Columbia River	27.49	16.96 (3.61)	0	0	32,096 (28,917)
Peshastin Creek	238.83	515.72 (10.08)	11 (0)	768 (239)	0
Wenatchee River	512.23	655.54 (18.06)	27 (2)	63,603 (16)	0

In addition to development potential presented above, relatively little development or redevelopment may be possible in the Peshastin UGA. Only approximately five dwellings, 6,300 square feet of commercial, and 2,400 square feet of industrial uses are likely in shoreline jurisdiction (Table 19).

Table 19. Summary of waterbodies with likely residential, commercial, and industrial development in shoreline jurisdiction in the Peshastin UGA in WRIA 45.

Waterbody / Environment Designation	Acres in Total Shoreline Jurisdiction	Acres in Study Area (Shoreline Jurisdiction) Outside of Buffers	Single Family Units (Study Area (Jurisdiction))	Multi-Family Units Study Area (Jurisdiction)	Commercial Sq Ft Study Area (Jurisdiction)	Industrial Sq Ft Study Area (Jurisdiction)
Urban						
Wenatchee River	72.97	44.60 (11.19)	26 (3)	1 (1)	6,495 (3,636)	2,393 (2,393)
Rural						
Wenatchee River	15.52	14.69 (3.51)	2 (1)	6 (0)	39,537 (2,675)	0

The majority of development in the Wenatchee watershed will occur in the Rural environment, where riparian buffers of 100 to 150 feet apply. Where existing development is further from the shoreline, common line setback requirements will ensure that the integrity of existing shoreline vegetation is retained. The conservation of shoreline buffers also helps ensure that residential development outside of shoreline jurisdiction will not degrade shoreline functions.

Some residential development is anticipated on Lake Wenatchee among existing single-family residential development. Extensive overwater coverage is already present on Lake Wenatchee, associated with single-family residential development. Repair and replacement of existing piers is expected to result in a reduction in overwater surface coverage in the nearshore area and increased light transmission as a result of the installation of grated decking and removal of skirting, required under the SMP. New overwater structures are likely to accompany residential development of existing vacant parcels on Lake Wenatchee. These new structures will need to comply with strict standards to minimize and mitigate for any impacts (See section 6.2 for details).

Development of recreational and public access areas on public lands could result in the removal of vegetation and increased soil compaction in areas of intensive use. The proposed SMP regulations require mitigation for any potential impacts associated with development of public access.

The Wenatchee River Channel Migration Zone Study identified 24 restoration sites for preservation, enhancement, or restoration. Although no time or implementation strategy exists to protect and restore the sites, it is expected that actions will be taken as opportunities allow.

Actions to comply with the Wenatchee River Watershed Dissolved Oxygen and pH Total Maximum Daily Load Water Quality Improvement Plan (TMDL), including identifying and addressing sources of water quality impairments, are expected to improve water quality conditions in the Wenatchee basin in the near future.

7.2 City of Wenatchee

The primary anticipated changes in the City of Wenatchee’s shorelines include multi-family residential development and commercial and industrial development and redevelopment in the High Intensity environment on the Columbia River (Table 20). Some single-family residential development is anticipated in the study area near the Wenatchee River, but outside of shoreline jurisdiction. Significant development is not anticipated in the Shoreline Residential, Waterfront Park, or Urban Conservancy environments, which combined, cover 62% of the City’s shoreline jurisdiction.

Existing conditions in the High Intensity environment on the Columbia River include commercial and industrial areas, where development, roads, and the railroad are located adjacent to the River, and shoreline vegetation is sparse.

Table 20. Summary of waterbodies with likely residential, commercial, and industrial development in shoreline jurisdiction in the City of Wenatchee.

Waterbody / Environment Designation	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Shoreline Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Multi-Family Units in Study Area (Jurisdiction)	Commercial Sq Ft Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)
High Intensity						
Columbia River	38.49	86.68 (25.44)	0	302 (59)	23,193 (4,565)	221,636 (221,636)

The effects of upland development are primarily influenced by the extent and type of development and impervious surface coverage, the location of the development and proximity to the waterbody, and the quality and extent of vegetated buffers. The proposed SMP includes provisions for the City of Wenatchee that require that any vegetation removal is minimized and mitigated through planting within the buffer or in a vegetated corridor perpendicular to the shoreline (2:1 replacement ratio for significant trees and 1:1 replacement ratio

for all other vegetation). These provisions are expected to minimize the impacts of development where existing properties have substantial vegetation coverage.

The City's SMP applies standard buffers specific to each environment designation. The City's standard shoreline buffer width in the High Intensity environment is 60 feet from the OHWM. In the High Intensity environment, the separation from development to the OHWM ranges from 36 feet to approximately 240 feet in places where development is separated from the shoreline by a park or right-of-way. SMP regulations provide some variability in the buffer standards to accommodate unique site characteristics, provide better long-term protection for the environment and increase functional performance in degraded or impaired areas. A reduction up to 25% of the standard buffer widths may be approved if the applicant provides mitigation that results in a higher functioning buffer than would be provided by a standard buffer without enhancement, or if existing conditions prevent functional riparian conditions. Buffer reductions beyond 25%, but not more than 50% of the standard buffer, may be allowed, but must be accompanied by a demonstration that other siting alternatives are not possible, and a critical area study documenting that the "no net loss" standard will be met. Buffer enhancements are expected to offset any potential functional decline related to a reduction in buffer width.

With the exception of one parcel, south of Riverfront Park, properties identified as having development potential within the City are separated from the shoreline by another development, use, or a road, and the nearest parcel boundary is generally landward of the standard buffer width. For those parcels separated from the shoreline, the control of stormwater runoff is the most significant concern for shoreline functions. Stormwater management is required in the SMP to be consistent with Ecology's latest stormwater manual for Eastern Washington, which provides standards and best management practices.

Continued development of recreational and public access areas along the shorelines of the City present potential increases in the intensity of land use in the City's public lands. Such changes could result in the removal of vegetation and increased impervious surfaces. The City's proposed SMP regulations require that public access shall avoid shoreline impacts and that any impacts shall be mitigated. Furthermore, the proposed SMP requires the implementation of best management practices to limit water quality impacts from the use of pesticides or fertilizers that could be associated with the maintenance of public use sites. In addition to the potential for recreational enhancement, the City's public shoreline parks offer opportunities for ecological improvement. Possible actions identified in the Shoreline Restoration Plan include a reduction of shoreline armoring, removal of non-native vegetation, native revegetation, shoreline stabilization, and the addition of interpretive nature and/or historical

signs. A combination of native revegetation and bioengineering techniques could be provided to secure the shoreline from excessive erosion.

7.3 City-Associated Urban Growth Areas

7.3.1 Wenatchee UGA

Within the unincorporated Wenatchee UGA, industrial development is anticipated in the High Intensity environment on the Columbia River. Only two single-family residential developments are expected in shoreline jurisdiction (Table 21). The analysis shows potential industrial development on the Wenatchee River in the Urban Conservancy environment; however, industrial uses are prohibited in the Urban Conservancy environment. Much of the study area is in public use, and recreational uses may be developed over time.

Existing conditions in the High Intensity environment on the Columbia River include industrial development, highway, and railroads closely bordering the River. Vegetation is patchy, generally consisting of a narrow strip of shrubs.

Table 21. Summary of waterbodies with likely residential, commercial, and industrial development in shoreline jurisdiction in the City of Wenatchee UGA.

Waterbody / Environment Designation	Acres in Total Shoreline Jurisdiction	Acres Outside of Buffers in Study Area (Shoreline Jurisdiction)	Single Family Units in Study Area (Jurisdiction)	Industrial Sq Ft in Study Area (Jurisdiction)
High Intensity				
Columbia River	78.94	83.48 (22.03)	0	59,020 (37,029)
Shoreline Residential				
Wenatchee River	3.95	3.77 (1.19)	4 (2)	0
Urban Conservancy				
Wenatchee River	72.59	81.86 (13.44)	56 (0)	40,421 (13,543)*

* Despite land use analysis results, these uses are not permitted in the specified environment designation.

The proposed SMP includes provisions for the City of Wenatchee that any vegetation removal is minimized and mitigated through planting within the buffer or in a vegetated corridor perpendicular to the shoreline (2:1 replacement ratio for significant trees and 1:1 replacement ratio for all other vegetation).

These provisions are expected to minimize the impacts of development where existing properties have substantial vegetation coverage.

The City's SMP applies standard buffers specific to each environment designation. The City's standard shoreline buffer width in the High Intensity environment is 60 feet from the OHWM. Buffer reduction options are consistent with the City's SMP, presented in Section 4.5. Existing shoreline setbacks in a randomly sampled subset of the High Intensity environment range from approximately 35 feet to 115 feet. Buffer standards and vegetation conservation standards are expected to retain shoreline vegetative functions. Additionally, over half of the potential industrial development area in the City's UGA is separated by the shoreline by public lands or other uses, which will ensure that development is spatially removed from the shoreline on those parcels. For those parcels separated from the shoreline, the control of stormwater runoff is the most significant concern for shoreline functions. Stormwater management is required in the SMP to be consistent with Ecology's latest stormwater manual for Eastern Washington, which provides standards and best management practices for the control and treatment of stormwater runoff.

The SMP also requires that industrial development is located, designed, and constructed to ensure no net loss of ecosystem functions. Where possible, industrial development and redevelopment are encouraged to locate where environmental cleanup and restoration of the shoreline area can be incorporated. Federal and state requirements for hazardous materials clean up or management also must be met. The SMP provisions are expected to result in improved ecological conditions where industrial redevelopment occurs because stormwater improvements will be required, and environmental cleanup and restoration will be encouraged. In summary, SMP standards are expected to result in no net loss of shoreline functions, and if cleanup efforts are pursued, an improvement in shoreline functions could occur within the Wenatchee UGA.

8 NET EFFECT ON ECOLOGICAL FUNCTIONS

The CIA indicates that future growth is likely to be targeted along the Columbia and Wenatchee Rivers and environment designations in the City of Wenatchee and Wenatchee UGA. These developments have the potential to impact specific shoreline functions. This analysis can help inform City officials of potential future shoreline impacts and the importance of specific proposed SMP provisions.

The proposed SMP, which includes the Shoreline Restoration Plan, is expected to protect and improve shorelines within the City of Wenatchee while accommodating the reasonably foreseeable future shoreline development. No net loss of shoreline ecological function will be achieved, and ecological functions may improve over time. Other local, state and federal regulations, acting in concert with this SMP, will provide further assurances of improved shoreline ecological functions over time.

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

Environment designations: The Shoreline Analysis Report provided the information necessary to assign environment designations by segment to each of the shoreline waterbodies (see **Chapter 3 of the SMP**). Shoreline uses and modifications were then individually determined to be either permitted (as substantial developments or conditional uses) or prohibited in each of those environment designations. The most uses and modifications are allowed in areas with the highest level of existing disturbance.

General provisions: **Chapter 4 of the SMP** contains a number of regulations on a variety of topics that contribute to protection and restoration of ecological functions.

Shoreline modification and use provisions: **Chapter 5 of the SMP** contains a number of regulations on a variety of topics that contribute to protection and restoration of ecological functions. 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. These regulations also emphasize avoidance and minimization of ecological impacts via appropriate setbacks, protection and enhancement of vegetation, reduction of impervious surfaces and use of innovative designs such as LID techniques that do not degrade and may even enhance shoreline functions.

Shoreline Restoration Plan: The *Shoreline Restoration Plan* (**Appendix C of the SMP**) identifies a number of project-specific opportunities for restoration on both public and private properties inside and outside of shoreline jurisdiction, and also identifies ongoing City programs and activities, restoration partners, and recommended actions consistent with a variety of watershed-level efforts.

The following are some of the key features identified in the proposed SMP and this evaluation which protect and enhance shoreline ecological functions.

- Much of the City’s shoreline area is in public ownership or separated by public right-of-way or railroad right-of-way; development is anticipated within shoreline jurisdiction in upland areas that are separated from the shoreline by these identified intervening public ownership and right-of-ways.
- Regulations focus development and growth in areas that are already developed or where functions are already degraded, while protecting those areas that are ecologically intact or otherwise sensitive to development pressures.
- Vegetation conservation areas and structural setbacks throughout the City is based on environment designation and existing conditions. Larger setbacks are required in areas with a higher need for protection of shoreline resources.
- SMP provisions require any projects to identify and analyze for potential impacts. When potential for adverse ecological effects exists, projects are to follow mitigation sequencing to avoid, minimize and mitigate any impacts.
- Planned restoration along the shorelines of the City will provide opportunities to restore shoreline ecological functions.
- Emphasis on achieving no net loss of shoreline ecological functions throughout shoreline jurisdiction.

Given the above provisions of the SMP, including the Shoreline Restoration Plan and the key features listed above, implementation of the proposed SMP is anticipated to achieve **no net loss of ecological functions in the shorelines of Wenatchee.**

9 LONG-TERM MONITORING

City planning staff will track all land use and development activity, including exemptions, within their respective shoreline jurisdictions, and will incorporate actions and programs of other departments as well. Reports will be assembled by each jurisdiction that provides basic project information, including location, permit type issued, project description, impacts, mitigation (if any), and

monitoring outcomes as appropriate. Examples of data categories might include square feet of non-native vegetation removed, square feet of native vegetation planted or maintained, reductions in chemical usage to maintain turf, linear feet of eroding stream bank stabilized through plantings, linear feet of shoreline armoring removed or modified levees, changes to square footage of over-water cover, or number of fish passage barriers corrected.

The report would also recommend or describe relevant updates to WRIA, City goals and implementation plans, and outline current and ongoing implementation of various programs and restoration actions (by local government or other groups) that relate to watershed health.

The staff reports will be assembled to coincide with Comprehensive Plan updates and will be used, in light of the goals and objectives of the Shoreline Master Program, to determine whether implementation of the SMPs is meeting the basic goal of no net loss of ecological functions relative to the baseline condition established in the Shoreline Analysis Report. In the long term, each local government should be able to demonstrate a net improvement in their respective shoreline environments.

Based on the results of these assessments, each local government may make recommendations for changes to its SMP.

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APPENDIX A: SHORELINE USE AND MODIFICATION MATRICES

[will be inserted when these use and modification matrices have been finalized
by each City and the County]

APPENDIX B: LAND CAPACITY ANALYSIS