BergerABAM

Shoreline Master Program Update

Skamania County

Final Cumulative Impacts Analysis

Ecology Grant No. G1500044

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Final Cumulative Impacts Analysis

Skamania County
Shoreline Master Program Update

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FINAL CUMULATIVE IMPACTS ANALYSIS

Skamania County
Shoreline Master Program Update

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SUMMARY

This report provides a summary and analysis of the cumulative impacts that can be expected to occur over time as Skamania County (County) implements its updated Shoreline Master Program (SMP) (Title 20 of the Skamania County Code [SCC]). The County is updating their SMP in order to comply with the Washington State Shoreline Management Act (SMA) and the Washington Administrative Code (WAC) implementing rules (WAC 173-26, also called the Shoreline Master Program Guidelines and referred to in this report as the SMP Guidelines).

The County is developing an updated locally approved SMP (Draft SMP), which contains policies and regulations to protect the County's shorelines from potential negative effects caused by future development, including industrial practices, commercial development, residential growth, and recreational development and uses. The Draft SMP policies and regulations are consistent with the state SMP Guidelines and the policy goals of the SMA. The Draft SMP achieves ecological protection by:

- Establishing shoreline environment designations to shore segments based on the ecological conditions, current land use, and existing degree of shoreline modification;
- Providing the highest level of protection for high quality, ecologically intact and environmentally sensitive areas and reserving them for low-intensity uses;
- Ensuring that permitted uses on each shore segment are appropriate considering the ecological sensitivity of the land, consistency with the Comprehensive Plan, community goals, and compatibility with existing uses;
- Requiring that uses or development with the potential to cause significant ecological impacts to a shore segment are either prohibited or allowed only with approval of a conditional use permit;
- Implementing critical areas regulations to provide protective buffers for: fish and wildlife habitat conservation areas, geological hazard areas, critical aquifer recharge areas, and wetland critical areas;
- Integrating all shoreline regulations with applicable sections of the Skamania County Code as well as relevant state and federal regulatory programs.

Under the Draft SMP, approximately 48 percent of the shoreline would be designated Natural Environment, 46 percent would be designated Rural Conservancy, 5 percent would be designated Shoreline Residential, and 1 percent would be High Intensity. These designations help ensure that future shoreline use and development are compatible with local economic activity, community desires to both remain rural and accommodate single-family residential growth, and federal and state-mandated ecological protection goals.

In addition to the SMP, the County will also implement a shoreline restoration plan (prepared as part of the County's SMP update effort), which identifies opportunities to improve or restore ecological functions that have been impaired as a result of past development activities.

As new development occurs over time in Skamania County, the new policies and regulations in the Draft SMP will guide development to be located in the most suitable locations. Over time, the Draft SMP, other regulations, and voluntary restoration efforts will prevent a net loss of shoreline ecological functions as compared to existing (current) baseline conditions described in the Shoreline Inventory & Characterization Report (ICR). Collectively, the Draft SMP and shoreline restoration plan are expected to have a net beneficial effect on shoreline ecological health as restoration activities are implemented, and as new properties are developed and existing properties redeveloped in accordance with the new Draft SMP policies and regulations.

The Draft SMP also prevents cumulative impacts from occurring by requiring each shoreline use or development to mitigate adverse environmental impacts. Each proposed development is responsible for identifying potential impacts and implementing specific measures to offset those impacts such that the post development condition is no worse than the predevelopment condition. This report summarizes the types of impacts that may occur, and outlines the specific performance standards contained in the Draft SMP that will prevent cumulative impacts from occurring to ensure no net loss of shoreline ecological functions over time.

ACRONYMS, ABBREVIATIONS, AND TERMS USED

ACS	Aquatic Conservation Strategy
BMP	best management practice
CARA	Critical Aquifer Recharge Area
County	Skamania County
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
GMA	Washington State's Growth Management Act
GPNF	Gifford Pinchot National Forest
HPA	Hydraulic Project Approval
HUC	hydrologic unit code
LCFRB	Lower Columbia Fish Recovery Board
LID	low impact development
LWD	large woody debris
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NSA	Columbia River Gorge National Scenic Area
OHWM	ordinary high water mark
RCW	Revised Code of Washington
RM	river mile
SCC	Skamania County Code
SCEDC	Skamania County Economic Development Council
SED	Shoreline Environment Designation
SEPA	Washington State Environmental Policy Act
SMA	Shoreline Management Act
SMP	Shoreline Master Program
SMMP	Shoreline Management Master Program
State	State of Washington

UCW	Underwood Conservation District
U.S.	United States of America
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WRIA	Water Resource Inventory Area

1.0 INTRODUCTION

This cumulative impact analysis supports the Skamania County (County) shoreline master program (SMP) update, referred to here as the Draft SMP (Skamania County 2016a). The County's long-standing SMP is being updated in order to comply with updates to Washington's Shoreline Management Act (SMA), the Revised Code of Washington (RCW) 90.58, and the Washington Administrative Code (WAC) 173.26 adopted in 2003 by the state legislature. The County's SMP was first adopted in June 1974, revised in August 1975, and revised again in July 1986 (Skamania County 1974).

This report assesses the potential cumulative impacts of shoreline development under the Draft SMP and is funded with grant assistance from the Washington State Department of Ecology (Ecology) (Ecology Grant No. G1500044). The analysis contained in this report relies on the existing condition information provided in the County's "Final Shoreline Inventory and Characterization Report" (Skamania County 2016b), which evaluated ecosystem processes and included an inventory and analysis of shoreline conditions related to land use, public access, and environmentally sensitive areas and habitat. This analysis also utilizes the Inventory and Characterization Report to assess development potential based on proposed shoreline environment designations (SEDs) contained in the Draft SMP.

1.1 Purpose

This report was generated to address the requirements for a cumulative impacts analysis that are contained in the Shoreline Master Program Guidelines (WAC 173-26-201; referred to in this report as the SMP Guidelines), and is part of the County's grant agreement with Ecology. Cumulative impact analyses are conducted while drafting SMP provisions as part of the comprehensive update process. The County is required to evaluate the cumulative impacts of "reasonably foreseeable" future development to verify that the updated proposed policies and regulations for shoreline management contained in the Draft SMP are adequate to ensure "no net loss" of shoreline functions compared to "baseline" conditions. "No net loss" means that impacts may occur, but adequate measures are in place within the overall shoreline program to mitigate them such that the post development conditions are no worse overall than pre-development conditions.

The findings of this report will be used to inform decisions on policies, programs, and regulations in the Draft SMP to address adverse cumulative impacts and protect shoreline ecological functions. This analysis is not proposed for inclusion as part of the Skamania County comprehensive plan or the development regulations of the Skamania County Code (SCC), but may serve as a useful reference during SMP implementation.

According to the SMP guidelines, the assessment of cumulative impacts occurs at both the planning stage and at the permitting stage or when individual development proposals are reviewed (a site-specific effort once the SMP is adopted and implemented). The Guidelines recommend assessing the impacts of "commonly

occurring and planned development" at the planning stage "without reliance on an individualized cumulative impacts analysis." In contrast, developments that have un-anticipatable impacts that cannot be reasonably identified at the time of SMP development should be evaluated via the shoreline substantial development and conditional use permit processes to ensure that there is no net loss of ecological function after mitigation (WAC 173-26-201(3)(d)(iii)).

1.2 State Requirements

Per the SMP Guidelines (WAC 173-26-201), the County is required to evaluate the cumulative impacts of "reasonably foreseeable future development" on the shorelines of the state as follows:

> *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 among development opportunities. Evaluation of such cumulative impacts should consider:*
>
> *(i) Current circumstances affecting the shorelines and relevant natural processes;*
>
> *(ii) Reasonably foreseeable future development and use of the shoreline; and*
>
> *(iii) Beneficial effects of any established regulatory programs under other local, state, and federal laws.*

Per Ecology's *Shoreline Master Programs Handbook* (SMP Handbook, Ecology 2012), "no-net loss" incorporates the following concepts:

> *(i) The existing condition of shoreline ecological functions should not deteriorate due to permitted development. The existing condition or baseline is documented in the shoreline inventory and characterization report. Shoreline functions may improve through shoreline restoration.*
>
> *(ii) New adverse impacts to the shoreline environment that result from planned development should be avoided. When this is not possible, impacts should be minimized through mitigation sequencing.*
>
> *(iii) Mitigation for development projects alone cannot prevent all cumulative adverse impacts to the shoreline environment, so restoration is also needed.*

This cumulative impacts analysis uses the above-identified considerations and guidance as a framework for evaluating potential cumulative impacts on shoreline ecological health that may result from development or activities under the proposed Draft SMP.

1.3 Scope

This report provides a planning level assessment of the potential cumulative impacts that can be expected to occur if the Skamania County SMP (Draft SMP dated August 2016) is approved and implemented as written. Per state requirements, assessment is limited to cumulative impacts of "reasonably foreseeable future development" in areas under SMA jurisdiction. For this planning level assessment, the baseline conditions are assumed to be the conditions that are identified in the County's Final Shoreline Inventory and Characterization Report (Skamania County 2016b). The foundation of this assessment is provided by the shoreline inventory and characterization, and the Draft SMP including environment designations, policies and regulations.

As defined by the Shoreline Management Act of 1971, shorelines include certain waters of the state plus their associated "shorelands." At a minimum, the waterbodies in Skamania County that are designated as shorelines of the state are streams and rivers whose mean annual flow is 20 cubic feet per second or greater and lakes of 20 acres or larger. Shoreline jurisdiction includes these waters, together with the lands underlying them and all lands extending landward 200 feet in all directions, as measured on a horizontal plane from the ordinary high water mark (OHWM), as well as all associated wetlands.

Non-federal and non-tribal shoreline use and development (e.g., private/commercial) on federal and/or tribal lands is subject to local SMP regulation (e.g., third-party vendor/lease activities on private in-holder parcels) for project review and permitting. The SMP does not apply to federal activities on federal land or tribal activities on tribal land, but does apply to any shoreline use and/or development activities initiated by a non-federal agency/individual on federal lands or on non-tribal member-owned land within a tribal reservation.

To be consistent with the County's Draft SMP and the Inventory and Characterization Report, this analysis organizes shorelines and reaches under jurisdiction into 12 HUCs (hydrologic unit code), or watershed boundaries, in order to assess their existing characteristics (e.g., geographic location, biological health) and potential for impacts (e.g., future urban development).

2.0 NATURAL PROCESSES

This section consists of summary descriptions of the natural processes affecting shoreline conditions within Skamania County; additional information is available in the Final Shoreline Inventory and Characterization Report (Skamania County 2016b). This overview provides a basis for understanding how ecosystem-wide processes affect and shape shoreline functions in accordance with WAC 173-26-201(3)(d). The information is presented on a watershed scale and sets the context for the more specific, waterbody-scale discussion in the SMP ICR.

Because a watershed is an area from which water drains to a common point, this results in a set of physical and biological interactions and processes that causes the watershed to function as an ecosystem (Washington Department of Fish and Wildlife 2012). Ecosystem processes are defined as "…the suite of naturally occurring physical and geological processes of erosion, transport, and deposition; and specific chemical processes that shape landforms within a specific shoreline ecosystem and determine both the types of habitat and the associated ecological functions" (WAC 173-26-020(14)). The hydrogeological setting of the county, which includes climate and precipitation as well as geology, topography, and soils, has a significant role in determining the geochemical and biological processes within watersheds.

These processes create and maintain natural landscapes and the many natural resources present in Skamania County. They can occur over various geographic scales from watershed basins to smaller subwatersheds to shoreline reaches. The processes include the movement of water, sediment, nutrients, pathogens, toxins, and wood as they enter into, pass through, and eventually leave a watershed (Chapter 7, SMP Handbook). These ecosystem-wide processes within the county are discussed below.

In terms of freshwater processes, hydrologic processes move water through the hydrologic cycle, which moves water from the surface of the earth via evaporation and returns it to the earth's surface through precipitation. Hydrologic processes are largely governed by surrounding climate, topography, geology, and soil permeability and can be altered by man-made development (e.g., constructed impervious surfaces) (Ecology 2005).

Key freshwater processes at work in the upland environment include:

- Hydrologic movement of surface and subsurface water;
- Movement of toxics, nutrients, and pathogens; and
- Movement of sediment and organic matter.

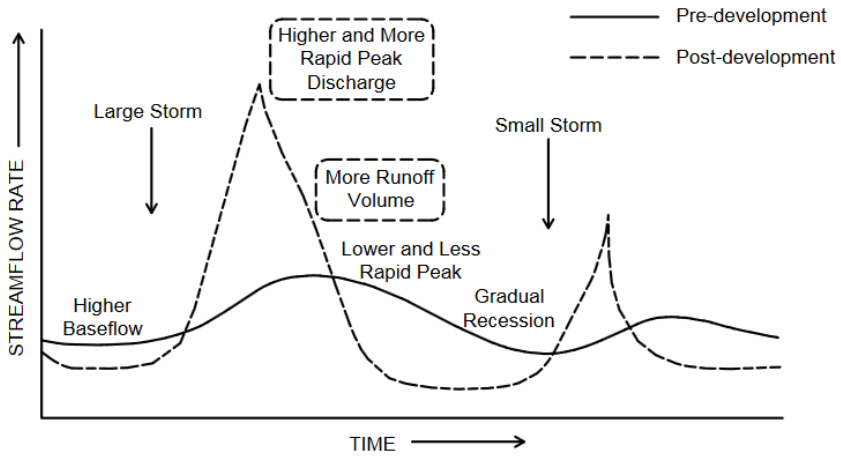
The rate at which water recharges aquifers or flows into streams, lakes, and oceans is largely influenced by soil permeability and precipitation. Precipitation levels are higher on the west side of the Cascades and foothills than in the areas of the county that are

located to the east of the ridgeline. Rainfall levels also increase with increasing elevation and with distance from the Columbia River.

Rainfall contributes to surface water and recharges groundwater as precipitation infiltrates through the soil. Developed areas withdraw substantial amounts of groundwater through wells for industrial, public water supply, irrigation, and residential uses, reducing stream flows. This can become more noticeable, and even problematic, during the drier parts of the year.

Hydrologic processes are also influenced by forest cover in a watershed. Eighty percent of Skamania County is designated National Forest area (Skamania County 2007a). The forested areas provide a vegetative cover that blocks sunlight and decreases the amount of potential snowmelt. Snowpack is a source of surface water runoff and/or groundwater recharge later into the summer when precipitation slows. Non-forested areas have a higher potential to generate peak runoff (higher flow for a shorter period of time), thereby decreasing natural hydrologic processes (Coffin and Harr 1992). Non-forested areas also have a lower rate of infiltration, interception, and evapotranspiration resulting in increased rainfall runoff as surface flow rather than groundwater. A significant portion of precipitation falling on non-forested land immediately becomes direct runoff producing high discharges (Reddy 2005). Higher peak flows increase erosion, which makes slopes and river/streambanks less stable. Peak flows carry pollutants and soil as it is eroded into the runoff water, which subsequently increases contamination and turbidity in surface water, decreasing the water quality for species dependent on clean waters.

Urban development further modifies the land through grading, filling, and increasing the amount of impervious surfaces and use of common chemicals for landscape maintenance and vehicle operation. Development decreases the amount of rainfall that infiltrates into the subsurface, reducing groundwater recharge (Skamania County 2007a). Figure 1 illustrates the changes that occur to hydrological processes following development. The increase of impervious surface further increases peak runoff, again increasing pollution, erosion and turbidity in surface water runoff into lakes, streams and marine water. Proper stormwater management can minimize the adverse impacts of urban development on natural hydrologic processes and aquatic habitat.



Source: Ecology 2014

Figure 1. Changes in Hydrology after Development

Point source pollution comes from a discrete location, such as an outfall or discharge pipe. Non-point source pollution comes from numerous, diverse locations such as roads and parking areas, rooftops, driveways, and yards. There are few point and non-point sources of pollution in the less populated areas of Skamania County. This factor and the high proportion of public forested lands within County watersheds result in minimally impacted water quality for the lower populated and predominately forested areas of the county. Skamania County has limited water quality data available for specific watersheds but, in general, the limiting water quality impacts include inputs of pathogens (i.e., fecal coliform), nutrients, increased water temperature, total suspended solids, and turbidity due to agricultural and silviculture practices. The development, construction, and nonpoint-pollution sources found in urban areas also contribute to the degradation of water quality (Skamania County 2005; Ecology 1997; Skamania County 2007a).

Slopes with erodible soils and areas prone to mass wasting (e.g., landslides, soil creep, rockfalls, debris avalanches, etc.) provide important sediment inputs (e.g., spawning gravels, sand, etc.) for local waterbodies and downstream along the Columbia River. Mechanisms for sediment input are closely aligned with geologic controls but are influenced by precipitation and vegetative cover. As sediments are sorted and move downstream, they create the essential habitats that support a variety of wildlife. For example, gravel sizes play an important role in the suitability of spawning gravels for salmonids and lamprey. Fines and sands that are lighter travel farther downstream and provide spawning grounds for forage fish such as sand rollers and smelt, while slow-moving areas with silts and sands provide refuge for young lamprey while they filter

feed and before they migrate to the ocean. When water velocity is reduced, the deposition of fine sediment increases and sediments are stored in depressional areas, such as wetlands and lakes and on floodplains.

However, changes in sediment supply have wide-ranging impacts on aquatic ecosystems and can limit ecologic functions by impairing habitat quality and water quality. The naturally occurring sediment supply processes, such as surface erosion and mass wasting, can be altered by human use and result in increased sediment inputs to aquatic ecosystems. Loss of forest cover and road development can increase those inputs by increasing rates of mass wasting and surface erosion. Altered hydrology may also increase streambank erosion inputs to aquatic resources and influence rates of instream transport and storage. Sediment generated from agriculture, mining, and construction sites are other potential sources of sediment to aquatic habitats.

In addition to the human-influenced impacts described above, such effects may be further exacerbated by changes in background conditions. According to Appendix A of Ecology's SMP Handbook, climate change in Washington may result in environmental impacts that affect shorelines and the ecosystems that they support. Some potential effects of climate change include, but are not limited to: altered hydrological cycles that may affect flooding and water resources; increased sediment in glacier-fed rivers that may result in increased flooding, aggradation, and channel movement; and increased landslides, which may result in more wood and sediment inputs to streams, and potentially increase flooding, channel movement, and transport of wood to hazardous positions (Beason and Kennard 2006).

3.0 CURRENT CONDITIONS

This section describes the current conditions and circumstances of the county from two different perspectives: a broad, watershed-scale perspective (section 3.1) and a finer, HUC-12 scale perspective (section 3.2). More detailed information on shoreline conditions is included in the Inventory and Characterization Report (Skamania County 2016b).

Skamania County is located in the southwestern portion of Washington, and has an area of 1,070,080 acres or approximately 1,672 square miles (USDA-NRCS 1990). The county extends northward from the north shore of the Columbia River through the Cascade Range, north of Mount St. Helens, to the border of Lewis County. Skamania County also extends from the eastern border of Clark County and southeastern corner of Cowlitz County to the western border of Klickitat County and southwestern corner of Yakima County. The mountains of the Cascade Range, which are part of a ring of volcanoes and mountains around the Pacific Ocean known as the Ring of Fire, dissect the county near the southeast corner.

Skamania County has a rural population density of 6.9 persons per square mile, with most of the population concentrated on land adjacent to the Columbia River in the southern half of the county (OFM 2016). On the whole, the county did not experience much population growth (2.5 percent) between 2010 and 2015 compared to the state (6.6 percent) (U.S. Census Bureau 2016). Population and housing changes between 2010 and 2015, as estimated by the U.S. Census Bureau, are provided in Table 1.

Table 1. Changes in Population and Housing Units, 2010 to 2015

	2010	2015	Percent Change
Population	11,066	11,339	2.5%
Housing Units	5,628	5,667	0.7%

U.S. Census Bureau 2016

Population centers in the county include Carson River Valley (population of 2,116), North Bonneville (956), and the City of Stevenson (1,465). Stevenson, which serves as the County seat, experienced a 22 percent increase in population between 2000 and 2010. According to the County's comprehensive plan, future development is expected to be consistent with historical trends and the comprehensive plan estimates, and growth will primarily be accommodated in the south of the county and subareas (including Swift Reservoir and West End).

A large portion of Skamania County land area is under federal ownership (USFS or tribal lands), or is part of the Columbia River Gorge National Scenic Area (NSA) with both private and public land ownership. Approximately three-fourths of the county are in the Gifford Pinchot National Forest (GPNF) beginning at near the town of Stabler and extending northward. In the National Forest, there are highly restrictive land use regulations that limit the development of shoreline uses (residential, commercial, and

most industrial uses) and promote resource conservation and extraction, where appropriate. The southernmost 5- to 10-mile area of the county along the north shore of the Columbia River is in the NSA, where restrictive regulations apply to new uses outside of designated urban areas. Therefore, a vast majority of the county is under tight land use controls which limit the ability to establish new uses.

The Columbia River is a shoreline of statewide significance that flows from east to west through the NSA, bordering Skamania County to the south. The river extends approximately 37 linear miles through Skamania County from river mile (RM) 168.1 at the southeast corner of the county to RM 128.5 at the southwest corner of the county, and waterward from land to the midline/state line of the river. The County's shoreline jurisdiction along the Columbia River encompasses nearly the entire southern border of the county, excluding two incorporated areas. One excluded area is the portion from approximately RM 149 to RM 151, which is under the City of Stevenson's SMP jurisdiction. The second excluded area is the City of North Bonneville's southern boundary, which is mostly landward of the Columbia River with a small portion of the river frontage under City SMP jurisdiction. Due to the presence of the incorporated areas, the Skamania SMP includes an area of County jurisdiction along the Columbia River (not within the City of North Bonneville) that extends waterward to the midline of the Columbia River, as well as some portions of Rock Creek outside the City of Stevenson. Per WAC 173-26-150, Stevenson is opting to predesignate its NSA Urban Area, while North Bonneville is not. Both of these unincorporated Urban Areas remain under County shoreline jurisdiction until annexation occurs.

3.1 Current Watershed Conditions

Significant drainage basins within the county include portions of the Columbia River and four Watershed Resource Inventory Areas (WRIAs): 29 Cowlitz, 27 Lewis, 28 Salmon-Washougal, and 29 Wind-White Salmon. WRIAs were formalized under WAC 173-500-040 and authorized under the Water Resources Act of 1971, RCW 90.54. An overview of the four WRIAs in Skamania County is illustrated in Figure 2. Each of these significant drainages is discussed in the following sections. Watershed management plans and associated detailed implementation plans for WRIAs 25/26, 27/28 and 29 are available through the LCFRB, and should be referenced for more detailed descriptions of current watershed conditions.

3.1.1 WRIA 26 Cowlitz

WRIA 26 Cowlitz (Figure 3) has a total drainage basin of approximately 2,492 square miles and includes the Cowlitz River and its tributaries, which drain the region around Mount Rainier, Mount Adams, and Mount St. Helens. The county's portion of WRIA 26 includes approximately 8,903 acres of shoreline jurisdictional area and 85 miles of rivers and streams under shoreline jurisdiction. The sub-basins are predominantly located on U.S. Forest Service (USFS) land, and existing land use within the WRIA is approximately 97 percent government services (e.g., education, public administration, health care, government-owned national forest land). WRIA 26 has approximately 6,021.88 acres of

landslide hazard zones. The Grays-Elochoman & Cowlitz Watershed Management Plan (2006) and Detailed Implementation Plan (2008) should be referenced for a more detailed description of current watershed conditions (LCFRB 2006a).

3.1.2 WRIA 27 Lewis

WRIA 27 Lewis (Figure 4) has a total drainage basin of approximately 1,308 square miles and includes the Lewis River and its tributaries, which generally flows west from Mount Adams, through Skamania and Clark counties. Approximately 638 square miles of WRIA 27 are located within the west and north-central parts of the county. The major surface waters of WRIA 27 that are located within Skamania County include the headwaters of the Lewis River, Muddy River, Upper Lewis River, Middle Lewis River, Lower Lewis River, and East Fork Lewis River. WRIA 27 also includes Swift Reservoir, a 4,600-acre lake created upstream of Swift Dam, which was built in 1958 for hydroelectric power generation and provides a variety of fishing, camping, swimming, and other recreational opportunities. Human-made impassable barriers and a loss of access to headwater production areas within the WRIA have severely reduced the distribution of some salmon populations (Lower Columbia Fish Recovery Board 2010). The Salmon-Washougal and Lewis Watershed Management Plan (2006) and Detailed Implementation Plan (2008) should be referenced for a more detailed description of current watershed conditions (LCFRB 2006b).

3.1.3 WRIA 28 Salmon-Washougal

WRIA 28 Salmon-Washougal (Figure 5) is approximately 495 square miles, of which approximately 160 square miles are located within the southwest portion of the county. The Washougal River watershed is the only portion of WRIA 28 that is located within the county. The major surface waters of WRIA 28 that are located within the county include the Washougal River, West Fork Washougal River, Hamilton Creek, Tanner Creek, and portions of the Columbia River. The headwaters of the Washougal River are located within the GPNF, and the river and its tributaries generally flow south and then west through Clark County toward the Columbia River. Duncan Creek, Hamilton Creek, Tanner Creek, and Woodward Creek flow south directly into the Columbia River and are within the NSA. The Salmon-Washougal and Lewis Watershed Management Plan (2006) and Detailed Implementation Plan (2008) should be referenced for a more detailed description of current watershed conditions (LCFRB 2006b).

3.1.4 WRIA 29 Wind-White Salmon

WRIA 29 Wind-White Salmon (Figure 6) is in total approximately 902 square miles, with 589 square miles located within the county. Nearly two-thirds of the WRIA is located within the GPNF and a significant portion of the lower one-third is within the NSA. The majority of the watershed is forested, but agriculture and forestry practices have affected ecosystem processes. Increased erosion has affected the movement of sediments, and the application of fertilizers has increased the movement of toxins with the watershed (WSRWMC 2008). Additionally, culvert installation for farm and logging roads has reduced the movement of large woody debris (LWD) within the watershed. The 2011

removal of the Condit Hydroelectric Dam, which was constructed in 1913 on the White Salmon River, is expected to provide access to approximately 32 miles of river and tributary habitat for steelhead and salmon; restore connectivity to spawning, rearing, foraging, and overwintering habitat for bull trout in the river; and have an overall potential of increased production for salmonids (Ecology 2010). The Wind-Little White Salmon Watershed Management Plan and Detailed Implementation Plan (LCFRB 2006c) should be referenced for a more detailed description of current watershed conditions.

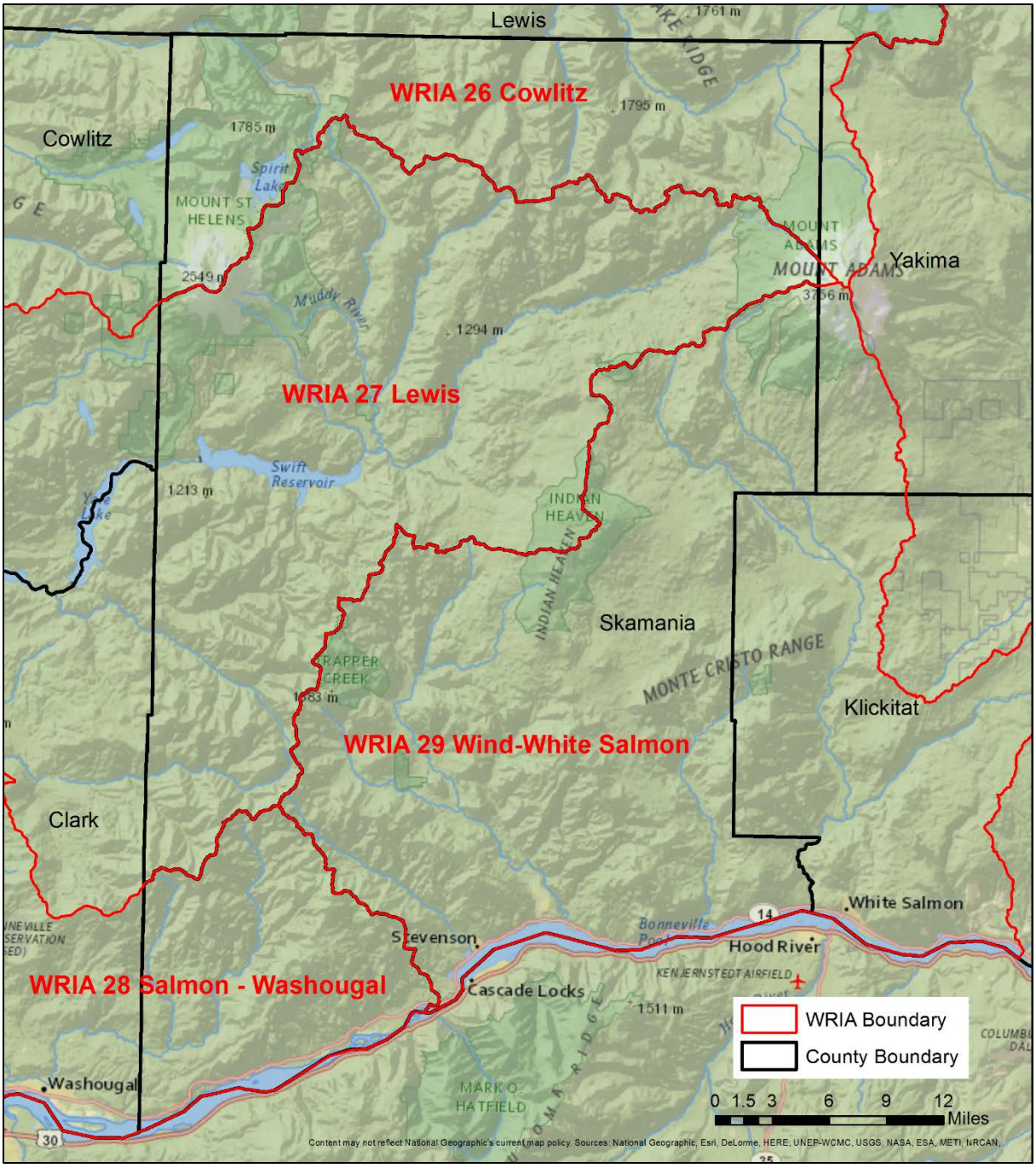


Figure 2. WRIA Overview of Skamania County

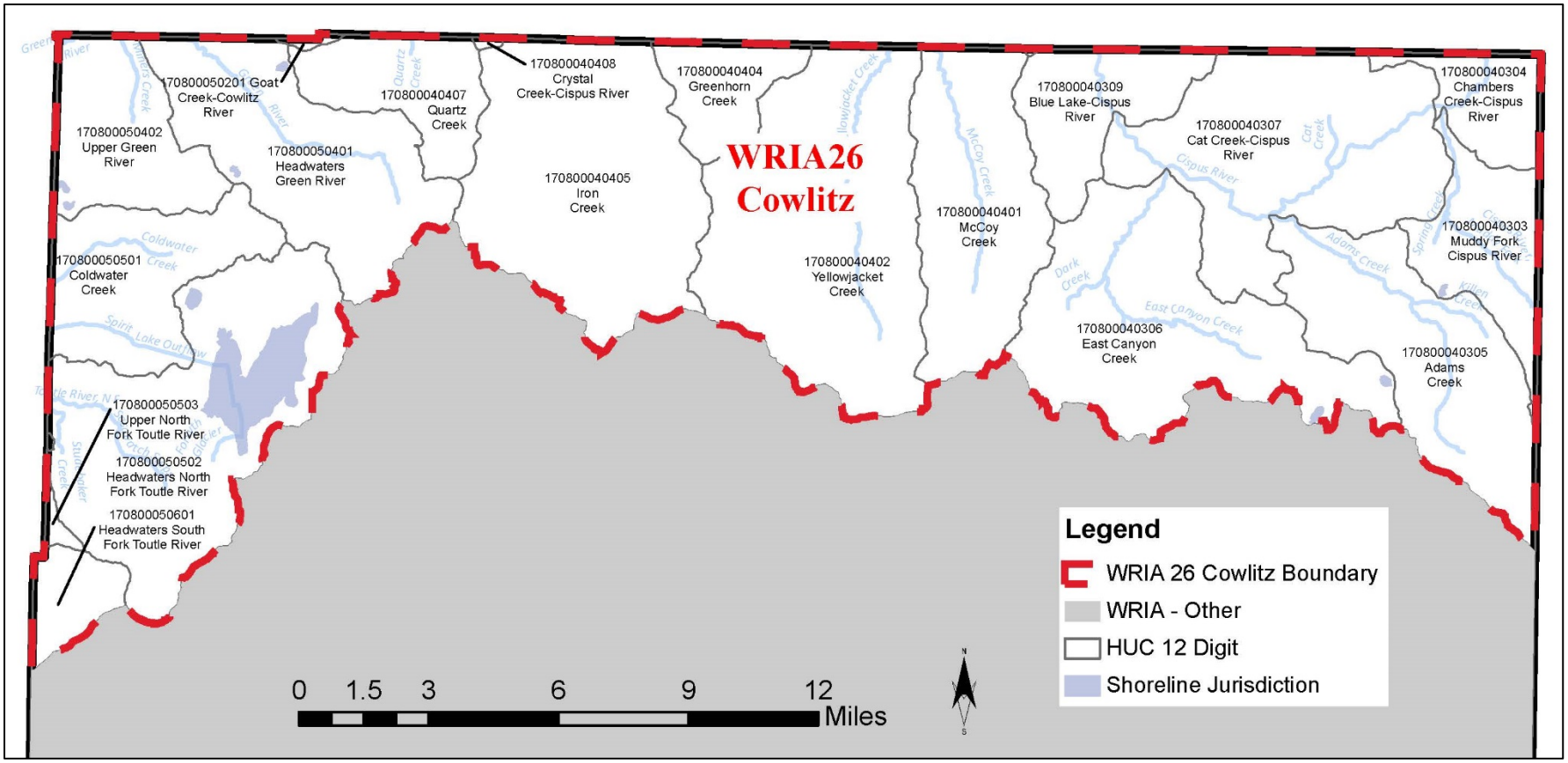


Figure 3. WRIA 26 Cowlitz

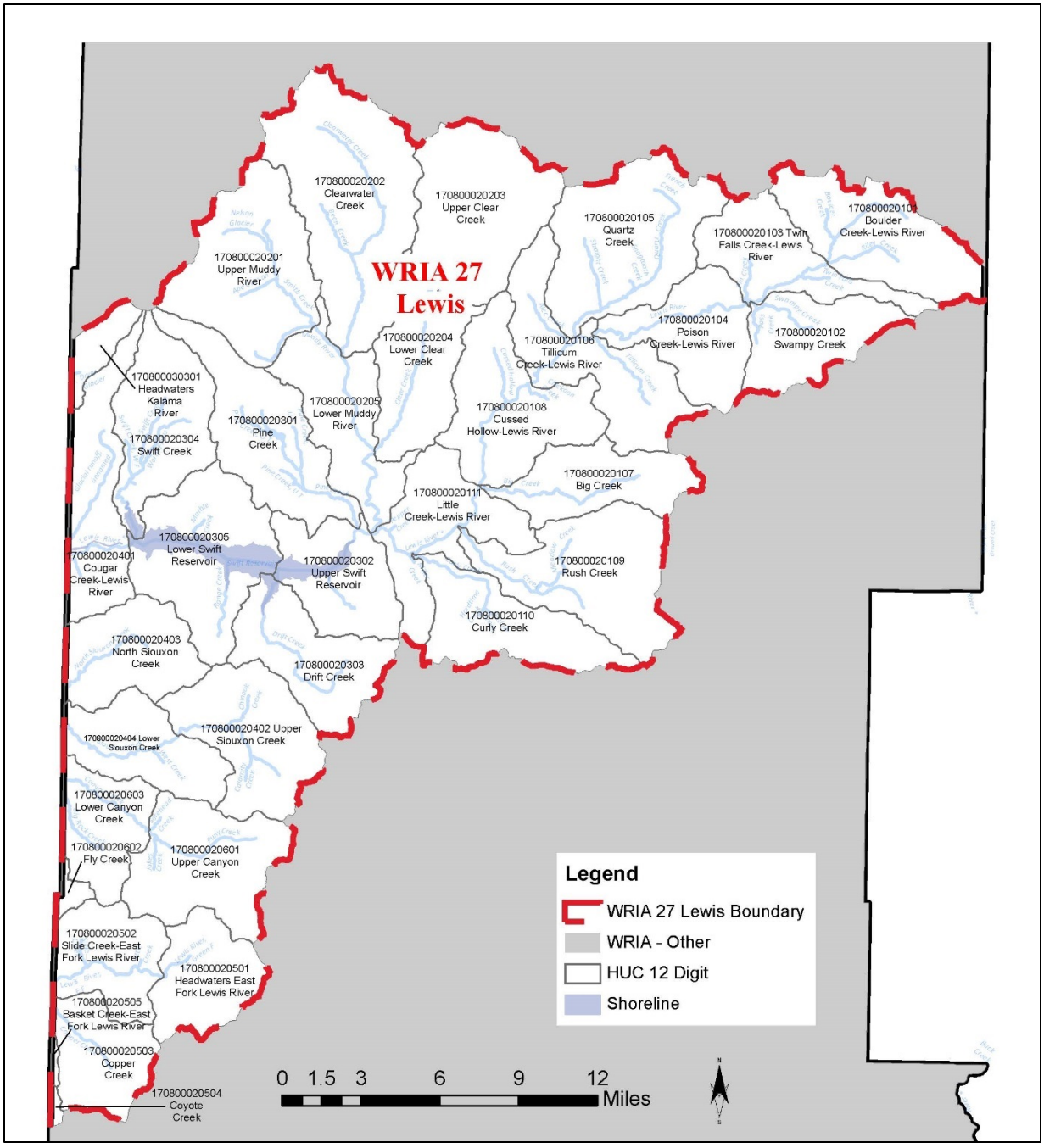


Figure 4. WRIA 27 Lewis

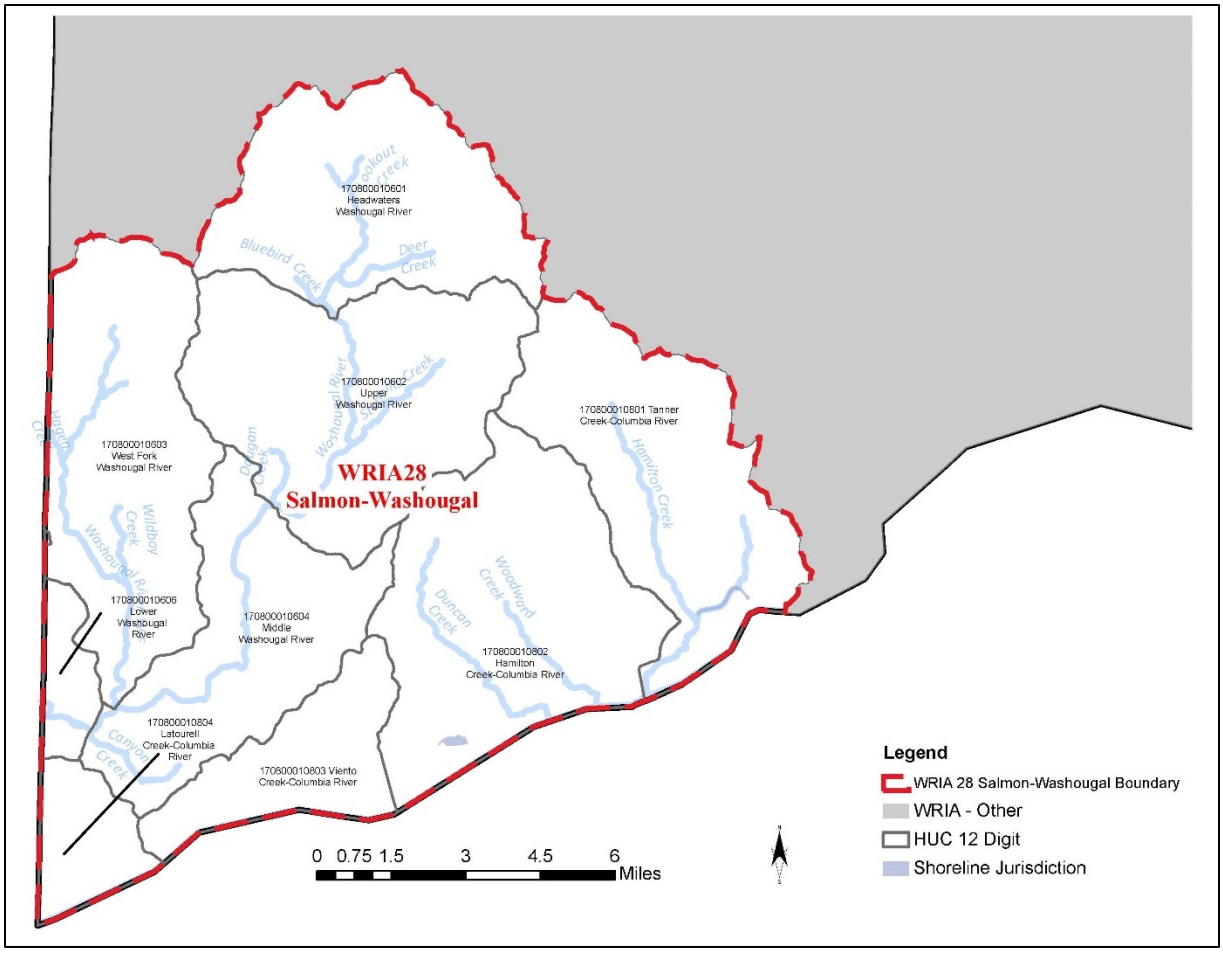


Figure 5. WRIA 28 Salmon-Washougal

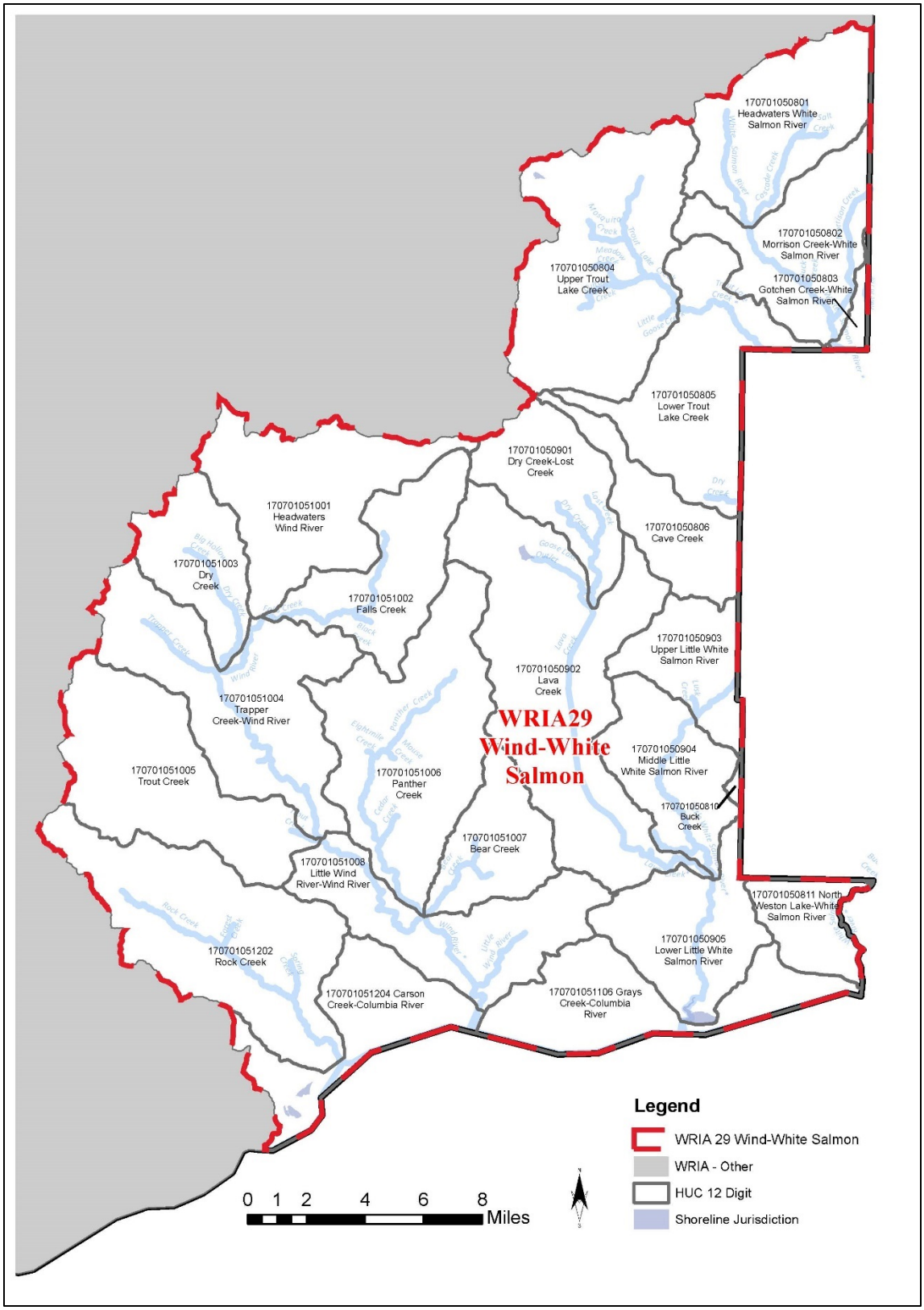


Figure 6. WRIA 29 Wind-White Salmon

3.1.5 Impervious Surfaces

Skamania County retains a healthy amount of forest cover and impervious surface cover is relatively low, even in the more developed areas in the south of the county along the Columbia River. Table 2 shows the percentage of impervious surface area within shoreline jurisdiction by watershed (HUC 12).

Because the percentages reported below are impervious surface within shoreline jurisdiction and within the county, there is some variability based on the area of the watershed and how much of it lies within Skamania. Buck Creek (170701050810) in WRIA 29, for example, shows nearly 21 percent impervious surface within shoreline jurisdiction. Within the Buck Creek shoreline area in the county, roads and houses make up a significant portion of land cover in the watershed. However, Buck Creek has a very small area of shoreline jurisdiction (approximately 3.8 acres) within the County, and does not have a significant area (0.8 acres) of impervious surface. Thus the reported percent impervious alone may be misleading in some cases, and should be considered in context of the HUC area (acres) and location.

Watersheds with higher percentages of impervious surfaces in their shoreline jurisdiction are generally those where development already exists, such as Rock Creek (2.6 percent) and Lower Washougal River (3.7 percent). WRIAs 28 and 29, which account for the more developed southern half of the county, have the highest average of impervious surfaces within shoreline jurisdiction (1.8 percent and 1.5 percent, respectively), while WRIAs 26 and 27, which account for the less developed northern half, have the lowest (1.0 percent each).

Table 2. Impervious Surface Percentages within Shoreline Jurisdiction by Watersheds

WRIA	Waterbody/12 Unit HUC	Acres in Shoreline Jurisdiction	Acres of Impervious Surface in Shoreline Jurisdiction	Percent Impervious Surface in Shoreline Jurisdiction
WRIA 26 Cowlitz	Muddy Fork Cispus River (170800040303)	596.4	2.8	0.5%
	Chambers Creek – Cispus River (170800040304)	342.7	4.8	1.4%
	Adams Creek (170800040305)	562.9	2.7	0.5%
	East Canyon Creek (170800040306)	632.7	11.0	1.7%
	Cat Creek – Cispus River (170800040307)	593.8	7.6	1.3%
	Blue Lake – Cispus River (170800040309)	105.9	0.1	0.0%
	McCoy Creek (170800040401)	321.6	1.9	0.6%
	Yellowjacket Creek (170800040402)	445.8	6.9	1.5%
	Greenhorn Creek (170800040404)	0.0	0.0	0.0
	Iron Creek (170800040405)	0.0	0.0	0.0
	Quartz Creek (170800040407)	21.7	0.3	1.6%
	Crystal Creek – Cispus River (170800040408)	0.0	0.0	0.0
	Goat Creek – Cowlitz River (170800050201)	0.0	0.0	0.0%
	Headwaters Green River (170800050401)	609.9	4.0	0.7%

WRIA	Waterbody/12 Unit HUC	Acres in Shoreline Jurisdiction	Acres of Impervious Surface in Shoreline Jurisdiction	Percent Impervious Surface in Shoreline Jurisdiction
	Upper Green River (170800050402)	319.9	4.3	1.3%
	Coldwater Creek (170800050501)	727.9	10.8	1.5%
	Headwaters North Fork Toutle River (170800050502)	3,351.8	0.0	0.0%
	Upper North Fork Toutle River (170800050503)	0.0	0.0	0.0%
	Headwaters South Fork Toutle River (170800050601)	0.0	0.0	0.0%
WRIA 27 Lewis	Boulder Creek – Lewis River (170800020101)	466.1	2.9	0.6%
	Swampy Creek (170800020102)	365.2	1.7	0.5%
	Twin Falls Creek – Lewis River 170800020103	356.6	1.3	0.4%
	Poison Creek – Lewis River (170800020104)	365.3	2.9	0.8%
	Quartz Creek (170800020105)	600.2	1.9	0.3%
	Tillicum Creek – Lewis River (170800020106)	550.2	2.8	0.5%
	Big Creek (170800020107)	692.7	1.1	0.2%
	Cussed Hollow-Lewis River (170800020108)	542.3	2.5	0.5%
	Rush Creek (170800020109)	848.2	4.8	0.6%
	Curly Creek (170800020110)	249.7	2.8	1.1%
	Little Creek – Lewis River (170800020111)	387.4	0.7	0.2%
	Upper Muddy River (170800020201)	632.4	2.3	0.4%
	Clearwater Creek (170800020202)	731.8	3.2	0.4%
	Upper Clear Creek (170800020203)	87.2	0.0	0.0%
	Lower Clear Creek (170800020204)	394.8	0.8	0.2%
	Lower Muddy River (170800020205)	642.3	0.8	0.1%
	Pine Creek (170800020301)	631.9	8.8	1.4%
	Upper Swift Reservoir (170800020302)	1,461.5	11.4	0.8%
	Drift Creek (170800020303)	704.0	0.5	0.1%
	Swift Creek (170800020304)	922.6	3.7	0.4%
	Lower Swift Reservoir (170800020305)	3,473.1	5.3	0.2%
	Cougar Creek – Lewis River (170800020401)	465.5	6.4	1.4%
	Upper Siouxon Creek (170800020402)	405.0	0.0	0.0%
	North Siouxon Creek (170800020403)	232.1	0.0	0.0%
	Lower Siouxon Creek (170800020404)	316.4	0.0	0.0%
	Headwaters East Fork Lewis River (170800020501)	77.4	5.6	7.2%
	Slide Creek – East Fork Lewis River (170800020502)	335.8	14.2	4.2%
	Copper Creek (170800020503)	173.6	7.8	4.5%
	Coyote Creek (170800020504)	0.0	0.0	0.0%
	Upper Canyon Creek (170800020601)	338.2	6.0	1.8%
	Fly Creek (170800020602)	0.0	0.0	0.0%
	Lower Canyon Creek (170800020603)	394.1	4.7	1.2%

WRIA	Waterbody/12 Unit HUC	Acres in Shoreline Jurisdiction	Acres of Impervious Surface in Shoreline Jurisdiction	Percent Impervious Surface in Shoreline Jurisdiction
	Headwaters Kalama River (170800030301)	18.1	0.0	0.0%
WRIA 28 Salmon – Washougal	Headwaters Washougal River (170800010601)	566.6	9.7	1.7%
	Upper Washougal River (170800010602)	535.1	20.2	3.8%
	West Fork Washougal River (170800010603)	620.4	8.3	1.3%
	Middle Washougal River (170800010604)	514.1	18.1	3.5%
	Lower Washougal River (170800010606)	75.4	2.8	3.7%
	Tanner Creek – Columbia River (170800010801)	847.6	9.7	1.1%
	Hamilton Creek – Columbia River (170800010802)	2,502.8	19.1	0.8%
	Viento Creek – Columbia River (170800010803)	1,621.5	1.0	0.1%
	Latourell Creek – Columbia River (170800010804)	483.9	1.7	0.4%
WRIA 29 Wind - White Salmon	Headwaters White Salmon River (170701050801)	766.4	2.7	0.4%
	Morrison Creek – White Salmon River (170701050802)	597.2	2.5	0.4%
	Gotchen Creek – White Salmon River (170701050803)	61.4	0.9	1.5%
	Upper Trout Lake Creek (170701050804)	1,229.4	4.3	0.3%
	Lower Trout Lake Creek (170701050805)	330.8	4.5	1.4%
	Cave Creek (170701050806)	0.0	0.0	0.0%
	Buck Creek (170701050810)	4.0	0.8	20.7%
	North Weston Lake-White Salmon River (Northwestern Lake) (170701050811)	305.5	8.3	2.7%
	Dry Creek – Lost Creek (170701050901)	394.1	4.2	1.1%
	Lava Creek (170701050902)	1,027.4	10.4	1.0%
	Upper Little White Salmon River (170701050903)	154.2	5.2	3.4%
	Middle Little White Salmon River (170701050904)	622.3	9.9	1.6%
	Lower Little White Salmon River (170701050905)	581.4	19.7	3.4%
	Headwaters Wind River (170701051001)	122.2	0.5	0.4%
	Falls Creek (170701051002)	742.6	6.3	0.8%
	Dry Creek (170701051003)	272.3	0.4	0.1%
	Trapper Creek – Wind River (170701051004)	1,422.8	20.5	1.4%
	Trout Creek (170701051005)	183.4	3.2	1.7%
	Panther Creek (170701051006)	838.0	17.2	2.0%
	Bear Creek (170701051007)	225.8	6.2	2.8%
	Little Wind River – Wind River (170701051008)	738.3	8.4	1.1%

WRIA	Waterbody/12 Unit HUC	Acres in Shoreline Jurisdiction	Acres of Impervious Surface in Shoreline Jurisdiction	Percent Impervious Surface in Shoreline Jurisdiction
	Grays Creek – Columbia River (170701051106)	3,317.8	74.1	2.2%
	Rock Creek (170701051202)	625.0	16.2	2.6%
	Carson Creek – Columbia River (170701051204)	2,808.4	24.8	0.9%

Source: Skamania County, Department of Assessment and GIS

3.2 Current Shoreline Conditions

Skamania County's shorelines are in relatively good condition ecologically compared to more developed areas along the Columbia River, in large part due to the regulations in place for the GPNF and the NSA. Docks, piers, and beach stairs occur intermittently, mostly throughout the northern two-thirds of the county, but there are pockets of heavily modified shorelines at Swift Reservoir, North Bonneville, the City of Stevenson, Home Valley, and Drano Lake.

Most of the shorelines in the northern three-quarters of the county are undeveloped and designated as National Forest. One exception is the area surrounding the Upper Swift Reservoir, which is not owned by the USFS. Primary land uses in this vicinity are a mixture of single-family residential; agriculture, forestry, fishing and hunting; and mining/extraction establishments.

The shorelines located in the southern third of the county are home to a more assorted set of land uses. Primary land uses in the developed areas proximate to the Columbia River include residential (primarily single-family); mining and extraction establishments; agriculture, forestry, fishing and hunting; recreational; and construction-related businesses. All watersheds have some portion of their lands under public ownership.

Existing single-family uses are located along the following waterbodies in the county: Swift Reservoir in the north, the Washougal River in the West End neighborhood in the southwest, and along other major tributaries throughout the county (such as the West Fork of the Washougal River, the Columbia River, Wauna Lake, and the Wind River).

Habitats in some areas of the county have been affected by farming and livestock grazing on riparian vegetation. Past logging operations concentrated near tributaries in some portions of the county have resulted in decreased riparian cover, increases in temperature and sedimentation, and changes in flow regimes (LCFRB 2010, Ecology 1999a). The reduction of riparian vegetation is one of the many factors that have led to the depression of some salmon populations within portions of the county (LCFRB 2010, Ecology 1999b). Additionally, urban development and impervious surface cover such as

roads increase runoff and erosion and may have negative effects on ecological functions and processes of priority habitats within the county (Skamania County 2007a).

Table 3 summarizes some of the major biological and land use characteristics of the watersheds with designated shoreline reaches in Skamania County. Watersheds are organized by WRIA, and color coded for reference (color coding is provided only as a visual aid and is not indicative of any conditions). All in-water areas are designated Aquatic, while the remaining four SEDs (Rural Conservancy, Natural Environment, Shoreline Residential, and High Intensity) are applied to upland areas only. A key is provided at the end of the table with detailed descriptions of the characteristics (e.g., land use and zoning acronyms).

Table 3. Summary of Characteristics

WRIA	12 Unit HUC	Biological Characteristics (1)	Existing Land Use		Shoreline Modifications (4)	Environment Designations (5)					
			Use (2)	Zoning (3)		Existing	Proposed (6)				
							AQ	NAT	RC	SR	HI
WRIA 26 Cowlitz	Muddy Fork Cispus River (170800040303)	Good	SG	UZ	None	Conservancy	X	X	X		
	Chambers Creek – Cispus River (170800040304)	Good	SG	UZ	None	Conservancy	X	X			
	Adams Creek (170800040305)	Good	SG	UZ	None	Conservancy	X	X	X		
	East Canyon Creek (170800040306)	Good	SG	UZ	None	Conservancy	X	X	X		
	Cat Creek – Cispus River (170800040307)	Good	SG	UZ	None	Conservancy		X	X		
	Blue Lake – Cispus River (170800040309)	Good	SG	UZ	None	Conservancy		X			
	McCoy Creek (170800040401)	Good	SG	UZ	None	Conservancy			X		
	Yellowjacket Creek (170800040402)	Good	SG	UZ	None	Conservancy	X	X	X		
	Quartz Creek (170800040407)	Good	SG	UZ	None	Conservancy		X			
	Headwaters Green River (170800050401)	Fair	SG, MN	UZ	None	Conservancy	X	X	X		
	Upper Green River (170800050402)	Good	SG, MN	UZ	None	Conservancy	X	X	X		
	Coldwater Creek (170800050501)	Good	SG	UZ	Low (1-10)	Conservancy	X	X			
	Headwaters North Fork Toutle River (170800050502)	Good	SG, CR, MN	UZ	None	Conservancy	X	X			

WRIA	12 Unit HUC	Biological Characteristics (1)	Existing Land Use		Shoreline Modifications (4)	Environment Designations (5)					
			Use (2)	Zoning (3)		Existing	Proposed (6)				
							AQ	NAT	RC	SR	HI
WRIA 27 Lewis	Boulder Creek – Lewis River (170800020101)	Good	SG	UZ	None	Conservancy		X	X		
	Swampy Creek (170800020102)	Good	SG	UZ	None	Conservancy	X	X	X		
	Twin Falls Creek – Lewis River	Good	SG	UZ	None	Conservancy		X	X		
	Poison Creek – Lewis River (170800020104)	Good	SG	UZ	None	Conservancy		X			
	Quartz Creek (170800020105)	Fair	SG	UZ	None	Conservancy		X			
	Tillicum Creek – Lewis River (170800020106)	Fair	SG	UZ	None	Conservancy	X	X	X		
	Big Creek (170800020107)	Good	SG	UZ	None	Conservancy		X	X		
	Cussed Hallow-Lewis River (170800020108)	Good	SG	UZ	None	Conservancy		X			
	Rush Creek (170800020109)	Good	SG	UZ	None	Conservancy	X	X	X		
	Curly Creek (170800020110)	Good	SG	UZ	None	Conservancy		X	X		
	Little Creek – Lewis River (170800020111)	Fair	SG, UD, RA, MN, AF	RL, UZ, FO	None	Conservancy		X	X		
	Upper Muddy River (170800020201)	Good	SG	UZ	None	Conservancy	X	X			
	Clearwater Creek (170800020202)	Poor	SG	UZ	None	Conservancy		X	X		
	Upper Clear Creek (170800020203)	Good	SG	UZ	None	Conservancy	X	X			
	Lower Clear Creek (170800020204)	Poor	SG	UZ, RL	None	Conservancy		X	X		

WRIA	12 Unit HUC	Biological Characteristics (1)	Existing Land Use		Shoreline Modifications (4)	Environment Designations (5)					
			Use (2)	Zoning (3)		Existing	Proposed (6)				
							AQ	NAT	RC	SR	HI
WRIA 27 Lewis	Lower Muddy River (170800020205)	Fair	SG, MN, AF, RA, UD	RL, FO, UZ	None	Conservancy	X	X	X		
	Pine Creek (170800020301)	Good	MN, SG, AF, RA, UD	RL, FO, UZ	None	Conservancy			X	X	
	Upper Swift Reservoir (170800020302)	Good-Fair	TC, SG, MN, UD, RA, AF, CR, AF	RL, FO	Heavy (30+)	Conservancy			X	X	
	Drift Creek (170800020303)	Good-Fair	SG, TC, MN	RL, FO	None	Conservancy			X		
	Swift Creek (170800020304)	Good-Fair	SG, MN, AF, RA, UD, TC	UZ, RL, FO	None	Conservancy, Natural		X	X	X	
	Lower Swift Reservoir (170800020305)	Fair-Poor	TC, SG, MN, AF, UD, RA	RL, FO	Low (1-10)	Conservancy		X	X	X	
	Cougar Creek – Lewis River (170800020401)	Good	UD, SG, TC, MN	FO, UZ	Low (1-10)	Conservancy			X		
	Upper Siouxon Creek (170800020402)	Good	SG	UZ, FO	None	Conservancy		X	X		
	North Siouxon Creek (170800020403)	Good	SG	FO	None	Conservancy			X		
	Lower Siouxon Creek (170800020404)	Good	SG	FO, UZ	None	Conservancy		X	X		
	Headwaters East Fork Lewis River (170800020501)	Poor	SG	UZ	None	Conservancy			X		
	Slide Creek – East Fork Lewis River (170800020502)	Fair	SG	UZ	None	Conservancy			X		
	Copper Creek (170800020503)	Poor	SG	UZ	None	Conservancy			X		

WRIA	12 Unit HUC	Biological Characteristics (1)	Existing Land Use		Shoreline Modifications (4)	Environment Designations (5)					
			Use (2)	Zoning (3)		Existing	Proposed (6)				
							AQ	NAT	RC	SR	HI
WRIA 27 Lewis	Upper Canyon Creek (170800020601)	Good	SG	UZ	None	Conservancy		X	X		
	Lower Canyon Creek (170800020603)	Good	SG	UZ	None	Conservancy			X		
	Headwaters Kalama River (170800030301)	Good	SG	UZ	None	Conservancy		X			
WRIA 28 Salmon-Washougal	Headwaters Washougal River (170800010601)	Good	SG, MN	FO, UZ	None	Conservancy			X		
	Upper Washougal River (170800010602)	Good	SG, MN, RA, AF, UD	FO	None	Conservancy			X		
	West Fork Washougal River (170800010603)	Fair	SG, AF, MN, RA, UD	FO, UZ, RL	Low (1-10)	Conservancy			X		
	Middle Washougal River (170800010604)	Poor	RA, SG, AF, MN, CR, UD	FO, RL, RH	Low (1-10)	Conservancy			X	X	
	Lower Washougal River (170800010606)	Poor	RA, MN, AF, UD, SG, AE	RH, CO, RL	None	Conservancy				X	
	Tanner Creek – Columbia River (170800010801)	Fair	SG, MN, UD, AF	FO, OC, PR, CO, ID, WT, UZ	Moderate (10-30)	Conservancy			X		
	Hamilton Creek – Columbia River (170800010802)	Fair	AF, SG, UD, RA, CR, MN	WT, RH, OC, PR, CO, FO, AG	Moderate (10-30)	Conservancy and Natural		X	X	X	X
	Viento Creek – Columbia River (170800010803)	Good	UD, RA, SG	WT, RH, FO, OC	Low (1-10)	Conservancy, Natural		X			
	Latourell Creek – Columbia River (170800010804)	Good	UD, SG	WT, OC, FO	None	Conservancy		X			

WRIA	12 Unit HUC	Biological Characteristics (1)	Existing Land Use		Shoreline Modifications (4)	Environment Designations (5)					
			Use (2)	Zoning (3)		Existing	Proposed (6)				
							AQ	NAT	RC	SR	HI
WRIA 29 Wind – White Salmon	Headwaters White Salmon River (170701050801)	Good	SG	UZ	None	Conservancy		X	X		
	Morrison Creek – White Salmon River (170701050802)	Good	SG	UZ	None	Conservancy					
	Upper Trout Lake Creek (170701050804)	Good	SG	UZ	None	Conservancy	X	X	X		
	Lower Trout Lake Creek (170701050805)	Fair	SG	UZ	None	Conservancy		X	X		
	North Weston Lake-White Salmon River (Northwestern Lake) (170701050811)	Poor	TC, UD, CR, SG, MN, AF	OC, RL, WT, GV, UZ	Low (1-10)	Conservancy, Natural			X		
	Dry Creek – Lost Creek (170701050901)	Fair	SG	UZ	None	Conservancy	X	X	X		
	Lava Creek (170701050902)	Good-Fair	SG, MN, RA, UD	FO, RL, RH, UZ	None	Conservancy	X	X	X		
	Upper Little White Salmon River (170701050903)	Fair	MN, SG	FO, UZ	None	Conservancy		X	X		
	Middle Little White Salmon River (170701050904)	Fair	MN, SG, RA, AF, UD	FO, RH, RL, UZ	None	Conservancy		X	X	X	
	Lower Little White Salmon River (170701050905)	Fair	MN, SG, RA, RC, AF, UD, TC	RH, OC, RL, WT, PR	Low (1-10)	Conservancy, Natural			X	X	X
	Falls Creek (170701051002)	Good	SG	UZ	None	Conservancy	X	X	X		
	Dry Creek (170701051003)	Good	SG	UZ	None	Conservancy		X			

WRIA	12 Unit HUC	Biological Characteristics (1)	Existing Land Use		Shoreline Modifications (4)	Environment Designations (5)					
			Use (2)	Zoning (3)		Existing	Proposed (6)				
							AQ	NAT	RC	SR	HI
WRIA 29 Wind – White Salmon	Trapper Creek – Wind River (170701051004)	Good	RA, AF, MN, SG, UD	RH, UZ, CO	Low (1-10)	Conservancy		X	X	X	X
	Trout Creek (170701051005)	Good	RA, AF, SG, MN, UD	RH, UZ	Low (1-10)	Conservancy	X	X	X		
	Panther Creek (170701051006)	Good	SG, RA, MN, AF, UD, AG	UZ, RH, FO	None	Conservancy		X	X		
	Bear Creek (170701051007)	Good	SG, MN, RA, AF	UZ, FO, RH	None	Conservancy		X		X	
	Little Wind River – Wind River (170701051008)	Good	GS, MN, AF, SG, RA, UD, TC, CR	UZ, RH, FO, RL, WT, OC, CO, PR	Moderate (10-30)	Conservancy, Urban		X	X	X	X
	Grays Creek – Columbia River (170701051106)	Poor	UD, SG, GS, MN, RA, AF, TC, AG	WT, OC, FO, RH, PR, GV, CO, RL, ID	Moderate (10-30)	Conservancy, Urban			X		X
	Rock Creek (170701051202)	Good-Fair	AF, MN, SG, RA, UD	RH, UZ, FO	Low (1-10)	Urban, Conservancy, Natural		X	X		
	Carson Creek – Columbia River (170701051204)	Fair-Poor	UD, AF, TC, RA, CR, SG	WT, OC, FO, UZ, ID, CO	Heavy (30+)	Urban, Conservancy, Natural			X		X

Key:

1. Biological Characteristics: These relative qualifier terms were developed during the Inventory and Characterization Report assessment and are further described in that document.
2. Land Use Categories: AE – arts, entertainment, and recreation; AF – agriculture, forestry, fishing, hunting; CR – construction related business; GS – general sales or services; MN – mining; RA – residence or accommodation functions; SG – services government; TC – transportation, communication, information, utilities; UD – undefined
3. Zoning Categories: AG – agriculture; CO – commercial; FO – forest; GV – government/service; ID – industrial; OC - open space/conservancy; RH – residential - higher density; RL – residential - lower density; UZ – unzoned; WT – water
4. Shoreline Modifications: This is a quantitative estimate of the number of modifications based on aerial photography, and as reported in the Inventory and Characterization Report.
5. Existing Environment Designations are from the Skamania County Shoreline Management Master Program (July 1986). Proposed Environment Designations are from the Skamania County Shoreline Master Program Update, Final Inventory and Characterization Report (June 2016).
6. Proposed Shoreline Environment Designations: AQ – Aquatic; NAT – Natural Environment; RC – Rural Conservancy; SR – Shoreline Residential; HI – High Intensity.

4.0 FUTURE DEVELOPMENT

According to the SMP Guidelines, the cumulative impacts analysis must evaluate reasonably foreseeable future development and the use of the shoreline that is likely to occur as allowed by the proposed provisions of the Draft SMP, within a planning period of 20 years. This section describes the "reasonably foreseeable future development" that is expected to take place over the next 20 years in Skamania County. Section 5.0 below describes how the Draft SMP will shape and influence future development in a manner that prevents cumulative adverse impacts.

The two best indicators for predicting future development in the county are current development trends (including population growth and developable land, which indicate what the development pressures are across the county) and the provisions of the Draft SMP (which will guide where and what kind of development takes place within the shorelines). Of the SMP provisions, shoreline environment designations (SEDs) will have the greatest impact, as they determine what types of shoreline development are appropriate for each shoreline.

The SEDs and their development regulations are discussed below, followed by development trends in Skamania County. The next section of the discussion applies the SED and trends to the county to determine foreseeable development. Because the USFS regulations in the GPNF restrict development on those lands in a manner distinctly different from the rest of the county, foreseeable development is discussed separately in the context of within the GPNF, and outside the GPNF.

4.1 Shoreline Environment Designations

The types of development allowed on county shorelines will vary subject to the SED assigned to each shore segment (pending approval of the Draft SMP). In order to guide development appropriately, Ecology's SMP Guidelines require that SEDs be assigned to shoreline areas according to their ecological function, existing land uses, and the goals and aspirations of the community. These designations will help protect ecological functions and values and accommodate preferred and water-dependent shoreline uses.

For each SED, the Draft SMP identifies:

- ***Permitted uses and developments*** – These are uses and developments that are consistent with the SMA. Such uses/developments require a shoreline substantial development permit, a shoreline conditional use permit, a shoreline variance, and/or a statement that the use/development is exempt from the need for a shoreline substantial development permit.

- ***Prohibited uses and developments*** – These are uses and developments that are inconsistent with the SMA and that cannot be allowed through any permit or variance.

Consistent with the requirements of the SMA, the Draft SMP provides a system of environment designations that mirror those outlined in the SMP Guidelines. The following environment designations are assigned to the county's shorelines (see section 4.0 of the Draft SMP for complete descriptions, policies, and regulations):

- ***Aquatic Environment*** – The purpose of the "aquatic" environment is to protect, restore, and manage the unique characteristics and resources of shoreline areas waterward of the OHWM. The SMP states that "Uses that adversely impact the ecological functions of critical freshwater habitats should not be allowed except where necessary to achieve the objectives of RCW 90.58.020, and then only when their impacts are mitigated according to the sequence described in WAC 173-26-201 (2)(e) as necessary to assure no net loss of ecological functions." Prohibited uses include residential, agriculture, timber harvesting, and non-water oriented commercial/industrial use.

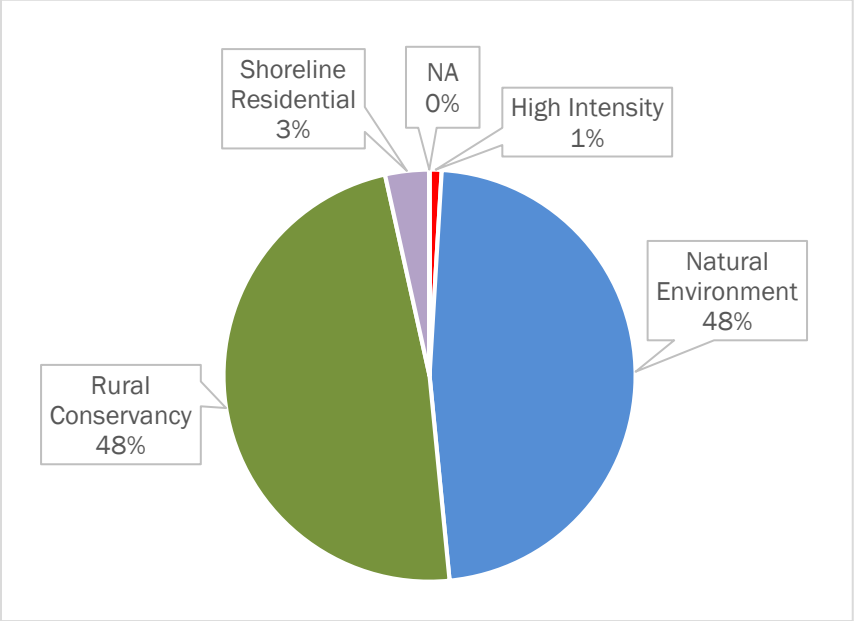
- ***Natural Environment*** –The purpose of the "natural" environment is to protect those shoreline areas that are relatively free of human influence or that include intact or minimally degraded shoreline functions intolerant of human use. These systems require that only very low-intensity uses be allowed in order to maintain the ecological functions and ecosystem-wide processes. Consistent with the policies of the designation, the County includes planning for the restoration of degraded shorelines within this environment. Prohibited uses include agriculture, boating facilities (excluding non-motorized boat launches), residential, mining, and industrial.

- ***Rural Conservancy Environment*** –The purpose of the "rural conservancy" environment is to provide recreational opportunities, support sustainable forestry and mining operations, and provide for low-intensity residential and water-oriented commercial and industrial uses consistent with the rural character of Skamania County. Such uses will be allowed only upon the demonstration that they protect ecological functions, and conserve existing natural resources and valuable historic and cultural areas. Examples of uses that are appropriate in a "rural conservancy" environment include low-impact outdoor recreation uses, timber harvesting on a sustained-yield basis, agricultural uses, aquaculture, low-intensity residential development and other natural resource-based low-intensity uses.

- ***Shoreline Residential Environment*** – The purpose of the "shoreline residential" environment is to accommodate residential development and appurtenant structures that are consistent with the provisions of the Draft SMP. An additional purpose is to provide appropriate public access and recreational uses. Commercial development in these areas should be limited to water-oriented uses. Prohibited uses include agriculture (excluding gardens 0.5 acre or less), forest practices, institutional uses, and mining.

- ***High-Intensity Environment*** – The purpose of the "high-intensity" environment is to provide for high-intensity water-oriented commercial, transportation, and industrial uses while protecting existing ecological functions and restoring them in previously degraded areas. In regulating uses in the "high-intensity" environment, first priority is given to water-dependent uses. Second priority is given to water-related and water-enjoyment uses. Non-water-oriented uses are not allowed except as part of mixed-use developments. Non-water-oriented uses may also be allowed in limited situations where they do not conflict with or limit opportunities for water-oriented uses or on sites where there is no direct access to the shoreline.

The proposed SEDs ensure that most of the county's shorelines will be reserved for relatively low-intensity uses, consistent with the rural nature of Skamania County. As illustrated by Figure 7, the two most protective designations (Natural Environment and Rural Conservancy) are the most frequently proposed designations (more than 45 percent of the county shorelines in each). Natural Environment and Rural Conservancy are dominant in both the north and south of the county (inside and outside the GPNF). Aquatic is excluded from this calculation, as it applies to shoreline areas waterward of the OHWM.



Source: Skamania County, Department of Assessment and GIS

Figure 7. Percent (Approximate) of County Shorelines in Each Shoreline Environment Designation

Although Shoreline Residential accounts for only 3 percent of the total shorelines, this use is concentrated heavily in the southern half of the county and mirrors currently populated/developed areas. In the south, Shoreline Residential is located along Wind River, Panther Creek (north of the City of Stevenson), around Wauna and Woody's Lakes, and along the Washougal River in the southwest of the county. Shoreline

Residential is present in the north of the county only in the Swift Reservoir area, which allows the existing and new residential development that is present and expected to expand.

High-intensity shorelines are located only in the southern portion of the county, in pockets on the Wind River and the Little White Salmon River, and in pockets along the Columbia River near Drano Lake, Carson, Stevenson, and North Bonneville.

The proportions of the designations are approximately the same for both lake shorelines and stream/river shorelines in the county. As illustrated by Table 4 and Table 5, Natural Environment and Rural Conservancy are the most common designations for both streams/rivers and for lakes, followed by Shoreline Residential.

While Rural Conservancy is the most common (48 percent) SED for rivers/streams, Natural Environment is the most common (54 percent) for lakes, meaning there is slightly more protection by SEDs for lake shorelines. For lake shorelines, forty-three percent (56 miles) are designated Rural Conservancy. Shoreline Residential accounts for nearly 3 percent, and High Intensity accounts for less than 1 percent. Wauna Lake, located along the Columbia River between Stevenson and North Bonneville, is designated entirely Shoreline Residential. The shorelines of lakes are expected to remain rural, based on the SED.

Table 4. Approximate Length of Lake Shoreline in each Shoreline Environment Designation

Shoreline Environment Designation	Approximate Length (Miles)	Percent of Total Lake Shorelines
Natural Environment	70.1	53.7%
Rural Conservancy	55.8	42.7%
Shoreline Residential	3.7	2.8%
High Intensity	1.0	0.8%
NA	0.0	0.0%

Source: Skamania County, Department of Assessment and GIS

The designations for stream/river shorelines allow more development than the designations for lake shorelines. Rural Conservancy is the dominant designation for the shorelines of rivers/streams (48 percent). Unlike the Natural Environment, Rural Conservancy allows single-family residential development which, as discussed in the following section, is predicted to be the bulk of future development in the county. Natural Environment accounts for 45 percent of the stream/river shorelines, which provides the highest level of protection. Approximately 5 percent of the remaining stream/river shorelines are designated Shoreline Residential, and 1 percent are High Intensity, and these are the least restrictive designations. Stream/river shorelines designated Shoreline Residential or High Intensity are primarily concentrated in the southern portion of the county, along the Wind, Little Salmon, and Washougal rivers.

Table 5. Approximate Length of Stream/River Shoreline in Each Shoreline Environment Designation

Shoreline Environment Designation	Approximate Length (Miles)	Percent of Total Stream/River Shorelines
Natural Environment	268.6	45.4%
Rural Conservancy	287.3	48.5%
Shoreline Residential	28.6	4.8%
High Intensity	7.0	1.2%
NA	0.4	0.1%

Source: Skamania County, Department of Assessment and GIS

4.2 Development Trends

A major determinant of future development is existing land use regulations, especially in Skamania County where development is largely restricted to the southern developed portions of the county that are not under federal jurisdiction. Approximately 80 percent of the county (to the north) lies within the GPNF and is subject to highly restrictive land use regulations. Thus, planning efforts in Skamania are limited to the southern portion of the county. However, development in the south is also highly regulated within the NSA.

The 2003 update of the Community Action Plan of the Skamania County Economic Development Council (SCEDC) notes that the county's proximity to the Portland-Vancouver metro area and its easy access from Interstate 84 and State Route 14, combined with recreational destinations such as the Gorge, GPNF, and Mount St. Helens, attract millions of visitors each year. The Community Action Plan Update notes that traditional industries, such as agriculture and forestry, are giving way to the service and housing sectors. Additionally, existing residences are often upgraded to larger, more intense uses. Retirement-age populations were noted as growing quickly, underscoring the demand for housing, much of which is likely to be in shoreline areas. The commute and vacation-home populations are helping drive demand for housing. Forecasted land demand for employment uses is 92 acres for industrial, 33 acres for office, and 8 acres for government by 2020. The Community Action Plan Update includes a list of 31 preferred projects, approximately half of which would occur partly or wholly within Skamania County shoreline jurisdiction. Projects range from infrastructure upgrades (broadband installation to the Wind River Nursery) to a new Port of Skamania waterfront building (SCEDC 2003).

In general, County plans and codes confine intensive residential, commercial, and industrial development to areas where development has historically occurred in the southern portion of the county and around Swift Reservoir.

Below, two key development indicators (population growth and developable land) are discussed, followed by conclusions on what type of development will occur both inside and outside the GPNF.

4.2.1 Population Growth

Population growth is a key indicator for future development, as it demonstrates what the likely demand will be in order to accommodate the new population, including housing, commercial uses, utilities, and roads. Both the State Office of Financial Management (OFM) and the Lower Columbia Fish Recovery Board (LCFRB) develop population projections for Skamania County. OFM provides projections on a county-wide basis for the entire state (Table 6). The most recent OFM projections were released in 2012, and reflect Low, Medium, and High population projections. The estimated population in the county in 2015 was 11,339 per the U.S. Census, which indicates that the population growth surpassed the Low OFM projection but falls below the Medium OFM estimate for 2015, suggesting that growth will likely be somewhere between the Low and Medium projections (U.S. Census Bureau 2016, OFM 2012). Even the High projection suggests that population growth in Skamania County will remain relatively low – approximately 1 percent annually.

Table 6. Office of Financial Management Population Projections for Skamania County

Population Growth Projection	2015	2025	2035	Percent Change 2015–2035
Low	10,605	10,965	11,325	7%
Medium	11,282	12,014	12,816	14%
High	12,415	13,665	14,991	21%

Source: OFM 2012

The LCFRB developed population projections (Table 7) by subwatershed within their WRIA 29A Watershed Planning Detailed Implementation Plan (2015), which is a part of their WRIA 29A management plan (LCFRB 2006c). The projections are based on the U.S. Census, OFM growth estimates (High), and county land use and zoning information. As shown in the table, LCFRB developed population projections from 2015 to 2035; however, population projections for the Underwood subwatershed were developed separately and reported for different years.

Table 7. Lower Columbia Fish Recovery Board Population Projections

Subwatershed	2015	2025	2035	Percent Change 2015–2035
City of Stevenson	1,702	2,013	2,383	40%
Wind River	2,939	3,278	3,627	23%
Stabler/Unincorporated Areas of North Carson	460	506	556	21%
Little Wind River	85	94	103	21%
Home Valley	476	524	575	21%
Little White Salmon River	440	484	531	21%
Wauna Area	175	193	211	21%
Kanaka Creek	210	231	254	21%

Subwatershed	2015	2025	2035	Percent Change 2015–2035
Nelson Creek	40	44	48	20%
Carson Creek Watershed	20	22	24	20%
	2011	2017	2029	% Change 2011-2029
Underwood	999	1,072	1,245	25%

Source: WRIA 29A Detailed Implementation Plan (LCFRB 2006c)

While the City of Stevenson is conducting its own SMP update and is therefore not included in this report or SMP effort, the city's population growth is an indicator of where development in the county will occur. As shown in Table 7, LCFRB projects that the population of Stevenson will grow 40 percent by the year 2035; in contrast, other developed areas are projected to grow approximately 20 percent (comparable to the county growth rate). This is in line with recent population increases in the City: Stevenson experienced a 22 percent increase in population between 2000 and 2010 (U.S. Census Bureau 2016). It can be expected that the areas around Stevenson (and within the jurisdiction of the Skamania County SMP) will grow at a higher rate than areas located further from the county's population centers.

The 2010 Census reported an average household size of 2.5 in Skamania County. In order to determine whether the county could potentially accommodate maximum growth, OFM's High population projection was used to analyze housing supply, demand, and production. Per the High projection, the net growth of 2,576 would require the addition of 1,026 residences in the county by the year 2035. Approximately 51 houses would need to be constructed each year in order to meet this demand. Per the Skamania comprehensive plan, population growth is expected to be concentrated in the four urban areas (City of Stevenson, City of North Bonneville, the unincorporated area of Carson, and the unincorporated area of Home Valley), the West End Subarea, and minimal increases in the Columbia River Gorge National Scenic Area Subarea (Skamania 2007a). Land available to accommodate projected development is discussed in the following section.

4.2.2 Developable Land

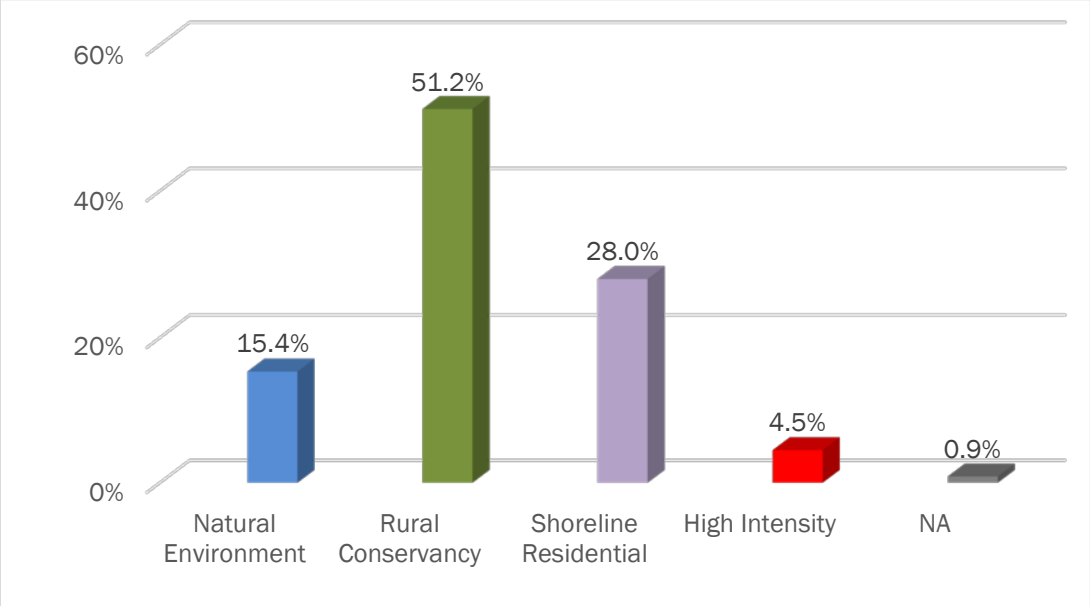
Existing and projected demand for land in the county, based on population growth, is an indicator of how much development can be expected in the next 20 years (the planning timeframe for this document). The availability and location of developable land – that is, vacant and/or subdivideable parcels – provides an indication of where this development may occur. As the SEDs determine the types of development that are appropriate for shoreline parcels, the locations of vacant and subdivideable parcels located within each SED are discussed below.

Vacant parcels (defined as parcels with less than $1,000 of assessed value of improvements) are likely candidates for future development, and therefore an indicator

of where development may occur in the future. County data indicate that approximately 60 percent (906 parcels) of all parcels (1,518 parcels) partially or fully within shoreline jurisdiction (including lakes and streams) are vacant. This includes parcels both within and outside of the GPNF. Of these, roughly 50 percent of the vacant parcels are designated Rural Conservancy and 30 percent are designated Shoreline Residential (Figure 8).

Based on Draft SMP provisions and current land use trends, the unimproved parcels in Shoreline Residential jurisdiction will most likely be developed with single-family residences and appurtenant or accessory structures (e.g., sheds, decks, garages) and roads. Development of the unimproved parcels in Rural Conservancy will also likely favor single-family residences and appurtenant structures. Additional development will likely include forest practices, recreational development (both water and non-water oriented), and water-related/water-dependent industrial and institutional development.

Development in Natural Environment (15 percent of vacant parcels) is expected to be low-intensity, due to development guidance provided by the SMP. Only water-dependent recreational development is permitted outright in this designation. Conditional uses in Natural Environment include non-motorized boat launches, forest practices, and utilities.



Source: Skamania County, Department of Assessment and GIS

Figure 8. Percent of Vacant Parcels by Shoreline Environment Designation

In addition to the development of existing vacant parcels, future development will occur via subdivisions of larger parcels creating more vacant parcels. Development pressures in the county are reflected in the demand to subdivide parcels into smaller properties for development. To obtain an estimate of the number of new lots that could be created

through subdivision, the County calculated the number of existing lots on the jurisdictional shoreline that could be divided into multiple parcels based on ownership and zoning (Table 8).

A parcel designated R-5 was assumed to be subdivideable into two lots if it is at least 10 acres in size, three lots if it is at least 15 acres in size, and so on. The estimates were then correlated to the proposed shoreline environment designation. Federal or State owned lands were not included, as it is unlikely that these lands will be subdivided or developed.

Except for High Intensity, the number of existing lots eligible for subdivision based on ownership and zoning is below 20 percent for each SED: Natural (13 percent), Rural Conservancy (16 percent), and Shoreline Residential (18 percent). High Intensity has the highest subdivision potential (26 percent); these shorelines are generally located either on Swift Reservoir or along the existing developed shorelines in the southern portion of the county. Parcels designated Aquatic are excluded from this analysis, as they cannot be developed through subdivision.

Table 8. Parcels in Shoreline Jurisdiction that Could Potentially Be Subdivided

	Able to be Subdivided		Unable to be Subdivided	
SED	**# of Parcels**	**Percent**	**# of Parcels**	**Percent**
Natural	27	13.2%	178	86.8%
Rural Conservancy	147	16.6%	738	83.4%
Shoreline Residential	137	17.8%	634	82.2%
High Intensity	21	26.3%	59	73.8%
Total/Percent	332	17%	1,609	83%

Source: Skamania County, Department of Assessment and GIS

As illustrated by the table, approximately 17 percent of shoreline parcels can be further subdivided while 83 percent of shoreline parcels in Skamania County cannot.

Shoreline Residential has the second highest subdivision potential (18 percent) and, based on the growing demand for housing in the county, will likely see requests for subdivisions over the next 20 years. Shorelines designated Shoreline Residential are located throughout the county, and the demand for subdivision will likely correlate to a given parcel's proximity to a developed area or existing road.

As mentioned at the beginning of this section, land use regulations vary widely between lands located within the GPNF and lands outside. Thus the following discussion of foreseeable development, based on population growth, developable land, and land use regulations, is separated by location within or outside the GPNF.

4.3 Foreseeable Development

4.3.1 Inside GPNF

Skamania County does not apply zoning designations to National Forest lands, so the County critical areas ordinance, building codes, and the National Forest Plans are what regulate land use in these areas. New land uses are managed by the USFS under the Northwest Forest Plan. Forest Plans contains seven land use management categories: Adaptive Management, Administratively Withdrawn, Congressionally Withdrawn, Late Successional Reserve, Managed Late Successional Reserve, Matrix, and Other Owners. These designations are subject to USFS guidelines and standards for activities occurring on these lands. Figure 9 illustrates where these designations occur in the county, and Table 9 summarizes each management category.

Table 9. USFS Management Designations in Skamania County

Management Designation	Percent of County	Description
Adaptive Management (AM)	5.4%	Federal forest lands within the range of the northern spotted owl that have been designated as areas where new approaches for the integration and achievement of ecological, economic, and other social objectives can be developed and tested.
Administratively Withdrawn (AW)	6.3%	Lands identified in current national forest management plans at the district level as having preferred recreational value and are not scheduled for timber harvest.
Congressionally Withdrawn (CW)	12.5%	Lands reserved by Congress for particular non-timber harvest purposes. Includes national parks and monuments, wilderness areas, wild and scenic rivers, and national wildlife refuges.
Late Successional Reserve (LSR)	23.9%	Lands designed to maintain a functional, interactive, late-successional, and old-growth forest ecosystem. These lands serve as habitat for late-successional and old-growth related species such as the northern spotted owl.
Managed Late Successional Reserve (MLSR)	1.1%	Lands similar to Late- Successional Reserves but are identified for certain owl activity centers on the eastside where regular and frequent fire is a natural part of the ecosystem.
Matrix (M)	27.8%	Remaining federal forest lands in the range of the northern spotted owl located outside reserves, congressionally withdrawn areas, and administratively withdrawn areas. Matrix lands are available to third-party private contractors for timber harvest at varying levels.
Other Owner (OO)	5.0%	Lands assumed to be owned by non-USFS entities.

Approximately 81.9 percent of Skamania County is under USFS jurisdiction. Figure 9 illustrates the USFS management designations for these portions of the county. Most USFS land in Skamania County is Matrix (27.8 percent) and Late Successional Reserve (23.9 percent). Matrix lands are located throughout the county, and development within the GPNF would most likely occur on these lands. Per USFS guidelines, most scheduled timber harvest takes place in Matrix, and most other silvicultural activities are conducted in portions of Matrix with suitable forest lands (USFS 2001).

Late Successional Reserve areas are located in two clusters in south-central and north-central Skamania County, and are subject to strict development regulations to protect owl habitat. Development activities within Late Successional Reserve require a management assessment prior to any activity that would result in habitat manipulation. Timber harvest and silviculture activities are subject to the review of the USFS Regional Ecosystem Office.

Based on USFS guidelines, little to no development is expected to occur in Congressionally Withdrawn areas, which account for 12.5 percent of county land. There are four areas designated as Congressionally Withdrawn in the county: Mt St Helens and Mt Adams and their surrounding areas, located on the northeast and northwest borders, respectively; and the smaller Indian Heaven and Trapper Creek wilderness areas, both located in central Skamania County.

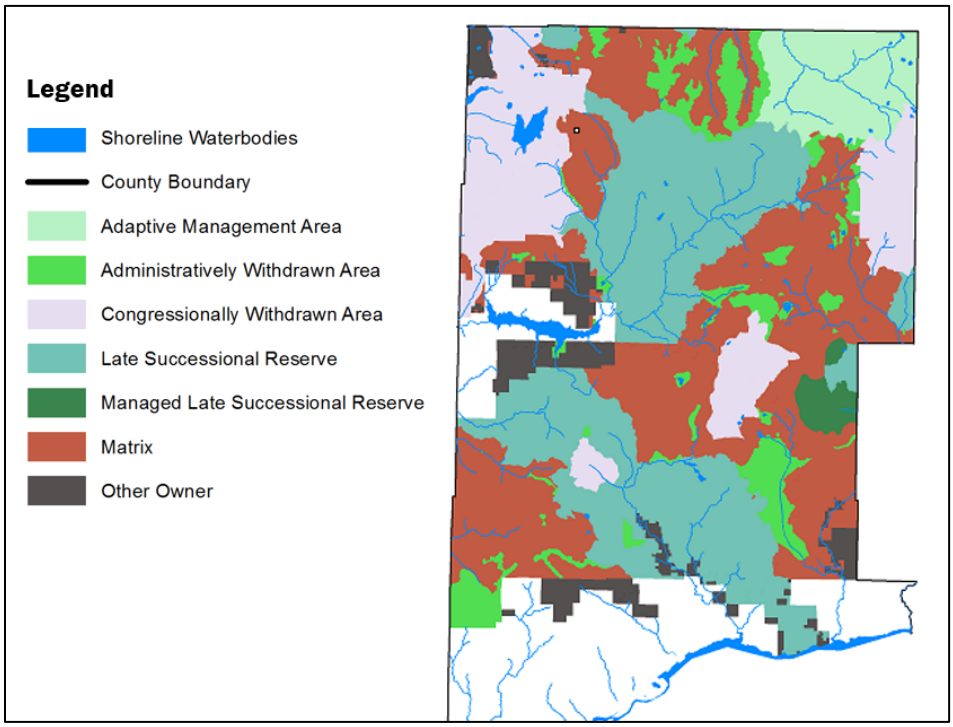


Figure 9. USFS Management Designations in Skamania County

There are several areas of Administratively Withdrawn scattered throughout the county, including Silver Star Scenic Area in the southeast corner of the GPNF. Development of these lands is intended to focus on recreational uses (as opposed to timber harvest) (USFS 2001).

The Cispus Adaptive Management Area is located in the northeast corner of the county, accounting for 5.4 percent of the land. Adaptive Management Areas were selected by the USFS to provide opportunities for innovation, provide examples in major physiographic provinces, and provide a range of technical challenges. Most are associated with areas

impacted socially and economically by reduced timber harvest on federal lands (USFS 2001). The USFS defines the goal for this area as "development and testing of innovative approaches at stand, landscape, and watershed levels to integration of timber production with maintenance of late-successional forests, healthy riparian zones, and high quality recreational values" (USFS 2001). While allowing some development, Adaptive Management Areas must also comply with guidelines and regulations for any areas that fall under Riparian Reserves (discussed below).

In addition to the management categories above, the Northwest Forest Plan contains an Aquatic Conservation Strategy (ACS), which establishes Riparian Reserves. Riparian Reserves serve as an overlay to the above-mentioned management designations, excluding Other Owners; per USFS, Riparian Reserves standards and guidelines supersede management designations. While excluded from ACS regulations, SMP provisions will apply to lands designated as Other Owners.

Riparian Reserves apply buffer widths on both sides of waterbodies to help protect ecological function and habitat. In many cases, Riparian Reserve widths are greater than shoreline jurisdiction. Many, if not all, shoreline waterbodies within GPNF would qualify as Riparian Reserves. Within Riparian Reserves, uses are limited to those which will not be detrimental to the waterbody and will meet the ACS.

Development within Riparian Reserves is restricted by USFS guidelines. Prohibited uses include timber harvest, new livestock operations or facilities, and structures related to mining activities. Standards and guidelines are provided to direct the management of roads, grazing, recreation, minerals, fire and fuels and other activities in such a manner as to help meet ACS objectives within Riparian Reserves (Oregon State Bureau of Land Management and Region 6 USFS 2005). The standards and guidelines are designed to focus the review of proposed and certain existing projects to determine compatibility with the ACS objectives. Complying with the ACS objectives means that the proposed management activity will maintain the existing conditions or implement actions to restore conditions (USFS 2001). For example, Recreation Management standard RM-1 states:

> *New recreational facilities within Riparian Reserves, including trails and dispersed sites, should be designed to not prevent meeting Aquatic Conservation Strategy objectives. Construction of these facilities should not prevent future attainment of these objectives. For existing recreation facilities within Riparian Reserves, evaluate and mitigate impact to ensure that these do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy objectives.* (Oregon State Bureau of Land Management and Region 6 USFS 2005)

The USFS management designations are the primary guidance in the kinds of development that may occur on National Forest lands in Skamania County. In addition to the timber and building regulations discussed above, the USFS can also be expected to decommission and

rehabilitate old roads and construct new forest access roads and utilities, as needed, over the next 20 years. To reiterate, while federally-owned lands are not excluded from SMP jurisdiction, the SMP does not apply to federal activities on federal lands.

4.3.2 Outside GPNF

As discussed in section 4.2.1, OFM's High population projection would require the addition of 1,026 residences in Skamania County by the year 2035 (approximately 51 houses would need to be constructed each year, on average, in order to meet this demand). Table 10 illustrates the number of permits within shoreline jurisdiction, issued by Skamania County in recent years, for a specific land use. An average of nearly 100 permits for single-family residences have been issued each year since 2011, indicating that the housing supply in the county is meeting –if not exceeding - the projected demand.

Table 10. Skamania County Permit Data, 2011-2016

Type of Permit	Permits Issued within Shoreline Jurisdiction	Approximate Average per Year
Single-Family Residential	497	99
Multi-Family Residential	39	8
Commercial	63	13
Recreation	6	1
Utility	9	2
Shoreline Modification	4	1
Forest Practices	4	1
Roads	6	1
Vegetation Removal and Grading	17	3
Land Divisions	30	6
Industrial	1	<1

Source: Skamania County, Department of Assessment and GIS

Reviewing the permits issued within shoreline jurisdiction in Skamania County over 2011–2016 also provides an insight into the types of demand for existing shoreline space. Table 10 shows that there has been more single-family residential, commercial, and multi-family residential development within Skamania County's shoreline jurisdiction than other types of land use. Although less significant, there were also substantial numbers of land divisions.

Based on permit history, and the large proportion of vacant land in the Rural Conservancy and Shoreline Residential environment designations, it can be expected that single-family residential development and accessory uses will constitute the majority of development within Skamania County's shorelines. Commercial use will likely be the second-most common development, and will support the growing population. However, because commercial development is restricted in Rural Conservancy per conditional use permits, and because there is very little commercially-

zoned land, commercial development will likely occur on vacant parcels designated as High Intensity in the more developed southern areas of the county.

Below is a discussion of several established subareas within the county (Swift Reservoir, West End, Carson, and others), and their expected development patterns. The overarching theme of these areas is the need to balance the growing demand for single-family housing with the community's desire to remain rural.

Swift Reservoir and Surrounding Area

The Swift Reservoir and surrounding area is a rural, recreational destination located in the northern portion of the county that falls outside the GPNF. Recreational uses and vacation homes are located on isolated portions of the lake. The area's remoteness and lack of utilities kept growth minimal, with development limited to seasonal recreational cabins. However, over the last 20 years, recreational development in the area has increased significantly, with visible signs of environmental degradation (Skamania County 2007b). From the year 2000 through May 2006, the County approved 131 new, privately owned lots through the short plat process, and approved building permits for 24 new recreational cabins. While there is demand for increased development, the surrounding community does not wish to develop to an extent that would dramatically alter the existing rural character; the community's concern about growth prompted the County to develop a Swift Reservoir Subarea Plan in 2007 (Skamania County 2007b).

Based on a 20-year planning timeframe (2007–2027), the Swift Subarea Plan envisions an additional 564 recreational cabins, for a full buildout potential of approximately 1,000 recreational cabins under the proposed land use designations. The plan notes that the Swift subarea currently does not have the necessary infrastructure and County services to accommodate full-time recreational growth (no electrical services, municipal water systems, public sewer systems, or phone services are available in the Swift subarea) (Skamania County 2007b).

New residential growth will increase pressures on shorelines within this subarea for single-family residences (a preferred shoreline use) and appurtenant structures. Vacant parcels in the Swift Reservoir area are primarily designated as Rural Conservancy, with several pockets of Shoreline Residential. These parcels may be developed for single-family housing (likely vacation homes) based on projected demand, the subarea plan, and Draft SMP regulations.

West End and Surrounding Area

The West End area is a rural community of approximately 67,000 acres of land in south-central Skamania County. Like Swift Reservoir, the subarea plan for the West End was developed as a result of the rural community's concerns over increased development. Between 1990 and 2001, a large number of individual rezone requests for higher density residential zoning in the West End were received by the County, with over 1,400 acres of land rezoned without regional oversight or public involvement. This prompted

concerned citizens and the County to re-examine its comprehensive plan. According to the West End Subarea Plan, it was determined that "changes were necessary to provide for orderly planned growth that protected the rural character of the West End Community" (Skamania County 2007c).

The number of primary residences in the West End subarea is projected to increase by 868 by the end of 2025, giving the West End subarea a total population of 4,135 people and a total of 1,583 residences (Skamania County 2007c). This demand will likely increase the pressure on Skamania County shorelines for single-family homes. Single-family homes are a preferred shoreline use, provided they are developed consistent with the provisions of the Draft SMP to protect the environment.

Vacant parcels in shoreline jurisdiction in the vicinity of the West End area are located along the Washougal River and its tributaries. There are numerous smaller (circa 1 acre) parcels located within shorelines designated as Shoreline Residential, which will likely be candidates for single-family residential development. In addition to these parcels, larger parcels available for subdivision are located in the northern area of the West End community; these are generally zoned Rural Conservancy, and may also be developed for single-family residences.

Carson, Wind River, and Surrounding Area

The Carson Subarea Plan was developed to provide land use regulations tailored to a unique part of Skamania County. The Carson subarea is a Gorge Urban Area, and consists of a greater density of residential and commercial structures than found throughout most of unincorporated Skamania County. While the subarea plan notes that Carson is growing steadily and that the community wishes to remain rural, the plan does not provide population or household data or projections. Per LCFRB population projections, this area is expected to grow slightly more than 1 percent annually over the next 20 years, for a population increase of approximately 690 persons (or 23 percent) by 2035. Applying the County average household size of 2.5, this would translate to roughly 276 new households by 2035.

Land uses within Carson fall within four different categories: residential, commercial, industrial, or destination resort. Most of the subarea is composed of residential land uses, primarily on the north and south ends. Commercial land uses can be found along a vertical strip located centrally within the subarea. Additionally, there is a small industrial area near the northeast portion of the subarea, and destination resort in the southeast.

One shoreline waterbody – the Wind River – is within the vicinity of the Carson subarea. The Wind River is located just east of and adjacent to the Carson subarea. Designated land uses that are located near or within shoreline jurisdiction of the Wind River include Rural Residential, Rural Estate, High Density Residential, Industrial, and Destination Resort.

Vacant parcels are located along the Wind River, from the mouth at the Columbia River, up through Carson, and extending north beyond the Carson subarea. There are two stretches of High Intensity shoreline, both located within Carson. Other shorelines in Carson are designated Rural Conservancy and Natural Environment. At the northern edge of Carson and extending further north along the Wind River, most parcels within shoreline jurisdiction are vacant and located in Shoreline Residential designations. These parcels will likely be targeted for development for several reasons: their location along the riverfront, their ability to be subdivided, the SED provisions allowing for residential development, and their access to the Wind River Highway.

The Columbia River Shoreline

The West End near Washougal, the unincorporated areas surrounding the cities of North Bonneville and Stevenson, the Underwood community, and the Gorge Urban Areas of Carson and Home Valley have been designated by the County for development to be directed in its comprehensive plan and subarea plans (Skamania County 2007c). Uses in these areas are predominantly single-family residential and accessory structures, recreational facilities, and open space (preferred or allowed uses under the SMA and WAC) interspersed with agriculture and pockets of commercial, forestry, and public facilities, such as roads and the BNSF railroad tracks. The designation of the Columbia River shoreline in Skamania varies along the river, with at least some length of the shoreline falling within each SED. Development in these parcels would also be required to adhere to NSA regulations.

Other Existing Developed Areas

Shorelines that are already developed in south Skamania County and are likely to continue to undergo new development as referenced above include the Washougal River, Canyon Creek, the Washougal River West Fork, Woody's Lake, and Duncan Creek in west County, Ashes Lake, Wauna Lake, Panther Creek, Muddy Creek, and Bear Creek in south-central County, and along the White Salmon and Little White Salmon rivers in east County. Potential development along these shorelines generally consists of high- and low-density residential, commercial, industrial, and recreation.

5.0 DEVELOPMENT IMPACTS AND SMP PROVISIONS

Shoreline development causes a number of harmful effects on the natural resources that occur along shores, and are often cumulative in nature. These adverse effects can be managed or compensated for through careful planning, complying with regulations, and using best management practices (BMPs), eco-friendly building and LID techniques, and effective mitigation measures. The Draft SMP recommends (or stipulates, in some cases) all of these tools to effectively prevent cumulative adverse impacts on shoreline ecological functions.

As described in section 4.0, much of the foreseeable development on Skamania County's rivers, lakes, and streams will be related to single-family residential development. These and other future development actions will impact the shorelines; however, substantial and/or cumulative adverse impacts will be prevented if the Draft SMP is implemented as intended. This section describes potential effects of common development actions that could alter the County's shorelines substantially, and explains how the Draft SMP will mitigate potential adverse impacts.

5.1 Main Tools for Protecting Shorelines

5.1.1 Shoreline Environment Designations

The assignment of SEDs is one of the key tools for regulating shoreline uses to achieve the policy goals of the SMA and those developed for the County SMP. The environment designations are based on biological and physical capabilities and limitations of the shoreline, existing and planned development patterns, and the community's vision or objectives for its future development. The development of SEDs, as dictated by WAC 173-26-211, results in requirements, regulations, and management policies tailored to each of the designation categories.

5.1.2 Critical Areas Regulations and Buffers

The Draft SMP contains critical areas provisions. Critical areas include: (1) wetlands; (2) areas with a critical recharging effect on aquifers used for potable water; (3) fish and wildlife habitat conservation areas; (4) frequently flooded areas; and (5) geologically hazardous areas.

The Draft SMP provides buffer regulations for wetlands based on the rating of a given wetland. The determination of a wetland's rating will be based on the entire extent of wetlands, unrelated to property lines or ownership patterns. Wetlands are rated according to Ecology's wetland rating system (found in the *Washington State Wetland Rating System for Eastern Washington* and/or *Western Washington*, 2014 or as amended). The designated wetlands buffers are modified from Ecology's "Guidance on Widths of Buffers and Ratios for Compensatory Mitigation for Use with the Western Washington Wetland Rating System." Wetlands are assessed based on their rating, their habitat score, and the existing intensity of land use.

The Draft SMP stipulates that all non-residential development proposed in a critical aquifer recharge area (CARA) must include a critical areas report prepared by a qualified professional who is a hydrogeologist, geologist, or engineer licensed in Washington who has experience preparing hydrogeological assessments. To receive a permit for development in a CARA, the applicant must demonstrate, through a Level 1 site evaluation report, how the project will integrate necessary and appropriate BMPs to prevent degradation to groundwater. The applicant must also meet existing local, state, and federal laws and regulations.

For fish and wildlife habitat conservation areas, the Draft SMP stipulates that all new structures and land alterations are prohibited from habitat conservation areas, except in accordance with the Draft SMP. A critical areas report is required for proposed development in or adjacent to fish and wildlife habitat conservation areas, and must be prepared by a qualified professional. The SMP does not require riparian buffers, but instead relies on robust vegetation conservation regulations to meet no net loss of riparian vegetation functions. Vegetation conservation standards are contained within section 3.7 of the SMP and are augmented by the shoreline setback standards in Table 5-1 of the SMP.

For lands that are frequently flooded, the Draft SMP states that new development or new uses in shoreline jurisdiction, including the subdivision of land, should not be established when it would be reasonably foreseeable that the development or use would require structural flood hazard reduction measures within the channel migration zone or floodway. The draft SMP also establishes a process for identifying properties within the channel migration zone using mapping in the SMP appendices and a review of physical indicators in aerial photos and a site visit.

Per the Draft SMP, all uses which are allowed in the shoreline environment designation are allowed in geologic hazard areas, but are subject to review by the Administrator prior to issuance of a shoreline permit.

5.1.3 Vegetation Conservation Standards

In addition to requiring new development to observe the critical area buffer standards noted above, the Draft SMP requires new developments to preserve nearshore and riparian vegetation. The purpose of the vegetation conservation policies and regulations is not to prevent shoreline uses, but to require that new clearing, vegetation management, and development activities result in no net loss of shoreline ecological functions. The vegetation conservation provisions require that all vegetation removal whether for native or non-native vegetation, adhere to the requirements of the sceciton. Proponents of all new shoreline uses or developments are required to submit site design plans to County staff for review to ensure that the layout of structures and uses minimizes vegetation clearing and maintains native vegetation.

All vegetation removal is required to use mitigation sequencing to avoid, or where avoidance is not possible, mitigate for impacts. Where mitigation is required, mitigation ratios range from 1:1 to 3:1 where the first number is the area impacted and the second number is the amount of area that needs to be replaced. Mitigation ratios are higher for mature trees and vegetation than for grass and pasture areas. Additional protections are required for Oak Woodlands. Consultation with WDFW is required for all vegetation removed within 100 feet of shoreline water bodies. Specific planting densities require 5 trees and 10 shrubs per 1,000 square feet of cleared area. Monitoring of planted vegetation is required.

5.2 Residential Development

5.2.1 Effects

Residential development can be one of the most detrimental types of developments to shorelines, in particular because it is largely incremental and the individual impacts are cumulative and difficult to identify for smaller (e.g., single-family home) developments. Most of the ecological effects are caused by actions commonly associated with residential development and use, such as normal maintenance and repair, removal of shoreline vegetation, changes to runoff and drainage pathways, development of docks/piers, increases in boating activities, etc.

Typically, development of vacant lots into residential uses results in the replacement of vegetated and pervious areas with impervious surfaces, and the addition of altered landscapes with non-native species and where chemical lawn/garden treatments are used. These actions can have several negative impacts on shoreline ecological functions, including:

- reducing the ability of the land to improve the quality of water passing through the (previously) untreated vegetation and soils;
- an increase in stormwater runoff, which can lead to soil erosion, flooding, and in-water sediment deposits; and
- contamination of surface water from chemical and nutrient applications.

Other shoreline modifications, such as ramps and docks, are common with residential development. Direct impacts may include the loss of shoreline vegetation, destruction or disruption of habitat, and disruption of wildlife. Indirect impacts occur primarily through disruption of sediment transport and/or sediment impoundment, and water quality degradation (EnviroVision et al. 2007).

The removal of shoreline vegetation reduces shade and LWD recruitment potential, which warms the water and decreases in-stream habitat complexity. The loss of bank vegetation can result in channel widening and affect sediment supply, which in turn affects the floodplain – needed for habitat and high flow attenuation. Failure to maintain

or plant vegetation along bluffs can decrease root strength, create unstable slopes, and increase the likelihood of future landslides (Washington Department of Fish and Wildlife 2012).

Other potential impacts on wildlife include noise impacts to fish and wildlife and spreading non-native species. Where motorized water craft are allowed, impacts may include increased wave energy and shoreline erosion, increase in contaminated sediments and/or turbidity (caused by propeller scour), and possible chemical pollutants from boat emissions (EnviroVision et al. 2007). Common effects of residential development are summarized in Table 11.

Table 11. Common Effects of Residential Development on Shorelines

Development Activity	Potential Impacts
Vegetation clearing	• Simplified habitat structure due to removal of large wood, overhanging branches, and boulders • Decreased terrestrial food supply, shading, and protection from overhead predators due to clearing of riparian vegetation • Increased water temperatures due to loss of shade from shoreline vegetation • Increased beach substrate temperatures during low tide in summer • Habitat fragmentation and disruption of wildlife travel corridors • Increased incidence of non-native, invasive species due to site disruption
Shoreline armoring	• Changes in juvenile salmonid prey diversity and abundance due to alterations in river substrate and structure • Flow alteration, erosion/accretion patterns, flooding
Dock/Pier construction	• Substrate modification due to piling placement and grounding of boats and/or structures • Loss of aquatic vegetation from shade impacts of boats and floats, and scouring from buoy anchors causing reductions in spawning, rearing, and refugia habitat available to forage fish • Altered juvenile salmon migration behavior and increased predation due to shading from overwater structures • Disruption of salmon migration and feeding areas due to noise and turbidity associated with construction activity
Creation of lawns and impervious surfaces	• Increased pollutant loading in lakes and rivers from use of fertilizers and pesticides used on nonnative landscaping • Disrupted surface, subsurface, groundwater hydrology from loss of natural conveyance and infiltration
In-water recreational activities	• Changes to substrate, increased forage fish egg mortality, and fish avoidance from propeller wash and grounding of boats • Noise impacts on wildlife

5.2.2 SMP Provisions

The Draft SMP prevents impacts caused by residential development by coordinating the size, scale and location of residential structures with the applicable SED, and by controlling the types of accessory uses/structures that are allowed (e.g., docks). Some of the specific regulations include the following:

- *General Provisions*: All new development, use, or activities subject to the SMP must meet the general provisions in Chapter 3 of the SMP including avoiding or mitigating impacts to archaeological resources, critical areas, shoreline vegetation, and water quality. Special emphasis is placed on uses which protect the statewide interest on shorelines of statewide significance.

- *Setbacks*: New residential uses and non-water-oriented appurtenant structures such as garden sheds, garages, and guest houses, shall adhere to the setback standards in the SMP. These range from 60 to 150 feet, may be adjusted based on criteria, and may not be less than 50 feet.

- *Shoreline stabilization*: New, expanded, or altered residential uses shall adhere to the shoreline stabilization requirements of the SMP.

- *Stormwater runoff*: Runoff from all impervious (roofs) and semi-impervious (compacted driveways) surfaces is recommended to be collected, dispersed and infiltrated on site with no impact to adjacent properties pursuant to BMPs in Ecology's stormwater management manual.

- *In-stream structures*: Structures such as docks, piers, and shoreline stabilization must provide for the protection and preservation of ecosystem-wide processes, ecological functions, and cultural resources, including, but not limited to, fish and fish passage, priority habitats and species, other wildlife and water resources, shoreline critical areas, hydrogeological processes, and natural scenic vistas.

In summary, new residences and substantial remodels/additions are anticipated in the shoreline jurisdiction areas of the county. The provisions of the Draft SMP as referenced above will serve to maintain or improve ecological functions of the shoreline over the long term, thereby resulting in no net loss of shoreline ecological function.

5.3 Forest Practices

5.3.1 Effects

Forest practices include the harvesting of timber and activities associated with this practice, such as road building, stream crossings, and the storage and transport of timber from the forest to the mills. These activities have the potential to alter shorelines in a variety of ways. As noted in section 3.0, the removal of forest cover in a watershed can alter hydrologic processes related to infiltration and recharge, increase the volume of surface runoff, and lead to erosion and/or landslides as slopes become destabilized.

Timber harvesting also eliminates habitat for forest-dwelling wildlife. When vegetation removal occurs close to the shoreline, it can reduce LWD recruitment and decrease other organic inputs which provide important food web support functions. Shoreline vegetation also plays a role in trapping and removing sediments, nutrients and other pollutants, so the loss of vegetation can also have adverse effects on water quality. Finally, riparian and nearshore vegetation provides cover, perching, nesting, foraging, and migratory habitat for many species of birds, amphibians, and mammals that can be adversely affected as a result of timber harvest activities.

5.3.2 SMP Provisions

The Draft SMP regulates non-harvest-related development actions such as road building, but does not regulate timber harvest. Harvest activities, except for Class IV conversions to non-forest uses, are left to the purview of the state Forest Practices Act (RCW 76.09). This is consistent with the SMP Guidelines which state: "Local master programs should rely on the Forest Practices Act and rules implementing the act and the Forest and Fish Report as adequate management of commercial forest uses within shoreline jurisdiction" (WAC 173-26-241(3)(e)). Specific regulations in the Draft SMP include the following:

- With respect to timber situated within 200 feet landward of the OHWM within shorelines of the statewide significance, Ecology or the County will allow only selective commercial timber cutting, so that no more than 30 percent of the merchantable trees may be harvested in any 10-year period.

- Preparatory work associated with the conversion of land to non-forestry uses and/or developments is not considered forest practices and will be reviewed in accordance with the provisions for the proposed non-forestry use and the general provisions of the Draft SMP, including vegetation conservation.

- Forestry activities proposed within the NSA must comply with SCC Title 22 (Columbia River Gorge National Scenic Area).

5.4 Recreational Development

5.4.1 Effects

Increases in recreational use can create negative ecological impacts. These can include an increase in demand for, and/or the availability of, recreational activities, which can in turn increase the number of people travelling to and using a particular site. Increased foot-traffic and vehicular usage can disturb the site and increase trash, solid waste, and emissions/local air pollution. Aesthetic and noise pollution are often-overlooked consequences of irresponsible recreational development. Recreational activities can disturb the nesting and rearing habitat of some birds. Allowing motorized watercraft along shorelines can increase wave energy and erode shorelines, damage shorelines through their use by people and watercraft, re-suspend contaminated sediments and/or increase turbidity, and introduce chemical pollutants from emissions.

5.4.2 SMP Provisions

The primary goal of the Draft SMP with regards to recreational uses is to maintain and improve Skamania County's extensive system of public access by working with property owners, applicants, and federal, state, and local agencies to protect public access against degradation over time and the impacts of development. In order to achieve the community's goal of protecting and enhancing existing public access to shorelines and recreational facilities, the Draft SMP requires that all shoreline development proposals (with the exception of certain exceptions) (1) incorporate provisions for adequate public access and (2) include public access as part of each development project by a public entity, and (3) encourage public access for all private development (except residential development of less than five parcels), unless such access is shown to be incompatible for reasons of safety, security, or their effect on the shoreline environment.

In order to address ecological impacts from increases in recreational uses, the Draft SMP requires that public access facilities result in no net loss of shoreline ecological functions. The Draft SMP does not require public access where the applicant demonstrates that significant environmental impacts that cannot be mitigated will result from the public access. In addition, new boating facilities are to be located where access roads are adequate to handle the traffic generated by the facility.

5.5 Agriculture

5.5.1 Effects

Agriculture usually involves ground-disturbing activities such as clearing, grading, tilling, mowing, and harvesting crops. In addition, agricultural activities often involve applying fertilizers and raising animals. The potential effects of these activities on shorelines are increased erosion and sedimentation, introduction of nutrients and bacteria to surface and groundwater systems, and loss of habitat and habitat fragmentation. These effects can often be mitigated by using BMPs and maintaining buffers between the agricultural activity and the shoreline waterbody.

5.5.2 SMP Provisions

Existing agricultural uses on agricultural lands would generally not be regulated by the SMP because the SMP guidelines indicate that "master programs shall not require modification of or limit agricultural activities occurring on agricultural lands."

However, the Draft SMP contains provisions to address (1) new agricultural activities on land not meeting the definition of agricultural land, (2) when agricultural lands are converted to non-agricultural uses, and (3) in cases of other development on agricultural land that does not meet the definition of agricultural activities. New agricultural uses must be consistent with the environment designations in which they are located. Additional provisions require that new agricultural uses meet setback standards, and that the use must preserve existing native vegetation within the setback area. To avoid potential contamination or damage to the shoreline by livestock, fencing is required to

prevent animals from damaging vegetation, stream slopes, and other sensitive natural features in the shoreline setback area. Stock watering facilities are to be provided so that livestock do not need to access streams or lakes for drinking water.

5.6 Aquaculture

5.6.1 Effects

Aquaculture has the potential to cause adverse shoreline ecological impacts because it is generally located in proximity to critical areas and habitats, navigation channels, and other waterfront uses (Ecology 2012). Aquaculture can disturb aquatic vegetation and substrates, introduce non-native species, discharge chemicals and nutrients, and require the use of predator control devices which can harm wildlife – birds in particular. Aquaculture can also affect the visual and aesthetic qualities of the shoreline and potentially disrupt recreational use. These effects may be more likely to occur with large-scale or intensive commercial operations. Several aquaculture facilities exist on Skamania County's shorelines. The Washington Department of Fish and Wildlife (WDFW) operates two fish hatcheries in Washougal and national fish hatcheries are located in Carson, on the White Salmon River, and on Spring Creek.

5.6.2 SMP Provisions

The Draft SMP states that "aquaculture is a water-dependent use which should be encouraged provided that it minimizes impacts to result in no net loss of shoreline ecological functions." In order to achieve no net loss, the Draft SMP requires that the siting of new aquaculture facilities consider navigational conflicts and adjacent land uses, distinguish between water-dependent and water related portions of aquaculture facilities, and give preference to water-dependent portions of uses to be located near, over, or in the water. Additionally, aquaculture facilities are to consider any impacts on water quality, temperature, flows, and oxygen content.

5.7 Mining

5.7.1 Effects

Mining has the potential to impact water quality by increasing the risk of water contamination. Groundwater may become contaminated as minerals in the upturned earth seep into the water table. On the surface, loosened topsoil may wash into streams, allowing sediments to pollute the waterways and alter the flow of the waterway, which could affect erosion and channel migration. These effects can have potential impacts to fish and plant life downstream. There is also a potential increase in risk of flooding by damaging existing waterways.

5.7.2 SMP Provisions

The provisions in the Draft SMP regarding mining apply to all new, expanded, or altered operations. Mining will be permitted only as a conditional use in the Aquatic, Rural Conservancy, and High Intensity environments. An applicant for mining and associated activities within the shoreline jurisdiction must demonstrate that the proposed activities depend on a shoreline location consistent with the Draft SMP and

WAC 173-26-201(2)(a). Mining and associated activities must be designed and conducted to result in no net loss of shoreline ecological functions. Mining within the active channel(s) or channel migration zone of a stream will be approved only through a conditional use permit and only if the use can demonstrate no adverse impacts. The disposal of overburden or other mining spoil or non-organic solid wastes must comply with the fill policies and regulations of the Draft SMP and other applicable County regulations. Any shoreline permit application for mining must include a reclamation plan that complies with the format and detailed minimum standards of RCW 78.44 and WAC 332-18.

5.8 Stormwater

5.8.1 Effects

Stormwater runoff can have significant negative impacts to shorelines and the ecological health of a watershed. During rain events, large volumes of stormwater runoff can be carried to waterbodies and cause flooding and erosion and wash away habitats. Stormwater runoff can also pick up pollutants commonly found on impervious surfaces, including sediment, oil and grease, trash, and pesticides, and carry them to waterways or into the groundwater. As the amount of paved surfaces increases in a watershed, the likelihood of insufficient groundwater recharge, a greater volume of stormwater runoff, and a higher potential of watershed degradation also increases.

5.8.2 SMP Provisions

Skamania County does not have adopted stormwater regulations. Instead, the Draft SMP requires that new developments, expansions, or retrofits of existing developments assess the effects of additional stormwater runoff volumes and velocities, and mitigate potential adverse effects on shorelines through design and implementation of appropriate stormwater management measures. Stormwater runoff from all impervious and semi-impervious surfaces should be collected, dispersed, and infiltrated on site with no impact to adjacent properties pursuant to BMPs in Ecology's Stormwater Management Manual.

To implement the stormwater policies and regulations of the Draft SMP, the Shoreline Administrator will require that new development and redevelopment proposals submit stormwater reports showing how the proposal will not degrade the water quality or quantity of shoreline waterbodies. New and existing single-family dwellings are exempt from this regulation.

Stormwater outfalls may be placed below the OHWM to reduce scouring, but new outfalls and modifications to existing outfalls must be designed and constructed to avoid impacts to existing native aquatic vegetation attached to, or rooted in, the substrate, and to minimize impacts to existing native riparian vegetation. In river and stream shorelines, stormwater outfall structures may require permanent bank hardening to prevent failure of the outfall structure or erosion of the shoreline.

5.9 Shoreline Stabilization

5.9.1 Effects

Shoreline stabilization includes actions taken to address erosion impacts to property and dwellings, businesses, or structures caused by natural processes, such as floods or wind. These actions include structural and nonstructural methods. Nonstructural methods include shoreline setbacks, relocating the structure to be protected, managing groundwater and stormwater, planting vegetation, and instituting planning and regulatory measures to avoid the need for structural stabilization. Structural stabilization includes measures that follow the shoreline such as rock armoring, bulkheads, revetments, flood walls, or structures built to protect roads or railroads. Shoreline erosion and accretion are natural processes that contribute to shoreline ecology though organic inputs. Hardening the shoreline can interrupt these natural processes and accelerate downstream erosion.

5.9.2 SMP Provisions

Where feasible, new development should be designed to avoid the need for future shoreline stabilization. The Draft SMP includes the following specific requirements: The design of land divisions must use a geotechnical analysis of the site and shoreline characteristics to ensure that the lots created will not require stabilization. New development must be set back adequately from steep slopes or bluffs to ensure that stabilization is unnecessary during the life of the structure(s). New development that requires shoreline stabilization that causes significant impacts to downstream properties should not be permitted.

All proposals for shoreline stabilization structures, both individually and cumulatively, must not result in a net loss of ecological functions, and must be the minimum size necessary. Soft approaches must be used unless they are demonstrated to be insufficient to protect primary structures, dwellings, and businesses.

5.10 Boating Facilities and Overwater Structures

5.10.1 Effects

Boating facilities and overwater structures, such as boat ramps ,piers docks, marinas, mooring balls and buoys, and boat/kayak launches can affect various factors that influence habitats. These impacts include changes in light, wave energy, substrates, and water quality. While one dock may not present a significant obstacle, the cumulative effect of numerous overwater structures along a shoreline can be (EnviroVision et al. 2007). Boating facilities are scattered throughout Skamania County on the Swift Reservoir, along the Columbia River, and in the Wauna Lakes, Ashes Lake, Wind River, and Drano Lake areas, and at various other locations in the county, including the GPNF.

5.10.2 SMP Provisions

Development of new and the expansion or alteration of existing boating facilities must meet no net loss and mitigation sequencing requirements, with a preference for facilities that minimize the amount of shoreline modification, in-water structure, and overwater

cover. Parking and storage areas must be landscaped or screened to provide visual and noise buffering between adjacent dissimilar uses or scenic areas. Boating facilities must be constructed of materials that will not have adverse effects on water quality or aquatic plants and animals over the long term. Materials used for submerged portions, decking, and other components that may come in contact with water must be approved by applicable state agencies for use in water to avoid discharging pollutants from wave splash, rain, or runoff.

Specific regulations, for private and public boating facilities, include:

Moorage Associated with Private Residential Use

- No single-use residential docks may be authorized unless the applicant can demonstrate that reasonable community dock options have been investigated and found infeasible.

- All private moorage structures must be the minimum size necessary and designed to avoid and then minimize potential adverse impacts. All unavoidable adverse impacts must be mitigated, and a mitigation plan must be submitted.

- Only shared or community docks may be allowed for all new residential development of two or more waterfront dwelling units or subdivisions or other divisions of land occurring after the effective date of this SMP.

- Piers and ramps may be no more than 4 feet in width.

- Docks and float components for private docks or community docks may not exceed a width of 8 feet. Docks and piers must the shortest length able to provide moorage for the intended boating use. In no case may a dock or pier extend farther from shore than necessary to achieve a water depth of 10 feet.

Moorage Associated with Commercial Use

- The amounts of overwater cover, including length and width, the number of in-water structures, and the extent of any necessary shoreline stabilization or modification must be minimized. This requirement does not apply to recreational and public access features required and licensed by the Federal Energy Regulatory Committee.

- Non-water-dependent accessory uses must be located landward of all water-oriented uses.

- Garbage or litter receptacles must be provided and maintained by the operator at locations convenient to users.

5.11 Nonconforming Development

5.11.1 Effects

"Nonconforming use or development" means a shoreline use or development which was lawfully constructed or established prior to the effective date of the Act or this SMP, or amendments thereto, but which does not now conform to the use and development standards of the Draft SMP. Nonconforming development may individually or cumulatively impact shorelines as the structures do not adhere to the most recent regulations identified in the Draft SMP, which are based on current conditions and technical information.

5.11.2 SMP Provisions

Within the shoreline, the expansion or structural alteration of nonconforming dwelling units may be permitted provided that it does not bring such development further from compliance with this SMP. For example, a building or structure encroaching into a shoreline setback must not further encroach into the shoreline setback. Nonconforming uses, excluding residential units, may not expand. Proposed accessory uses and appurtenance structures (sheds, garages, decks, etc.) to nonconforming dwelling units must conform to all applicable requirements of the SMP.

5.12 Other Impacts

In addition to the development types discussed above, the following uses have the potential to impact shorelines in Skamania County: commercial and industrial development, utility development, transportation, and signage.

Unanticipated and incremental impacts within the county's shoreline jurisdiction are mostly likely to result from shoreline uses or activities that do not meet the thresholds requiring a substantial development permit or statement of exemption. Unanticipated impacts are impacts that cannot be reasonably identified at the time of master program development. Incremental impacts are small impacts associated with existing and ongoing development that can result in cumulative impacts over time.

The SMP contains several mechanisms that are intended to offset potentially adverse unanticipated and incremental impacts. These mechanisms include the following.

1. A statement of exemption is required for all developments or actions that do not meet the substantial development threshold. The statement of exemption must demonstrate how the proposed action complies with the SMP.

2. Conditional use permits are required for all unidentified use and development activities that are not listed by the master program.

3. Mitigation sequencing will be applied during permit review for each proposal to ensure that impacts are handled in a priority order, with avoidance being the first priority.

4. Voluntary restoration activities and programs are encouraged, as summarized in the shoreline restoration plan.

Impacts of development, which will be evaluated on a case-by-case basis at the time permits are sought, will be mitigated largely through the SMP's general regulations for vegetation conservation, buffers, stormwater LID, and shoreline modifications as described above, and are summarized in Table 12. The table includes foreseeable uses and developments, their effects, and the proposed regulatory offsets. This includes effects of uses/developments that require a shoreline permit and those that are exempt from a shoreline permit.

Table 12. Summary of Foreseeable Development

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Agricultural practices and construction (including structures and irrigation facilities)	Local and commercial agriculture zoning and ongoing agricultural activities exist primarily in the lower portion of the County. The SMP does not apply retroactively to existing agricultural operations, including maintenance, repair, or replacement of existing facilities.	Within shoreline jurisdiction, grading for cultivation removes riparian vegetation, affecting water quality (e.g., temperature) functions and nutrient inputs to aquatic environment (e.g., excessive nutrients from fertilizers; lack of nutrients from lost large woody debris recruitment); Irrigation facilities (e.g., diversions, channels, pumps) alter hydrologic processes (timing and volume of flows) and drainage patterns.	Some expansion of agriculture can be anticipated in the foreseeable future, though this expansion could be offset by current agricultural lands taken out of production or converted to other uses.	New agricultural development (e.g. a new facility at an existing operation, or a new farm start-up operation) shall conform to the provisions of the Master Program. The SMP establishes standards for shoreline and water quality protection that will likely limit impacts of new agricultural development. New infrastructure enabling water withdrawals may reduce downstream water quantity.	New agricultural activities must be managed to minimize impacts to shoreline environments, specifically to reduce livestock intrusion into the water, water quality contamination from the use of fertilizers and pesticides, and bank erosion. The SMP does not specifically address irrigation infrastructure other than an 'Agricultural Facility' , although in-stream structures such as pumps are regulated and utilities are regulated to ensure no net loss.	Department of Ecology Concentrated Animal Feeding Operation General Permit (NPDES); Department of Ecology and Department of Agriculture pesticide application permits; Department of Ecology Reservoir Permit, Water Right Change, or New Water Right Permit; HPA permitting process. County building permits

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Aquaculture	Five aquaculture facilities exist on Skamania County's shorelines. Two fish hatcheries are operated by the WDFW and both are located in Washougal. In addition, national fish hatcheries are located along the Wind River, the Little White Salmon River, and the Columbia River.	Infrastructure associated with aquaculture operations can affect longshore transport of sediment. If not properly located, aquaculture operations can also impact submerged aquatic vegetation.	Aquaculture is a water-dependent use, and when consistent with control of pollution and avoidance of adverse impacts to the environment and preservation of habitat for resident native species, is a preferred use of the shoreline under the SMP. Current operations are dependent on water quality, and a future expansion of aquaculture would only occur if water quality is maintained.	If undertaken in accordance with the SMP and other regulatory provisions, expansion of aquaculture operations is unlikely to result in negative impacts to shoreline processes or functions.	Siting of new aquaculture facilities must avoid conflicts with other water-dependent uses, such as recreational facilities; consider the impacts from aquaculture facilities on water quality, temperature, flows, oxygen content, and adjacent land uses; give preference to water-dependent portions to be located near to, over, or in the water.	WDFW Aquaculture Registration and Transfer Permit; Department of Health Aquatic Farm Registration and Shellfish Operation License; Department of Natural Resources Aquatic Use Authorization; NPDES permits for waste discharge.
Boating Facilities (docks, piers, buoys, and boat launches)	Commercial, public, and private piers and docks exist in isolated locations in Skamania County. There are a series of residential docks and piers associated with vacation homes.	Light, wave energy, substrates, WQ… Boat launches affect sediment transport and can contribute to degradation of habitat.	Demand for expansion of existing marinas or construction of new marinas and boat launches can be expected to accompany population growth at the county and regional level.	SMP regulations require new boat launches to be sited away from ecologically sensitive areas, and for mitigation to accompany any disruption of shoreline processes. Cumulative impacts are unlikely if activities are in accordance with the SMP.	New docks are allowed only for water-dependent uses or public access. New and expanded moorage structures must be designed to minimize impacts.	HPA permitting process (WDFW); Corps of Engineers Section 10 permit; SEPA and potential for mitigation. County critical areas requirements.

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Commercial Use	Commercial land uses within Skamania County shoreline jurisdiction are generally found in the southern portion of the County, including in the Carson and Home Valley CRGNSA gorge urban areas and along the Washougal River in the West End.	Impervious surfaces associated with commercial development can increase the rate of runoff, affecting water quality and quantity downstream. Waterfront commercial development can include docks and other structures that impact sediment transport and tidal processes. Improper containment of pollutants and chemical spill risks affect water quality.	The County's Comprehensive Plan identifies commercially zoned lands available for future development. These lands are located in existing population centers, in the southern portion of the County.	Impacts to shoreline functions and processes are unlikely within the current regulatory structure and if development is carried out according to the SMP. There is the possibility of incremental cumulative impacts caused by existing developments.	Water-dependent commercial uses will be given preference over water-related uses. Non-water oriented commercial development will not be allowed unless certain exceptions are met. Public access and ecological restoration must be considered as potential mitigation.	Skamania County building permits; NPDES Construction Stormwater General Permit and Coverage; NPDES Individual Permit for wastewater discharge to surface waters.
Enhancement and Restoration	A variety of restoration efforts are underway or planned in Skamania County, including stream restoration.	Shoreline processes such as sediment supply and transport, channel migration, and LWD recruitment can benefit from restoration. Habitat functions provided.	Funding opportunities for restoration benefiting salmonids and nearshore areas are increasing, and the restoration of the Gorge is a high priority at the state level. Restoration opportunities will likely increase in the foreseeable future.	Beneficial effects by restoring shoreline ecological functions and processes where they have been degraded	SMP Restoration Plan establishes policy basis and priorities for shoreline restoration actions. County to rely on partnerships to complete planning and on-the-ground efforts.	Specific projects would be developed in concert with a variety of stakeholders, permitting agencies, and/or funding sources.

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Flood Control Structures	Approximately 13 dams are located throughout the County, including the Bonneville Dam. There is no publicly available information on bulkheads, dikes, or levees in the county. This data gap is identified in the Inventory and Characterization Report and the Restoration Plan.	Levees and dikes isolate rivers from their floodplains, restricting channel migration. Dams can interrupt the passage of sediment, affecting sediment supply and thereby altering habitat functions.	The construction of additional dikes and levees is highly unlikely in the near future due to the current regulatory framework.	Flood control structures such as dikes and levees can cause significant damage to aquatic habitats. The construction of new flood control structures is, however, unlikely in the near future.	Structures that prevent the migration of salmonids shall not be allowed in the portion of water bodies currently or historically used by anadromous fish. Fish bypass facilities shall be provided that allow the upstream migration of adult fish and shall prevent juveniles migrating downstream from being trapped or harmed. This standard does not apply to existing dams regulated by the Federal Energy Regulatory Committee licensing process.	HPA permitting process; Army Corps of Engineers 404 and/or Section 10 permits; Department of Ecology Dam Construction and/or Reservoir permit; NEPA; SEPA and potential for mitigation.
Forest Practices	Much of the County's land base in upper watershed is in commercial forestry. Activities generally have effects at watershed scale which can result in site-specific degradation.	Hydrology and sediment processes most directly affected at watershed scale.	Forestry is and will remain an important economic activity to Skamania County.	Poorly functioning forestry roads will likely continue to contribute fine sediments to riverine aquatic environments. Landslides associated with these roads and road failure due to channel migration is also possible.	Proposed forest practices within County shorelines must result in no net loss of shoreline ecological functions.	Forest Practices Act (RCW 76.09); WAC 222, as amended; 1999 Forest and Fish Report implementing rules.

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Industrial/ Port Use	Skamania County has a limited number of existing industrial land uses. Industrial land uses within the County can generally be found along the Columbia River, and within the Carson Subarea.	Waterfront industrial development can include docks and other structures that impact sediment transport and tidal processes. Improper containment of pollutants and chemical spill risks affect water quality	The County's Comprehensive Plan identifies industrial zoned lands available for future development. These lands are located in existing population centers, in the southern portion of the County.	Possible impacts from new industrial development are difficult to foresee without the knowledge of where this development might be located. If activities within or near the shoreline jurisdiction are undertaken according to the SMP, impacts to processes and functions are unlikely.	When permitted, industrial development must be located, designed and constructed in a manner that assures no net loss of shoreline ecological functions, resources and values. Over-water construction of non-water-dependent industrial uses is prohibited.	Skamania County building permits; NPDES Individual Permit for wastewater discharge to surface waters; HPA permitting process and USACE Section 10 permit for port developments impacting aquatic areas.
Mining	Mines (primarily rock, stone, and gravel) are operated by private landowners are located throughout the County. Per the DNR, there are currently 9 active surface mines permitted in the county, operated by different landowners. Size varies from 10 acres to 160 acres (DNR 2016).	Clearing/Veg removal; Sediment input to freshwater bodies can increase as a result of mining, decreasing water quality. Mining within floodplains can alter channel morphology and decrease habitat functions.	Other mineral resource lands may be developed over time.	Review of potential environmental impacts during metal mining permitting is extensive. Combined with SMP policies and regulations, this framework makes impacts to shoreline processes and functions unlikely.	Most mining requires a CUP. The location of mining operations within shoreline jurisdiction to be based on a finding that such location is necessary because of the location of specific mineral resources, or that transportation and economic factors necessitate location near the shoreline.	State Surface Mining Act (RCW 78.44).

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
On-site Septic Systems	Most on-site septic systems in County are associated with rural residential and agricultural land uses.	Failing on-site septic systems may affect water quality by introducing pathogens in the hyporheic, riverine. Functioning on-site systems may also affect water quality with the introduction of excess nutrients in the hyporheic, riverine.	Under Washington State's Growth Management Act (GMA), sewer systems are generally not allowed outside of urban growth areas. On-site septic systems are likely to accompany residential and commercial development in rural areas of Skamania County.	On-site septic systems within the shoreline jurisdiction or in proximity to waters of the state may contribute to increased nutrient loading in the foreseeable future, and failing on-site systems may contribute pathogens to aquatic environments of the County.	Any existing septic system or other on-site system that fails or malfunctions will be required to connect to an existing municipal sewer service system if feasible, or make system corrections approved by Skamania County Community Development Department.	Septic permit through Skamania County.

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Recreational Development	Parks and other recreational facilities are located throughout the County.	Infrastructure associated with parks – such as boat ramps and docks – can interrupt sediment transport processes, contribute to scouring of the upper intertidal zone, and alter habitat functions associated with eelgrass. Water quality can be impacted in areas where wastewater/stormwater is not properly treated. Development often requires parking and other infrastructure.	As part of its county-wide planning process, Skamania County has developed a Parks and Recreation Master Plan (updated in 2016). The 2016 plan focuses on maintaining and improving existing recreational facilities, rather than developing new facilities.	Park and recreation facilities that do not require structures are unlikely to impact shorelines processes and functions. However, Access areas lacking adequate facilities for parking, trash & human waste may contribute to degraded conditions Facilities involving new structures are subject to permitting requirements and regulations of the SMP, which require the maintenance or improvement of shoreline functions. Foreseeable impacts are unlikely.	Within shoreline jurisdiction, water-oriented recreational facilities are the priority. Non-water-oriented facilities are permitted as conditional uses in the Rural Conservancy and High Intensity environments, but only after water-oriented facilities have been shown not to be feasible. Public access should be incorporated into all recreational projects. New recreational facilities shall be developed in compliance with the Skamania County Parks and Recreation Master Plan.	Appropriate permits from Skamania County.

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Residential, Single-family Development (and accessory or appurtenances)	Single-family residential uses make up the vast majority of Skamania County's developed shorelines. Many property owners are unaware that normal maintenance & repair has long been exempt from shoreline permit but must adhere to standards.	Clearing and grading for single-family development within shoreline jurisdiction removes riparian vegetation, affecting water quality & habitat functions. Chemical application related to landscaping and maintenance of pavement & roofs can also affect water quality by increasing contaminants and nutrient loading. Impervious surface effects on stormwater & hydrology;	Most development will be single-family residential on previously vacant parcels. Some amount of redevelopment/in-fill for existing homes, and a lesser degree of multi-family homes is anticipated.	Population growth throughout the County may create pressure to convert lands currently used for agriculture or forestry to residential uses. Residential land uses may typically result in associated shoreline modifications (i.e., vegetation clearing, grading, and shoreline structures such as piers, docks, bulkheads, etc.) that can affect shoreline functions.	New residential uses and non-water-oriented appurtenant structures such as garden sheds, garages, and guest houses, must adhere to the setback standards. Stormwater, vegetation, critical areas and shoreline stabilization provisions must be met.	Appropriate permits from Skamania County.
Shoreline Stabilization	Shoreline stabilization measures are sparsely located throughout the county.	Riprap and other armoring/hardening along stream banks can restrict channel migration and cause unintended effects to adjacent properties.	Additional shoreline stabilization measures are most likely to accompany necessary public infrastructure (including maintenance of existing and new), such as roads. Policies and regulations of the SMP strongly discourage new development where shoreline stabilization would be necessary.	Shoreline stabilization is typically highly detrimental to sediment transport processes and habitat. New hard, structural stabilization measures are, however, restricted to instances when existing structures or uses are at risk from erosion within a three-year timeframe.	All proposals for shoreline stabilization structures must not result in a net loss of ecological functions, and must be the minimum size necessary. Soft approaches must be used unless demonstrated not to be sufficient for protection.	HPA permitting process; Department of Ecology Water Quality Certification; Army Corps of Engineers 404 and/or Section 10 permits; SEPA and potential for mitigation.

Shoreline Use/ Activity	Current Status	Relevant Shoreline Processes Affected	Foreseeable Use & Development	Foreseeable Impacts & Effects	SMP Provisions	Other Regulatory Programs
Transportation & Utility Facilities	Transportation infrastructure and utility corridors are generally more common in the more developed southern watersheds, while extensive unpaved USFS roads exist within upper river basins.	Roads can constrict river and/or stream channels, limit channel migration, contribute pollutants to riverine environments, and increase sediment deposition in waters of the County.	Based on policies and regulations set forth in the SMP, the addition of new roads within the shoreline jurisdiction is unlikely. In addition, the County's Transportation Element shows that no capacity-related transportation improvements are necessary to meet estimated future traffic growth.	Road maintenance projects have the potential to temporarily increase erosion and associated sediment input to aquatic environments, but impacts are not likely due to the implementation of BMPs. Other impacts are unlikely as new transportation infrastructure is to be located outside of the shoreline jurisdiction. Utilities related to residential development are considered appurtenances, discussed below.	Requirements that new roads, parking, and primary utility facilities (e.g., stormwater treatment ponds, wastewater pump stations, electrical substations, etc.) be located outside shoreline jurisdiction or as far away from the shoreline as possible.	Allowed facilities such as stormwater or wastewater outfalls would require WDFW and/or USACE permits for in-water work.

6.0 OTHER PROGRAMS

County, state, and federal programs and regulations work in concert with the SMP to protect shorelines and accommodate appropriate shoreline uses. In addition, there are non-regulatory programs that provide resources and implement voluntary actions to protect and restore the county's shorelines. The following regulatory and non-regulatory programs apply within and/or outside of shoreline jurisdiction and therefore have direct and/or indirect influence on shorelines. These other programs will continue to support the overall goals and policies of the SMP and have beneficial effects on the health and function of the county's shorelines.

6.1 County Programs

In addition to the SMP, several local programs and mechanisms are available to help guide development and protect shorelines. These include, but are not limited to, local regulations as adopted by the Skamania County Code, the County Water Quality Program, and planning documents (e.g., the comprehensive plan, subarea plans).

Skamania County Code (SCC): Various sections of the code regulate development in ways that benefit the county's diverse shoreline environments. These regulations are focused on surface water management, flood damage prevention, clearing and grading activities, land use and development standards including management of environmentally critical areas, and LID techniques. The local regulations that are most relevant to shoreline development within the County's jurisdiction include, but are not limited to, SCC Title 15 "Buildings and Construction," Title 16 "Environment", Title 20 "Shoreline Management," Title 21 "Zoning", and Title 22 "Columbia River Gorge National Scenic Area."

Skamania County Water Quality Program: The focus of the County's Water Quality Program is to protect public health by identifying surface waters in the county that are impaired by bacterial contamination, prioritizing them for clean-up, and conducting pollution identification and correction projects to identify and correct sources of pollution (typically on-site sewage systems and animal waste). The program also conducts lake swimming beach monitoring, and responds to sewage spills and water quality complaints.

Skamania County Draft Multi-Jurisdictional Hazard Mitigation Plan (2010)

This plan was a joint effort among representatives of unincorporated Skamania County, the Cities of North Bonneville and Stevenson, special purpose districts, businesses, other agencies, and private citizens throughout the county. Purpose of the plan is to minimize the losses that can result from natural hazards.

6.2 State Regulations

A number of state agencies have regulatory jurisdiction over resources in the County's shoreline jurisdiction. As with local requirements, state regulations apply throughout the county and significantly reduce the potential for cumulative impacts to shorelines.

The major state regulations affecting shoreline-related resources include, but are not limited to:

Aquatic Lands Act (RCW 79.105 through 79.135): This statute directs the Washington Department of Natural Resources (WDNR) to manage state-owned aquatic lands to achieve a balance of public benefits, including public access, navigation and commerce, environmental protection, renewable resource use, and revenue generation when consistent with other mandates. If a proposed project requires the use of state-owned aquatic lands, then the project may be required to obtain an Aquatic Use Authorization from WDNR.

Forest Practices Act (RCW 76.09): This Act regulates activities that relate to growing, harvesting, and processing timber. The Forest Practices Board is an independent state agency that defines rules and regulations for forest practices. The rules are designed to protect public and natural resources such as water quality and fish habitat. The WDNR administers the publication of the Forest Practices Board rules, along with guidance and other technical information. Specific rules involving water quality protection must be approved by Ecology prior to Forest Practices Board adoption.

Hydraulic Code (RCW 77.55): This code gives WDFW the authority to review, condition, approve, or deny any construction activity that may use, divert, obstruct, or change the bed or flow of state waters. These types of projects must obtain a Hydraulic Project Approval from WDFW, which will contain conditions and site-specific BMPs to limit damage to aquatic species and their habitats.

State Environmental Policy Act (SEPA) (RCW 43.21C): This Act provides a tool to identify and mitigate potential environmental impacts that may result from government decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies, or plans. This information can be used to consider project options, modify a proposal to reduce likely impacts, to apply approval conditions, or to deny a proposal based on its adverse environmental impacts. Ecology is the legislative authority for SEPA with local government and project applicants required to follow the established process for determining if the impacts will be significant.

Water Pollution Control Act (RCW 90.48): All projects affecting surface waters in the state, including those that are not subject to sections 404/401 of the federal Clean Water Act, must still comply with the provisions of the state's Water Pollution Control Act. Ecology is the lead agency for implementing this law.

Watershed Planning Act (RCW 90.82): This statute was passed in 1998 to encourage local planning of local water resources, recognizing that local citizens and entities in each watershed have the strongest knowledge of, and the greatest stake in, the long-term management and protection of these water resources. Skamaniaand other counties

formed watershed planning units in order to develop long-range watershed management plans for the Grays- Elochoman and Cowlitz watersheds (WRIAs 25 and 26), the Salmon, Washougal and Lewis watersheds (WRIAs 27 and 28), and the Wind River and Little White Salmon watersheds (portions of WRIA 29). The plans and associated detailed implementation plans were adopted by the watershed planning unit in 2006 and updated in 2013. Ecology is the lead agency for implementing this law.

6.3 Federal Regulations

In addition to state and local regulations, a number of federal agencies have regulatory jurisdiction over resources in the County's shoreline jurisdiction. As with local requirements, federal regulations apply throughout the county and significantly reduce the potential for cumulative impacts to shorelines. The major federal regulations affecting shoreline-related resources include, but are not limited to the following.

Clean Water Act: This federal statute requires states to set standards for the protection of water quality. It also regulates excavation and dredging in waters of the U.S., including lakes, streams, and wetlands. Certain activities affecting shorelines, including all in-water work, require a permit from the U.S. Army Corps of Engineers (USACE) and/or Ecology under Section 404 and Section 401 of the Act, respectively. Aquaculture operations; the construction of bulkheads, docks, launching ramps, and beaches; and shoreline restoration projects all have the potential to require permits under Section 404 and Section 401. The USACE and Ecology review all projects and require mitigation for adverse impacts.

Columbia River Gorge National Scenic Area Act: The Columbia River Gorge holds federally protected status as a National Scenic Area and is managed by the Columbia River Gorge Commission and the USFS. Land use proposals must meet the requirements set by the Gorge Management Plan to protect and enhance the scenic, cultural, natural and recreational resources. The varied landscape supports agriculture and timber, residential and commercial, and open space uses.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): This act established requirements for closed and abandoned hazardous waste sites, liability for releases of hazardous waste at these sites, and a fund to provide for cleanup when responsible parties are not identified. Any development activity within the County's shoreline jurisdiction that takes place below the OHWM of a water of the United States or a water of the state will trigger the need for review by federal or state agencies.

Endangered Species Act (ESA): Section 9 of the ESA prohibits the "take" of federally listed species by any individual, organization, or agency, including the County. "Take" is defined by the ESA as actions to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage with a listed species. Section 7 of the ESA requires the USACE to consult with the National Oceanic and Atmospheric Administration

(NOAA) Fisheries (formerly the National Marine Fisheries Service) and the U.S. Fish and Wildlife Service on any projects that may fall within the USACE's jurisdiction that could affect listed species. NOAA approved the Lower Columbia Salmon and Steelhead ESA Recovery Plan in 2013, which provides the framework for recovering ESA-listed salmon and steelhead in the Lower Columbia region to healthy and harvestable levels. NOAA also approved the ESA Recovery Plan for the White Salmon River Watershed 2013.

National Pollutant Discharge Elimination System (also under the federal Clean Water Act): Ecology regulates activities that result in wastewater discharge to surface waters from fish hatcheries and acclimation ponds, industrial facilities, sand and gravel operations, and municipal wastewater treatment plants. These permits are also required for stormwater discharges from industrial facilities and construction sites of one or more acres.

Rivers and Harbors Act Section 10: This section of the Act gives the USACE the authority to regulate structures and activities that may affect navigable waters of the U.S., which are waters that are subject to the ebb and flow of the tide and have been used, presently used, or may be used, to transport interstate or foreign commerce. Proposals to construct new or modify existing in-water structures, excavate or dredge, etc. within Section 10 waters, must be reviewed and approved by the USACE.

Wild and Scenic Rivers Act: Congress created the National Wild and Scenic Rivers System in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Upper White Salmon Wild and Scenic Rivers Act was signed into law August 2, 2005, designating 20 miles of river segments of the main stem of the White Salmon River and Cascade Creek as a component of the National Wild and Scenic Rivers System. The act prohibits federal support for actions such as the construction of dams or other instream activities that would harm the river's free-flowing condition, water quality, or outstanding resource values.

6.4 Non-Regulatory Programs

During the SMP update process, Skamania County developed a shoreline restoration plan that sets a framework under which shoreline restoration can be successfully achieved and provides specific recommendations for restoring the county's shorelines (Skamania County 2016c). The plan builds on and incorporates information from the County's inventory and characterization report (Skamania County 2016b) and other ongoing local and regional efforts to understand and manage the county's diverse shorelines. As required by the SMP guidelines (WAC 173-26-201), the Restoration Plan includes the following key elements of the shoreline restoration planning process:

- Identification of degraded areas, impaired ecological functions, and sites with potential for ecological restoration.

- Establishment of overall goals and priorities for restoration of degraded areas and impaired ecological functions.
- Identification of existing and ongoing projects and programs that are currently being implemented which are designed to contribute to local restoration goals.
- Identification of timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals.

The Restoration Plan identifies shorelines that are high priorities for restoration, shorelines that have good restoration potential, and specific actions that can be taken throughout the county to improve shoreline conditions. Examples of restoration actions identified in the plan include areas where shoreline vegetation can be enhanced through planting, areas where overwater structures can be removed or replaced with more environmentally friendly designs, and culverts that can be removed/replaced to restore fish passage. As components of the plan are implemented either voluntarily or as mitigation for development impacts, the County expects to see a gain in shoreline ecological functions, which will counteract some of the incremental and cumulative effects of past and future development to improve shoreline conditions over time.

Table 13 describes other non-regulatory programs/organizations that are active in restoring, protecting, and educating the public about Skamania County shorelines. The organizations and agencies carrying out these programs have all previously implemented projects that have enhanced the shoreline environment or that have taken initial steps towards enhancement and protection of resources.

Table 13. Role of Non-Regulatory Programs/Organizations in Shoreline Management

Program/Organization	Mission Statement	Role in Restoration and Protection of County Shorelines
Columbia Land Trust	Columbia Land Trust conserves and cares for landscapes in the Northwest with a focus on providing well-being and an unrivaled quality of life.	• Multi-year floodplain restoration project for Hood River, including levee removal, LWD placement, and habitat restoration. • Forest thinning along the Little White Salmon in Skamania County. •
Columbia River Gorge Commission	Created to develop and implement policies and programs that protect and enhance the scenic, natural, cultural and recreational resources of the Gorge, while encouraging growth within the existing urban areas.	• Works with USFS to set policy for protecting the non-federal lands in the Gorge. • Serves as appeals board for land use decisions, supports counties in administering ordinances, and encourages economic development.
Friends of the Columbia Gorge	Vigorously protects the scenic, natural, cultural, and recreational resources of the Gorge. Friends fulfills this mission by ensuring strict implementation of Columbia River Gorge National Scenic Area Act and other laws protecting the region of the Columbia River Gorge; promoting responsible stewardship of Gorge land, air, and waters; encouraging public ownership of sensitive areas; educating the public about the unique natural values of the Columbia River Gorge and the importance of preserving them; and working with groups and individuals to accomplish mutual preservation goals.	• Works with government agencies and other groups to ensure private land is brought into public ownership (over 41,000 acres since their founding). • Formed Friends of the Columbia Gorge Land Trust, 509(a)(3) support organization, to acquire critical lands in the Gorge. • Reviews and comments on development applications submitted to County planning offices in every Gorge county. Comments have helped ensure sensitive, ecological development. Over the years, Friends has appealed less than two percent of the counties' decisions. • Leads annual guided Gorge hikes and outings, hosts special events, and nurtures the next generation of Gorge protectors through outdoor youth education programs.
Friends of the White Salmon	Works to protect White Salmon River and its watershed in order to restore and preserve the river and riparian habitats. Group achieves this through education and advocacy but also through financial support of critical causes and recreation.	• Develops comprehensive river management plans. • Organizes volunteering events. • Advocates policies that benefit the river.

Program/Organization	Mission Statement	Role in Restoration and Protection of County Shorelines
Lower Columbia Fish Enhancement Group (LCFEG)	LCFEG engages local communities to foster private stewardship and to create sustained habitat restoration and community-supported salmon recovery strategies within watersheds.	• LCFEG activities emphasize intensive habitat restoration projects that include fish passage projects and riparian revegetation, project effectiveness monitoring, and assessments of important habitat functions that limit salmon productivity.
Lower Columbia Fish Recovery Board	Coordinates the implementation of plans to restore and manage our water and fish to abundance into the future. Their work is science-based and reflects the aspirations of our region. The plans and their implementation serve as the basis for all fish recovery by all groups seeking federal, state, and private funding for restoration projects and innovative strategies.	• Writes and coordinates the implementation of plans to restore and manage water and fish resources. • Salmon recovery projects (including the current Trout Creek restoration project in Skamania County) • Habitat restoration • Watershed planning • Watershed monitoring
Northwest Power and Conservation Council (NPCC)	Mission is to ensure, with public participation, an affordable and reliable energy system while enhancing fish and wildlife in the Columbia River Basin.	• Runs the Columbia River Basin Fish and Wildlife Program. • As part of the program, develops 59 subbasin management plans.
Underwood Conservation District (UCD)	Engages landowners and land users throughout Skamania and west Klickitat Counties in the conservation, enhancement, and sustainable use of natural resources through voluntary stewardship.	• A legal subdivision of state government that administers programs for the productive use and conservation of natural resources. • Provides technical assistance, cost-share assistance, project and water quality monitoring, community involvement and education, and support of local stakeholder groups within the district. • Works with willing and interested landowners in implementing conservation practices.
Wild Fish Conservancy (formerly Washington Trout)	Seeks to improve conditions for all of the Northwest's wild fish by conducting important research on wild-fish populations and habitats, advocating for better land-use, harvest, and hatchery management, and developing model restoration projects.	• Projects that restore ecological processes and benefit wild fish stocks.

7.0 NO NET LOSS ANALYSIS

Per the SMA guidance, an SMP must allow "the utilization of shorelines for economically productive uses that are particularly dependent on shoreline location and provides preferential accommodation of single-family uses" while achieving "no net loss" of ecological functions. As this analysis shows, Skamania County's Draft SMP balances standards of protection to shorelines while allowing and accommodating appropriate shoreline uses and developments justifying that the no net loss standard has been satisfied.

The Draft SMP protects shorelines while still accommodating preferred shoreline uses and recognizing private property rights. The proposed regulations are based on a detailed inventory of ecosystem-wide and shoreline reach conditions as well as detailed knowledge about threats facing shoreline resources.

The components of the proposed SMP that will protect, enhance, and restore shoreline functions within the County's jurisdiction while ensuring no net loss of ecological functions include the following:

1. Shoreline environment designations to protect or enhance the current or desired character of shorelines.

2. General policies and regulations intended to protect the shoreline functions, as well as policies designed to protect specific shoreline functions, such as water quality, water quantity, vegetation, and habitat.

3. Specific vegetation conservation standards combined with use setbacks to protect shoreline ecological functions;

4. Critical areas regulations to provide protections for wetlands, fish and wildlife habitat, critical aquifer recharge areas, flood hazard areas, and geologically hazardous areas.

5. Local, state, and federal regulations to ensure that shoreline impacts are avoided, minimized, and/or mitigated.

6. Restoration activities and programs that are expected to improve shoreline functions. These non-regulatory enhancement and restoration activities are likely to offset or minimize potentially adverse unanticipated and/or incremental cumulative impacts within the County's shoreline jurisdiction.

The proposed regulatory and non-regulatory provisions of the SMP are based on a detailed inventory of ecosystem-wide and shoreline reach conditions as well as detailed knowledge about threats facing shoreline resources. Nearly all the shorelines (cumulatively 97 percent) in the county are designated Aquatic, Natural, or Rural Conservancy, which are the most restrictive designations and offer the highest level of

protection. With these designations and the regulations that they trigger, shoreline uses and modifications such as bulkheads, residential docks, and piers will be restricted to appropriate areas and, when allowed, required to mitigate for impacts. With regard to forest practices, the Draft SMP includes regulations that are fully consistent with the SMP guidelines and with Ecology directives related to regulating timber harvest.

One of the primary ways that no net loss is achieved in the SMP is through vegetation conservation provisions. Because the SMP does not rely on shoreline buffers, the SMP contains detailed and robust vegetation conservation provisions combined with use setbacks in Table 5-1 of the SMP. The draft SMP proposes what is known as a "setback-only" approach, which employs use setbacks and vegetation conservation provisions, but does not use buffers as is common in other SMPs. Section **Error! Reference source not found.** below elaborates on the particulars of the Draft SMP regulations on Vegetation Management and how the no net loss standard has been satisfied with the proposed setback-only approach.

7.1 Vegetation Conservation

WAC 173-26-221(5) requires that SMPs address vegetation conservation, but is not prescriptive as to how this is accomplished. Most communities use some combination of setbacks, riparian buffers, and vegetation conservation provisions. However, not all communities use buffers. Since the proposed setback-only approach with vegetation conservation provisions in the draft SMP does not include riparian buffers, Ecology has requested that additional scientific justification be provided, to show that no net loss of ecological functions is achieved.

7.1.1 Vegetation Conservation in Science and Ecology Guidance

As a first step in demonstrating that the vegetation conservation provisions achieve no net loss, BergerABAM reviewed key findings of the scientific literature and Ecology guidance. The following Ecology guidance and science-based documents were reviewed:

- Ecology's SMP Handbook, Chapter 11, "Vegetation Conservation, Buffers and Setbacks"
- Ecology's Wetlands in Washington State Volume 2 - Guidance for Protecting and Managing Wetlands
- WDFW's Management Recommendations for Washington's Priority Habitats: Riparian

The guidance in Chapter 11 of Ecology's SMP Handbook focuses on the provision of buffers to protect shoreline vegetation. Per Ecology, buffers are "naturally vegetated areas adjacent to water bodies that protect the ecological functions of the shoreline and help to reduce the impacts of land uses on the water body… Buffers provide a transition between the aquatic and upland areas." Ecology guidance acknowledges that

"alternatives to strict buffer or setback with vegetation conservation may be acceptable, if they protect shoreline functions." Buffers and setbacks are the standard approach Ecology expects jurisdictions to use. If alternative approaches are used (e.g., a setback-only approach with no shoreline buffers), jurisdictions must demonstrate these approaches achieve no net loss. The following excerpts from the SMP Handbook summarize Ecology guidance with regard to how buffer regulations should be constructed and tailored to local circumstances.

- Buffer width versus function:

  When determining the buffer width, the potential risk to ecological functions should be considered. According to the scientific literature, the buffer widths to protect shoreline ecological functions vary according to the parameter observed and the site conditions of the study.

- Tailoring buffer widths:

  Alternatives to a strict buffer or setback with vegetation conservation may be acceptable if they protect shoreline functions. The buffers and setbacks for marine and freshwater shorelines should be tailored to local conditions including existing shoreline functions and existing and planned land use and public access.

- Logical process:
  - Use the inventory and characterization report to establish existing conditions and functions as inputs to buffer width;
  - Review the scientific literature;
  - Use the critical areas ordinance buffers as a starting point; and
  - Get public input on the social value of buffers (aesthetics, views, property values).

- Ecology's review:

  Ecology expects that most SMPs will include buffers (or setbacks with vegetation conservation requirements) to protect the existing ecological functions of the shoreline.

  Buffer sizes, setbacks and development regulations will vary among jurisdictions because they are tailored to local conditions and the shoreline ecological functions that are present. A buffer that is appropriate for one shoreline is not appropriate for all shorelines.

  Buffer widths: Ecology recommends 150 to 200-foot buffers on undeveloped shorelines and 150-foot buffers in rural residential areas.

The following summarizes key findings of the scientific literature supporting the provisions of the SMP as developed per guidance provided by Ecology regarding construction and tailoring of regulations:

- ***The value and functions of buffers:*** Scientific literature shows that there is agreement within the scientific community that intact vegetation adjacent to waterbodies is highly beneficial and the restricted use of riparian habitat is needed to retain the functions of aquatic and riparian ecosystems.

  In addition to considerations of ecological functions and values, Ecology recommends considering that buffers and setbacks provide social and economic value, including aesthetic and safety benefits. Scientific literature shows that intact and protected shorelines filter pollutants and provide water purification; help alleviate the impacts of flooding, protect people and property; reduce bank cutting and erosion; maintain stream flows during dry periods; and support recreation. Shoreline and riparian areas have also been shown to have intrinsic values that improve quality of life (WDFW, Management Recommendations for Washington's Priority Habitats: Riparian).

- ***Buffer widths:*** There is little agreement on the specific width needed to protect these functions. In general, wider widths better preserve more ecological functions, but studies have shown that varying widths are necessary to protect individual functions. WDFW recommends considering local conditions when determining the width of protective areas. Considerations for determining the width of protective setbacks may include the size of a waterbody, identifying specific functions that require protection (based on existing or anticipated threats), and/or priority species in the area that need additional riparian area width for sufficient protection, among others. Additionally, WDFW states that site-specific variables will affect the necessary width to retain functions, and widths may be modified accordingly if adequate local information exists (WDFW, Management Recommendations for Washington's Priority Habitats: Riparian).

- ***Mitigation for impacts:*** Ecology's guidance and supporting scientific literature recommend implementing mitigation measures to offset impacts to shorelines and shoreline vegetation resulting from development.

The information provided above shows that both Ecology's guidance, and the scientific literature it is based on, reinforce that riparian vegetation protects and improves shoreline ecological, social, and economic functions, but there is little consensus on the specific widths necessary to protect all functions. Both the guidance and the literature recommend tailoring protective buffer widths to local conditions and anticipated threats to protect the ecological, economic, and social functions and values provided by shorelines and riparian areas. Where impacts are unavoidable, mitigation should be provided.

7.1.2 Vegetation Conservation Provisions in the SMP

This subsection describes the vegetation conservation provisions proposed in the SMP. Ecology has approved a variety of methods for vegetation conservation and setbacks in

other communities ranging from the use of a simple setback with no buffer to more complicated regulatory frameworks involving a combination of buffers, critical areas regulations, and setbacks.

The SMP vegetation conservation provisions apply to any activity, development, or use that results in the removal of or impact to native shoreline vegetation, whether or not that activity requires a shoreline permit. The Draft SMP seeks to prevent impacts caused by vegetation removal by implementing shoreline vegetation conservation policies and regulations that do not prevent all shoreline uses, but, where impacts are unavoidable, by requiring that clearing, vegetation management, and development activities be limited to the minimum necessary to accommodate approved shoreline development, and that impacts to shoreline vegetation be mitigated sothat no net loss of ecological functions results.

Some of the specific Draft SMP policies and regulations include the following:

- Shoreline vegetation should be conserved, encouraging new development, use, or shoreline activities in previously degraded areas in order to preserve ecological functions.

- The County should encourage residents and those applying for building permits to participate in the Skamania County Noxious Weed Control Program and the Skamania County Master Gardeners training to educate the community and help preserve native vegetation and limit the spread of noxious species.

- Clearing should be limited to the minimum necessary to accommodate approved development. Mitigation sequencing per SMP Ssection 3.4 must be applied unless specifically exempt, and must be in accordance with SMP ratios.

- Minimum mitigation ratio is 1:1 and maximum ratio is 3:1 unless a larger buffer is recommended by WDFW, resulting in more native trees and shrubs planted than removed. Additionally, any native tree or shrub removal within 100 feet of the shoreline will require that an individual contact WDFW for appropriate mitigation measures and ratios. Vegetation removal in the shoreline is assigned mitigation ratios based on the type, size, and amount of vegetation to be removed, and the existing conditions of the area proposed for vegetation removal.

- Mitigation planting shall provide 5 trees and 10 shrubs per 1,000 square feet of cleared area, ensuring that vegetation in mitigation areas is multilayered and provides structural complexity and species diversity.

- The location of the enhancement area must be on site (whenever feasible), and in an area of low habitat functionality within 50 feet of the shoreline (or as close as possible to the shoreline waterbody).

- The project shall be monitored for three years for plant survivorship and planting shall achieve a plant survival standard of 80 percent at the end of three years to ensure that mitigation is successful in replacing lost ecological functions and values and vegetation survival.

- A conservation covenant is required if future development is likely to impact a mitigation area.

- Trees that pose a hazard that is not an emergency may be removed if the hazard cannot be eliminated through methods that would retain some habitat function.

- Noxious species removal is allowed using specific methods, and when native vegetation replaces those species removed, the County is to encourage residents to participate in noxious weed control programs prior to undertaking removal projects.

The SMP handbook states that "some local governments with intensely developed shorelines have established only setbacks from the OHWM. Vegetation conservation is required, and planting new vegetation, replacing noxious weeds and invasive plants, and other habitat improvements are required for new or expanded development. These measures meet the requirements of the SMP Guidelines to protect ecological functions, as buffers do." Although in most cases Skamania County does not have intensely developed shorelines as are common in urban areas, robust vegetation conservation provisions and adequate setbacks can be utilized the same way in rural areas to preserve shoreline functions and meet no net loss and, in effect, operate much like shoreline buffers.

7.2 How No Net Loss Is Achieved

Much of Skamania County has undisturbed/minimally disturbed shorelines and riparian areas in the National Forest and other undeveloped areas of the county. Natural designated shorelines constitute 48 percent of shorelines in the county. Developed areas are concentrated in the southern portion of the county in the Columbia River Gorge and along streams and rivers (Columbia River, Lewis River, Little White Salmon River, White Salmon River, Wind River, Little Wind River, Wind River, Muddy River, Bear Creek, Greenleaf Creek, Hamilton Creek, and Swift Creek) and around Swift Reservoir. Within these areas, single-family residential development predominates.

Based on the Inventory and Characterization Report, Skamania County will continue to focus development in the already developed portions of the county (in the south along rivers and streams and along Swift Reservoir), thereby largely limiting impacts and vegetation removal in currently undeveloped areas. The Rural Conservancy and Natural Environment designations are proposed to comprise 48 and 49 percent of the shoreline, respectively; both are restrictive designations with sizeable setbacks. Shoreline Residential accounts for a little over 3 percent of the total shorelines, and this use is concentrated heavily in the southern half of the county mirroring currently

populated/developed areas. High intensity designations are the least restrictive, but these areas only account for 1 percent of county shorelines, and are located only in the southern portion of the county in areas that are currently developed.

The functions most likely to be impacted by vegetation removal within 200 feet of the shoreline include influences on water temperature and dissolved oxygen; control of stream sedimentation; control of stream pollution; contribution to the food web; contribution of LWD; reduced structural complexity; reduced connectivity; and reduction in flood control and infiltration. To ensure that these ecological functions are protected, features of Skamania's vegetation conservation provisions that will ensure no net loss is achieved include:

Directing development toward existing developed areas of the county, not toward pristine areas. This is done by placing greater restrictions on development in Rural Conservancy and Natural Environment shoreline designations, and limiting the least restrictive shoreline environments (Shoreline Residential and High Intensity) to previously developed areas of the county.

Applicability of Vegetation Conservation Provisions. All areas within shoreline jurisdiction are subject to the vegetation conservation provisions that require no net loss of functions and provide standards for vegetation removal and replacement regardless (described further below) of the size of the waterbody or the type of vegetation removal activity. Setbacks, in combination with vegetation conservation provisions, are based on shoreline designation and development types and have been provided in order to protect riparian areas from potentially harmful or degrading development.

Avoidance. The first step in mitigation sequencing, avoidance, helps direct development toward pre-disturbed areas. In this way, natural areas in developed landscapes are retained as much as possible, rural lands are maintained, and urban sprawl is reduced, all recommendations made by WDFW for the protection of riparian areas (Knutson and Naef 1997). WDFW indicates that undeveloped parcels play an important role in maintaining a diversity of wildlife within developed landscapes, and that rural lands have a greater capacity to support native wildlife than heavily urbanized areas. By directing development toward pre-disturbed areas, and limiting intensive development in undeveloped areas, these SMP regulations achieve no net loss.

Vegetation replacement and mitigation ratios. SMP mitigation ratios higher than 1:1 are often required in order to account for the temporal loss of ecological functions while mitigation sites fully develop, and to reduce the risk of lost ecological functions because of the failure of mitigation efforts. The SMP provides for a special focus on protection of oak woodlands. Requiring greater than 1:1 impact to replacement ratios meets scientific recommendations and guidance because there is a risk of failure of a project designed to compensate for impacts, and there is a loss or reduction of functions during the time it takes a mitigation project to achieve the targeted level of performance. Greater

mitigation ratios provide adequate vegetative cover to enable younger trees and shrubs to collectively provide functions previously offered by a smaller number of mature trees and shrubs and controls for the temporal loss of functions (Wetlands in Washington State Volume 2 – Guidance for Protecting and Managing Wetlands 2005).

Minimum planting requirements. The vegetation conservation regulations of the SMP require 5 trees and 10 shrubs be planted per 1,000 square feet of impacted area. Example: if 1,000 square feet of shoreline area with a forested canopy were impacted, 3,000 square feet (a 3:1 ratio) would need to be mitigated, requiring the planting of 15 native trees and 30 native shrubs.

Conservation covenant. The SMP states that a conservation covenant is required if future development is likely to impact the mitigation area. This requirement ensures the protection of areas likely to experience development pressure in the future through a covenant recorded on the property title, and results in no net loss of ecological function from current or future developments. The restrictive covenant is written to "run with the land" in perpetuity, or for a substantial period of time, and the covenant remains in effect regardless of the ownership of the land with every subsequent owner or occupier required to comply with the terms of the covenant. (Compensatory Mitigation Site Protection Instrument Handbook for the U.S. Army Corps of Engineers, 2016).

Monitoring. Monitoring of mitigation sites for plant survivorship is required for three years to ensure that mitigation sites are successful in meeting the no net loss requirement. Ecology has indicated that many projects that compensate for impacts are not successful because there has been no follow-up (Wetlands in Washington State – Volume 2: Guidance for Protecting and Managing Wetlands, 2005). Monitoring ensures that standards for survivorship are met and the mitigation process can be successful. "Monitoring is integral to the success of an effective management strategy. Without valid monitoring data, management actions may, for many, not result in improved conditions or compliance with regulatory permits. Timely decisions, based on valid monitoring data, result in increased efficiency and higher probabilities of success" (WSDOT Wetland Mitigation Site Monitoring Methods, 2008). Because of monitoring requirements and mitigation ratios greater than 1:1, in many cases mitigation will result in greater vegetation coverage across the shoreline.

Trimming/hazard tree removal. The SMP allows the removal or conversion to a wildlife snag of trees that are not an emergency, but pose a safety hazard, where pruning, crown thinning, or other techniques that maintain some habitat function cannot eliminate the hazard. This provision meets science and guidance because, when a tree poses a safety hazard but is not an emergency, pruning the tree or converting it into a wildlife snag retains the habitat function and structural complexity the tree provides. If trees are removed completely and are exempt per the SMP, other mitigation actions performed in the county will offset the loss of a lone hazard tree through the mitigation ratios and planting densities.

7.3 Conclusions

Given the policy guidance and regulatory requirements proposed, including the implementation of the shoreline restoration plan and the key vegetation conservation and setback features listed in the previous section, the implementation of the Draft SMP is anticipated to achieve no net loss of ecological functions in the county's shorelines. Skamania's robust vegetation standards are more specific and require greater mitigation than what most rural communities require, and account for temporal losses and the possibility of failure of mitigation efforts. In the long term, a net gain in functions is likely in many instances, because the mitigation ratios exceed 1:1 and will eventually result in larger, better functioning resources than those impacted. Additionally, monitoring and conservation covenant requirements will ensure the success of mitigation sites and their protection from future development in perpetuity. Therefore, the SMP policies and regulations will result in no net loss of ecological functions or values of shorelines.

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