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CUMULATIVE IMPACTS ANALYSIS AND NO NET LOSS REPORT

Clallam County Shoreline Master Program Update

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1 1.0 INTRODUCTION

2 Clallam County is updating its Shoreline Master Program (SMP) to comply with the Washington
3 State Shoreline Management Act¹ (SMA) and the implementing rules in the Washington
4 Administrative Code (WAC) (also known as the Shoreline Guidelines)². As part of the SMP
5 update effort, the County is required to evaluate the “cumulative impacts” of reasonably
6 foreseeable future development to verify that proposed policies and regulations for shoreline
7 management are adequate to ensure “no net loss of shoreline ecological functions.” This report is
8 an analysis of the cumulative impacts that can be expected to occur over time as the Draft SMP
9 is implemented^{3,4}. This report also describes how the County will achieve no net loss through the
10 adoption and implementation of the Draft SMP.

11 This report is prepared as a requirement of the County’s grant agreements with the Washington
12 Department of Ecology (Grant No. G1000062) and U.S. Environmental Protection Agency
13 (Grant No. PO-00J08801).

14 1.1 Report Purpose and Background

15 The Shoreline Guidelines establish the standard of no net loss of shoreline ecological functions
16 as one of the central tenets of shoreline management:

17 *“To ensure no net loss of ecological functions and protection of other shoreline*
18 *functions and/or uses, master programs shall contain policies, programs, and*
19 *regulations that address adverse cumulative impacts and fairly allocate the*
20 *burden of addressing cumulative impacts among development opportunities.”*

21 No net loss assumes that some impacts may occur but that adequate measures are in place within
22 the overall shoreline master program to offset them such that the post development conditions
23 are no worse *overall* than pre-development conditions. The challenge is in maintaining shoreline
24 functions while allowing appropriate new development. Success requires due diligence to ensure
25 that new developments are located and designed to avoid and minimize impacts to shoreline
26 ecological functions.

27 Local governments achieve no net loss by:

- 28 1. Establishing appropriate SMP goals, policies and regulations to protect shoreline
29 functions;

¹ Revised Code of Washington (RCW) 90.58

² Washington Administrative Code (WAC) 173-26

³ Note: All text, tables and charts concerning parcel attributes are based on available assessor’s data and should be considered approximate. Information has not been field-verified or independently verified and is intended for general planning purposes only.

⁴ This analysis is based on the current Draft SMP [under review in January 2013], which has not yet been adopted by the County Board of Commissioners nor approved by Ecology.

- 1 2. Appropriately regulating individual shoreline development proposals to ensure they
2 mitigate adverse impacts;
- 3 3. Implementing restoration actions to improve shoreline ecology;
- 4 4. Monitoring changes over time; and
- 5 5. Adjusting shoreline management protocols as needed to obtain the desired results.

6 The purpose of this report is to programmatically assess whether the right policies and
7 regulations have been developed to prevent cumulative impacts from occurring once the
8 County’s updated SMP is implemented. This report also includes recommendations and tools for
9 improving administration and tracking of shoreline management decisions to better assess
10 whether individual actions are achieving no net loss. The County’s Draft Shoreline Restoration
11 Plan (ESA, 2013; prepared under separate cover) identifies opportunities and needs for shoreline
12 restoration.

13 **1.2 Scope of the Analysis**

14 Neither the SMA nor the Shoreline Guidelines specifically define cumulative impacts. However,
15 the National Environmental Policy Act provides the following definition:

16 *“the impact on the environment which results from the incremental impact of the*
17 *action when added to other past, present, and reasonably foreseeable future*
18 *actions regardless of what agency (Federal or non-Federal) or person undertakes*
19 *such other actions. Cumulative impacts can result from individually minor but*
20 *collectively significant actions taking place over a period of time.”*

21 In addition the Washington State Environmental Policy Act states that a review of cumulative
22 impacts) should address:

23 *“how the impacts of the proposal will contribute towards the total impact of*
24 *development in the region over time.”*

25 The objective of the cumulative impacts analysis is to demonstrate that commonly occurring
26 shoreline uses and developments within the County will not result in a *net* loss of ecological
27 functions compared to baseline conditions. For this analysis, the baseline conditions are the
28 conditions that are generally identified and described in the County’s Shoreline Inventory and
29 Characterization Report (ESA, 2012)—including the baseline data presented for the selected
30 functional “indicators” which are explained in the chapters that follow.

31 This analysis is limited to areas of unincorporated Clallam County that are under the jurisdiction
32 of the SMA. The impacts addressed in this analysis are the cumulative ecological impacts that
33 could result from development and uses within shoreline jurisdiction. Development outside of
34 Clallam County’s shoreline jurisdiction is not considered in this cumulative impact / no net loss
35 analysis assessment.

1 The Shoreline Guidelines describe the cumulative impacts analysis requirements as follows:⁵

2 *“Evaluation of such cumulative impacts should consider: (i) current*
3 *circumstances affecting the shorelines and relevant natural processes; (ii)*
4 *reasonably foreseeable future development and use of the shoreline; and (iii)*
5 *beneficial effects of any established regulatory programs under other local, state,*
6 *and federal laws.”*

7 The Guidelines state that the impacts of “commonly occurring and planned development” should
8 be assessed programmatically “without reliance on an individualized cumulative impacts
9 analysis”. In contrast, developments that have unforeseen or uncommon impacts, which cannot
10 be reasonably identified at the time of SMP development should be evaluated via the shoreline
11 substantial development and/or conditional use permit processes to ensure that all impacts are
12 addressed and that there is no net loss of ecological function after mitigation.⁶

13 In addition, the Guidelines require evaluation of the cumulative effects caused by:

- 14 • Unregulated activities (i.e., timber harvest and certain agricultural uses)⁷,
- 15 • Developments that are exempt from a shoreline substantial development permit (e.g.,
16 single-family residential development), and
- 17 • Residential bulkheads, residential piers, and runoff from newly developed properties.

18 The Guidelines require particular attention be paid to platting or subdividing property and
19 installation of infrastructure that could establish a pattern for future shoreline development.

20 The Draft SMP includes standards and procedures for evaluating the effects of specific
21 development actions on a case-by-case basis at the time individual shoreline development
22 proposals are reviewed. These project-level analyses will allow site-scale factors to be included
23 in the assessment of baseline conditions to supplement the shoreline inventory and
24 characterization information available for the County as a whole. To achieve no net loss, the
25 SMP requires each project to mitigate impacts by first avoiding, then minimizing adverse effects,
26 then replacing damaged resources through compensatory mitigation efforts (this mitigation
27 sequence is required in Section 4.4.3 of the Draft SMP). The County is also required to
28 implement restoration measures on a voluntary basis to supplement the project-level mitigation
29 actions.

⁵ WAC 173-26-186(8)(d))

⁶ WAC 173-26-201(3)(d)(iii)

⁷ According to RCW 90.58.065: SMPs shall not require modification of or limit agricultural activities occurring on agricultural lands. According to WAC 173-16-241: 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.

1 This analysis is based on the current draft SMP, which is under review by the Clallam County
2 Community Development Department, the SMP Advisory Committee, the Planning Commission
3 and Board of Commissioners. Accordingly, this analysis may need to be revised if substantial
4 revisions are made to the policies and regulations proposed in the [current] Draft SMP.

5 *Note to reviewers: We based this analysis on the November 2012 Draft SMP but factored in*
6 *some of the changes that have been suggested by the County's SMP Committee. The next*
7 *iteration of the Draft SMP, which will incorporate those changes, is the [March] 2013 Draft*
8 *SMP.*

8 **1.3 Report Methods and Structure**

9 The methods used in this analysis are generally consistent with the guidance included in
10 Ecology's SMP Handbook, Chapter 17 Cumulative Impacts. The quantitative analysis of threats
11 focuses on portion of the County that drain to the Strait of Juan de Fuca (Water Resources
12 Inventory Areas [WRIAs] 17, 18, and 19). The analysis for areas that drain to the Pacific Ocean
13 (WRIA 20) is still in process and will be included an addendum to this report—although the
14 information in Chapters 1, 4, 6, and 7 is relevant to all areas of the County. Different methods
15 were used to analyze cumulative impacts in the two regions because the work was funded
16 through different grants and the analysis for the Strait of Juan de Fuca was designed to be
17 compatible with the Puget Sound Partnership's (Partnership) ongoing effort to protect and restore
18 Puget Sound.

19 A detailed description of the data sources and analysis protocols will be provided under a
20 separate cover to assist other jurisdictions in replicating this type of analysis if desired. That said,
21 all of the data sources used here are identified in the Shoreline Inventory and Characterization
22 Report (ESA, 2012).

23 Although the written analysis of cumulative impacts / no net loss occurs in the final stages of the
24 SMP update process, the effort to prevent cumulative impacts and achieve no net loss has been
25 integral to all phases of Clallam County's SMP update process from the shoreline inventory and
26 characterization phase through the development of the Draft SMP and the Shoreline Restoration
27 Plan. As a result, this report draws heavily from those documents and previous efforts.

28 **1.3.1 Relationship to Puget Sound Recovery Efforts**

29 The Partnership is in the midst of a multi-year collaborative process to identify the strategies and
30 actions that are needed to recover Puget Sound by 2020. The Partnership is focusing on finding
31 strategies and actions that reduce threats to the ecosystem caused by:

- 32 • Land development
- 33 • Shoreline alteration
- 34 • Runoff from the built environment
- 35 • Wastewater discharge

- 1 • Loss of floodplain function

2 In doing this work, the Partnership is identifying a series of Sound-wide indicators that describe
3 the biophysical components of the entire Puget Sound ecosystem. They are developing criteria
4 for judging each indicator’s ability to reliably track changes in ecosystem status and defining
5 targets for assessing how the ecosystem responds to management actions⁸. The indicators and
6 targets are the “vital signs” that help describe Sound’s ecological and human health status and
7 communicate progress toward recovery (Figure 1-1).

8 The Partnership is using a conservation planning framework known as *Open Standards for the*
9 *Practice of Conservation (Open Standards)*. The Open Standards framework was developed by a
10 consortium of non-governmental organizations to improve the planning, design, management,
11 and assessment of conservation actions⁹. The framework is widely seen as a way to improve
12 conservation outcomes through strategic planning, evaluation of progress, and learning related to
13 ecosystem recovery. The Open Standards framework provides a process for defining:

- 14 • The **vision** and **context** for a specific conservation goal;
- 15 • **Key components** of the vision;
- 16 • **Current conditions** of components; and
- 17 • **Major threats** to maintaining or improving the components.

⁸ See the 2012 Action Agenda, the 2012 Biennial Science Work Plan, the 2011 Science Update and the 2009 Technical Memorandum on Identification of Ecosystem Components and Their Indicators and Targets for more information. Available at: http://www.psp.wa.gov/action_agenda_center.php

⁹ For more information on Open Standards, go to: <https://sites.google.com/a/uw.edu/puget-sound-open-standards---temporary-share-site/>



1

2 **Figure 1-1. Puget Sound Vital Signs - Indicators and Targets for Puget Sound Recovery (Source: Puget**
 3 **Sound Partnership, 2012)**

4 To increase continuity with the Puget Sound recovery efforts, we incorporated aspects of the
 5 Open Standards framework into the assessment cumulative impacts and no net loss in Clallam
 6 County (for the Strait of Juan de Fuca drainages only). We attempted to model the Partnership
 7 framework because there is no formal or established framework for analyzing cumulative
 8 impacts / no net loss in a robust, transparent or quantitative fashion and because the County's
 9 SMP update is an element of the overall Puget Sound recovery effort. For example, we used a set
 10 of guiding questions from the Open Standards framework to facilitate identification of
 11 underlying assumptions and major forces supporting and/or degrading shoreline functions. The
 12 questions help highlight shoreline areas where protection and/or restoration strategies are most
 13 needed to ensure no net loss (Table 1-1).

1 **Table 1-1. Key questions guiding the cumulative impacts and no net loss analysis for WRIAs 17, 18 and 19**

Key Question	Response	Where described in this report
What is our overall goal? (i.e., <i>What do we care about?</i>)	Maintaining shoreline ecological functions.	Chapter 2
What are the components of healthy shorelines and how do we measure them?	The shoreline ecosystem includes a marine component and a freshwater component. For purposes of this analysis, each component includes the waterbody and the lands adjoining them. The health of each component can be assessed using specific attributes and indicators.	Chapter 3
What are the threats to healthy shorelines?	Threats are the physical, biological or chemical alterations that degrade ecosystem components.	Chapter 4
Where are threats most prevalent and why?	Threats are most prevalent in areas that have the highest development pressure because of planned use patterns, zoning, parcel configurations and other factors.	Chapter 5
Where might threats result in loss of ecological function?	No net loss is most likely to occur in areas where the policies and regulations of the SMP may not be sufficient to prevent impacts and full mitigation of impacts may not be feasible.	Chapter 5
How do protection and restoration strategies of the Draft SMP address identified threats and achieve no net loss?	The SMP addresses threats through limitations on allowed uses, establishment of buffers, and other strategies to protect existing ecological functions. Includes consideration of compensation strategies, such as the restoration plan implementation. Also includes consideration of county, regional, state, and federal regulations, recovery plans, and conservation efforts.	Chapter 6
How can the County use this analysis to track and respond to changes in shoreline function?	The no net loss checklist attached to this report provides a consistent way to record key metrics related to individual development proposals and adjust management policies as needed.	Chapter 7

2

3 We also incorporated aspects of the Partnership’s approach related to indicator selection because
 4 the two efforts seek some of the same outcomes. For example, a goal of the SMP is to protect
 5 and restore habitat. This is also one of the Partnership’s main goals (and a strategic initiative in
 6 the 2012 Action Agenda). Despite these similarities, the Partnership’s work is much broader in
 7 scope than the County’s SMP update—both geographically and statutorily—and the Partnership

1 has the technical and financial resources to support a more complex and multifaceted effort. As a
2 result, we used best professional judgment to tailor and simplify our analysis to fit the County's
3 specific needs for a shoreline analysis. As an example:

- 4 • The Partnership's indicators and targets are organized around their six statutory goals:
5 human health, human quality of life, habitat, species/food webs, water quality, and water
6 quantity. We selected indicators organized around the ecological function goals described
7 in the Shoreline Guidelines: habitat, water quality, vegetation, hyporheic processes and
8 hydrology¹⁰. Because there is considerable overlap in the categories described in the
9 Guidelines, we consolidated them into three function categories: habitat, hydrology and
10 water quality.
- 11 • The Partnership divides the goals into four different habitat domains called components:
12 marine, freshwater, terrestrial, and interface/ecotone. We divided the goals into two
13 components: marine (nearshore) and freshwater to correspond to the different types of
14 shorelines. Each component encompasses the waterbody and the adjoining shorelands.
- 15 • The Partnership identifies multiple attributes to characterize each component. Attributes
16 define the structure, composition or function of the component but are not easily
17 measured. For each attribute, there are one or more indicators that serve as proxies for the
18 attributes and provide a measurable way to judge ecosystem changes in response to
19 management. We selected a narrow set of attributes and indicators that pertain to
20 shoreline management and could be assessed now using readily available data.

21 The chapters that follow describe the analysis of cumulative impacts and results using these
22 goals, components, attributes and indicators.

23

¹⁰ WAC 173-26-201(3)(d) (1) (C)

1 **2.0 NO NET LOSS AS A VISION AND A GOAL**

2 According to the vision statements for the Clallam County Shoreline Master Program update¹¹,
3 Clallam County residents “envision a future environment that is at least as beautiful and
4 productive as today--a future with more people, more fish and wildlife, sustainable forests for
5 generations of working families, and accessible, clean shorelines.” Achieving this vision will
6 require the protection of shoreline ecological functions to keep the environment “at least” as
7 healthy and productive as it is now and restoration of ecological processes in order to have
8 “more” of what people currently enjoy, use, and value.

9 The County’s vision is consistent with the state’s requirement that shoreline master programs
10 achieve no net loss of shoreline ecological functions.¹² The concept of ecological functions
11 recognizes that each ecological system is composed of a wide variety of interacting physical,
12 chemical and biological components, that are interdependent in varying degrees and scales, and
13 that produce the landscape and habitats as they exist at any time. Ecological functions are the
14 work performed or role played individually or collectively within ecosystems by these
15 components¹³.

16 As a shoreline management goal or statement of aspiration, maintaining ecological functions at a
17 baseline level seems relatively straightforward. Operationally, it is much more challenging.
18 Maintaining shoreline ecological functions through effective SMP implementation presupposes
19 several things:

- 20 1. That we can ‘measure’ ecological functions to establish a baseline;
- 21 2. That we can document linkages between specific development actions and changes in
22 ecological function (i.e., armoring of feeder bluffs affects sediment supply, which affects
23 beach structure and the productivity of beaches for forage fish spawning, etc.);
- 24 3. That we can differentiate or segregate the effects of actions that occur outside of the
25 scope of the SMP from those that are directly tied to SMP decisions; and
- 26 4. That we can compare conditions at some future point in time to the existing conditions to
27 determine whether the level of function has increased, decreased, or remained the same.

¹¹ Available at http://www.clallam.net/realestate/assets/applets/Vision_WRIA17_19_8-2-11_FINAL.pdf and
http://www.clallam.net/realestate/assets/applets/FINAL_WRIA_20_FORUM_AND_SURVEYS_Report.pdf

¹² The no net loss requirement is specific to shoreline ecological functions and must be balanced with other policy goals of the SMA such as providing public access or accommodating water-dependent uses. In fact, there are multiple human dimensions to the SMA that are not directly tied to no net loss, but which must nevertheless be factored into shoreline management

¹³ WAC 173-26-201(3)(c)

- 1 This report attempts to address each of these challenges by¹⁴:
- 2 1. Describing baseline conditions in terms of a few key functions that are heavily influenced
3 by SMP decisions and that are measurable using discrete indicators (see below);
 - 4 2. Identifying threats to shoreline ecological functions (Chapter 4)
 - 5 3. Evaluating potential land use changes at the parcel scale (Chapter 5);
 - 6 4. Assessing the potential for the expected land use changes to cause loss of functions
7 (Chapter 5);
 - 8 5. Showing how the SMP policies and regulations address type and level of expected loss
9 (Chapter 6); and
 - 10 6. Offering a tool for tracking development actions and their effects on shoreline functions
11 to improve SMP implementation over time (Chapter 7).

12 To select indicators, we considered a wide range of characteristics that reflect the functionality of
13 the shoreline. We examined the list of suggested no net loss indicators in Ecology's Shoreline
14 Handbook¹⁵ and we engaged a technical work group to provide guidance on the indicator
15 selection. We developed an initial list of indicators in 2011 that included both indicators of
16 healthy shorelines (e.g., percent of shoreline area with kelp/eelgrass) and indicators of degraded
17 shorelines (e.g., number of docks per mile of shoreline). We presented data for these indicators
18 in the Shoreline Inventory and Characterization Report (ESA, 2012). As the SMP update work
19 progressed, we sought a refined list of indicators that would more closely align with the
20 Partnership's indicators and targets (in the Action Agenda) and would meet all of the following
21 criteria:

- 22 • theoretically sound;
- 23 • directly relevant to SMP management decisions;
- 24 • sensitive to change; and
- 25 • measurable across the entire County (WRIAs 17, 18 and 19) using available data.

26 The refined list of selected indicators includes at least one indicator for each major function
27 category identified in the Shoreline Guidelines (habitat, water quality and hydrology)¹⁶. Each

¹⁴ Some of these analysis steps have not yet been completed for WRIA 20.

¹⁵ See Table 4-1 in Chapter 4 available at
<http://www.ecy.wa.gov/programs/sea/shorelines/smp/handbook/Chapter4.pdf>

¹⁶ The Shoreline Guidelines [WAC 173-26-201(3)(d) (1)(C)] describe the different types of shoreline ecological functions that the SMP must protect in terms of habitat, water quality, vegetation, hyporheic processes and

1 function category has two components—marine (nearshore) and freshwater (both rivers and
2 lakes)—corresponding to the two shoreline habitat domains. Each component is characterized by
3 one or more indicators that serve as proxies for the conditions of key attributes. In other words,
4 the indicators are not direct measures of function, but are indirect surrogates for direct functional
5 measurements. For example, the presence of a feeder bluff within a shoreline reach is an
6 indicator that the shoreline plays a role in sediment supply and habitat formation; and the
7 presence of eelgrass is an indicator that the shoreline is important for primary productivity or
8 food web functions (Table 2-1).

9 **Table 2-1. Components, attributes and indicators of shoreline ecological functions (shaded cells have no**
10 **defined indicator)**

Function Category	Habitat		Water Quality		Hydrology	
	Marine	Freshwater	Marine	Freshwater	Marine	Freshwater
Attribute / Indicator	Extent and condition of feeder bluff	Status of salmon stocks	Status of Shellfish beds (closures)	Amount of impervious surface	Number of tidal barriers	Area of undeveloped floodplain/channel migration zone
	Area of kelp/eelgrass beds	Condition of riparian vegetation				
	Condition of riparian vegetation					

11
12 The functions represented by the indicators above are not the only functions important to the
13 Clallam County shoreline environment—they are simply indicators that can be consistently
14 measured across the entire study area given the available data and resources. We acknowledge
15 that the requirement for no net loss applies to *all* functions—and the County’s SMP is designed
16 to protect all shoreline functions, not just certain ones. However, we lack the means, technology,
17 and capacity to objectively certain functions, or track their status in response to management
18 actions.

19 As a result, we have elected to focus our quantitative analysis on certain functions that are
20 closely tied to shoreline development activities (and well correlated to the Partnership’s
21 indicators for the Protect and Restore Habitat goal as depicted in Figure 1-1). Measuring these
22 indicators over time can provide an indication of whether, how and to what degree shoreline
23 conditions and functions are changing in response to actions governed by the SMP. The changes

hydrology. To simplify, we condensed this to three categories. Vegetation is included in the habitat category and hyporheic is included in the water quality category.

- 1 can then be reviewed in light of shoreline management decisions to determine if the SMP is
- 2 achieving no net loss.

- 3 Previous analyses of no net loss in other jurisdictions have been largely qualitative. The hope
- 4 with this effort is that by measuring and tracking the selected indicators over time, we have some
- 5 solid data to assess whether the County's no net loss vision is being achieved overall.

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3.0 SHORELINE COMPONENTS, ATTRIBUTES AND INDICATORS

This chapter summarizes the current conditions and relevant marine and freshwater processes in terms of specific shoreline components, attributes and indicators as described in Chapters 1 and 2. The Shoreline Inventory and Characterization Report (ESA, 2012) provides an expanded description of the full suite of ecosystem processes and functions for the County's marine and freshwater shorelines. The Shoreline Inventory and Characterization Report also contains a full set of maps and literature citations for the information summarized here.

3.1 Marine Component

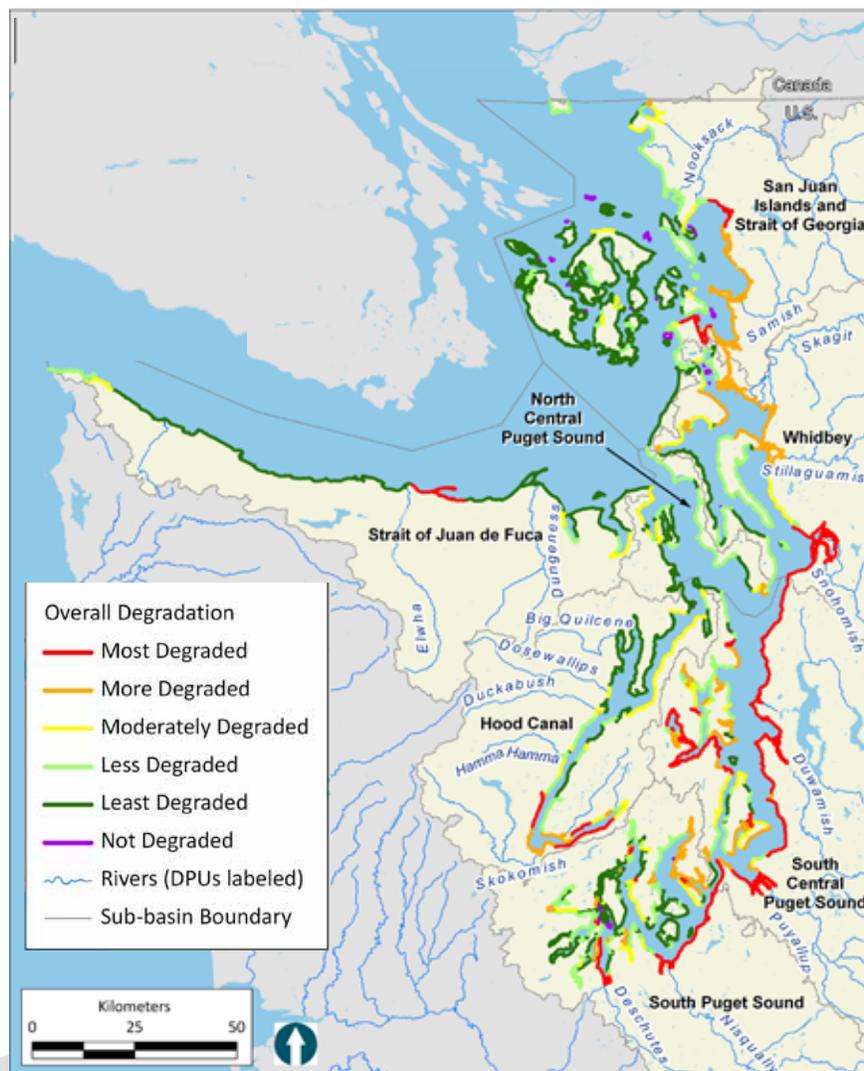
The Strait of Juan de Fuca marine shoreline consists of 18 drift cells, each composed of different shoretypes that reflect the underlying geology, degree of exposure to wind/waves, long-term patterns of sea level change, the ongoing redistribution of sediment by net shore-drift processes and the influence of freshwater systems including the Dungeness, Elwha, Lyre and other rivers. By some measures, the processes that shape and maintain the marine ecosystem are among the least altered in the Puget Sound basin. The Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) completed a comparative analysis that ranked each reach of the Puget Sound/Strait of Juan de Fuca shoreline based on the degree to which a suite of ecosystem processes were altered. The level of degradation was rated on a relative scale from "most degraded" to "not degraded." Overall the reaches of the Strait were less degraded than most other areas of Puget Sound (Schlenger et al. 2010) (Figure 3-1). It is important to note that PSNERP did not evaluate biological conditions (such as vegetation or habitat availability) per se, but assessed the configuration of the shoreline compared to historic conditions and the presence of "stressors" such as fill, armoring, marinas, dams, etc., which influence biological attributes.

3.1.1 Habitat

The marine shoreline of Clallam County supports numerous species of marine mammals, fish, birds and other wildlife and provides a critical pathway for Orca, Pacific salmon and many other species to migrate to and from the Pacific Ocean. The beaches and intertidal areas support sand lance, Pacific herring, surf smelt and many species of bivalves. There are several species of rockfish in the nearshore waters. Gray whales feed at the mouths of several streams and harbor seals haul out on rocks in the intertidal. Black brant, harlequin ducks, and many other avian species use the marine shore for foraging.

The eastern Strait is designated critical habitat for threatened Chinook and chum salmon; the entire Strait is critical habitat for endangered Orca. Other Endangered Species Act-listed species including steelhead trout use the nearshore area for rearing and migration.

The nearshore habitats of the Strait are relatively free of the stressors that degrade habitat. Outside of incorporated areas, only about eight percent of the marine shore is armored. Most of the armoring is on low bank shores as opposed to feeder bluffs. Exceptions to this occur around Sequim Bay / Gibson Spit.



1
2 **Figure 3-1. Relative overall degradation of Strait of Juan de Fuca nearshore reaches in terms of nearshore**
3 **processes (Schlenger et al. 2010)**

4 Relatively few overwater structures are located in Clallam County, but there are small
5 concentrations of docks and piers in Clallam Bay, Sequim Bay and at Bullman Beach. Because
6 the majority of these structures are located outside of sediment transport zones, they generally do
7 not have a major effect on net shore-drift. However, they can impact migratory habitat, shade out
8 aquatic plants, become havens for predator species and have other adverse impacts on habitat
9 quality and availability.

10 Other structural shoreline modifications are scattered along the shore at Twin Rivers (intertidal
11 fill or mole), Whiskey Creek (boat launch / breakwater), Deep Creek (boat launch), Gibson Spit
12 (Port Williams Road fill), Clallam Bay (breakwaters), and Shipwreck Point (SR 112 fill).

13 The quality and availability of marine shoreline habitat is determined by a wide array of
14 physical, biological, chemical and sociological factors. We selected three indicators that are
15 strong measures of habitat attributes along the marine shoreline: 1) the extent and condition of

1 feeder bluffs; 2) riparian forest cover; and, 3) aquatic plant communities. Unmodified feeder
 2 bluffs, dense forest canopies and continuous beds of kelp and eelgrass are indicators of healthy,
 3 properly functioning marine habitat and the opposite conditions are evidence of habitat
 4 degradation. Using Geographic Information Systems (GIS) technology, we can measure these
 5 attributes to obtain a quantitative estimate of habitat function. Although these are not the only
 6 indicators of habitat function, these are the indicators we can readily measure to support our no
 7 net loss analysis.

8 Feeder bluffs make up roughly 30 percent of the County’s marine shoreline—roughly 39 miles in
 9 total length (Coastal Geologic Services 2011). These are mostly located in eastern Clallam
 10 County, along the Miller Peninsula, Green Point, Dungeness Harbor, and Freshwater Bay. Less
 11 than two percent (about 0.2 mile) of the mapped feeder bluffs are modified with structural
 12 armoring (Table 3-1).

13 **Table 3-1. Percent of each marine reach mapped as feeder bluff along the Strait of Juan de Fuca in Clallam**
 14 **County (data from CGS 2011)**

Marine Reach	Reach Miles (approx)	Feeder Bluff Area as a Percent of Reach Length		
		Feeder Bluff - Exceptional	Feeder Bluff	Feeder Bluff - Talus
1– Diamond Point	12.5	14%	30%	0%
2 – Sequim Bay**	8.2	0%	28%	0%
3 – Gibson Spit **	6.1	28%	10%	0%
4 – Kulakala Point	7.9	0%	6%	0%
5 – Dungeness Spit	15.7	0%	0%	0%
6 – Green Point	10.4	63%	8%	0%
7 – Angeles Point	7.3	3%	22%	1%
8 – Observatory Point	4.9	0%	0%	0%
9 – Crescent Bay / Low Point	10.7	0%	4%	35%
10 – Twin Rivers	7.4	7%	7%	68%
11 – Deep Creek	5.3	0%	0%	47%
12 – Pysht River	2.4	0%	0%	4%
13 – Pillar Point	2.1	0%	0%	63%
14 – Slip Point	6.8	0%	0%	0%

Marine Reach	Reach Miles (approx)	Feeder Bluff Area as a Percent of Reach Length		
		Feeder Bluff - Exceptional	Feeder Bluff	Feeder Bluff - Talus
15 – Clallam Bay	5.7	0%	0%	0%
16 – Sekiu River /Kaydaka	3.6	0%	0%	14%
17 – Shipwreck Point	6.9	0%	0%	0%
18 – Rasmussen /Bullman Creek	4.6	0%	0%	0%
** = includes some armored feeder bluff. In Sequim Bay 0.17 miles of feeder bluff are armored; Gibson Spit 0.05 mile of mapped feeder bluff are armored				

1
 2 Feeder bluffs are the engines of sediment delivery, continually eroding to form beaches, sand
 3 spits and other marine/ nearshore habitats. Properly functioning (unmodified) bluffs generate the
 4 mixed sand and pea gravel substrates where forage fish such as sand lance and surf smelt spawn.
 5 Given that littoral drift can rapidly transport particles of this size, the of presence feeder bluffs
 6 that erode at a fairly high rate is directly linked to the extent of suitable sand lance and surf smelt
 7 spawning habitat (Shaffer and Ritchie, 2008).

8 The process of bluff erosion and beach formation begin when sediment grains, blocks or slabs
 9 detach from the bluff face and slide down the slope. The eroded material deposited at the base or
 10 toe of the slope protects the bluff from wave attack for a while, but is gradually distributed along
 11 the shore by a process called littoral drift. Surface waves typically approach the shore at an angle
 12 from the northwest creating longshore currents that transport the sediment down-drift.

13 The type and extent of riparian forest is another attribute of habitat conditions on the marine
 14 shore. Using GIS, we measured the amount of closed canopy forest within 200 feet of the
 15 ordinary high water mark as an indicator of habitat function. Shoreline riparian vegetation is
 16 fairly intact on the bluffs and low bank shores west of Port Angeles, but bluff and low bank areas
 17 near the east end of the County tend to be cleared and are more developed. Along the Strait, the
 18 percentage of the shoreline composed of vacant land with closed canopy forest undeveloped
 19 ranges from about 10 to 85 percent (Table 3-2). The forests provide abundant foraging, perching
 20 and nesting habitat for bald eagles and other birds. The areas of mapped bald eagle habitat form a
 21 nearly continuous band along the Strait from the Miller Peninsula to the Makah Reservation.
 22 Vegetation overhanging the intertidal area provides shade for surf smelt and sand lance eggs, and
 23 serves as a source of terrestrial insects for consumption by marine fishes and provides cover at
 24 high tide.

1
2

Table 3-2. Developable Lands (Vacant Parcels) that have Closed Canopy Forest along the Strait of Juan de Fuca in Clallam County

Marine Reach	Vacant Parcel Area with Closed Canopy Forest (Acres)	Total Reach Area (land only)	Percent of Reach Area
1– Diamond Point	25.9	268.2	9.7%
2 – Sequim Bay	24.5	254.8	9.6%
3 – Gibson Spit	16.0	616.7	2.6%
4 – Kulakala Point	20.5	920.1	2.2%
5 – Dungeness Spit	4.2	248.8	1.7%
6 – Green Point	26.2	280.1	9.3%
7 – Angeles Point	53.7	322.1	16.7%
8 – Observatory Point	4.3	107.3	4.0%
9 – Crescent Bay / Low Point	50.0	252.7	19.8%
10 – Twin Rivers	69.4	175.0	39.7%
11 – Deep Creek	87.1	127.4	68.4%
12 – Pysht River	21.5	65.7	32.7%
13 – Pillar Point	25.8	48.6	53.0%
14 – Slip Point	132.6	154.7	85.7%
15 – Clallam Bay	5.4	96.1	5.6%
16 – Sekiu River /Kaydaka	51.0	93.4	54.6%
17 – Shipwreck Point	24.4	156.9	15.5%
18 – Rasmussen /Bullman Creek	42.3	119.2	35.5%
Total	684.9		

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The intertidal areas along the Strait support kelp forests and eelgrass meadows that provide cover, feeding and rearing areas for a wide range of species including several species of salmon, pelagic fish, crab and sea birds. The extent of these aquatic plant communities is an indicator of habitat function. Kelp and eelgrass are relatively abundant along the Strait occurring as continuous beds or in patches in places such as Freshwater Bay, Dungeness Bay, Crescent Bay and some areas just west of the Twin Rivers (Table 3-3).

1 **Table 3-3. Kelp abundance per mile of reach along the Strait of Juan de Fuca in Clallam County (data from**
 2 **WDNR 2004)**

Marine Reach	Acres of Kelp	Total Aquatic Area of Reach (acres)	Percent
1 – Diamond Point	92	1295	7%
2 – Sequim Bay	0	843	0%
3 – Gibson Spit	0	577	0%
4 – Kulakala Point	5	845	1%
5 – Dungeness Spit	234	1622	14%
6 – Green Point	492	1336	37%
7 – Angeles Point	507	833	61%
8 – Observatory Point	237	524	45%
9 – Crescent Bay / Low Point	467	1113	42%
10 – Twin Rivers	451	860	53%
11 – Deep Creek	219	590	37%
12 – Pysht River	1	239	0%
13 – Pillar Point	141	261	54%
14 – Slip Point	461	809	57%
15 – Clallam Bay	222	390	57%
16 – Sekiu River /Kaydaka	290	454	64%
17 – Shipwreck Point	444	737	60%
18 – Rasmussen /Bullman Creek	435	546	80%

3
 4 **3.1.2 Water Quality**

5 Marine water quality in the Strait is affected by point and non-point source pollution, including
 6 poorly maintained septic-systems, runoff from roads, agricultural fields, and chemically treated
 7 lawns. These sources of pollution can cause elevated levels of fecal coliform, high water
 8 temperature and low dissolved oxygen—conditions that affect eelgrass and other marine
 9 organism and can threaten shellfish harvest areas. The presence of marine biotoxins such as
 10 Paralytic Shellfish Poisoning ("red tide"), Amnesic Shellfish Poisoning and Diarrhetic Shellfish

1 Poisoning are also a concern in Clallam County. These are conditions affect the suitability of
2 beaches for shellfish harvest (commercial and recreational) and other human uses. Some of the
3 main areas of concern in terms of water quality functions are Freshwater Bay, Dungeness Bay,
4 Washington Harbor, Sequim Bay and Discovery Bay.

5 Hart Crowser (2007) catalogued nine important pathways or sources of pollutants to Puget
6 Sound as a whole including aerial transport, surface runoff, groundwater discharge, discharges
7 from industrial and municipal wastewater treatment plants, discharges from combined sewer
8 overflows, direct spills, transport of pollutants through exchange of oceanic water and
9 reintroduction of pollutants from contaminated sediments. Most of these pathways can be loosely
10 related or unrelated to SMP decisions. SMPs arguably have a somewhat limited influence on
11 marine water quality because the SMP regulates a very small percentage and very narrow portion
12 of the land draining to the Strait. Furthermore, it is difficult to parse out the effect of SMP land
13 use decisions from other decisions such as health department decisions about septic systems,
14 municipal decisions about wastewater treatment, decisions about road construction/management,
15 and decisions related to agriculture/forest practices which are outside the scope of the SMP.

16 As a result, we selected one relatively narrow indicator of water quality related to shellfish
17 harvest, which is an important shoreline management issue in Puget Sound. We consider the
18 frequency/presence of shellfish harvest closures (or lack thereof) to be an indicator of water
19 quality function for the marine shoreline component. This is compatible with the Partnership's
20 indicator and targets for human health.

21 The State and County Health Department monitor water quality conditions along the Strait to
22 ensure the beaches and tidelands are safe for shellfish harvest. Beach closures occur when water
23 quality conditions degrade to the point of making the shellfish unsafe to eat. Over the years,
24 certain areas including Dungeness Bay have been plagued by water quality degradation. In 2011,
25 approximately 500 acres of the Dungeness Bay growing area was upgraded from Prohibited to
26 Conditionally Approved for commercial shellfish harvest. The upgrade was due to improved
27 marine water quality at monitoring stations near the mouth of the Dungeness River. The change
28 was prompted by cleanup actions, monitoring, and public outreach by Clallam County, Clallam
29 Conservation District, the Jamestown S'Klallam Tribe, and other partners. The reclassified area
30 has the same seasonal restriction as inner Dungeness Bay: open to commercial shellfish harvest
31 from February through October but closed from November through January. The tidelands
32 surrounding the mouth of the Dungeness River are still closed to shellfish harvest year-round due
33 to freshwater inputs from the river and Meadowbrook Creek, elevated levels of fecal coliform
34 bacteria in Meadowbrook Creek, and uncertainty about the marine water quality at the mouths of
35 these drainages.

36 **3.1.3 Hydrology**

37 Tidal barriers are structures such as dikes and levees that impede tidal flow into and out of
38 estuarine/nearshore areas. They can also include roads constructed across estuarine wetlands.
39 Tidal barriers alter flow dynamics and impact the free exchange of sediment, detritus, and
40 organisms. Lack of tidal flow retards tidal channel formation and maintenance, and prevents
41 water and sediment from reaching marshes, which reduces marsh size and complexity.

1 The hydrologic processes along the marine shoreline are altered in numerous places by tidal
2 barriers. Roads, dikes and levees and other structures have modified several of the estuaries and
3 river deltas along the Strait. To assess baseline tidal hydrology functions, we tallied the number
4 and location of tidal barriers (or partial barriers) along the Strait. There are 48 mapped barriers
5 and they occur at Graysmarsh, Washington Harbor, Dungeness River estuary, and Pysht River
6 estuary.

7 **3.1.1 Marine Reach Overview**

8 Table 3-4 provides an overview of existing conditions along the County's marine shorelines.
9 Data is provided consistent with the components, attributes, and indicators of healthy marine
10 shorelines (as presented in Table 2-1).

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Table 3-4. Summary of marine shoreline existing conditions, as assessed for key components based on attributes and indicators.

Marine Reach Name	Overall Reach Condition
1– Diamond Point	Half of the shoreland area within the reach is heavily forested, which provides habitat for a diversity of wildlife species and helps stabilize erosive bluffs. Outside of the shoreland zone, the majority of Miller Peninsula upland area is forested. The predominant shoreform of Miller Peninsula is bluff backed beach. Half the shoreline consists of feeder bluffs which, along with net shore-drift, supply the sediments that maintain barrier beaches at adjacent spits and Diamond Point. The densest concentration of residential development is located in the Diamond Point vicinity, with more sparse development in the Travis Spit vicinity and along the Discovery Bay shoreline. Much of the remaining area is undeveloped Miller Peninsula State Park, managed by Washington State Parks. Sections of the shoreline (6% of reach total) have been armored, presumably to protect adjacent residences. The armoring occurs along Diamond Point and Paradise Cove, which are accretion shoreforms. Approximately 3 docks are located in the Diamond Point vicinity, but no other overwater structures are present.
2 – Sequim Bay	Approximately one-third of the shoreland area within the reach is heavily forested. The dense forest cover also helps stabilize the bluffs within the reach. Outside of the shoreland zone, forest is the predominant land cover, however portions have been cleared for residential development, agriculture, and other uses. The predominant shoreform of Sequim Bay is bluff backed beach (approximately one-third of the total reach shoreline is classified as feeder bluffs, which supply the sediments that maintain numerous barrier beaches). Bluffs within the reach are generally stable (at least partially due to relatively sheltered position of Sequim Bay = less wave energy).
3 – Gibson Spit	Over 4/5 of shoreland vegetation is natural within 300 feet of the shoreline (predominantly natural shrub and herbaceous habitat predominantly inventoried as wetland). The majority of the landslide hazard areas within the reach are forested, which helps stabilize the slopes. Outside of the shoreland zone, the majority of the surrounding land is agricultural, but some forest land is present in the Gierin and Bell creek vicinities. Shoreforms in the reach consist of bluff backed beach, barrier beach, and barrier estuary, with a lesser amount of Dungeness River delta shore at the northern end of the reach. Washington Harbor (aka Bell Creek estuary) is the largest tidal wetland complex in the vicinity of Sequim Bay. Associated shoreforms and habitats remain; however, a public maintenance road and dikes have degraded ecosystem processes including tidal hydrology, sediment supply, and tidal channel formation.
4 – Kulakala Point	Within 300 feet of the shore, approximately half of the area contains forest and natural shrub and herbaceous vegetation. However, much of the vegetation directly bordering the shoreline has been removed to accommodate dense shoreline development (focused along Three Crabs Road, Seashore Lane, Jamestown Road, and the south shore of Dungeness Harbor). The reach predominantly consists of delta shoreform associated with the Dungeness River, with barrier beach at Cline Spit and bluff backed beach along Dungeness Harbor. Cline Spit is maintained by the sand, gravel, and cobble that drifts from the east and west; the western side of Cline Spit is armored, and several residential properties along Three Crabs Road are protected by bulkheads and other types of armoring. Complete and partial tidal barriers (levees) are located at the Dungeness River mouth. Pockets of nearshore fill and/or structures cover portions of the beach and may impede sediment transport processes (at the end of Crays Road, at Cline Spit, and near Three Crabs Road, and a concrete flume at the mouth of Cooper Creek). The naturally vegetated areas that remain in the reach, located primarily in the Dungeness River delta and its associated wetlands and Dungeness Bay, provide important habitat for a large diversity of fish and wildlife species.
5 – Dungeness Spit	Dungeness Spit is the longest natural sand spit in the United States. Eastward net shore-drift along the feeder bluffs to the west (Reach 6) supplies the sand, gravel, and cobble that maintains the spit. There are no identified shoreline modifications within the reach. Almost the entirety of Dungeness Spit, and all of Graveyard Spit, are contained within the Dungeness National Wildlife Refuge. The refuge protects a wide array of wildlife species and habitat assemblages. The majority of the shoreland area in the reach contains natural shrub and herbaceous vegetation.
6 – Green Point	Approximately one-third of the shoreland area in the Green Point reach is forested, and another third contains natural shrub and herbaceous vegetation. Forest cover is generally absent in the heavily developed areas (Morse Creek vicinity, as well as residential development along most of the marine shoreline landward of the coastal bluff). The predominant shoretype in the reach is bluff backed beach, with smaller portions of barrier beach and barrier estuary. Over 70% of this reach is mapped as feeder bluff or feeder bluff exceptional. These feeder bluffs are subject to the high wind and wave energy. There is very minimal armoring within the eastern half of the reach, which allows unimpeded drift and natural beach building processes to occur to occur along Dungeness Spit (Reach 5). Further west, a second drift cell flows west from Lees Creek towards Port Angeles. The shoreline within this drift cell is heavily modified with armoring that protects the Olympic Discovery Trail, and contains an area of nearshore fill. The mouths of Morse and McDonald Creek, also within Reach 6, are in tsunami hazard areas and mapped FEMA 100-year floodplains (coastal and stream). There is limited residential development adjacent to the McDonald Creek mouth; however, dense residential development is located near the Morse Creek mouth, and many of these homes are within the floodplain and/or channel migration zone of the creek. There are no overwater structures identified within the reach.
7 – Angeles Point	Shoretypes within the reach are primarily bluff backed beach and Elwha River delta shores, with net shore drift consistently eastward (from west end of Freshwater Bay, across Elwha River mouth and feeding Ediz Hook [long spit within City of Port Angeles jurisdiction]). The feeder bluffs within the reach, located east of Angeles Point and within Freshwater Bay, are mapped as unstable, but no recent slides are identified. Shoreline unmodified, except at levied and armored sections at the mouth of the Elwha. Within 300 feet of the shore, more than half of the shoreland area contains forest cover, and another quarter is natural shrub and herbaceous vegetation. Substantial estuarine wetland associated with mouth of Elwha River. Land ownership within the reach is 58% private, 18% public, and 24% tribal. The majority of the private and tribal-owned land is used for residential development, with some agriculture land present. The publicly owned land includes DNR forest land and park land.
8 – Observatory Point	Virtually the entire shoreline of this reach consists of rocky platform shore. The rocky shoreline is relatively stable compared to most of the reaches to the east; minimal landslide or erosion hazards are mapped within the reach. There are no identified shorelines modifications (such as armoring or docks) identified within the reach. There is no appreciable net shore-drift along this reach. The majority of the shoreland area is forest habitat, with a lesser portion of natural shrub and herbaceous vegetation. Less than one-tenth of the riparian vegetation has been altered. Private development within the reach is limited to moderate-density residential development (east third of the reach); most homes are set back over 200 feet from the shoreline. A substantial amount of forest coverage remains on the developed parcels. At the western end of the reach, surrounding Tongue Point, is the Salt Creek Recreation Area, one of the County's premier marine parks.

Marine Reach Name	Overall Reach Condition
9 – Crescent Bay / Low Point	Reach contains shoreline along Crescent Bay, the mouths of Salt, Whiskey, and Murdock creeks, and the Lyre River estuary. Net shore-drift is generally eastward along the reach. The western half of the reach generally consists of feeder bluffs, which supply the sand, gravel, and cobble to sustain the beaches of Crescent Bay. The feeder bluffs near the center of the reach are composed of talus, which erode much slower than the unconsolidated glacial deposits that make up the feeder bluffs in the western portion of the reach. Just over half of the shoreland area contains forest vegetation, and the majority of the land that borders the shoreland zone is also forested. Less than 10% of the shoreland area consists of wetland habitat that is concentrated along the river mouths, primarily in the Salt Creek estuary. A breakwater, associated with a boat ramp, is located at the Whiskey Creek Campground (only mapped shoreline modification within the reach). Land uses and ownership within the shoreland area vary throughout the reach, but generally consist of park lands, private recreational uses (Crescent Beach and RV Park), commercial forestry, and rural residential.
10 – Twin Rivers	The predominant shoretype within the reach is rocky platform shores, with small portions of barrier beach and bluff-backed beach located at the Twin River mouths. Over three-quarters of the shoreline consists of feeder bluffs, but the majority of these bluffs are composed of talus, which erode more slowly than the unconsolidated glacial deposits (common along eastern shore of the Strait of Juan de Fuca). Net shore-drift is entirely eastward through the reach. However, a large, manmade obstruction to littoral drift occurs in the western portion of the reach; referred to as a mole, this remnant shoreline modification from past mining activities bisects drift into two separately functioning cells. Most of the land within the shoreland area is privately owned and zoned for Commercial Forestry. Some DNR-managed forest land is located in the eastern portion of the reach. Shorelands within the reach are largely undeveloped.
11 – Deep Creek	The eastern half of the reach is composed of bluff backed beach (feeder bluffs are composed of talus, which erode more slowly than the unconsolidated glacial deposits) while the western half is rocky platform shores, with a small barrier beach area at the mouth of Deep Creek. Net shore-drift along the reach is entirely eastward; however, a large obstruction (the Silver King Resort breakwater) is located at the mouth of Jim Creek. Nearshore fill, armoring, and 3 overwater structures are located in the resort vicinity. The remainder of the reach has no identified shoreline modifications. Approximately three-quarters of the shoreland area of the reach consists of forest habitat. In addition, most of the land surrounding the shorelands is forested. Land ownership within the reach is 100% private. Land usage within the shoreland is Commercial Forestry, with the exception of the Silver King Resort area, which is zoned Rural Neighborhood Commercial.
12 – Pysht River	The most abundant shoretype in the reach is barrier estuary, associated with the mouth of the Pysht River. A south-trending drift cell, originating at Pillar Point, supplies the sand, gravel, and cobble that forms barrier beach north of the Pysht River mouth. This drift cell converges with a westward drift cell at the Pysht River estuary. Rocky platform shores comprise the eastern portion of the shoreline. Tidal barriers (levees) are located at the mouth of the river. More than half of the shoreland area of the reach is mapped as forest habitat, and most of the remainder of the shorelands (Pysht River estuary) contain natural shrub and herbaceous vegetation. In addition, most of the land surrounding the shorelands is forested. The Pysht estuary is one of the largest estuarine complexes on the Olympic Peninsula and provides important habitat for waterfowl and other wetland-dependent species, as well as steelhead and several salmon species. Land ownership within the reach is 100% private. Land use in the reach is primarily timber land, with a small amount of low-density residential and open space. The entire reach is zoned Commercial Forest.
13 – Pillar Point	Almost the entire shoreline of the reach consists of bedrock shores, with rocky platforms comprising the eastern half and a broad pocket beach in the western half. Feeder bluff talus shoreforms back the pocket beach. The reach consists of two short drift cells, which converge at the pocket beach area. There is no appreciable drift along the rocky platform area. There are no identified shoreline modifications within the reach. Almost the entire shoreland area contains forest habitat, and the surrounding land is also forested. Land ownership within the reach is almost entirely private, and use is primarily timber, with a smaller amount of low-density residential located in the eastern portion of the reach, adjacent to Pillar Point.
14 – Slip Point	Bedrock rocky platform shores comprise the entire shoreline within the reach, and there is no appreciable net shore-drift along the shores. There are no identified shoreline modifications within the reach. Almost the entire shoreland area contains forest habitat, and the surrounding land is also forested. Almost the entire shoreland area is privately-owned timber land.
15 – Clallam Bay	The eastern half of the shoreline in this reach consists of low beaches (barrier estuary and barrier beach), with bluff backed beach in the western portion. These beaches are maintained by two drifts cells (originating at the Clallam Bay headlands), which converge in the central portion of the bay near the mouth of the Clallam River. Almost one-quarter of the shoreline within the reach has been armored, or otherwise modified. Two marina breakwaters are located within the reach, near the center of the bay and at the west end. In addition, shoreline armoring is present along the shoreline near the west marina. There are several overwater structures (docks) at each of the marinas. This is one of the more heavily developed reaches in western Clallam County so the shoreline vegetation has been substantially altered. Only about one-quarter of the shoreland area contains forest cover, with natural shrub and herbaceous vegetation located along the Clallam River. The remainder of the shorelands contains developed and lawn/landscaped area. Most of the land outside of the SMP jurisdiction is forested. Major land uses within the shoreland area include open space, roads, lodging, high-density residential, and commercial. Over 90% of the shoreland area is privately owned.
16 – Sekiu River /Kaydaka	Rocky platform shores comprise over half of the shoreline within the reach, with bluff backed beach in the center of the reach. Two small pocket beaches are located in the western portion of the reach. Net shore-drift within the reach is entirely eastward. A small section of shoreline armoring is located at the eastern end of the reach, near Sekiu. The remainder of the shoreline is unaltered. Almost the entire shoreland area contains forest habitat, and the surrounding land is also forested. The eastern two-thirds of the reach is primarily privately owned timber land, with one publicly owned parcel (managed by State Parks) located near the center of the reach. Land use in the western third of the reach is moderate-density residential and vacant parcels.
17 – Shipwreck Point	The majority of the shoreline consists of rocky platforms shores, with barrier beaches and barrier estuary located near the Hoko and Sekiu estuaries. A bluff backed beach is located between the estuaries, and a pocket beach is located in the western portion of the reach. Net shore-drift in the reach is entirely eastward. Nearly the entire eastern half of the reach is armored (50% of the total reach), which protects Highway 112. Approximately one-third of the reach is heavily forested, with a lesser amount of natural shrub and herbaceous vegetation within the wetlands associated with the river estuaries. Natural vegetation cover within a third of the shoreland area has been altered by residential development and roads. Almost half of the land use within the reach is timber, with other substantial land uses being residential, open space, and roads. Moderate- to high-density residential subdivisions are located along the pocket beach near the center of the reach, on the landward side of Highway 112, and directly west of the Hoko River estuary. Most of the homes are set back more than 75 feet from the shoreline.

Marine Reach Name	Overall Reach Condition
18 – Rasmussen / Bullman Creek	More than three-quarters of the reach consists of rocky platform shores, with some intermittent pocket beaches. Most of the shoreline within the reach has no appreciable net shore-drift; however, eastward drift occurs along Bullman Beach and at the mouth of Rasmussen Creek. Two small segments of shoreline armoring (8% of reach total length) are mapped in the western portion of the reach, at Bullman Beach and the mouth of Snow Creek. In addition, there is one overwater structure (dock) mapped at Snow Creek. Approximately half of the shoreland area within the reach is heavily forested, which helps stabilize erosive slopes and provides habitat for a diversity of wildlife species. Natural shrub and herbaceous vegetation is present near the creek mouths. Vegetation in approximately a quarter of the reach has been altered by roads and development. Most of the shoreland area is bordered by forest land. The predominant land usage within the reach is timber, with residential, lodging, and open space land at the west end of the reach. A pocket of higher density residential development is located at Bullman Beach, and most of the homes are fairly close to the shoreline (approximately 50 feet). The entire residential area is within mapped tsunami and coastal floodplain hazard areas.

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1 **3.2 Freshwater Component**

2 Rivers and streams on the North Olympic Peninsula pass through a complex patchwork of land
3 use and land cover as they flow north from the Olympic Mountains and foothills to the Strait of
4 Juan de Fuca. As with the marine environment, the movement and storage of materials such as
5 water, sediment, nutrients, pathogens, and organic materials in/across upland areas affects the
6 health and sustainability of freshwater rivers and lakes.

7 **3.2.1 Habitat**

8 Freshwater rivers, streams and lakes in Clallam County are vital to the health of many Puget
9 Sound salmon and trout stocks, including Chinook salmon, summer chum salmon, bull trout and
10 steelhead, which are listed as threatened under the federal Endangered Species Act. Due to their
11 reliance on healthy freshwater systems, we selected the salmon stock status as one of two
12 indicators of habitat function.

13 Historically, the basins of the Dungeness, Elwha, and Lyre rivers and Morse Creek were among
14 the most productive of the north Olympic coast¹⁷. However, these and other basins have
15 experienced marked declines in stock productivity likely caused by habitat loss, harvest
16 practices, and changes in ocean conditions. The Sekiu, Clallam, Pysht, Twin, Hoko, Deep Lyre-
17 Crescent basins are all at risk of losing one or more runs of Chinook, pink, chum and/or coho
18 salmon (Table 3-5).

19 **Table 3-5. Basins with critical, declining or at risk salmon stocks (based on data from North Olympic**
20 **Peninsula Lead Entity**

Area	Critical and Declining	Specific Stocks at Risk of Extirpation
Central Strait (McDonald, Siebert, & Bagley)		Coho
Clallam Basin		Chum
Deep Basin	Fall chum	Chum
Dungeness Basin	Fall pink, summer steelhead	
East and West Twin Basins	Fall chum	Chum
Eastern Strait (Bell, Gierin, Cassalery, Cooper, Meadowbrook) ¹		Coho
Elwha Basin	Summer pink, fall chum	
Hoko Basin		Chum

¹⁷ (NOPL Strategy available at <http://www.noplegroup.org/nople/pages/strategy/PrioritizedWatersheds.htm>).

Area	Critical and Declining	Specific Stocks at Risk of Extirpation
Jimmycomelately	Summer chum	Chum, coho
Lyre-Crescent Basin		Chum
Pysht Basin		Chinook
Sekiu Basin		Chinook, chum
Western Strait Clallam Independents (Village east to Colville Creek) ¹	Fall coho, fall chum	Coho, chum

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2 The second indicator of freshwater habitat function that we selected is riparian forest cover.
 3 Salmon and other aquatic organisms rely on processes sustained by the dynamic interaction
 4 between the stream and the adjacent riparian area. As with marine shorelines, riparian forest
 5 cover has a major impact on habitat (as well as water quality and hydrology functions).
 6 Streamside (and lakeside) riparian forests are essential components of healthy freshwater
 7 habitats. Insects falling from overhanging vegetation provide food for fish, while leaves and
 8 other organic matter falling into streams provide food and nutrients for many species of aquatic
 9 insects, which in turn provide forage for fish. Most juvenile salmonids that rear in streams prey
 10 on aquatic invertebrates and terrestrial insects that fall into streams from overhanging vegetation
 11 (Horner and May, 1999; May et al., 1997).

12 Riparian forest cover is also the primary source of organic / woody debris. Organic material,
 13 including large woody debris, enters streams via streambank erosion and treethrow/windthrow
 14 processes operating within roughly 200 feet of stream channels. These processes play a
 15 substantial role in stream channel maintenance and in-stream habitat formation and are therefore
 16 critical to the health of freshwater habitats. According to some studies more than half of all large
 17 woody debris recruitment is from within 25 feet of streams, and about 90 percent comes from
 18 trees growing within about 50 feet of streams (Murphy and Koski, 1989; McDade et al., 1990;
 19 Van Sickle and Gregory, 1990). In addition, for larger streams that are prone to avulsion (such as
 20 the lower Dungeness River), large woody debris can be recruited from distances much greater
 21 than 50 feet.

22 In Clallam County, most stream and rivers have a high percentage of closed canopy riparian
 23 cover within 200 feet of the stream channel—especially in western Clallam County (Table 3-6).
 24 The amount of closed canopy riparian forest along the lower reaches of the Dungeness, Elwha
 25 and Salt Creek is lower than most other areas of the County.

1
2 **Table 3-6. Acres of closed canopy forest within 200 feet of the ordinary high water line (Data from Point No Point Treaty Council 2011)**

Reach Name	Acres of Riparian Forest within 200' Shoreline	Total Acres of Reach	% of Riparian Forest
Bear_Cr_01	121	130	93%
Boun_Cr_01	54	55	99%
Brow_Cr_01	10	13	75%
Bull_Cr_01	11	18	58%
Cany_Cr_01	71	77	91%
Char_Cr_01	30	42	72%
Clal_Rv_01	59	110	53%
Clal_Rv_02	19	30	64%
Clal_Rv_03	31	89	35%
Clal_Rv_04	291	322	90%
Covi_Cr_01	15	15	100%
Deep_Cr_01	258	280	92%
Dung_Rv_01	15	45	33%
Dung_Rv_02	114	263	43%
Dung_Rv_03	83	175	48%
Dung_Rv_04	238	250	95%
Dung_Rv_05	326	330	99%
Dung_Rv_06	170	170	100%
Elli_Cr_01	35	44	79%
Elwh_Rv_01	104	214	49%
Elwh_Rv_02	51	147	34%
Elwh_Rv_03	68	102	67%
Etwi_Rv_01	201	216	93%
Gray_Rv_01	375	392	96%
Gree_Cr_01	27	33	83%
Herm_Cr_01	51	84	61%
Herm_Cr_02	37	55	68%
Hoko_Rv_01	36	44	81%
Hoko_Rv_02	66	115	57%
Hoko_Rv_03	264	319	83%
Hoko_Rv_04	64	103	63%
Hoko_Rv_05	185	246	75%
Hoko_Rv_06	131	179	73%
Hoko_Rv_07	110	150	73%

Reach Name	Acres of Riparian Forest within 200' Shoreline	Total Acres of Reach	% of Riparian Forest
Hoko_Rv_08	90	117	77%
Hoko_Rv_09	105	124	85%
Indi_Cr_01	174	238	73%
Last_Cr_01	2	3	67%
Lhok_Rv_01	149	211	71%
Litt_Rv_01	111	115	96%
Lyre_Rv_01	171	187	91%
Lyre_Rv_02	65	65	100%
Mcdo_Cr_01	242	350	69%
Mors_Cr_01	274	424	65%
Nbhe_Cr_01	43	52	82%
Nfse_Rv_01	206	244	84%
Oldr_Cr_01	13	24	56%
Pysh_Rv_01	60	92	65%
Pysh_Rv_02	189	264	72%
Pysh_Rv_03	41	69	60%
Pysh_Rv_04	183	251	73%
Roya_Cr_01	17	17	100%
Salm_Cr_01	25	47	52%
Salt_Cr_01	9	37	24%
Salt_Cr_02	158	183	86%
Sbli_Rv_01	69	70	100%
Seki_Rv_01	178	272	66%
Sfpy_Rv_01	44	67	66%
Sfpy_Rv_02	116	145	80%
Sfse_Rv_01	114	124	92%
Silv_Cr_01	34	34	100%
Suth_Lk_01	1	3	39%
Wtwi_Rv_01	206	256	80%
Grand Total	6,623	8,695	76.2%

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3.2.2 Water Quality

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Water quality is an important factor in maintaining suitable freshwater habitats for fish and other aquatic species. Salmonids, in particular, require water that is both colder and has lower nutrient levels than many other types of native fish. Dissolved oxygen is one of the most influential water

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1 quality parameters for stream biota, including salmonids (Bjornn and Reiser, 1991). A chief
2 influence on dissolved oxygen levels in most streams is temperature; cooler waters maintain
3 higher levels of oxygen than warmer waters.

4 As with the marine environment, selecting a measure of water quality function that is highly
5 responsive to SMP decisions (as opposed to other types of land management decisions) is
6 difficult. We selected the amount of impervious surface within shoreline jurisdiction as an
7 indicator of freshwater quality functions. Two major impacts of increased imperviousness are
8 increased runoff (e.g., Booth et al. 2002) and increases in deposition of nutrients, pathogens and
9 contaminants into water bodies (e.g., Kaye et al. 2006). Higher percentages of impervious
10 surface are correlated with declining water quality in freshwater systems (Horner et al.
11 1997).

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13 Minimizing new impervious surfaces can also help to maintain water quality in freshwater
14 streams. Currently, there is relatively little impervious cover within 200 feet of most freshwater
15 streams in Clallam County (Table 3-7). This means that infiltration and recharge processes are
16 largely intact in these areas, which helps to maintain hydrologic, water quality and habitat
17 functions. Exceptions to this are the upper reach (Reach 3) of the Clallam River, Lake Sutherland
18 and the lower reach of Morse Creek (Reach 1). These areas have roads near the shoreline, so the
19 levels of impervious surface areas are ~10 percent or more.

20 **Table 3-7. Impervious surface area as a percent of the shoreland jurisdictional area for streams in WRIA 17,**
21 **18 and 19 streams in Clallam County by reach (From National Land Cover Data Set)**

Freshwater Reach	Percent Impervious Area (excludes aquatic areas)
Bullman Creek Reach 01	5.0%
Canyon Creek Reach 01	1.1%
Charlie Creek Reach 01	0.9%
Clallam River Reach 01	3.0%
Clallam River Reach 02	4.9%
Clallam River Reach 03	15.0%
Clallam River Reach 04	1.3%
Deep Creek Reach 01	0.5%
Dungeness River Reach 01	2.4%
Dungeness River Reach 02	3.0%
Dungeness River Reach 03	6.1%
Dungeness River Reach 04	0.3%
East Twin River Reach 01	0.8%
Elwha River Reach 01	0.6%
Elwha River Reach 02	3.7%
Elwha River Reach 03	7.9%

Freshwater Reach	Percent Impervious Area (excludes aquatic areas)
Green Creek Reach 01	0.0%
Hoko River Reach 01	2.4%
Hoko River Reach 02	1.6%
Hoko River Reach 03	1.3%
Hoko River Reach 04	1.1%
Indian Creek Reach 01	5.8%
Lake Sutherland Reach 01	18.1%
Little River Reach 01	0.7%
Lyre River Reach 01	1.3%
McDonald Creek Reach 01	2.4%
Morse Creek Reach 01	9.8%
Pysht River Reach 01	0.2%
Pysht River Reach 02	4.1%
Pysht River Reach 03	5.7%
Pysht River Reach 04	2.1%
Salt Creek Reach 01	2.3%
Salt Creek Reach 02	1.5%
Sekiu River Reach 01	7.5%
Grand Total	3.5%

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3.2.3 Hydrology

The freshwater streams and lakes of Clallam County are fed by surface water runoff and groundwater recharge. Precipitation is the primary source of groundwater recharge. Soil permeability and underlying geology influence the amount of precipitation that becomes surface runoff. In mountainous areas with intact forest cover, shallow soils tend to limit infiltration so water either travels laterally as shallow subsurface flow, or percolates to deep groundwater through cracks and fissures in the bedrock. River valleys in the lowlands tend to have deeper, porous soils that create favorable conditions for groundwater discharge. In their natural state, these areas can store large quantities of water in shallow aquifers.

Removal of forest cover and development along streams alters the natural hydrologic cycle and increases the frequency, duration and amount of surface water runoff (Booth and Jackson, 1997); Alberti and Marzluff 2004). Runoff rates also increase when rivers become disconnected from their floodplains. Reduced storage and connectivity occur as a result of dikes, revetments and/ or levees along stream channels; stream channelization; and floodplain and wetland fill. The loss of surface water storage potential can increase the magnitude and frequency of peak flows and can

1 increase water level fluctuations in river and lake systems. In contrast, unaltered floodplains help
2 to mitigate effects of increased runoff. Connected floodplains allow for overbank storage, which
3 dissipates the erosive forces of the flood. As a result, the amount/extent of development within
4 floodplains and channel migration zones provides a measure of hydrologic functions. For this
5 reason, we selected the floodplain development as an indicator of freshwater hydrology function.

6 A comprehensive catalog of existing floodplain development across Clallam County is not
7 available; however, the Inventory and Characterization Report describes known revetments and
8 levees that occur along WRIA 17, 18, and 19 streams. A total of 40 existing revetments and
9 levees are inventoried (extending across 67 acres of shoreline). These structures are along the
10 Dungeness, Elwha, and Pysht Rivers, and also occur along Morse Creek Reach 1 and Little River
11 Reach 1 (ESA, March 2011). Levees and revetments are typically constructed to constrain
12 channels and/or prevent flooding – in order to protect development and uses occurring in
13 adjacent areas. As such, the location and extent of these structures are indicative of where the
14 most extensive existing floodplain development exists.

15 For freshwater reaches with high development pressure, we assessed potential for new floodplain
16 development (vacant lots occurring entirely within the mapped FEMA 100-year floodplain).
17 Results of this analysis are presented in Chapter 5.

18 19 **3.2.4 Freshwater Reach Overview**

20 Table 3-8 provides an overview of existing conditions along the County's freshwater shorelines.
21 Data is provided consistent with the components, attributes, and indicators of healthy marine
22 shorelines (as presented in Table 2-1).

Table 3-8. Summary of Freshwater Shoreline existing conditions, as assessed for key components based on attributes and indicators.

Freshwater Reach Name	Overall Reach Condition
Bear Creek (Bear_Cr_01)	The reach meanders through moderately steep terrain, trending generally westward. Vegetative cover through the reach is primarily forest habitat, which provides shading and habitat for fish and wildlife. Bear Creek provides habitat for Chinook, chum, and coho salmon, and steelhead trout. Erosion and landslides are prevalent throughout the middle and upper reach. The lower portion of the reach, near the Hoko River confluence, is within the FEMA 100-year floodplain. The reach consists of privately owned commercial timber lands. No shoreline modifications are mapped within the reach.
Boundary Creek (Boun_Cr_01)	. The stream profile through the reach is generally straight, flowing east and northeast through steep mountain terrain and valleys. The channel is bordered by a narrow floodplain. Dense forest cover is present within the reach, providing substantial shading and habitat for fish and wildlife. Boundary Creek provides habitat for resident cutthroat and rainbow trout populations. The reach contains public timber lands managed by DNR. The majority of the reach is located in a geologic hazard area, susceptible to erosion. No shoreline modifications are mapped within the reach. No shoreline modifications are mapped within the reach.
Brouwnes Creek (Brow_Cr_01)	Forest habitat borders the riparian corridor and extends outward through much of the reach, providing shade and habitat for fish and wildlife. The reach provides spawning and rearing habitat for Chinook, chum, and coho salmon, and steelhead trout. Resident cutthroat and rainbow trout are also present in the reach. Commercial forestry and timber lands are located throughout the reach. Much of the eastern portion of the reach lies within the FEMA 100-year floodplain. The middle and upper portions of the reach are located in geologic hazard areas, and are susceptible to erosion and landslides. The lands within the reach are largely undeveloped. No shoreline modifications are mapped within the reach. No shoreline modifications are mapped within the reach.
Bullman Creek (Bull_Cr_01)	The stream channel within the reach flows in a relatively straight, well-defined course. Vegetative cover in the reach is a combination of forest and herb and shrub habitat. Bullman Creek provides habitat for Chinook, chum, and coho salmon, and steelhead trout. Breeding populations of bald eagle are also located within the reach. Moderate- to low-density residential development is located in the lower portion of the reach along Highway 112. Timber and commercial forest lands are located in the middle and upper portion of the reach. The lower portion of the reach lies within the tsunami hazard zone and FEMA 100-year floodplain, and the majority of the reach is located in a geologic hazard area for erosion. Residential developments in the lower reach are located within the tsunami hazard zone, FEMA 100- year floodplain, and/or geologic hazard areas. No shoreline modifications are mapped within the reach.
Canyon Creek (Cany_Cr_01)	The stream meanders northeastward in a relatively straight path toward its confluence with the Dungeness. Vegetative cover is primarily dense forest cover that extends from the surrounding foothills into the riparian corridor, providing stream shading and habitat for fish and wildlife. The reach provides habitat for resident cutthroat and rainbow trout. The reach supports breeding populations of elk and harlequin duck. The majority of the reach consists of public, DNR-managed forest lands. Some commercial forestry parcels are located in the lower and middle portions of the reach. The majority of the reach lies in a geologic hazard area for slides. Public access to trails in the reach is available from Forest Service Road 2870. A hatchery water intake dam located at RM 0.08 is a complete barrier to upstream fish passage.
Charlie Creek (Char_Cr_01)	The stream profile in the reach is typically straight with a few broad meanders in the lower portion of the reach. Forest cover is prevalent throughout the reach, extending from the surrounding hillside into the riparian corridor. Herb and shrub habitat is located in portions of the lower reach. Wetland habitat is located in the floodplain of the lower portion of the reach, adjacent to Charley Creek Rd. The reach provides spawning and rearing habitat for coho and chum salmon, in addition to steelhead and resident cutthroat trout. Low-density rural residential development is located in the lower portion of the reach. Most of the reach area is DNR-managed public forest land. The upper and middle portions of the reach are located in a geologic hazard area for erosion. Slides areas are located in the upper portion of the reach along the southern reach boundary. No shoreline modifications are mapped within the reach.
Clallam River 1 (Clal_Rv_01)	Encompasses the large, flat alluvial fan complex of the river. The channel profile through this reach is highly sinuous supporting several large meander bends that move laterally across the broad low-gradient floodplain. Tributary streams braid and join the river in the lower portion of the reach. Patches of herb and shrub habitat, as well as forest habitat, are located in portions of the reach that have not been cleared for agriculture. Wetland habitat extends across the floodplain in several locations. The reach provides habitat for coho and chum salmon, as well as steelhead and resident cutthroat trout. The reach supports breeding populations of bald eagle. The majority of the reach contains moderate- to-low density residential development and agriculture. Approximately a third of the reach is zoned for commercial forestry. The majority of the reach lies within the tsunami hazard zone, the FEMA 100-year floodplain, and/or channel migration area. The upper portion of the reach lies in a geologic hazard area for erosion. This reach contains three identified shoreline modifications. River road crossings are present at Frontier Street and Weel Road. Additionally, a dam is located on a tributary to the river, in the southwestern portion of the reach.
Clallam River 2 (Clal_Rv_02)	The river profile in this reach is characterized by stretches of relatively straight channel segments followed by gentle sweeping meanders. Vegetation adjacent to the stream corridor is a mixture of dense forest cover and natural shrub and herb habitat. Highway 112 corridor runs perpendicular to the stream course through the central portion of the reach, potentially limiting access to floodplain and side-channel habitat. Wetland habitat extends through the southeastern portion of the reach. The reach provides spawning and rearing habitat for coho and chum salmon, steelhead, and cutthroat trout. The reach contains low-density commercial and residential development. The majority of the reach lies in the FEMA 100-year floodplain and/or in the channel migration zone. A geologic hazard area for erosion is present in the southeast portion of the reach. Some residences are located within the flooding and/or channel migration areas. Highway 112 crosses the river near the center of the reach.
Clallam River 3 (Clal_Rv_03)	The reach is characterized by a sinuous river channel containing several meanders throughout a broad and relatively flat floodplain. Highway 112 parallels the river through much of the reach and constitutes a lateral barrier between the river and portions of its natural floodplain. Two bridge crossings are located in the middle and upper portion of the reach. Much of the reach contains forest habitat, although a substantial portion of the reach has been cleared for agriculture and/or rural residential development. Wetland habitat is present throughout the reach. The reach provides spawning and rearing habitat for coho and chum salmon, in addition to steelhead and resident cutthroat trout. The reach also supports breeding populations of bald eagle. Low-density residential development and agriculture is prevalent in the reach. The majority of the reach lies in the FEMA 100-year floodplain and/or in channel migration area. Geologic hazard areas for slides and erosion are located in the east and west, respectively. Several existing residences are located within flood and/or channel migration hazard areas. Highway 112 runs parallel to the stream corridor before crossing in two locations in the central and south central portions of this reach.

Freshwater Reach Name	Overall Reach Condition
Clallam River 4 (Clal_Rv_04)	The channel is throughout the reach is confined within a narrow floodplain. Dense, contiguous forest habitat covers the majority of the reach, which provides shade and habitat for fish and wildlife. The reach provides spawning and rearing habitat for coho and chum salmon, in addition to steelhead and resident cutthroat trout. The majority of the reach contains public forest lands managed by DNR. The Clallam River Campground, a popular recreation area, is located in the lower portion of the reach. Undeveloped/informal public access to shorelines is available from Highway 112 throughout the reach. Approximately one half of the reach lies within the FEMA 100-year floodplain. Geologic hazard areas for slides and erosion are located throughout the reach. The majority of the floodplain supports dense forest cover and natural vegetation. No shoreline modifications are mapped within the reach.
Coville Creek (Covi_Cr_01)	The reach is relatively short, extending from near the stream mouth to approximately 0.3 mile upstream. The portion of Coville Creek within the reach trends generally northwest, along a straight channel length that flows across a wide terrace. The reach contains dense forest cover. The stream provides habitat for coho and chum salmon, and resident cutthroat trout. The reach provides habitat for breeding populations of bald eagle. The majority of the reach contains low density residential and forest lands. Existing homes are generally located 200 feet from the stream channel. The lower half of the reach lies within a tsunami hazard area and the FEMA 100-year floodplain. The entire reach lies within a geologic hazard area for slides. No shoreline modifications are mapped within the reach.
Deep Creek (Deep_Cr_01)	The reach is characterized by steep terrain. The channel profile through the reach is fairly sinuous as it meanders through low to moderate gradient stream segments. The reach contains dense forest cover, intermixed with herb and shrub communities. The reach provides spawning and rearing habitat for coho and chum salmon, and also provides habitat for steelhead trout and resident cutthroat trout. The lower portion of the reach supports breeding populations of bald eagle. Public (DNR-managed) and private timber lands are located throughout the reach. The lower portion of the reach is located within a tsunami hazard area and the FEMA 100-year floodplain. Geologic hazard areas for slides and erosion are located in the upper and middle portions of the reach. Some existing residences in the lower portion of the reach are located within flood and tsunami hazard areas. Highway 112 crosses Deep Creek at the north end of the reach, and the stream channel was historically denuded of large woody debris.
Dungeness River Reach 1 (Dung_Rv_01)	The reach consists of the broad alluvial floodplain of the lower Dungeness. The river channel within the reach has a relatively narrow forested riparian corridor; the surrounding floodplain is utilized for agriculture. Wetland habitat is located throughout the reach, adjacent to the stream course. The reach provides habitat for Chinook, chum, coho, and pink salmon, in addition to steelhead, bull, and resident cutthroat trout. The reach also provides priority habitat for bald eagle, harlequin duck, peregrine falcon, and waterfowl. The majority of the reach contains rural low-density residential and agricultural lands. The lower portion of the reach lies within a tsunami hazard zone, as well as the FEMA 100-year floodplain and channel migration zone. Geologic hazard areas for slides are located in the northwestern portion of the reach. Existing residential and agricultural development is located within the tsunami, flood and/or channel migration areas. This reach contains several shoreline modifications. The Dungeness River is constrained by levees along its entire east bank and a portion of the west bank, which have disconnected the river from its floodplain. Two culverts are present under East Anderson Road, west of the Schoolhouse Bridge.
Dungeness River 2 (Dung_Rv_02)	The channel profile through the reach is dynamic, supporting a high degree of sinuosity and braiding. The reach contains some forest and herb and shrub habitat, but much of the area has been converted to agriculture. A substantial portion of the reach contains wetland habitat. The reach provides spawning and rearing habitat for Chinook, chum, coho, and pink salmon, in addition to steelhead, bull, and resident cutthroat trout. Sockeye salmon have also been documented in the reach. The reach also provides habitat for bald eagle, harlequin duck, peregrine falcon, and waterfowl concentrations. The reach contains moderate- to low-density residential development and agricultural lands. The Mary Lukes Wheeler County Park provides public access to shorelines in this reach. Additionally, the Olympic Discovery Trail crosses in the northern portion of the reach. Most of the reach, including developed areas, are located in the FEMA 100-year floodplain and/or the channel migration zone. Four road crossings are located within the reach. The Hurd Creek Fish Hatchery is located in the western portion of the reach. South of Woodcock Road, most of the east side of the river is constrained by levees.
Dungeness River 3 (Dung_Rv_03)	The stream profile through the reach is sinuous, meandering and braiding across its floodplain. Vegetative cover in the reach is a mixture of forest cover and herb and shrub habitat. Portions of the stream corridor and floodplain have been cleared for agricultural uses and residential development. The reach provides spawning and rearing habitat for Chinook, chum, coho, and pink salmon, in addition to steelhead, bull, and cutthroat trout. Sockeye salmon have also been observed within the reach. Additionally, the reach provides habitat for bald eagle and harlequin duck. The reach contains moderate- to low-density residential development and agricultural lands. Undeveloped/informal public access is available through several publically owned side roads that allow access to shorelines within the reach. Additionally, the river can be accessed at the fish hatchery near the Canyon Creek confluence. Most of the reach lies within channel migration and FEMA 100-year floodplain hazard areas. Geologic hazard areas for erosion are located in the southern portion of the reach. Many existing residences are located within flood and/or channel migration hazard areas. Several levee sections are located within the reach. In addition, the Sequim Fish Hatchery is located in south eastern portion of the reach, and the Morse Creek Acclimation ponds are located in the southwest.
Dungeness River Reaches 4, 5, and 6 (Dung_Rv_04, Dung_Rv_05 and Dung_Rv_06)	The stream channel within the reaches is relatively confined and meandering. Vegetative cover in the reaches is consists primarily of forest habitat. The reaches provides spawning and rearing habitat for Chinook, coho, chum, and pink salmon, in addition to steelhead, bull, cutthroat, and rainbow trout. Additionally, reach 4 provides habitat for elk and harlequin duck populations. Reach 4 is primarily public forest land (DNR and Olympic National Forest). Reaches 5 and 6 are located within the Olympic National Forest. Much of reach 4 lies within flood hazard areas, and the central portion of the reach lies in a geologic hazard area for slides. Portions of the lower reach lie in a geologic hazard area for erosion. Public access to reaches 5 and 6 is accessible through Forest Service Road 2870. No shoreline modifications are mapped within these reaches.
Elli_Cr_01	The reach extends from the Hoko River confluence to approximately 1 mile upstream. The reach is covered primarily by dense forest. The reach provides spawning and rearing habitat for Chinook and coho salmon, in addition to steelhead and cutthroat trout. The majority of the reach contains commercial forest lands. The lower portion of the reach is located within the FEMA 100-year floodplain. Geologic hazard areas for erosion and slides are located throughout the reach. No shoreline modifications are mapped within the reach.

Freshwater Reach Name	Overall Reach Condition
Elwha River 1 (Elwh_Rv_01)	The stream channel within the upper portion of the reach is constrained by the steep bedrock walls of the Elwha Canyon, while the channel floodway widens in the lower portion of the reach and supports substantial wetland habitat. In the lower reach, levees are present along the eastern border of the reach. The reach consists primarily of forest habitat, although forest cover has been removed in some areas. Within the reach, the river provides habitat for bull trout, resident cutthroat, and steelhead trout, and Chinook, chum, pink, and coho salmon. The reach also provides habitat for bald eagle. Reach 1 of the Elwha is largely undeveloped, with the exception of the City of Port Angeles water facility. The northern portion of the reach lies within mapped channel migration, tsunami, and flood hazard zones. Elwha River Road and Granite Road cross the stream corridor in the central and south central portions of the reach, respectively. Levee sections are present throughout the lower portion of the reach, and a levee is present along the entire east side of the floodplain in the lower portion of the reach.
Elwha River 2 (Elwh_Rv_02)	The reach area consists primarily of forest habitat. Lake Aldwell provides habitat for rainbow trout, resident cutthroat trout, and bull trout; the Elwha River Dam blocks anadromous fish access to the reach. Bald eagle and trumpeter swan habitat is mapped throughout the reach. The upper portion of the reach lies within Olympic National Forest. The remainder of the reach area consists of forest land, both publically (DNR managed) and privately owned. The Elwha River Dam is located at the downstream end of the reach.
Elwha River 3 (Elwh_Rv_03)	The stream channel is relatively confined throughout the reach, and consists of a relatively straight single channel. Most of the reach contains dense forest cover. However, Olympic Hot Spring Road borders the river within the reach, which has permanently removed some forest habitat. The reach provides habitat for rainbow trout, resident cutthroat trout, and bull trout; the Elwha River Dam blocks anadromous fish access to the reach. The reach contains a mix of commercial forest land and low-density residential development. The majority of the reach lies within mapped channel migration and flood hazard zones. Olympic Hot Springs Road generally runs parallel to the Elwha within the reach, which blocks access to portions of its natural floodplain.
East Twin River (Etwi_Rv_01)	The river channel trends generally straight, accentuated by a few, tight meanders as the river flows through a steep valley. Vegetation within the reach is predominantly contiguous forest cover. The reach provides spawning and rearing habitat for chum and coho salmon, as well as steelhead trout. Natural cascades and waterfalls located at RM 3.6 block upstream passage. Populations of bald eagle are supported in the lower portion of the reach. Private timber lands are located in the lower third of the reach while public forest lands (DNR and Olympic National Forest) are located throughout the upper portion of the reach. Portions of the lower river channel have been constrained by the construction of dikes composed of river sediments, and the channel was historically denuded of large woody debris.
Gray Wolf River (Gray_Rv_01)	Forest cover is present throughout most of the reach. The Gray Wolf River provides habitat for Chinook, coho, chum, sockeye, and pink salmon, in addition to steelhead, bull, and resident cutthroat trout. The reach also supports populations of elk and harlequin duck. The Gray Wolf River is located within Olympic National Forest, portions of which are designated wilderness areas. The Lower Gray Wolf Trail is located within the reach, which is a popular hiking and camping area. Forest Service Road 2870 also provides public access to the reach. No shoreline modifications are mapped within the reach.
Green Creek (Gree_Cr_01)	The reach is covered primarily by dense forest habitat. This reach provides spawning habitat for chum and coho salmon, and juvenile rearing habitat for steelhead trout. The presence of resident cutthroat is also mapped within the reach. The reach contains privately owned commercial forest lands. The majority of the reach is situated within the FEMA 100-year floodplain. Geologic hazard areas for erosion and slides are located in the eastern half of the reach. No shoreline modifications are mapped within the reach.
Herman Creek 1 (HERM_CR_01)	Dense forest cover extends throughout much of the reach. The reach provides spawning and rearing habitat for steelhead and chinook and coho salmon, in addition to resident cutthroat. The reach contains commercial forest lands. The lower portion of the reach is situated in the FEMA 100-year floodplain. Geologic hazard areas for erosion and land slide are located in the middle and upper portions of the reach. No shoreline modifications are mapped within the reach.
Herman Creek 2 (HERM_CR_02)	Dense forest cover is present throughout most of the reach. The reach provides spawning and rearing habitat for coho salmon and steelhead trout. Resident cutthroat trout are also present within the reach. The reach contains commercial forest lands. Geologic hazard areas for erosion and landslides are present throughout the entire reach. No shoreline modifications are mapped within the reach.
Hoko River 1 (HOKO_RV_01)	The reach encompasses a large and flat alluvial floodplain. Dense forest cover extends throughout much of the reach. Wetland and estuarine habitat also extends through the majority of the reach. This reach provides spawning habitat for Chinook, chum, and coho salmon, and the presence of resident cutthroat and steelhead trout is also mapped within the reach. The reach supports breeding populations of bald eagle. Much of the lower portion of the reach is undeveloped park land (Hoko River State Park). Agricultural lands are located in the upper portion of the reach. Most of the reach lies within a tsunami hazard area, the FEMA 100-year floodplain and/or a channel migration area. Geologic hazard areas for erosion and slides are located in the northeastern portion of the reach. Highway 112 crosses the stream corridor at the upstream end of the reach.
Hoko River 2 (HOKO_RV_02)	The river channel within the reach contains a series of well defined braids and meanders, moving laterally across a broad floodplain. The Hoko-Ozette Road runs parallel to the river through much of the reach, acting as a lateral barrier between the river and its natural floodplain. The majority of the reach has been cleared for agriculture and rural residential development, leaving sparse residual forest cover and herb and shrub habitat along the stream. Wetland habitat is located in the floodplain of the river throughout much of the reach. The reach supports spawning and rearing habitat for Chinook, coho, and chum salmon, in addition to steelhead and cutthroat trout. Approximately one-third of the reach contains low-density residential development. The other two-thirds of the reach area is commercial timberland. The majority of the reach lies within mapped flooding and/or channel migration hazard areas. The northern portion of the reach lies within the undeveloped Hoko River State Park, and the Hoko-Ozette Road provides additional informal public access to shorelines in the reach. Highway 112 crosses the stream corridor at the downstream end of the reach.

Freshwater Reach Name	Overall Reach Condition
Hoko River 3 (HOKO_RV_03)	Channel configuration through the reach is a series of relatively straight stream segments followed by several tight meanders. The Hoko-Ozette Road runs parallel to the river through much of the reach, acting as a lateral barrier between the river and its natural floodplain. Forest cover borders the stream throughout much of the reach area. The reach supports spawning and rearing habitat for Chinook, coho, and chum salmon, in addition to steelhead and cutthroat trout. Bald eagle and harlequin duck populations are also present within the reach. Approximately two-thirds of the reach contains commercial forest lands. Low-density residential development is limited to the lower portion of the reach. Much of the reach area is located within FEMA 100-year floodplain and/or channel migration areas. Additionally, geologic hazard areas for erosion and land slide extend through much of the reach. The Hoko-Ozette Road provides informal public access to shorelines in the reach. No shoreline modifications are mapped within the reach.
Hoko River 4 – 8 (HOKO_RV_04 through HOKO_RV_08)	The stream channel is mostly unconfined throughout these reaches, with areas of meanders and segments of braided channel. Vegetative cover in the reach is primarily forest cover. Spawning and rearing habitat for Chinook, coho, and chum salmon, in addition to steelhead and cutthroat trout. The majority of all reaches contain commercial forest lands. Reaches are mapped with FEMA 100-year floodplain and/or channel migration area throughout much of shoreline. Geologic hazard areas for slides are located in portions of all these reaches. No shoreline modifications are mapped within these reaches.
Indian Creek (INDI_CR_01)	Outlet of Lake Sutherland to the creek's confluence with the Elwha River. The valley floor within the reach is generally broad and flat from the Lake Sutherland outlet until the stream is within a mile of a half of the Elwha, where the stream falls into a narrow, ravine-like valley. The majority of the reach area contains dense forest cover. The creek provides habitat for resident cutthroat and rainbow trout. With the upcoming Elwha dam removals, anadromous fish stocks will likely return and/or be reintroduced to the creek. The predominant land use in the reach is timber, much of which is public land managed by DNR. However, some low-density residential development is located within the reach. Flood hazard areas are located within the eastern portion of the reach. The existing residences along the creek are generally set back from the flood hazard areas. Highway 101 crosses the creek in 3 locations within the reach.
Last Creek (LAST_CR_01)	The reach contains dense forest cover. The reach supports spawning and rearing habitat for coho salmon, in addition to steelhead and resident cutthroat trout. The reach contains commercial forest lands. The reach is situated entirely within the FEMA 100-year floodplain. A geologic hazard area for erosion is located in the north eastern portion of the reach. No shoreline modifications are mapped within the reach.
Little Hoko (LHOK_RV_01)	Continuous forest cover is present throughout most of the reach. The reach supports spawning and rearing habitat for Chinook, chum, and coho salmon, in addition to steelhead and cutthroat trout. The reach contains public and private timber land, and over half the reach area consists of park land (the undeveloped Hoko River State Park). The lower portion of the reach is located in the FEMA 100-year floodplain and/or channel migration hazard area. Geologic hazard areas for erosion and land slide are located in the upper reach. The downstream end of the Little Hoko River is channelized, through the Hoko-Ozette road bridge.
Little Quilcene River	The reach contains dense forest cover. The Little Quilcene River within the reach provides habitat for resident cutthroat trout; anadromous fish passage to the reach is blocked by a natural falls at RM 7.0, in Jefferson County. The majority of the reach area lies within Olympic National Forest, with a small portion on private timber land. Under current zoning regulations, there is no potential for subdivision or residential development within the reach. There are no shoreline modifications mapped within the reach.
Little River (LITT_RV_01)	Most of the reach area is forested, but forest cover has been altered in some areas by low-density residential development and Little River Road. Erosion and slide hazard areas are mapped in portions of the reach. The Little River provides habitat for bull trout, resident cutthroat, and rainbow trout. The Elwha River Dam blocks anadromous fish access to the reach; anadromous fish are likely to return to the river after the dam is removed. Land use within the reach is primarily commercial timber, with some rural residential development located at the east end of the reach. Olympic Hot Springs Road crosses the Little River near its confluence with the Elwha.
Lyre River 1 (LYRE_RV_01)	The reach has a fairly steep gradient and flows within a relatively confined channel. Vegetative cover throughout the reach is primarily forest habitat. The reach provides spawning and rearing habitat for chum salmon and steelhead trout. Chinook and coho salmon have also been observed within the reach along with resident cutthroat trout. Breeding populations of bald eagle and band-tailed pigeon also utilize portions of the reach. Bank armoring and channelization have adversely affected habitat in the lower 1 mile of the reach. The upper two thirds of the reach are public forest lands (managed by DNR). Low density residential development is located in the lower portion of the reach, near Highway 112. The lower 0.4 miles of the reach located within a tsunami hazard zone. Geologic hazard areas including slides and erosion areas are located throughout the reach. Portions of the stream are also within the FEMA 100-year floodplain. Developed public access is available at the Lyre River campground, while informal/undeveloped public access to the shoreline is available along Lyre River Rd. Highway 112 crosses the river within the reach. The lower portion of the reach is channelized through a private campground.
Lyre River 2 (LYRE_RV_02)	The reach area is almost entirely covered by continuous forest habitat. The reach provides habitat for cutthroat and rainbow trout. A series of cascades and falls located at RM 2.7 prevent upstream migration and spawning of salmon and steelhead in this reach. The majority of the reach is located on public forest land (DNR and Olympic National Forest). Some private timber parcels are located near the confluence of June Creek and in the southeastern portion of the reach. The lower half of the reach lies in a geologically unstable zone, and is susceptible to erosion. No shoreline modifications are mapped within the reach.
McDonald Creek (MCDO_CR_01)	McDonald Creek flows fairly straight, and is located within a deep ravine. The lands within the reach are predominantly forested. McDonald Creek is utilized as a conveyance for a portion of the Dungeness irrigation system; Dungeness River water is put into the creek at RM 5, and withdrawn downstream at RM 2. The Creek provides spawning habitat for steelhead and coho salmon, and the reach provides habitat for bald eagle, peregrine falcon, and wood duck. The upper portion of the reach consists primarily of publically owned timber land managed by DNR. Low- to moderate-density development surrounds the lower portion of the reach, but forest cover within the riparian corridor is largely intact. Erosion and landslide areas are mapped along the stream channel for most of its extent. However, these hazard areas are generally confined to the creek's forested riparian corridor on undeveloped land. There are two road crossings over the stream (Old Olympic Highway and Highway 101).

Freshwater Reach Name	Overall Reach Condition
Morse Creek (MORS_CR_01)	The reach extends from near the creek mouth to the boundary of Olympic National Park. Below the park, the creek is generally confined in a ravine-like canyon, but below approximately RM 1.7 the valley broadens into a relatively wide, low-gradient floodplain. The upper portion of the reach is largely forested, but forest cover decreases downstream in the developed areas. Morse Creek provides spawning habitat for steelhead, and Chinook, chum, coho, and pink salmon. In addition, the presence of bull trout, residential cutthroat, and rainbow trout are identified in the creek. The reach also provides habitat for wood duck and harlequin duck. Land use in the upper portion of the reach is primarily low- to moderate- density residential, with some commercial timber parcels. Higher density residential development is present in the reach downstream from approximately RM 3.0. Much of the upper portion of the reach lies within erosion and landslide hazard areas. Channel migration zones and mapped flood hazard areas are present in the lower portion of the reach. Many homes are present within these hazard areas. Several levee sections border the stream channel near the mouth, and the lower 1.2 miles of the creek was historically channelized. Highway 101 crosses the stream near the mouth.
North Branch Herman Creek (NBHE_CR_01)	The reach extends from the Herman Creek confluence to approximately 1.8 miles upstream. The stream profile in the upper portion of the reach is relatively straight and trends generally south. The channel becomes more sinuous by middle reach and by the lower reach the stream contains several meanders. Vegetative cover in the reach consists primarily of dense forest cover, with some herb and shrub habitat located in the lower portion of the reach. The reach provides habitat for coho salmon and steelhead trout. The reach contains timber lands, both publically and privately owned. Many of the stream banks and surrounding areas are unstable. Geologic hazard areas for erosion and slides extend through the upper and lower portions of the reach, respectively. No shoreline modifications are mapped within the reach.
(North Fork Sekiu River) NFSE_RV_01	The reach extends from the confluence with the Sekiu River to approximately 4.6 miles upstream. In the upper portion of the reach, the river is characterized by a relatively straight channel. The channel becomes increasingly sinuous and meandering downstream before its confluence with the mainstem Sekiu. The majority of the reach contains dense forest habitat. The reach supports spawning and rearing habitat for Chinook, coho, and chum salmon, as well as steelhead trout. The upper and lower portions of the reach are primarily privately owned commercial timber lands. The middle reach contains public forest lands managed DNR. Much of the reach is located within the FEMA 100-year floodplain. Geologic hazard areas for erosion and land slides are located throughout the reach, but are concentrated in the upper and lower portions of the reach. No shoreline modifications are mapped within the reach.
Old Royal Creek (OLDR_CR_01)	The reach extends from the Hoko River confluence to approximately 0.4 miles upstream. The majority of the reach area is located within the FEMA 100-year floodplain. The reach is covered by contiguous forest cover. Old Royal Creek provides habitat for coho salmon and steelhead trout. Low-density residential development is located in the upper portion of the reach, but most structures are located outside the reach boundary. The middle and lower portions of the reach contain commercial timber lands. No shoreline modifications are mapped within the reach.
Pysht River 1 (PYSH_RV_01)	Encompasses the large, flat alluvial floodplain complex. The channel profile through the reach is sinuous, and contains a series of wide meanders and several side channels that braid and join the mainstem near its mouth. Most of the river channel within the reach is constrained by levees. The stream corridor is bordered by a thin, but dense stand of forest cover, and patches of herb and shrub habitat. The reach provides habitat for Chinook, chum, and coho salmon, in addition to steelhead and resident cutthroat trout. In addition, the reach supports breeding populations of bald eagle and waterfowl concentrations. Tidal and estuarine influence extends upstream through the reach. The majority of the reach contains commercial forest lands. The northern portion of the reach contains limited rural residential development. The reach is situated within a tsunami hazard zone and the FEMA 100-year floodplain. Geologic hazard areas for erosion and slides are located in the eastern portion of the reach. The river channel is constrained by levees throughout most of the reach, and was historically hydromodified to accommodate log transport.
Pysht River 2 (PYSH_RV_02)	The river channel within the reach is highly sinuous and meandering. The river is bounded by State Highway 112 that runs parallel to the stream through much of the reach, and functions as a lateral barrier between the river and its natural floodplain. Vegetation through the reach is a mixture of dense forest cover and herb and shrub habitat. A number of anadromous fish including Chinook, chum, and coho salmon, as well as steelhead trout utilize the reach for spawning and rearing. The reach supports breeding populations of bald eagles. Low-density residential development and commercial forest lands are located in the majority of the reach. Portions of the lower reach are located in the tsunami hazard area. The majority of the reach is located in the FEMA 100-year floodplain, while geologic hazard areas for erosion and slides are located in the upper portion of the reach. Several residential developments are currently located in flood, geologic, and/or tsunami hazard areas.
Pysht River 3 (PYSH_RV_03)	Vegetation in the riparian corridor is primarily dense forest cover, intermixed by patches herb and shrub habitat. The reach provides spawning and rearing habitat for Chinook, chum, and coho salmon, in addition to steelhead and cutthroat trout. Low-density residential development is located in the lower half of the reach, and the upper half contains commercial forest lands. The majority of the reach is situated within the FEMA 100-year floodplain and/or the active channel migration area. Geologic hazard areas for erosion and landslides are located in the southeast and southwest, respectively. Existing residences within the reach are located in the flood and/or channel migration hazard areas. Highway 112 runs parallel to the Pysht River within the reach, which acts as a barrier between the river and its natural floodplain.
Pysht River 4 (PYSH_RV_04)	The river channel within the reach is confined to a narrow floodplain. Contiguous forest cover extends throughout much of the reach. The reach provides spawning and rearing habitat for Chinook, coho, and chum salmon, as well as steelhead and resident cutthroat trout. The reach supports breeding populations of bald eagle. The majority of the reach consists of commercial forest lands. The lower third of the reach is situated in the FEMA 100-year floodplain and/or channel migration zone. Geologic hazard areas for erosion and landslides are located throughout the upper two-thirds of the reach. Highway 112 crosses the river in the lower portion of the reach.
Royal Creek (ROYA_CR_01)	The stream channel is relatively confined straight. Vegetation throughout the reach consists of dense forest cover. The reach provides habitat for resident cutthroat and rainbow trout. The reach is located in Olympia National Forest. It can be accessed via trail, from Forest Service Road 2870. No shoreline modifications are mapped within the reach.
Salmonberry Creek (SALM_CR_01)	Within the reach, the channel is relatively narrow and confined. Vegetation along the stream corridor is primarily forest cover, with patches of herb and shrub habitat. The reach provides spawning and rearing habitat for coho salmon, in addition to steelhead and resident cutthroat trout. The reach consists entirely of commercial forest lands. The lower portion of the reach lies within the FEMA 100-year floodplain. Geologic hazard areas for erosion and slides are located through the lower and upper portions of the reach, respectively. No shoreline modifications are mapped within the reach.

Freshwater Reach Name	Overall Reach Condition
Salt Creek (SALT_CR_01)	The channel profile through the reach is highly sinuous, with several side channels joining the mainstem near the mouth. Vegetative cover throughout the reach is mostly herb and shrub habitat, bordered in places by riparian forest. Wetland (salt marsh) habitat extends across the floodplain. The reach provides habitat for coho, chum and Chinook salmon, as well as steelhead, cutthroat, and rainbow trout. The reach supports breeding populations of bald eagle. Several adjacent tributaries have culvert structures, which reduces access to side-channel habitat within the reach. The majority of the reach area contains rural residential development. Approximately one-third of the land is zoned for commercial forestry and cannot be subdivided. The majority of the reach lies within a tsunami hazard zone, the FEMA 100-year floodplain, and/or identified channel migration areas. A private road bisects the salt marsh, which disconnects the creek from the western portion of its natural estuary. In addition, several culverts are located on tributaries to Salt Creek within the reach boundary.
Salt Creek (SALT_CR_02)	The stream channel within the reach is highly sinuous, and has a low gradient. The reach contains dense forest habitat sparsely intermixed by herb and shrub habitat. Wetlands are located in the lower third of the reach. The reach provides spawning and rearing habitat for coho salmon and steelhead trout, as well as resident cutthroat trout. The reach also provides priority habitat for breeding populations of band-tailed pigeon. The lower third of the reach consists of public forest lands (managed by DNR). The upper two-thirds of the reach are zoned for commercial forestry. The northern portion of the reach is within a tsunami hazard zone, while geologic hazard and slide areas are located in the south. Portions of the reach are located within the FEMA 100-year floodplain and the active channel migration area. A semi- fish-passable dam is located at RM 6.5 which limits upstream fish migration.
South Branch Little River (SBLI_RV_01)	Dense, contiguous forest cover extends throughout the reach. This reach provides habitat for bull trout, resident cutthroat, and rainbow trout. The Elwha River Dam blocks anadromous fish access to the reach. The upper two-thirds of the reach are located in the Olympic National Forest, while the lower portion of the reach is privately owned. Geologic hazard areas for landslides are located throughout the reach. No shoreline modifications are mapped within the reach.
Sekiu River (SEKI_RV_01)	The Sekiu River Road borders much of the river, which separates the river from much of its natural floodplain. The majority of the reach is covered by dense forest habitat. Habitat provided for Chinook, coho, and chum salmon, in addition to steelhead and resident cutthroat trout; also habitat for breeding populations of bald eagle. Moderate- to low-density rural development is located in the lower portion of the reach. The middle and upper portions of the reach contain commercial forest land. The lower portion of the reach is located within a tsunami hazard area and the FEMA 100-year floodplain. Geologic hazard areas for erosion and landslides are located in the middle and upper portions of the reach, respectively. The Sekiu River Road borders much of the river, which separates the river from much of its natural floodplain.
South Fork Pysht River 1 (SFPY_RV_01)	The reach segment is relatively short and contains a fairly sinuous, meandering channel. Vegetative cover through the reach is mainly contiguous forest cover intermixed with sparse patches of herb and shrub habitat. The reach provides spawning and rearing habitat for Chinook and coho salmon, in addition to steelhead trout. The reach also provides habitat for resident cutthroat and chum salmon. The majority of the reach is commercial forest land. The northern portion of the reach lies in the active channel migration area and the FEMA 100-year floodplain. Areas in the southwest and northeast portion of the reach are susceptible to geologic hazards (primarily erosion). No shoreline modifications are mapped within the reach.
South Fork Pysht River 2 (SFPY_RV_02)	The river channel is moderately sinuous in this reach. Vegetative cover is primarily a mixture of dense forest habitat intermixed by patches of herb and shrub habitat. The reach provides spawning habitat for steelhead, and Chinook and coho salmon. The presence of resident cutthroat and chum salmon are also mapped within the reach. Land use within the reach is primarily commercial forestry. Most of the reach lies in the FEMA 100-year floodplain and in areas subject to geologic hazards. Three quarters of the reach is susceptible to erosion. Additionally, slide areas are located in the middle portion of the reach, along the north bank. There are no shoreline modifications mapped within the reach.
South Fork Sekiu River (SFSE_RV_01)	The reach extends from the mainstem confluence to approximately 3 miles upstream. The reach is covered by dense forest cover. The South Fork Sekiu River contains spawning habitat for coho salmon and steelhead trout, and also provides habitat for resident cutthroat trout. Land use within the reach is primarily commercial forestry. The lower portion of the reach is located within the FEMA 100-year floodplain. Geologic hazard areas for slides and erosion are located throughout the reach. No shoreline modifications are mapped within the reach.
Silver Creek (SILV_CR_01)	The reach is covered by dense forest cover. Silver Creek provides habitat for resident cutthroat and rainbow trout. The reach is located entirely within the Olympic National Forest, and can be accessed from Forest Service Road 2870. No shoreline modifications are mapped within the reach.
West Twin River (WTWI_RV_01)	The river flows northeast from steep mountain slopes onto lower gradient hills. The river then reenters a narrow valley between hillcrests to the east and west, emerging onto a low-gradient terrace and delta. Vegetative cover in the riparian corridor and surrounding watershed is comprised predominantly of dense forest habitat, intermixed with pockets of herb and shrub habitat. The reach provides spawning habitat for coho salmon and steelhead and rearing habitat for coho salmon. Resident cutthroat is also mapped within the reach. The reach supports breeding populations of bald eagle. Approximately half of the reach contains private timber lands, while the other half of the reach is public timber/forest lands (managed by DNR). Private lands are located in the middle and lower half of the reach, along the west bank of the West Twin River. Public lands are located along the east bank of the West Twin River and in the upper portion of the reach. The lower portion of the reach is located within a tsunami hazard zone, FEMA 100-year floodplain, and geologic hazard areas. No shoreline modifications are mapped within the reach.
Lake Sutherland (SUTH_LK_01)	Lake Sutherland is approximately 500 acres in area, and drains to Indian Creek. While natural vegetation within the reach has been completely cleared in some areas, over half of the shoreland area contains dense forest cover. The lake provides habitat for shore-spawning kokanee salmon, and resident cutthroat and rainbow trout. With the upcoming Elwha dam removals, anadromous fish stocks will likely return and/or be reintroduced to the lake. Most of the shoreline along Lake Sutherland contains moderate- to high-density residential development, and many docks are present along the shoreline. Portions of the developed lakeshore lie within mapped flood hazard areas. A small outlet structure at the lake outlet serves to retain fish stock and control water levels in the lake. Flooding events along the lake shore have occurred recently, which Lake Sutherland residents attribute to accumulating sediments and large woody debris at the outlet. Most of the Lake Sutherland shoreline has been modified with bulkheads and docks.

4.0 THREATS TO SHORELINE FUNCTIONS

Most types of shoreline use/development have the potential to threatened ecological functions to some degree. The nature and severity of the threat will depend on several factors including:

- How ubiquitous or widespread the development activity is;
- Its location relative to sensitive, fragile or valuable shoreline areas/resources;
- The design, scope and scale of the individual actions; and
- The level of scrutiny and regulation afforded by the SMP and other laws

This chapter examines different types of shoreline use, development and modification that are likely to occur in Clallam County and programmatically assesses the level of threat posed by each one (Table 4-1). Chapter 5 describes where these threats are most prevalent and Chapter 6 describes how the Draft SMP addresses the threats.

Much of the foreseeable development on Clallam County’s freshwater shorelines, especially in the upper watersheds, will be related to forest practices. Most of the development along the marine shore, the lakes and the downstream portions of the major rivers will be single-family residential development. Other types of shoreline use / development are generally considered less of a threat to shoreline functions overall because they will occur infrequently or be limited to relatively few geographic areas. As described in Section 1.2, developments or uses that have unforeseeable or uncommon impacts are addressed via the conditional use permitting process (as opposed to the cumulative impacts analysis) to ensure that there is no net loss of ecological function.

Table 4-1. Qualitative assessment of threats posed by major types of shoreline use and development

Type of Development or Use	Qualitative Threat Assessment	Rationale
Agriculture	Low	Agricultural uses are relatively uncommon within shoreline jurisdiction, with the exception of areas along the mid and lower Dungeness River. There are no significant areas of high-quality agricultural land that are not currently utilized for this purpose.
Aquaculture	Low to Moderate	Some limited shellfish farming occurs within the County’s bays, and may increase in the future. There is currently no finfish aquaculture occurring along the marine shoreline, but there is potential for new net pen aquaculture within the Strait of Juan de Fuca. Aquaculture developments that have the greatest potential for impact (geoduck, net pens) are regulated as conditional uses.

Type of Development or Use	Qualitative Threat Assessment	Rationale
Commercial / Industrial	Low	There are very few areas of commercial or industrial development along the shorelines and it is unlikely that this will change dramatically in the foreseeable future under the County's the current zoning and comprehensive plan. Commercial use/development is regulated as a conditional use except in the Marine Waterfront designation.
Forest Practices	High	A majority of the shoreline area is zoned and managed for commercial timber harvest.
Mining	Low	There are no active mines in shoreline jurisdiction and none are currently planned. Mining is regulated as a conditional use.
Recreation	Low	Recreational areas are scattered throughout the County but most of the uses are low intensity / low impact.
Parking	Low	The Draft SMP prohibits parking as a primary use in shoreline jurisdiction
Residential	High	Residential use along shorelines is widespread and is expected to increase.
Restoration	Low	Restoration is expected to improve – not threaten– shoreline functions.
Signs	Low	Signs by their nature pose minimal threat. Given the lack of commercial /industrial use, signage is uncommon in shorelines areas.
Transportation	Moderate to High	There are many existing roads within and across shoreline jurisdiction. Continued use of these facilities will threaten water quality, hydrology and/or habitat. Maintenance and safety improvements could also threatened functions.
Utilities	Low to High	Utility impacts are difficult to anticipate or gauge without specific information on the type and location of the utility. Threats could range from low to high— as a result most utilities are treated as conditional uses and would require a conditional use permit.

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1 **4.1 Aquaculture**

2 The level of threat associated with future aquaculture use/development is somewhat difficult to assess.
3 Commercial aquaculture is currently confined to a few areas of the marine shoreline and the likelihood
4 of widespread expansions or increases in aquaculture operations within the foreseeable future is
5 unknown. Aquaculture can cause adverse ecological impacts because it can disturb aquatic vegetation
6 and substrates, introduce non-native organisms, introduce chemicals/nutrients, and require use of
7 predator control devices which can harm birds and other wildlife. Aquaculture can also impact the visual
8 and aesthetic qualities of the shoreline and potentially disrupt recreational use. These effects are more
9 likely to occur with large-scale or intensive commercial operations such a fin fish or geoduck production
10 than with recreational beach culturing or hand-harvest. As a result, the SMP requires a conditional use
11 permit for those types of aquaculture use/development

12 Aquaculture can also have beneficial effects on the shoreline. For example, clams and oysters contribute
13 to improved water quality through filter feeding and provide habitat for other marine organisms. The net
14 effect of aquaculture use on shoreline ecology depends on a variety of factors including the location of
15 the aquaculture farm, the species cultivated, and the growing and harvest methods.

16 The Draft SMP recognizes that aquaculture is a preferred and water-dependent shoreline use—one that
17 is very important to the regional culture and economy. The SMP classifies most aquaculture
18 uses/development as conditional uses, which means they will receive careful scrutiny and review to
19 ensure that adverse effects can be mitigated. Other regulations specifically require that subtidal,
20 intertidal, floating, and upland structures and apparatus be located, designed and maintained to avoid
21 adverse effects on ecological functions and processes (see Chapter 6 for additional information). In
22 addition, aquaculture facilities/farms must be separated from one another a sufficient distance to prevent
23 cumulative effects on ecological functions and processes and adjoining land uses. The County will
24 determine what constitutes a sufficient distance in consultation with state and federal agencies and
25 Tribes based on the specific characteristics of the waterbody, reach, drift cell, and uplands in the vicinity
26 of the farm/facility.

27
28 The Draft SMP includes other standards to limit the size, location and scale of structures used in
29 aquaculture operations. For example, upland structures accessory to aquaculture use that do not require a
30 waterside location or have a functional relationship to the water must be located landward of shoreline
31 buffers and overwater work shelters and sleeping quarters accessory to aquaculture use/development are
32 prohibited.

33 **4.2 Forest Practices**

34 Forest practices include the harvesting of timber and related activities involving the storage and
35 transport of logs from the forest to the mills (road building, yarding, etc.). These activities have the
36 potential to affect shorelines in a variety of ways. As noted in Chapter 3, the removal of forest cover in
37 watershed can alter hydrologic process related to infiltration and recharge, increase the volume of
38 surface runoff, and lead to erosion and/or landslides as slopes become destabilized. Timber harvesting
39 also eliminates habitat for forest-dwelling wildlife. The construction of forest roads can exacerbate these
40 effects. When vegetation removal occurs close to the shore it can reduce large woody debris recruitment
41 and decrease other organic inputs which provide important food chain support functions. Shoreline
42 vegetation also plays a role in trapping and removing sediments, nutrients and other pollutants, so loss of

1 vegetation can have adverse effects on water quality. Finally, forests provide cover, perching, nesting,
 2 foraging and migratory habitat for many species of birds, amphibians and mammals, which can be
 3 adversely affected as a result of timber harvest activities.

4 Forest practices typically do not involve much in-water work except when culverts or bridges must be
 5 installed at stream crossings. Similarly, forest practices do not typically involve shoreline armoring or
 6 over-water structures.

7 The Draft SMP regulates non-harvest related actions such as road building, but does not regulate timber
 8 harvest. Harvest activities, except for Class IV conversions to non-forest uses, are regulated by the state
 9 Forest Practices Act (RCW 76.09) and not the SMA. Conversions of forest land to non-forestry uses
 10 must comply with the regulations of the proposed non-forest use and all other general regulations such
 11 as buffers (as described below). The Draft SMP prohibits forest practices below the ordinary high water
 12 mark and requires a conditional use permit for forest roads on slopes exceeding 35 percent.

13 Effectively this means all forest practices conversions and activities require a shoreline substantial
 14 development or conditional use permit from the County. In reviewing the permit application, County
 15 staff would assess the non-harvest related actions to ensure they are compliant with the SMP and defer
 16 to WDNR to enforce timber harvest rules. The FPA would limit removal of trees within the riparian
 17 zone and control impacts related to erosion and sedimentation. Together the SMP and the FPA impose
 18 the maximum degree of regulation provided for under state law.

19 **4.3 Residential Development**

20 Construction of a single-family residence, when carefully sited and located outside of shoreline buffers,
 21 does not typically cause major adverse effects on shoreline functions. Most of the effects are caused by
 22 actions commonly associated with (accessory to) residential development including construction of
 23 bulkheads, removal of shoreline vegetation for views, use of fertilizers and other chemicals, alteration of
 24 natural drainage pathways, construction of docks/piers, and installation of septic systems. These actions
 25 typically cause a variety of impacts that affect habitat, water quality and hydrology functions (Table 4-
 26 2).

27 **Table 4-2. Impacts Commonly Associated with Residential Development**

Development Activity	Potential Impacts ¹⁸
Vegetation clearing	<ul style="list-style-type: none"> • Simplification of habitat structure due to removal of large wood, overhanging branches, and boulders • Reduced bluff and beach stabilization, and increased erosion • Decreases in terrestrial food supply, shading, and protection from overhead predators due to clearing of marine riparian vegetation • Increased water temperatures due to loss of shoreline vegetation • Increased marine beach substrate temperatures during low tide in

¹⁸ The list of potential impacts is adapted from Protecting Nearshore Habitat and Functions in Puget Sound: An Interim Guide (EnviroVision et al., 2007)

Development Activity	Potential Impacts ¹⁸
	summer <ul style="list-style-type: none"> • Decreases in terrestrial food sources • Habitat fragmentation and disruption of wildlife travel corridors • Increased incidence of invasive species due to site disruption
Creation of lawns and impervious surfaces	<ul style="list-style-type: none"> • Increased pollutant load due to lakes and marine waters from non native landscaping requiring use of fertilizers and pesticides
In-water recreational activity	<ul style="list-style-type: none"> • Changes to substrate, increased forage fish egg mortality, and fish avoidance from propeller wash and grounding of boats during low tides • Substrate change and fish use impacts (avoidance) during low tides from propeller wash and grounding • Increased injury (lesions, tumors) to salmon and reduced prey and habitat due to water quality degradation from increased stormwater runoff and wastewater discharges • Chemical changes to the water column attributed to terrestrial and aquatic activities – directly affecting shellfish species and plankton (a major shellfish food source) • Introduced predator/parasite species
On-site septic systems	<ul style="list-style-type: none"> • Eutrophication due to leaky/failing septic systems reducing eelgrass cover due to increased shading from ulvoids and epiphytes • Contamination of shellfish harvest areas due to increased nutrients and bacteria • Algal blooms in lakes due to increased nutrients and bacteria
Noise and lighting	<ul style="list-style-type: none"> • Changes in fish and wildlife behavior patterns

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2 Residential use is the second most common type of use along the County’s shorelines and there a large
 3 number of undeveloped parcels that are expected to develop over the next 20 years. As a result
 4 residential development and the modifications that typically accompany it are expected to pose a
 5 substantial threat to shoreline ecological functions in certain areas. The specific types of threats that are
 6 expected in Clallam County include:

- 7 • Buffer encroachment / modification;
- 8 • Subdivision / intensification of use;
- 9 • View clearing;
- 10 • Shoreline stabilization; and
- 11 • Floodplain encroachment

- 1 These have the potential to impact key shoreline attributes (Figure 4-1). Chapter 5 provides data on the
- 2 specific nature of these threats and where they are most prevalent

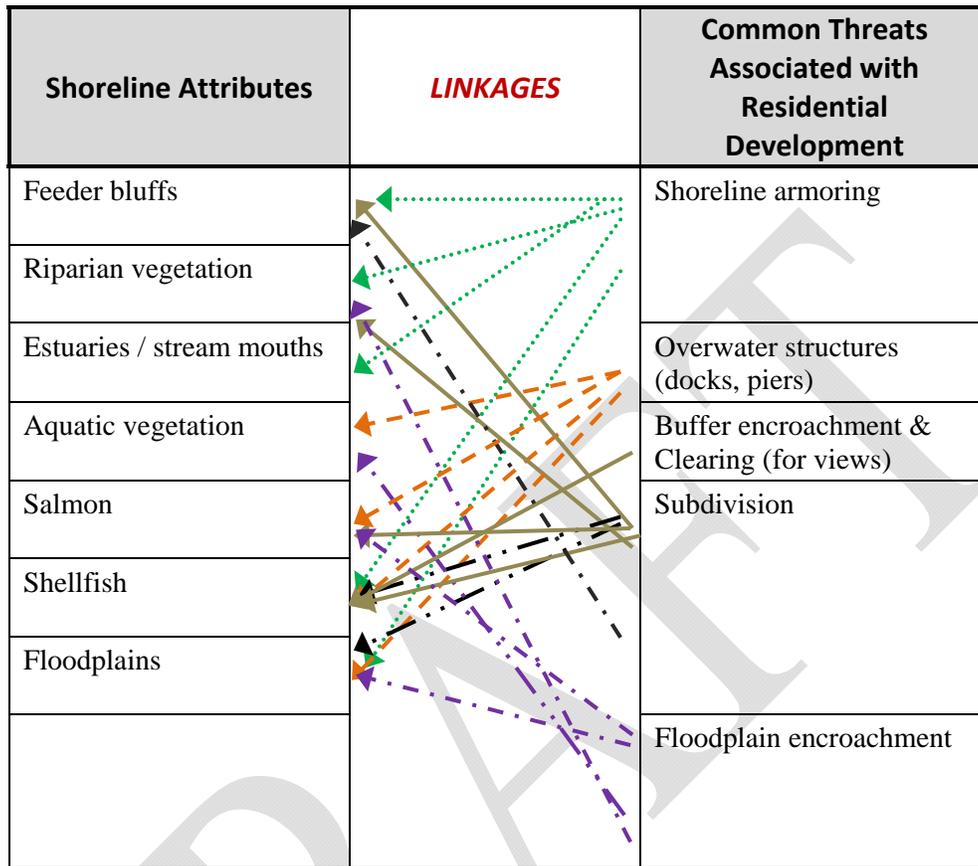


Figure 4-1. Common threats associated with residential development and linkages to shoreline attributes

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5.0 Where in Clallam County Are Threats Most Prevalent?

Chapter 4 describes the typical ways that future development can threaten or degrade shoreline ecological functions. This chapter examines threats that are specific to Clallam County and describes where in the County (WRIAs 17, 18, and 19) potential threats are believed to be most prevalent. Two different types of threats are taken into account:

1. Threats from existing development (meaning development that has already occurred but which continues to degraded the shoreline environment) and
2. Threats from future (new) development (including infill development, redevelopment and new development in areas that are relatively undeveloped).

While both types of development have the potential to alter the baseline conditions and impact ecological functions, this analysis focuses primarily on threats from new development because that is what the SMP is designed to prevent and because new development tends to have a disproportionate effect on places are relatively high functioning (compared to developed areas).

5.1 Potential for New Development

Using parcel data from the county assessor's office, aerial photography, information from the Shoreline Inventory and Characterization Report (ESA, 2012), zoning information and anecdotal information from Department of Community Development staff, we identified areas of the County that have the greatest potential for future development within the planning horizon of the SMP (~20 years). These areas are distinguished by the following characteristics

- high percentage of vacant parcels;
- relatively undeveloped but zoned for higher-density development (e.g., maximum allowed densities of 1 unit per acre and/or smaller minimum lots sizes (< 43,560 SF) based on current zoning;
- mostly underdeveloped relative to the allowable zoning and eligible for additional lot creation through subdivision; and/or
- platted, but not fully built-out.

Such areas (referred to as Analysis Areas) occur as scattered segments along the marine shoreline, in patches along the lower reaches of a few of the major rivers and at Lake Sutherland (Table 5-1, Figures 5-1, 5-2 and 5-2). The Analysis Areas are subsets of the shoreline reaches identified in the Shoreline Inventory and Characterization Report and include all areas where future development is anticipated to be concentrated. Whether the future development in these Analysis Areas poses a serious enough threat to cause a *net* loss of shoreline functions depends on multiple factors including specific nature of the development and the existing condition of the shoreline. These factors are considered in the analysis.

1 **Table 5-1. Shoreline Analysis Areas and Proposed Shoreline Environment Designations (SEDs) with High**
 2 **Potential for New Development**

Marine Analysis Areas (Proposed SED)	River and Lake Analysis Areas (Proposed SED)
Discovery Bay bluffs (SR-C) Diamond Point (SR-I) Travis Spit (SR-C) Sequim Bay (primarily SR-C) 3 Crabs (primarily SR-I) Dungeness Harbor (primarily SR-C) Dungeness Bluffs (primarily SR-C) Morse Creek to Port Angeles (SR-C) East Angeles Point (primarily SR-C; some Natural) Freshwater Bay (SR-C and SR-I) Whiskey Creek beach (SR-C; some Marine Waterfront) Lyre River vicinity (SR-C; some RC) Clallam Bay (Marine Waterfront, SR-I, SR-C, some Natural) Hoko River vicinity (SR-C, SR-I, some Natural) Bullman Beach (SR-I)	Clallam River (SR-C) Dungeness River (SR-C, some Natural) Elwha Tributaries (SR-C) Lake Sutherland (SR-I) Lyre River (SR-C, some SR-I) McDonald Creek (SR-C) Morse Creek (SR-I, SR-C, and Natural) Pysht River (SR-C) Salt Creek (SR-C)
N = Natural ; RC = Resource Conservancy; SR-C = Shoreline Residential - Conservancy; SR-I = Shoreline Residential- Intensive; MW = Marine Waterfront;	

3

4 The Analysis Areas comprise a relatively small percentage of the overall area subject to SMP
 5 jurisdiction (approximately 37% of the total shoreline miles in WRIAs 17, 18, and 19). The
 6 majority of Clallam County shorelines have relatively low potential for new for residential,
 7 commercial and/or industrial development (Table 5-2 and 5-3). This is generally true for the
 8 upper watersheds where public and privately owned resource lands are managed for timber
 9 production, conservation, and/or recreation. Development pressure in these areas is low because
 10 they are remote and somewhat underserved by public infrastructure. Under current zoning,
 11 residential development is allowed on lands zoned for commercial forestry, but only at low
 12 densities of 1 unit per 80 acres in most areas. A substantial portion of these lands will be subject
 13 to thinning, clearcutting and other harvest impacts, but forest harvest activities are largely un-
 14 regulated by the SMP, so we did not factor those impacts into our cumulative impacts analysis
 15 (see scope of analysis in Section 1.2).



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Figure 5-1. Analysis Areas for Clallam County's WRIA 17, 18, and 19 marine and freshwater shorelines – east region.



Figure 5-2. Analysis Areas for Clallam County's WRIA 17, 18, and 19 marine and freshwater shorelines – central region.

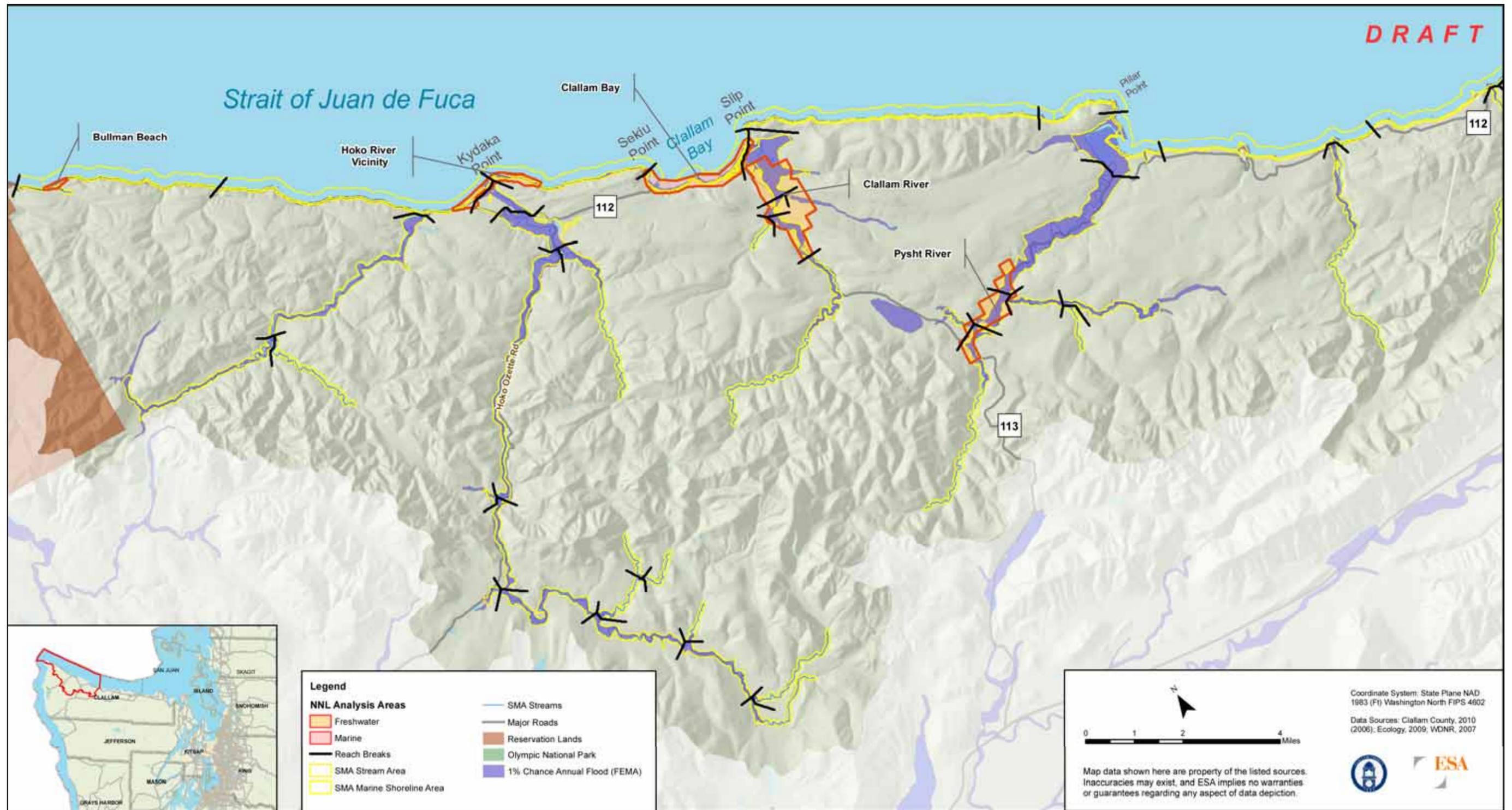


Figure 5-3. Analysis Areas for Clallam County's WRIA 17, 18, and 19 marine and freshwater shorelines – west region.

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1 **Table 5-2. Marine Reaches with Low Potential for New Development (Highlighted in Green)**

Marine Reach	Percent of Total Shoreline Length (~131 Total Miles)	Primary Anticipated Future Use / Development	Development Potential
1– Diamond Point	9.5% (12.5 miles)	Residential	Moderate to High
2 – Sequim Bay	6.2% (8.2 miles)	Residential	Moderate to High
3 – Gibson Spit	4.6% (6.1 miles)	Residential	Moderate to High
4 – Kulakala Point	6% (7.9 miles)	Residential	Moderate to High
5 – Dungeness Spit	12% (15.7 miles)	Ongoing Protection as Wildlife Refuge	Low
6 – Green Point	8.7% (11.4 miles)	Residential	Moderate to High
7 – Angeles Point	5.5% (7.3 miles)	Residential	Moderate to High
8 – Observatory Point	3.7 % (4.9 miles)	Ongoing Forestry (Except Freshwater Bay vicinity)	Low
9 – Crescent Bay / Low Point	8.1% (10.7 miles)	Residential	High
10 – Twin Rivers	5.6% (7.4 miles)	Ongoing Forestry	Low
11 – Deep Creek	4% (5.3 miles)	Ongoing Forestry	Low
12 – Pysht River	1.8% (2.4 miles)	Ongoing Forestry	Low
13 – Pillar Point	1.6% (2.1 miles)	Ongoing Forestry	Low
14 – Slip Point	5.2% (6.8 miles)	Ongoing Forestry	Low
15 – Clallam Bay	4.3% (5.7 miles)	Moderate Density Urban Uses	Low to Moderate
16 – Sekiu River /Kaydaka	4.3% (5.7 miles)	Ongoing Forestry	Low
17 – Shipwreck Point	5.2% (6.9 miles)	50% Ongoing Forest / 50% Residential	Moderate to High
18 – Rasmussen /Bullman Creek	3.5% (4.6 miles)	Predominantly Ongoing Forestry (Except Bullman Beach)	Low (Except Bullman Beach is Moderate)
All Reaches with Low Development Potential (5, 8, 10, 11, 12, 13, 14, 16, 18)	42 % (55 miles)	Primarily Ongoing Forestry	Low

1 **Table 5-3. Freshwater Reaches with Low Development Potential (Highlighted in Green)**

Freshwater Reach	Percent of Total Shoreline Length (~191 Total Miles)	Primary Anticipated Future Use / Development	Development Potential
Quilcene Snow (WRIA 17) – 0.7 % of total WRIA 17, 18, and 19 length within Clallam County			
Little Quilcene River	0.7% (1.3 miles)	Ongoing Forestry	Low
Elwha-Dungeness (WRIA 18) – 40.7% of total WRIA 17, 18, and 19 shoreline length within Clallam County			
Canyon Creek	0.9% (1.7 miles)	Ongoing Forestry	Low
Dungeness River			
<i>Reach 1</i>	0.5% (0.9 miles)	Ongoing Protection	Low
<i>Reaches 2 and 3</i>	4.8% (9.0 miles)	Residential	Moderate to High
<i>Reach 4, 5 and 6</i>	8.2% (15.7 miles)	Ongoing Forestry	Low
Elwha River			
<i>Reaches 1 and 2</i>	3.9% (7.4 miles)	Ongoing Protection	Low
<i>Reach 3</i>	1.1% (2.1 miles)	Residential	Moderate
Gray Wolf River	4.3% (8.3 miles)	Ongoing Forestry	Low
Indian Creek			
<i>Lower 2.0 miles</i>	1.1% (2.0 miles)	Residential	Moderate
<i>Upper 3.5 miles</i>	1.8% (3.5 miles)	Ongoing Forestry, Rural Residential	Low
Lake Sutherland	2.6% (5.0 miles)	Residential	Moderate to High
Little River	1.5% (2.8 miles)	Predominantly ongoing forestry	Low
McDonald Creek			
<i>Lower 5.0 miles</i>	2.6% (5.0 miles)	Residential	Moderate to High
<i>Upper 2.6 miles</i>	1.4% (2.6 miles)	Ongoing Forestry	Low
Morse Creek			
<i>Lower 1.1 miles</i>	0.6% (1.1 miles)	Residential redevelopment	Low (lots are built-out)
<i>Middle 5.3 miles</i>	2.8% (5.3 miles)	Residential	Moderate to High
<i>Upper 2.8</i>	1.5% (2.8 miles)	Ongoing Forestry	Low
Royal Creek	0.2% (0.3 miles)	Predominantly ongoing forestry	Low
Silver Creek	0.4% (0.7 miles)	Ongoing Forestry	Low
South Branch Little River	0.8% (1.6 miles)	Ongoing Forestry	Low

Freshwater Reach	Percent of Total Shoreline Length (~191 Total Miles)	Primary Anticipated Future Use / Development	Development Potential
Lyre-Hoko (WRIA 19) – 58.6% of total WRIA 17, 18, and 19 shoreline length within Clallam County			
Bear Creek	1.5% (2.8miles)	Ongoing Forestry	Low
Boundary Creek	0.6% (1.1 miles)	Ongoing Forestry	Low
Brownes Creek	0.1% (0.2 miles)	Ongoing Forestry	Low
Bullman Creek	0.2% (0.4 miles)	Predominantly Ongoing Forestry	Low
Charley Creek	0.5% (0.9 miles)	Predominantly Ongoing Forestry	Low
Clallam River			
<i>Reaches 1 – 3</i>	2.5% (4.8 miles)	Residential	Moderate to High
<i>Reach 4</i>	3.5% (6.7 miles)	Ongoing Forestry	Low
Coville Creek (assessed as part of the Freshwater Bay Analysis Area)	0.1% (0.3 miles)	Residential	Moderate to High
Deep Creek	3.0% (5.8 miles)	Ongoing Forestry	Low
East Twin River	2.3% (4.4 miles)	Ongoing Forestry	Low
Ellis Creek	0.5% (1.0 miles)	Ongoing Forestry	Low
Green Creek	0.4% (0.7 miles)	Ongoing Forestry	Low
Herman Creek	1.6% (3.1 miles)	Ongoing Forestry	Low
Hoko River	12.7 % (24.3 miles)	Predominantly Ongoing Forestry, Rural Residential in Reaches 1, 2 and 3	Low (limited development potential in shoreline areas)
Last Creek	0.05 % (0.02 miles)	Ongoing Forestry	Low
Little Hoko River	2.4% (4.6 miles)	Ongoing Forestry and Protection	Low
Lyre River <i>Lower 1.3 miles (w/in Reach 1)</i>	0.7% (1.3 miles)	Residential	Moderate to High
<i>Majority of Reach 1, all Reach 2</i>	2.1% (4.0 miles)	Ongoing Forestry	Low
North Branch Herman Creek	0.6% (1.1 miles)	Ongoing Forestry	Low
North Fork Sekiu River	2.7% (5.2 miles)	Ongoing Forestry	Low
Old Royal Creek	0.2% (0.4 miles)	Predominantly Ongoing Forestry	Low

Freshwater Reach	Percent of Total Shoreline Length (~191 Total Miles)	Primary Anticipated Future Use / Development	Development Potential
Pysht River			
<i>Reach 1</i>	1.0% (1.9 miles)	Residential	Moderate to High
<i>Reach 2</i>	2.9% (5.5 miles)	Ongoing Forestry	Low
<i>Reach 3</i>	0.8% (1.5 miles)	Residential	Moderate to High
<i>Reach 4</i>	2.8% (5.4 miles)	Ongoing Forestry	Low
Salmonberry Creek	0.6% (1.1 miles)	Ongoing Forestry	Low
Salt Creek			
<i>Lower 3.3 miles</i>	0.7% (3.3 miles)	Ongoing Forestry and Protection	Low
<i>Upper 1.4 miles</i>	2.1% (1.5 miles)	Residential	Moderate
Sekiu River	3.0% (5.7 miles)	Predominantly Ongoing Forestry	Low
South Fork Pysht River	2.4% (4.5 miles)	Ongoing Forestry	Low
South Fork Sekiu River	1.5% (2.9 miles)	Ongoing Forestry	Low
West Twin River	2.8% (5.3 miles)	Ongoing Forestry	Low
ALL REACHES WITH LOW DEVELOPMENT POTENTIAL	78.4% (149.4 miles)	Primarily Ongoing Forestry	Low

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2 5.2 Amount of New Development

3 To assess the level of threat posed by new development in our Analysis Areas we considered the
 4 amount of build-out that would occur based on parcel size, ownership, and proposed shoreline
 5 environment designations. We specifically evaluated the potential for intensification of use
 6 through subdivision / creation of new lots. We also considered whether the foreseeable
 7 development would be able to conform to the buffer requirements of the Draft SMP.

8 We identified potentially dividable parcels within shoreline jurisdiction based on underlying
 9 zoning requirements. We accounted for maximum density / minimum lot size, lot dimensions
 10 and position relative to shoreline jurisdiction and proposed shoreline / critical areas buffers. For
 11 example, within the County’s Rural Character Conservation 5 (RCC5) zone, the maximum
 12 allowable residential density is one dwelling unit per ten acres (the minimum lot size is 10
 13 acres), so a 45-acre parcel could theoretically be subdivided to create 4 total lots (an increase of 3
 14 residential lots over existing condition)—assuming there are no other constraints. Also, in the
 15 RCC5 zone, the standard minimum lot width required for new lots is 400 feet. So if an existing
 16 45-acre parcel is only 900 feet wide, we assume that only 1 new lot (as opposed to 3) would be
 17 created through subdivision. We did not include new lots that could be created outside of
 18 shoreline jurisdiction, and we assumed that no new lots would be created in areas that were
 19 entirely constrained by the proposed buffers because the SMP prohibits new lot creation in those
 20 circumstances. Although we attempted to be as accurate as possible, it is difficult to get a precise

1 estimate of development potential without detailed knowledge of parcel characteristics. Results
2 are summarized as follows (Note: all numbers are approximate):

3 **Marine Analysis Areas**

- 4 • **Majority of marine shoreline parcels are developed:** In all marine Analysis Areas, the
5 majority of residential parcels are occupied, meaning they contain existing residential
6 structures and associated improvements (approximately 880 residential parcels are
7 occupied, whereas 315 are undeveloped). The large majority (88%) of these occupied
8 parcels are not subdividable. Although some of the parcels may be redeveloped and there
9 may be ongoing impacts associated with the existing development, the potential for
10 substantial new impacts is low in the foreseeable future.
- 11 • **The number of new shoreline lots that could be created through future subdivision**
12 **is modest overall:** We counted a total of 136 new potential shoreline lots that could be
13 created through subdivision along the Strait of Juan de Fuca. This represents an
14 approximate 11% increase in the number of residential lots.
- 15 • **The majority of subdivision potential occurs in the Analysis Area between Morse**
16 **Creek and the City of Port Angeles.** Approximately 60 new lots could be created in this
17 area, which is predominantly zoned for urban densities (Urban Very Low Density [VLD]
18 and Urban Low Density [LD]). This represents 44% of potential new lots for all marine
19 Analysis Areas.
- 20 • **Potential for new lots is low to moderate in all other marine Analysis Areas:**
 - 21 • Sequim Bay – 23 new lots (16% increase)
 - 22 • Travis Spit – 11 new lots (22% increase)
 - 23 • Clallam Bay – 8 new lots (22% increase)
 - 24 • Freshwater Bay – 11 new lots (13% increase)
 - 25 • Lyre River Vicinity – 12 new lots (32% increase)
 - 26 • Whiskey Creek Beach – 4 new lots (15% increase)
 - 27 • Dungeness Bluffs – 11 new lots (< 10% increase)
 - 28 • Hoko River Vicinity– 3 new lots (<10% increase)
- 29 • **Some of the Analysis Areas will experience no new lot creation:** This is true for
30 Discovery Bay Bluffs, Diamond Point, 3 Crabs, Dungeness Harbor, and East Angeles
31 Point, and Bullman Beach.
32

33 **Freshwater Analysis Areas**

- 34 • **Majority of freshwater shoreline parcels are developed:** In all freshwater Analysis
35 Areas, the majority of residential parcels are occupied, meaning they contain existing
36 residential structures and associated improvements (approximately 738 residential parcels
37 are occupied, whereas 287 are undeveloped). The large majority (92%) of these occupied
38 parcels are not subdividable. Although some of the parcels may be redeveloped and there

1 may be ongoing impacts associated with the existing development, the potential for
2 substantial new impacts is low in the foreseeable future.

- 3 • **All of the freshwater Analysis Areas have some potential for subdivision.** The total
4 number of new lots is estimated to be up to 140 (13% potential increase from existing
5 conditions), with the greatest possible increases – by number of new lots – occurring in
6 the Morse Creek and Clallam River Analysis Areas:

- 7 ▪ Clallam River – 22 new lots (67% increase)
8 ▪ Elwha Tributaries – 11 new lots (25% increase)
9 ▪ Lyre River – 6 new lots (27% increase)
10 ▪ Morse Creek – 46 new lots (23% increase)
11 ▪ Pysht River – 6 new lots (29% increase)
12 ▪ Salt Creek – 7 new lots (44% increase)
13 ▪ Lake Sutherland – 18 new lots (< 10% increase)
14 ▪ Dungeness River – 19 new lots (< 10% increase)
15 ▪ McDonald Creek – 11 new lots (< 10% increase)
16

17 **5.3 Effect of Proposed Buffers on Existing and New Development**

18 We evaluated how the proposed SMP buffers would affect existing and new development.
19 Development that occurs landward of the protective buffers is presumed to pose less of a threat
20 to ecological functions compared to development within the buffers when all other factors are
21 equal.

22 Using aerial photography and GIS, we superimposed the proposed buffer extents on each parcel
23 and assessed whether there were existing structures in the buffer and whether the undeveloped
24 parcels were constrained or unconstrained by the proposed buffers. We considered both the
25 habitat buffers and safety buffers based on the site characteristics as well as the applicable
26 shoreline environment designation. Parcels were identified as ‘constrained’ when the buffer
27 encompassed nearly the entire property, or where there was less than 50-feet of parcel depth
28 landward of the proposed buffer. Here are the key findings of that analysis (Note: all numbers
29 are approximate):

30 **Marine Analysis Areas**

- 31 • **A high percentage of parcels have structures within the proposed buffers:** The
32 majority of Analysis Areas have a substantial portion of existing structures within
33 proposed SMP habitat and/or hazard buffers (Table 5-4). Half of the Analysis Areas have
34 50% or more of existing residential structures that would become legal nonconforming
35 structures (grandfathered structures), with the highest percentages identified in the
36 Diamond Point, Travis Spit, Dungeness Harbor, Dungeness Bluffs, and Morse Creek to
37 Port Angeles Analysis Areas (all to the east of Port Angeles).

1 **Table 5-4. Existing Development within the Proposed SMP Buffers for Marine Analysis Area Parcels**

Marine Analysis Areas	Number of occupied parcels	Occupied parcels with structures in the buffer
Discovery Bay Bluffs	11	4
Diamond Point	116	97
Travis Spit	32	24
Sequim Bay	127	29
3 Crabs	108	42
Dungeness Harbor	54	44
Dungeness Bluffs	141	99
Morse Creek to Port Angeles	77	59
East Angeles Point	16	4
Freshwater Bay	77	19
Lyre River vicinity	17	8
Whiskey Creek beach	12	8
Clallam Bay	31	19
Hoko River vicinity	38	21
Bullman Beach	15	4

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- **Two areas have high potential for new development in the buffer -- Diamond Point and Dungeness Bluffs:** Compared to other Analysis Areas, there are substantial numbers of vacant parcels at Diamond Point and Dungeness Bluffs that are constrained by the buffers. Developments on these parcels would likely require a variance and there is a reasonable expectation that they would be eligible for such given the surrounding development. At Diamond Point, over two-thirds of the 32 vacant parcels are constrained such that new residential development would occur within 50 feet of the ordinary high water mark (in the proposed habitat buffer) (Table 5-5). At Dungeness Bluffs, there are 17 vacant parcels where new development would likely occur within the buffer. This may create increased pressure for shoreline armoring in the future.

1 **Table 5-5. Existing, Legal Parcels Where New Development Would be Constrained by Proposed Marine**
 2 **Buffers**

Marine Analysis Areas	Number of vacant parcels	Vacant parcels constrained by proposed buffer
Discovery Bay bluffs	10	3
Diamond Point	32	22
Travis Spit	17	7
Sequim Bay	16	1
3 Crabs	3	1
Dungeness Harbor	1	0
Dungeness Bluffs	68	17
Morse Creek to Port Angeles	7	2
East Angeles Point	8	0
Freshwater Bay	44	5
Lyre River vicinity	16	2
Whiskey Creek beach	14	5
Clallam Bay	6	1
Hoko River vicinity	15	1
Bullman Beach	6	2

3
 4 **Freshwater Analysis Areas**

- 5 • **368 total parcels have structures within the proposed buffers:** This represents
 6 approximately 49% of all freshwater shoreline parcels that are occupied. These lots are
 7 predominantly focused in three Analysis Areas: Lake Sutherland, Dungeness River, and
 8 Morse Creek (Table 5-6)
- 9 • **71 existing, undeveloped parcels have potential for new development within the**
 10 **proposed buffers** (approximately 25% of all freshwater shoreline parcels that are
 11 undeveloped). Lots do not have adequate depth to allow for future residential
 12 development to occur outside of shoreline jurisdiction. The undeveloped lots
 13 predominantly occur in two Analysis Areas: Dungeness River and Morse Creek. This
 14 may create increased pressure for shoreline armoring (to reduce damage from flooding
 15 and erosion) in these areas (Table 5-7).

1

2 **Table 5-6. Existing Development within the Proposed SMP Buffers for Freshwater Analysis Area Parcels**

Freshwater Analysis Areas	Number of developed parcels	Number of developed parcels constrained by proposed buffer
Clallam River	9	7
Dungeness River	203	115
Elwha tributaries	21	8
Lake Sutherland	234	159
Lyre River	12	3
McDonald Creek	109	17
Morse Creek	131	34
Pysht River	11	4
Salt Creek	8	0

3

4 **Table 5-7. Existing Development within the Proposed SMP Buffers for Freshwater Analysis Area Parcels**

Freshwater Analysis Areas	Number of vacant parcels	Number of vacant parcels constrained by proposed buffer
Clallam River	24	9
Dungeness River	74	24
Elwha tributaries	23	3
Lake Sutherland	32	5
Lyre River	10	1
McDonald Creek	28	3
Morse Creek	68	20
Pysht River	20	5
Salt Creek	8	1

5

6 **5.4 Riparian Vegetation Impacts from New Development**

7 For all undeveloped parcels considered to be ‘constrained’ by the full buffer extent, we assessed
 8 vegetation condition (using aerial photos and vegetation maps) and determined if new
 9 development would impact forested riparian areas. Undeveloped, constrained parcels with
 10 existing riparian forest cover were coded for potential riparian buffer / forest cover loss. This
 11 yielded locations and a count of parcels where riparian / forest cover loss could occur. Key
 12 findings are summarized as follows (Note: all numbers are approximate):

1 Marine Analysis Areas

2 • **Most Analysis Areas have low potential for riparian forest loss:** Most of the marine
3 Analysis Areas including Discovery Bay Bluffs, Freshwater Bay, Hoko River vicinity,
4 Lyre River vicinity, and Sequim Bay would have minimal potential for forest cover loss
5 due to new development. This is because there are very few constrained parcels and the
6 parcels that are constrained already have structures. In these cases, we assume there will
7 be minimal additional clearing compared to areas where new development could occur
8 within the buffer. There is virtually no potential for forest cover loss at 3 Crabs, Clallam
9 Bay, Dungeness Harbor, East Angeles Point, and Morse Creek to Port Angeles for the
10 same reason. There is moderate potential for forest cover loss due to new development in
11 the following areas:

- 12 ▪ Diamond Point – 10 parcels (6.7% of total parcels and 31% of vacant parcels);
- 13 ▪ Travis Spit – 7 parcels (14.3% of total parcels and 41% of vacant parcels).
- 14 ▪ Dungeness Bluffs – 8 parcels (3.8% of total parcels and 12% of vacant parcels);
- 15 ▪ Whiskey Creek Beach – 5 parcels (18.5% of total parcels and 36% of vacant
16 parcels).

18 Freshwater Analysis Areas

19 • **Clallam Bay, Pysht River, Dungeness River and Morse Creek Analysis Areas have**
20 **the greatest potential for loss of forest cover:**

- 21 ▪ Clallam River – 6 parcels (18% of total parcels)
- 22 ▪ Pysht River – 5 parcels (16% of total parcels)
- 23 ▪ Dungeness River – 27 parcels (10% of total parcels)
- 24 ▪ Morse Creek – 18 parcels (9 % of total parcels)

26 • **There is little to moderate potential forest cover loss in most Analysis Areas:**

- 27 ▪ Elwha Tributaries – 3 parcels (7% of total parcels)
- 28 ▪ Lake Sutherland 4 parcels (1 % of total parcels)
- 29 ▪ Lyre River 1 parcel (5 % of total parcels)
- 30 ▪ McDonald Creek 3 parcels (2% of total parcels)
- 31 ▪ Salt Creek – no potential for riparian forest loss identified

32 5.5 Riparian buffer / forest cover loss due to clearing for view / 33 access corridors

34 For all undeveloped parcels in our Analysis Areas, we considered whether the view and shore
35 access allowances in the Draft SMP would result in riparian buffer/ forest cover loss. The
36 analysis also included potential future lots that could be created through subdivision (results
37 from Section 5.2). This yielded locations and a count of parcels where riparian buffer / forest
38 cover loss could occur due to view/access clearing. Key findings are summarized as follows
39 (Note: all numbers are approximate):

1 **Marine Analysis Areas**

- 2 • **Most areas have moderate to high potential for riparian impacts associated with**
3 **view corridor allowances;** we counted a total of 155 parcels (12.5% of total parcels;
4 50% of vacant parcels) with moderate potential for view corridor impacts to riparian
5 forest as future development occurs. These parcels primarily occur within nine of the
6 marine Analysis Areas:
- 7 ▪ Diamond Point – 16 parcels (10.7% of total parcels and 50% of vacant parcels);
 - 8 ▪ Discovery Bay Bluffs – 9 parcels (43% of total parcels and 90% of vacant parcels);
 - 9 ▪ Travis Spit – 14 parcels (14.3% of total parcels and 41% of vacant parcels);
 - 10 ▪ Dungeness Bluffs – 23 parcels (10.8% of total parcels and 34% of vacant parcels);
 - 11 ▪ Freshwater Bay – 25 parcels (20.5% of total parcels and 57% of vacant parcels);
 - 12 ▪ Hoko River Vicinity – 15 parcels (26% of total parcels and 100% of vacant
 - 13 parcels);
 - 14 ▪ Lyre River Vicinity – 7 parcels (18% of total parcels and 44% of vacant parcels);
 - 15 ▪ Sequim Bay – 11 parcels (7% of total parcels and 69% of vacant parcels);
 - 16 ▪ Whiskey Creek Beach – 10 parcels (37% of total parcels and 71% of vacant
 - 17 parcels).
- 18
- 19 • **There is no potential for buffer forest cover loss as a result of the view corridor**
20 **allowance in some areas:** View clearing / access allowances are not expected to result in
21 riparian cover loss within the 3 Crabs, Dungeness Harbor, and Morse Creek to Port
22 Angeles Analysis Areas because forest cover has already been cleared from the buffers in
23 these areas.

24 **Freshwater Analysis Areas**

- 25 • **Most Analysis Areas have moderate to high potential forest cover loss as a result of**
26 **the view corridor allowance** (meaning more than 15% of the total lots would experience
27 forest cover loss); we counted a total of 225 parcels (22% of total parcels) with moderate
28 potential for view corridor impacts to riparian forest as future development occurs. The
29 majority of these parcels are currently undeveloped (186 out of 225).
- 30 ▪ Elwha Tributaries (45%)
 - 31 ▪ Clallam River (48.5%)
 - 32 ▪ Lyre River (45.5%)
 - 33 ▪ Morse Creek (34.2%)
 - 34 ▪ McDonald Creek (17.5%)
 - 35 ▪ Pysht River (35.5%)
 - 36 ▪ Salt Creek (50%)
- 37
- 38 • **Two Analysis Areas have low potential forest cover loss as a result of the view**
39 **corridor allowance** (meaning less than 15% of the total lots would experience forest
40 cover loss):
- 41 ▪ Dungeness River (14.4%)

- Lake Sutherland (10.5%)

5.6 Potential forest cover loss outside of proposed buffers

For undeveloped parcels that have developable area outside of the proposed buffer but still within shoreline jurisdiction, we examined vegetation conditions and assessed the potential for non-riparian forest cover loss (vegetation impacts outside of the proposed buffers). This produced a list of locations and a count of parcels where non-buffer forest cover loss could occur due to new development. Findings are summarized as follows (Note: all numbers are approximate):

Marine Analysis Areas

- **There are only a few areas that would experience forest cover loss outside of required habitat and safety buffer areas, and fewer than 10% of the total parcels in each analysis area would be affected:**
 - Bullman Beach (2 undeveloped parcels)
 - Hoko River Vicinity (5 undeveloped parcels)
 - Clallam Bay (1 undeveloped parcel)
 - Freshwater Bay (5 undeveloped parcels)
 - Lyre River Vicinity (1 undeveloped parcel)

Freshwater Analysis Areas

- **There are only a few areas that would experience forest cover loss outside of required habitat and safety buffer areas, and the number of total parcels affected in each analysis area is generally low to moderate** (the portion of parcels affected compared to total parcels is less than 10% for each area, except for the Elwha Tributaries Analysis Area, where 34% of total parcels would be affected):
 - Elwha Tributaries (15 undeveloped parcels)
 - Lake Sutherland (19 undeveloped parcels)
 - Morse Creek (13 undeveloped parcels)
 - McDonald Creek (2 undeveloped parcels)

5.7 Potential for riparian buffer/ forest cover enhancement

The proposed SMP requires enhancement of riparian vegetation / forest cover through planting anytime development on a dimensionally constrained parcel occurs within a degraded buffer. Enhancement is required when development proposal use buffer averaging, common-line buffer allowances, or require a shoreline variance (buffer modification required exceeding allowances provided by the proposed SMP).

We considered how often this requirement would be triggered when development occurs on dimensionally constrained, undeveloped parcels. We tallied undeveloped, constrained parcels

1 with limited existing forest canopy within the buffer area. Within the Analysis Areas, parcels in
2 this circumstance are relatively uncommon. Results are summarized as follows (Note: all
3 numbers are approximate):

4 **Marine Analysis Areas**

- 5 • **The potential for increases/enhancement of forest cover is limited to relatively few**
6 **lots.** This occurs in the following Analysis Areas: Diamond Point (<1% of lots);
7 Dungeness Bluffs (4 % of lots); Lyre River Vicinity (9% of lots). No lots with potential
8 increase were identified in the other marine Analysis Areas.

9 **Freshwater Analysis Areas**

- 10 • **There is potential for increase in forest cover on relatively few lots in the following**
11 **Analysis Areas:** Clallam River (6% of lots); Dungeness Rivers (1% of lots); Morse
12 Creek (1% of lots). No lots with potential increase were identified in the other freshwater
13 Analysis Areas.

14 **5.8 Impacts from New Shoreline Modifications (Armoring and** 15 **Dock/Piers)**

16 There is no single comprehensive inventory of shoreline armoring that covers all of Clallam
17 County, however the Shoreline Inventory and Characterization Report (ESA, 2012) includes a
18 fairly complete summary of the available data and maps depicting shoreline armoring—especially
19 along the marine shoreline. Compared to other marine shorelines in Puget Sound, Clallam
20 County has a relatively low percentage of shoreline armoring amounting to less than 10% of the
21 total shoreline miles.

22 We used the available data along with satellite photography and Ecology’s shoreline oblique
23 photography to try to quantify the potential for new shoreline armoring. On marine shorelines,
24 we assumed that only low bank shorelines would have potential new shoreline armoring because
25 the SMP prohibits armoring of feeder bluffs, and requires all new development to be set back
26 from the top of coastal bluffs (100 foot standard buffer; 150 foot exceptional feeder bluff buffer
27 – see Chapter 6 for additional details).

28 We assumed that developed parcels without existing mapped armoring would seek approval for
29 new armoring in the foreseeable future if the existing structure occurred within 50 feet of the
30 ordinary high water mark. We reasoned that such parcels would experience risks due to storm
31 surges and other climate-induced events. For undeveloped parcels without existing mapped
32 armoring, we assumed potential for new shoreline armoring if the lot was constrained such that
33 new structures would be located with 50 feet of the water.

34 To gauge the potential impacts associated with new docks on the marine shoreline, we
35 conservatively assumed that all parcels on low bank shorelines that did not currently have a dock
36 had potential for new docks. This is likely a gross over-estimation since the exposed shores along
37 the Straits are not generally conducive for residential docks. Docks are somewhat more likely in

1 the bays and other semi-protected areas but if past history is any indication, the potential for
2 dock proliferation is low across the entire marine shoreline.

3 Data concerning the presence of stream bank armoring in Clallam County is scant, so we
4 assumed that any parcel along a shoreline stream that had an existing structure within 50 feet of
5 the ordinary high water mark, or within 100 feet of the ordinary high water mark for in mapped
6 channel migration zones had potential for new bank armoring. For undeveloped parcels, we
7 assumed potential for new bank armoring if the lot was constrained such that a new structure
8 could occur within 50 feet of the shore or 100 feet of the shore if there was a mapped channel
9 migration zones. In reality, the likelihood of such occurrences is tempered by the SMP policies
10 and regulations which strictly limit development in channel migration zones, but we wanted to
11 account for potential variances.

12 We assumed there would no new residential dock construction on shoreline streams in Clallam
13 County. We suspect there could be isolated cases of dock construction on rivers or streams, but
14 there is no reasonable foreseeable dock construction given the nature of the rivers and the past
15 development history.

16 At Lake Sutherland, we assumed all residential parcels without an existing dock had for potential
17 new private recreation / residential docks. We assumed there would be no new armoring on lake
18 Sutherland because we assumed the SMP preference for bioengineered stabilization would apply
19 in these situations.

20 Results are summarized as follows (Note: all numbers are approximate):

21 **Marine Analysis Areas**

- 22 • **The potential for new armoring is limited to approximately 83 parcels.** Overall, the
23 potential for new armoring is minimal except within the Diamond Point and 3 Cabs
24 Analysis (Table 5-8).
- 25 • **The number of new docks could be quite high, but actual dock construction is**
26 **expected to be modest.** Although there are numerous parcels at Diamond Point, Sequim
27 Bay, 3 Crabs and Bullman Beach that could accommodate a new dock, the rate of dock
28 construction in these areas has historically been very low because of the exposed nature
29 of the shoreline in these areas. Actual dock construction is expected to be much less than
30 shown in Table 5-8.

31 **Freshwater Analysis Areas**

- 32 • **The potential for new armoring is substantial impact in the Clallam River, Morse**
33 **Creek, and Pysht River Analysis Areas. Other Analysis Areas with some potential**
34 **for impact include Dungeness River, Elwha River, and Lyre River (Table 5-9).**
- 35 • **Approximately 47 of the 267 parcels along the Lake Sutherland shoreline (17%)**
36 **have potential for new residential docks.** Lots with potential for new docks are split
37 relatively evenly between occupied properties (25 with potential for new docks) and

1 vacant lots (21 with potential for new docks); however the large majority (95%) of
2 existing docks occur on occupied parcels (Figure 5-4).

3 **Table 5-8. Parcels within Marine Analysis Areas with Potential for New Shoreline Modifications**

Analysis Area	Total Parcels	New Armoring		New Dock	
		Number of Parcels	Percentage	Number of Parcels	Percentage
Disco Bay bluffs, Dungeness Bluffs, Dungeness Harbor, Morse Creek to Port Angeles, East Angeles Point	No potential for future shoreline modification identified - no areas suitable for new residential armoring / docks				
Diamond Point	149	16	11%	60	40%
Travis Spit	49	0	0%	1	2%
Sequim Bay	148	10	7%	97	66%
3 Crabs	112	14	13%	96	86%
Freshwater Bay	122	0	0%	39	32%
Lyre River vicinity	38	0	0%	5	13%
Whiskey Creek beach	27	1	4%	1	4%
Clallam Bay	37	1	3%	13	35%
Hoko River vicinity	58	0	0%	18	31%
Bullman Beach	21	3	14%	20	95%
Total	761	83	11%	657	86%

1 **Table 5-9. Parcels within Freshwater Analysis Areas with Potential for New Shoreline Modifications**

Analysis Area	Total Parcels	New Armoring	
		Number of Parcels	Percentage
Clallam River	33	6	18%
Dungeness River	277	5	2%
Elwha Tributaries	44	4	9%
Lake Sutherland	267	0	0%
Lyre River	22	1	5%
McDonald Creek	137	0	0%
Morse Creek	199	33	17%
Pysht River	31	6	19%
Salt Creek	16	0	0%
Total	1026	55	5%

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Figure 5-4. Shoreline parcels on Lake Sutherland with potential for new residential docks (highlighted in blue).



3

5.9 Impacts from Development in Floodplains and Channel Migration Zones (river / stream shorelines only)

We evaluated the potential for new development to impact mapped floodplains and channel migrations zones using existing FEMA 100-year floodplain maps and channel migrations zone maps prepared by Ecology. These maps sets are not comprehensive meaning that there are rivers/streams with no mapped floodplain and rivers/streams where the potential for channel migration has not been assessed or documented. There are also issues with the maps that are available in that the floodplain maps have known inaccuracies and the channel migration maps are coarse-scale planning level maps. Nonetheless, we used these data sets to identify existing undeveloped parcels located within the mapped floodplains.

Results are summarized as follows (Note: all numbers are approximate):

- **Development within floodplains and CMZs is limited primarily to two of the Analysis Areas, with the small percentages of parcels affected in three other Analysis Areas.** The relatively high percentages in the Clallam River and Pysht River Analysis Areas are due to the few number of undeveloped parcels overall, and do not suggest a significant threat to floodplain / channel migration habitat and hydrology:
 - Clallam River analysis area (12% of parcels with potential for future floodplain development; 12% of parcels with potential for future CMZ development).
 - Pysht River (10% of parcels for floodplain and 13% of parcels for CMZ development).
 - Dungeness River (4% of parcels for floodplain and 12% of parcels for CMZ development)
 - Lyre River (5% for both floodplain and CMZ development)
 - Morse Creek (3% floodplain / 10% CMZ development)

1

Table 5-10. Summary of Development Threats for each Analysis Area – Marine shoreline

Analysis Area	Marine Reach	Vacant Parcel Development Potential	Subdivision Potential	Buffer Clearing on Constrained Lots	View Clearing	Overall potential for buffer (habitat / safety) forest loss	Potential Riparian Improvement	Future Shoreline Armoring	Future Overwater Structures
Discovery Bay Bluffs	1 – Diamond Point	Substantial potential (10 lots, 48%)	No potential subdivision	Moderate	High	Substantial potential	None apparent	No potential future armoring	No potential future structures
Diamond Point	1 – Diamond Point	Substantial potential (32 lots, 21%)	No potential subdivision	High	Moderate	Substantial potential	Minimal	Substantial potential (16 lots, 11%)	Substantial potential; however little is anticipated
Travis Spit Vicinity	1 – Diamond Point	Substantial potential (17 lots, 35%)	Substantial potential (22%, 11 new lots)	Moderate	Moderate	Substantial potential	None apparent	No potential future armoring	Limited potential (1 lot, 2%)
Sequim Bay	2- Sequim Bay (majority); 3 - Gibson Spit (NW end)	Minimal	Substantial potential (16%, 16 new lots)	Some potential (7%, 10 lots)	Low	None apparent	Some potential (16 lots, 11%)	Limited potential (10 lots, 7%)	Substantial potential (97 lots); however little is anticipated
3 Crabs Vicinity	4 - Kulakala Point	Limited potential (3 lots, 3%)	No potential subdivision	Moderate	No potential impact	Some potential	None apparent	Moderate potential (14 lots, 13%)	Substantial potential (96 lots); however little is anticipated

Analysis Area	Marine Reach	Vacant Parcel Development Potential	Subdivision Potential	Buffer Clearing on Constrained Lots	View Clearing	Overall potential for buffer (habitat / safety) forest loss	Potential Riparian Improvement	Future Shoreline Armoring	Future Overwater Structures
Dungeness Harbor	4 - Kulakala Point	Limited potential (1 lot, 2 %)	No potential subdivision	Minimal	No potential impact	Limited potential	None apparent	No potential future armoring	No potential future structures
Dungeness Bluffs	6 – Green Point	Substantial potential (68 lots, 32%)	Limited potential (less than 10%, 11 new lots)	Low	Moderate	Some potential	Minimal	No potential future armoring	No potential future structures
Morse Creek to Port Angeles	6 – Green Point	Limited potential (7 lots, 7%)	Substantial potential (Low	No potential impact	Limited potential	None apparent	No potential future armoring	No potential future structures
East Angeles Point	7 – Angeles Point	Substantial potential (8 lots, 33%)	No potential subdivision	Minimal	Moderate	Limited potential	None apparent	No potential future armoring	No potential future structures
Freshwater Bay	7 – Angeles Point	Substantial potential (44 lots, 36%)	Substantial potential (13%, 11 new lots)	Minimal	High	Moderate potential	None apparent	No potential future armoring	Substantial potential (39 lots); however little is anticipated
Whiskey Creek Beach	9 – Crescent Bay / Low Point	Substantial potential (16 lots, 42%)	Substantial potential (15%, 4 new lots)	Minimal	High	Moderate potential	None apparent	Minimal potential (1 lot, 4%)	Minimal potential (1 lot, 4%)

Analysis Area	Marine Reach	Vacant Parcel Development Potential	Subdivision Potential	Buffer Clearing on Constrained Lots	View Clearing	Overall potential for buffer (habitat / safety) forest loss	Potential Riparian Improvement	Future Shoreline Armoring	Future Overwater Structures
Lyre River Vicinity	9 – Crescent Bay / Low Point	Substantial potential (14 lots, 52%)	Substantial potential (32%, 12 new lots)	Moderate	Moderate	Substantial potential	Minimal	No potential future armoring	Moderate potential (5 lots); however little is anticipated
Clallam Bay	15 – Clallam Bay (entire reach)	Some potential (6 lots, 16%)	Substantial potential (22%, 8 new lots)	Moderate	Low	Moderate potential	None apparent	Minimal potential (1 lot, 3%)	Moderate potential (13 lots); however little is anticipated
Hoko River Vicinity	16 – Sekiu-Kydaka Point / 17 – Shipwreck Point	Substantial potential (15 lots, 26%)	Limited potential (less than 10%, 11 new lots)	Minimal	High	Moderate potential	None apparent	No potential future armoring	Moderate potential (18 lots); however little is anticipated
Bullman Beach	18 – Rasmussen / Bullman Creek	Substantial potential (6 lots, 29%)	No potential subdivision	Low	Low	Limited potential	None apparent	No potential future armoring	Moderate potential (20 lots); however little is anticipated

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Table 5-11. Summary of Development Threats for each Analysis Area – Freshwater shoreline

	Vacant Parcel Development Potential	Subdivision Potential	Buffer Clearing on Constrained Lots	View Clearing (% of total parcels)	Overall potential for buffer forest loss	Potential Riparian Improvement	Floodplain / CMZ Development (% of total parcels where floodplain)	Future Shoreline Armoring (# of Lots; % of Total Lots)	Future Overwater Structures
Clallam River	Substantial potential (24 lots, 73%)	Substantial potential (18 new lots; 55% potential increase)	High	High (48.5%)	Substantial potential	Limited (6% of lots)	Moderate potential	High potential (6 lots; 18%)	No potential for future shoreline modification identified - no areas suitable for new residential armoring / docks
Dungeness River	Substantial potential (74 lots, 27%)	Limited potential (15 new lots; 5% potential increase)	High	Moderate (14%)	Substantial potential	Minimal (1% of lots)	Low potential	Low potential (5 lots; 2%)	
Elwha tributaries	Substantial potential (23 lots, 52%)	Substantial potential (11 new lots; 25% potential increase)	Moderate	High (45%)	Substantial potential	None apparent	None apparent	Moderate potential (4 lots; 9%)	
Lake Sutherland	Substantial potential (32 lots, 12%)	Limited potential (10 new lots; 4% increase)	Moderate	Moderate (10.5%)	Moderate potential	None apparent	None apparent	No potential future armoring	

	Vacant Parcel Development Potential	Subdivision Potential	Buffer Clearing on Constrained Lots	View Clearing (% of total parcels)	Overall potential for buffer forest loss	Potential Riparian Improvement	Floodplain / CMZ Development (% of total parcels where floodplain)	Future Shoreline Armoring (# of Lots; % of Total Lots)	Future Overwater Structures
Lyre River	Substantial potential (10 lots, 18%)	Substantial potential (4 new lots; 55% potential increase)	Low	High (45%)	Moderate potential	None apparent	Low potential	Low potential (1 lot; 5%)	No potential for future shoreline modification identified - no areas suitable for new
McDonald Creek	Substantial Potential (28 lots, 20%)	Limited potential (9 new lots; 7% increase)	Low	Moderate (17.5%)	Limited potential	None apparent	None apparent	No potential future armoring	
Morse Creek	Substantial Potential (68 lots, 34%)	Substantial potential (40 new lots; 20% potential increase)	High	High (34%)	High potential	Minimal (1% of lots)	Low potential	High potential (33 lots; 17%)	No potential for future shoreline modification identified - no areas suitable for new residential armoring / docks
Pysht River	Substantial Potential (20 lots, 65%)	Moderate potential (5 new lots; 16% potential increase)	High	High (35.5%)	High potential	None apparent	Moderate potential	High potential (6 lots; 17%)	
Salt Creek	Substantial Potential (8 lots, 50%)	Substantial potential (5 new lots; 31% potential increase)	Low	High (50%)	Moderate potential	None apparent	None apparent	No potential future armoring	

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1 **5.10 Potential Loss of Functions and Restoration – Marine**
2 **Shorelines**

3 **5.10.1 Marine Reach 1 – Diamond Point**

4 The Diamond Point reach extends along Miller Peninsula, from the Clallam/Jefferson county line
5 to the northwest corner of Sequim Bay. Land use along the shoreline is primarily undeveloped
6 open space, with pockets of residential development. This is consistent with the zoning which is
7 either Rural Low (R5), Urban Residential Low (URL), or open space.

8 Within this reach there are three areas where the reasonably foreseeable future development
9 pressure is considered high because of existing lot patterns, future development potential based
10 on underlying zoning, and the potential impacts such development could have on shoreline
11 ecological components (and functions). Within these three Analysis Areas new development has
12 the potential to threaten shoreline functions if not carefully planned and designed. The Analysis
13 Areas are:

- 14 • Discovery Bay Feeder Bluffs
- 15 • Diamond Point
- 16 • Travis Spit Vicinity

17 Outside of the Analysis Areas, Reach 1 includes undeveloped, large lots which are primarily part
18 of Miller Peninsula State Park (undeveloped park land), managed by Washington State Parks
19 (Figure 5-4). Only one parcel is privately owned (immediately west of the Diamond Point
20 community). The proposed SMP will designate all of these areas Natural, requiring 175 foot
21 habitat buffers for any new development. There is limited threat to marine shoreline ecological
22 functions in these areas.

23 The densest concentration of residential development is located in the Diamond Point vicinity,
24 with more sparse development landward of feeder bluffs along the Discovery Bay shoreline and
25 in the Travis Spit vicinity / northeast Sequim Bay (Figure 5-4).

26 **Table 5-12. Reasonably foreseeable future development – Marine Reach 1- Diamond Point**

Feature	Description
<i>Analysis Area: Discovery Bay Feeder Bluffs</i>	
Zoning	Rural Low (R5)
Existing Shoreline Condition	>90% forested, most homes set back >150' from inventoried priority feeder bluff exceptional
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy

Feature	Description
Major New Development	No major new development is currently anticipated within the Discovery Bay Feeder Bluffs Analysis Area
Minor New Development	<p>Existing parcel pattern and subdivision potential: There are 21 total parcels in the analysis area, 11 of which have existing development and are non-subdividable, and the remainder of which (10 parcels) are vacant and non-subdividable. <u>There is no apparent subdivision potential.</u></p> <p>Developed parcels: Of the 11 parcels developed with residential use, 36% (4 parcels) have existing structures within proposed SMP hazard buffer area.</p> <p>Vacant parcels: Of the 10 vacant parcels, 30% (3 parcels) would likely be dimensionally constrained by proposed SMP buffer areas. Riparian vegetation is already altered on two of these lots (intact on one).</p> <p>Potential for new shoreline modification: There are no areas appropriate for new residential armoring or new overwater docks. The proposed SMP prohibits armoring of feeder bluff shorelines.</p>
Summary of Anticipated Future Development	<p>Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces); New residential development on 10 vacant parcels (3 parcels where a reduced safety hazard buffer may be required).</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>The large majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through clearing allowances for view / shoreline access corridors.</p> <p>Limited impacts to feeder bluff and sediment transport processes are expected, as there is no potential for future shoreline modification.</p>
Identified Restoration Opportunities	Remove pile wall at Eagle Creek
Necessary Restoration to Account for Threats	Revegetation of existing disturbed riparian / feeder bluff buffer areas (within Analysis Area, or potentially within opportunity areas in Diamond Point)
<i>Analysis Area: Diamond Point</i>	
Zoning	Urban Residential Low Density (URL)
Existing Shoreline Condition	Minimal riparian forest along low bank (~ 3%); 90% forested along bluffs to the south and west of Diamond Point; Some armoring and docks along low bank

Feature	Description
Proposed Shoreline Environment Designation	<ul style="list-style-type: none"> • Shoreline Residential – Intensive (marine shoreline in lowbank areas of Diamond Point); • Shoreline Residential – Conservancy (high bank shorelines to the south and west of the point); • Natural – wetland and surrounding open space area associated with Diamond Point shoreline
Major New Development	No major new development is currently anticipated within the Diamond Point Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 149 total parcels in the Analysis Area, 116 of which have existing residential development, 32 are undeveloped (1 nonresidential parcel). <u>There is no apparent subdivision potential.</u></p> <p>Developed Parcels: Of the 116 parcels developed with residential use, 84% (98 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 32 undeveloped parcels, 69% (22 parcels) would likely be dimensionally constrained by proposed SMP buffer areas. Riparian vegetation is already altered on 13 of these lots (at least partially intact on 9).</p> <p>Potential for New Shoreline Modification: There is substantial potential for future shoreline armoring (16 parcels; 11% of total lots) and future residential docks; despite potential for residential docks, very few are anticipated due to past development patterns and the exposed nature of the shoreline. The proposed SMP prohibits armoring of feeder bluff shorelines (applicable to SR-C designated areas within this Analysis Area)</p>
Summary of Anticipated Future Development	<p>New development on currently vacant parcels (22% of lots), including buffer clearing and potential for narrow setbacks due to the number of dimensionally constrained lots.</p> <p>Intensified use on existing developed residential properties (redevelopment with larger structures; some additional riparian vegetation impact and more impervious surfaces);</p> <p>New armoring to protect residential development (existing and new development on constrained lots); some potential for future overwater structures (few if any anticipated)</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>Alteration to existing intact riparian vegetation (limited to 9 dimensionally constrained, undeveloped lots with at least partially intact riparian vegetation). View clearing allowances may additionally alter riparian vegetation; however impacts are limited by existing altered condition.</p> <p>Diamond Point Analysis Area (along with the Three Crabs Vicinity) has the highest potential for new shoreline stabilization to protect residential development. Few if any new overwater structures are anticipated.</p>
Identified Restoration Opportunities	Remove wharf piles along Diamond Point
	Remove fill, restore tidal prism of coastal lagoon/embayment at Diamond Point
	Revegetate disturbed riparian areas along Diamond Point, where possible

Feature	Description
Necessary Restoration to Account for Threats	Implementation of identified opportunities as shoreline development and redevelopment occurs)
<i>Analysis Area: Travis Spit Vicinity</i>	
Zoning	Urban Residential Low Density (URL)
Existing Shoreline Condition	> 90% forested along bluffs, generally not forested along low bank (~ 3%). Some armoring and docks along low bank.
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy
Major New Development	No major new development is currently anticipated within the Travis Spit Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 49 total parcels in the Analysis Area, 32 of which have existing residential development, 17 are undeveloped. <u>There is moderate subdivision potential (11 new lots; 22% increase).</u></p> <p>Developed Parcels: Of the 32 parcels developed with residential use, 75% (24 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 17 vacant parcels, 41% (7 parcels) would likely be dimensionally constrained by proposed SMP buffer areas. Riparian vegetation is generally intact on all seven of these parcels.</p> <p>Potential for New Shoreline Modification: There are no areas appropriate for new residential armoring, and only one parcel identified where a new residential dock may occur. The proposed SMP prohibits armoring of feeder bluff shorelines.</p>
Summary of Anticipated Future Development	<p>Subdivision of existing residential lots and new development (22% increase in total lots);</p> <p>Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces);</p> <p>New residential development on 17 vacant parcels (7 parcels where a reduced safety hazard buffer may be required).</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through: intensified uses through subdivision; potential development on 7 existing dimensionally constrained parcels; and clearing allowances for view / shoreline access corridors.</p> <p>Limited impacts to feeder bluff and sediment transport processes are expected, as there is no potential for future shoreline modification.</p>
Identified Restoration Opportunities	None identified

Feature	Description
Necessary Restoration to Account for Threats	Revegetation of existing disturbed riparian / feeder bluff buffer areas (within Analysis Area [potentially on Travis Spit], or potentially within opportunity areas at Diamond Point or elsewhere in Sequim Bay)

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5.10.2 Marine Reach 2 – Sequim Bay

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The “Sequim Bay” reach contains 8.2 miles of marine shoreline which extends from the northeast corner of the bay (approximately one mile south of Travis Spit) to just south of the John Wayne Marina. The reach also contains the mouths of Jimmycomelately and Dean creeks (these streams are not shorelines of the state, except where they enter Sequim Bay).

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The dominant land use along the Sequim Bay shoreline is moderate- to low-density residential development (occurring throughout the reach). This is consistent with the zoning which is primarily Rural Low (R5).

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Foreseeable future development pressure is considered high throughout the Sequim Bay shoreline area because of existing lot patterns, future development potential based on underlying zoning, and the potential impacts such development could have on shoreline ecological components (and functions). As such, we assessed the entire reach as an Analysis Areas, where new development has the potential to threaten shoreline functions if not carefully planned and designed.

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Table 5-13. Reasonably foreseeable future development – Marine Reach 2 – Sequim Bay (entire reach)

Feature	Description
<i>Analysis Area: Sequim Bay</i>	
Zoning	Rural Low (R5)
Existing Shoreline Condition	~70% forested. Existing setbacks vary. Docks and armoring are present in some locations.
Proposed Shoreline Environment Designation	Shoreline Residential - Conservancy
Major New Development	No major new development is currently anticipated within the Sequim Bay Analysis Area

Feature	Description
<p>Minor New Development</p>	<p>Existing Parcel Pattern and Subdivision Potential: There are 148 total parcels in the Analysis Area, 127 of which have existing residential development; 17 are undeveloped (5 nonresidential parcels). <u>There is substantial subdivision potential (23 new lots; 16% increase).</u></p> <p>Developed Parcels: Of the 127 parcels developed with residential use, 23% (29 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 17 vacant parcels, only 1 parcel would likely be dimensionally constrained by proposed SMP buffer areas. Riparian vegetation is generally intact on this parcel.</p> <p>Potential for New Shoreline Modification: There is some potential for future shoreline armoring (10 parcels; 7% of total lots) and future residential docks; despite potential for residential docks, very few are anticipated due to past development patterns and the exposed nature of the shoreline. The proposed SMP prohibits armoring of feeder bluff shorelines (applicable to SR-C designated areas within this Analysis Area)</p>
<p>Summary of Anticipated Future Development</p>	<p>Subdivision of existing residential lots and new development (16% increase in total lots);</p> <p>Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces);</p> <p>New residential development on 17 vacant parcels (predominantly occurring consistent with standard buffers and other requirements of the proposed SMP);</p> <p>Some potential for new shoreline stabilization to protect residential development. Few if any new overwater structures are anticipated.</p> <p>No other development or uses are anticipated.</p>
<p>Threats Associated with Anticipated Development</p>	<p>The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through: subdivision (intensification of residential use); and clearing allowances for view / shoreline access corridors.</p> <p>Limited impacts resulting from shoreline modification are anticipated, as there is limited potential for new shoreline armoring and few residential docks are anticipated.</p>
<p>Identified Restoration Opportunities</p>	<p>Remove unnecessary shoreline armoring /bulkheads and creosote walls</p> <p>Remove dikes at south end of bay</p> <p>Restore tidal flushing to lagoon area south of John Wayne Marina</p> <p>Patches of disturbed vegetation are present along the bay; revegetate these areas, where possible.</p>
<p>Necessary Restoration to Account for Threats</p>	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed.</p> <p>Additional opportunities to compensate impacts occur in Reach 3 (Removal of fill and armoring at Graysmarsh; revegetate the disturbed areas between Graysmarsh and Gibson spit, where possible)</p>

1 **5.10.3 Marine Reach 3 – Gibson Spit**

2 The “Gibson Spit” reach contains 6.1 miles of marine shoreline, which extends from north of the
3 John Wayne Marina in Sequim Bay to just north of Graysmarsh (Gierin Creek mouth) along the
4 Strait of Juan de Fuca. The reach contains the northwestern shoreline of Sequim Bay and the
5 estuaries of Bell and Gierin creeks (Bell and Gierin Creeks are not shorelines of the state, except
6 where they enter the Strait of Juan de Fuca).

7 There is moderate future development potential in the southern area of the reach (south of
8 Gibson Spit) – areas where moderate- to high-density residential development is present along
9 the Sequim Bay shoreline. We assessed this area for cumulative impacts as part of the Sequim
10 Bay Analysis Area, detailed above.

11 Land use in the northern portion of the reach (Gibson Spit and northward) is primarily forestry
12 and agriculture, with minimal existing shoreline development. Most of the reach is zoned for
13 agricultural residential, except for the spit which is rural low zoning. Throughout this area,
14 undeveloped parcels are larger (20 acres average) and are currently working timber and
15 agricultural lands with little to no existing residential development along the shoreline. Under
16 current zoning regulations, parcels in this area cannot be subdivided into lots less than 5 acres, so
17 the potential for dense shoreline development in this area is unlikely. Additionally, the
18 significant extent of wetland habitat at Graysmarsh likely precludes intensive development in the
19 area.

20 **5.10.4 Marine Reach 4 – Kulakala Point**

21 The “Kulakala Point” reach contains 7.9 miles of marine shoreline, which extends from north of
22 Graysmarsh (Gierin Creek mouth) to just east of the landward end of Dungeness Spit. The reach
23 contains Dungeness Bay, Cline Spit, and Dungeness Harbor. The reach includes the Dungeness
24 River delta (a shoreline of the state), and the mouth of Cassalery Creek. The creek is not a
25 shoreline of the state, except where it enters the Strait of Juan de Fuca.

26 Within 300 feet of the shore, approximately half of the shoreland area contains forest and natural
27 shrub and herbaceous vegetation. However, much of the vegetation directly bordering the
28 shoreline has been removed to accommodate dense shoreline development, particularly along
29 Three Crabs Road, Seashore Lane, Jamestown Road, and the south shore of Dungeness Harbor.
30 Outside of the shoreland zone, the surrounding land consists of residential development and
31 agriculture.

32 Within this reach there are two areas where the reasonably foreseeable future development
33 pressure is considered high because of existing lot patterns, future development potential based
34 on underlying zoning, and the potential impacts such development could have on shoreline
35 ecological components (and functions). Within these two Analysis Areas new development has
36 the potential to threaten shoreline functions if not carefully planned and designed. The Analysis
37 Areas are:

- 38 • Three Crabs Vicinity
- 39 • Dungeness Harbor

1 Outside of the Analysis Areas, Reach 4 includes large lots which are primarily preserved as open
 2 space (undeveloped parcels adjacent to the Dungeness River mouth that are owned or managed
 3 by WDFW, the North Olympic Land Trust, and Dungeness Farms (private) for fish and wildlife
 4 conservation purposes) or used for agriculture. The proposed SMP will designate much of this
 5 area Natural, requiring 175 foot habitat buffers for any new development. Other areas (primarily
 6 rural areas with some agricultural use) are designated Shoreline Residential – Conservancy, and
 7 would require 100 to 150 foot habitat buffers. Due to existing ownership and use patterns,
 8 significant conservation and restoration efforts already underway, and protective standards of the
 9 proposed SMP, there is limited threat to marine shoreline ecological functions in these areas.

10 **Table 5-14. Reasonably foreseeable future development – Marine Reach 4 – Kulakala Point**

Feature	Description
Analysis Area: Three Crabs Vicinity	
Zoning	R5 and R2; existing lots are typically small, or have “piano key” shape
Existing Shoreline Condition	<3% forested, mostly built-out, most setbacks 50’ or less, ~5% armored
Proposed Shoreline Environment Designation	Shoreline Residential - Intensive
Major New Development	No major new development is currently anticipated within the Three Crabs Vicinity Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 112 total parcels in the Analysis Area, 108 of which have existing residential development, only 3 are undeveloped (1 nonresidential parcel). <u>There is no apparent subdivision potential.</u></p> <p>Developed Parcels: Of the 108 parcels developed with residential use, 39% (42 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 3 undeveloped parcels, all have adequate buildable area outside of buffers in the proposed SMP.</p> <p>Potential for New Shoreline Modification: There is moderate potential for future shoreline armoring (14 parcels; 13% of total lots) and future residential docks; despite potential for residential docks, very few are anticipated due to past development patterns and the exposed nature of the shoreline.</p>
Summary of Anticipated Future Development	<p>Intensified use on existing developed residential properties (redevelopment with larger structures; some additional riparian vegetation impact and more impervious surfaces);</p> <p>New armoring to protect residential development (existing and new development on constrained lots); some potential for future overwater structures (few if any anticipated)</p> <p>No other development or uses are anticipated.</p>

Feature	Description
Threats Associated with Anticipated Development	<p>Threats are primarily associated with redevelopment of residential properties, including: intensification of uses (more impervious surfaces, more lawns, increased vegetation clearing within and outside of riparian buffers). Redevelopment in the 3 Crabs Vicinity also provides opportunity to improve condition (new structures built consistent with wider buffer standards; riparian enhancement).</p> <p>Three Crabs Vicinity (along with Diamond Point Analysis Area) has the highest potential for new shoreline stabilization to protect residential development. Few if any new overwater structures are anticipated.</p>
Identified Restoration Opportunities	<p><i>Beneficial project in progress:</i> Community sewage system along 3 Crabs Road</p> <p><i>Beneficial project in progress:</i> Restore riparian habitat along streams in the 3 Crabs Road vicinity</p> <p>Restoration of tidal flushing channels in the 3 Crabs Road vicinity</p> <p>Reconfiguration of boat launch and groin at the north end of Sequim-Dungeness Way</p> <p>Removal of derelict structures east of Cline Spit</p> <p>Removal of armoring and dikes at Cline Spit to improve fish habitat and increase lagoon area (CGS)</p> <p>Revegetate the disturbed areas along Marine Drive, where possible</p>
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed, and on implementing projects that remove shoreline armoring (addressing potential for new shoreline armoring along the marine shoreline).</p> <p>Additional opportunities to compensate impacts occur in Reach 3 (Removal of fill and armoring at Graysmarsh; revegetate the disturbed areas between Graysmarsh and Gibson spit, where possible)</p>
<i>Analysis Area: Dungeness Harbor</i>	
Zoning	R2
Existing Shoreline Condition	20% forested, mostly on bluff face, some docks, setbacks vary. Mostly built out
Proposed Shoreline Environment Designation	Shoreline Residential - Conservancy
Major New Development	No major new development is currently anticipated within the Dungeness Harbor Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 58 total parcels in the Analysis Area, 54 of which have existing residential development, only 1 is undeveloped (3 nonresidential parcels). <u>There is no apparent subdivision potential.</u></p> <p>Developed Parcels: Of the 54 parcels developed with residential use, 81% (44 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: The one vacant residential parcel has adequate room to build outside of proposed standard SMP buffers.</p> <p>Potential for New Shoreline Modification: There are no areas appropriate for new residential armoring or new overwater docks. The proposed SMP prohibits armoring of feeder bluff shorelines.</p>
Summary of Anticipated Future Development	<p>Intensified use on existing developed residential properties (redevelopment with larger structures; some additional riparian vegetation impact and more impervious surfaces);</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>Threats are primarily associated with redevelopment of residential properties, including: intensification of uses (more impervious surfaces, more lawns, increased vegetation clearing within and outside of riparian buffers). Redevelopment in the 3 Crabs Vicinity also provides opportunity to improve condition (new structures built consistent with wider buffer standards; riparian enhancement).</p>
Identified Restoration Opportunities	Reconfiguration of boat launch and groin at the north end of Sequim-Dungeness Way
	Removal of derelict structures east of Cline Spit
	Removal of armoring and dikes at Cline Spit to improve fish habitat and increase lagoon area (CGS)
	Revegetate the disturbed areas along Marine Drive, where possible
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed.</p> <p>Additional opportunities to compensate impacts occur in Reach 3 (Revegetation of the disturbed areas between Graysmarsh and Gibson spit, where possible)</p>

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5.10.5 Marine Reach 5 – Dungeness Spit

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The “Dungeness Spit” reach contains 15.7 miles of marine shoreline. The reach includes the entire spit, including Graveyard Spit, and a small portion of the landward end of the spit. Nearly the entire reach is within the Dungeness National Wildlife Refuge.

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Given that the majority of the reach is a publicly owned national wildlife refuge the threat of future development is very low. The few privately owned parcels in this reach land cannot be subdivided under current zoning regulations. The existing homes are located more than 300 feet

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1 back from the shoreline; therefore, there is a low chance of future armoring. Due to existing
2 ownership and use patterns, and protective standards of the proposed SMP, there is limited threat
3 to marine shoreline ecological functions throughout all of Reach 5.

4 **5.10.6 Marine Reach 6 – Green Point**

5 The “Green Point” reach contains 11.4 miles of marine shoreline, which extends along the Strait
6 of Juan de Fuca from just west of Dungeness Spit to the Port Angeles city limits. The reach also
7 contains the mouths of McDonald, Siebert, Morse, and Lees creeks. McDonald and Morse
8 Creeks are shorelines of the state. The other streams that intersect this reach are not shorelines of
9 the state, except where they enter the Strait of Juan de Fuca. The western end of this reach (west
10 of Morse Creek) is within the Port Angeles urban growth area and may eventually be annexed by
11 the City. According to the City’s draft shoreline master program, this area would have a
12 dual/parallel designation of Urban Conservancy Recreation along the water and Shoreline
13 Residential inland if it were annexed.

14 The predominant shoretype in the reach is bluff backed beach, with smaller portions of barrier
15 beach and barrier estuary. Over 70% of this reach is mapped as feeder bluff or feeder bluff
16 exceptional (Figure 5-5).



17
18 **Figure 5-5. Segment of exceptional feeder bluff west of Dungeness Spit lacking native riparian forest cover.**
19 **Note proximity of existing homes to edge of retreating bluffs (Photo: Ecology Coastal Atlas)**

20
21 Approximately one-third of the shoreland area in the Green Point reach is forested, and another
22 third contains natural shrub and herbaceous vegetation. Forest cover is generally absent in the

1 heavily developed areas. The forest cover that remains in the reach helps stabilize the erosive
 2 bluffs.

3 Within this reach there are two areas where the reasonably foreseeable future development
 4 pressure is considered high because of existing lot patterns, future development potential based
 5 on underlying zoning, and the potential impacts such development could have on shoreline
 6 ecological components (and functions). Within these two Analysis Areas new development has
 7 the potential to threaten shoreline functions if not carefully planned and designed. The Analysis
 8 Areas are:

- 9 • Dungeness Bluffs
- 10 • Morse Creek to Port Angeles (substantially within the Port Angeles UGA)

11 In the limited areas outside of these two Analysis Areas, Reach 6 includes large lots which are
 12 primarily preserved as open space / park lands (publically owned areas of the Dungeness
 13 Recreation Area and private open space around the mouth of Morse Creek). The proposed SMP
 14 designates these areas SR – C, and would require 100 to 150 foot habitat buffers. Due to existing
 15 ownership and use patterns and protective standards of the proposed SMP, there is limited threat
 16 to marine shoreline ecological functions in these areas.

17 **Table 5-15. Reasonably foreseeable future development – Marine Reach 6 – Green Point**

Feature	Description
Analysis Area: Dungeness Bluffs	
Zoning	R1 through R5
Existing Shoreline Condition	15% forested, largely unmodified shoreline
Proposed Shoreline Environment Designation	Shoreline Residential - Conservancy
Major New Development	No major new development is currently anticipated within the Dungeness Bluffs Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 213 total parcels in the Analysis Area, 141 of which have existing residential development, with 68 undeveloped residential lots (4 nonresidential parcel). <u>Subdivision potential is limited (11 new possible lots).</u></p> <p>Developed Parcels: Of the 141 parcels developed with residential use, 70% (99 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 68 undeveloped parcels, 25% (17 parcels) are dimensionally constrained such that new development would likely be required within the standard buffers proposed by the SMP. 8 of these 17 parcels have intact riparian vegetation that could be impacted when new development occurs.</p> <p>Potential for New Shoreline Modification: There are no areas appropriate for new residential armoring or new overwater docks. The proposed SMP prohibits armoring of feeder bluff shorelines.</p>
Summary of Anticipated Future Development	<p>Intensified use on existing developed residential properties (redevelopment with larger structures; some additional riparian vegetation impact and more impervious surfaces);</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>Highest potential for riparian alteration and feeder bluff impacts comes through: new development on existing vacant residential lots. Additional threats are associated with redevelopment of residential properties, including: intensification of uses (more impervious surfaces, more lawns, increased vegetation clearing within and outside of riparian buffers). Redevelopment along the Dungeness Bluffs shoreline also provides opportunity to improve condition (new structures built consistent with wider buffer standards; riparian enhancement).</p>
Identified Restoration Opportunities	<p>Siebert Creek ecosystem protection (HWS)</p> <p>Restore Morse Creek estuary</p> <p>Revegetate disturbed areas along the bluffs, where possible</p>
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.</p>
Analysis Area: Morse Creek to Port Angeles	
Zoning	R1 through R5
Existing Shoreline Condition	~30% forested, armoring at toe of bluff (Olympic Discovery Trail)

Feature	Description
Proposed Shoreline Environment Designation	Shoreline Residential - Conservancy
Major New Development	No major new development is currently anticipated within the Diamond Point Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 98 total parcels in the Analysis Area, 77 of which have existing residential development, 14 are undeveloped (7 nonresidential parcels). <u>This analysis area has the highest potential subdivision potential (60 new lots possible) of all the marine analysis areas.</u></p> <p>Developed Parcels: Of the 77 parcels developed with residential use, the majority have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: The large majority of vacant residential parcels have adequate room to build outside of proposed standard SMP buffers.</p> <p>Potential for New Shoreline Modification: There are no areas appropriate for new residential armoring or new overwater docks. The proposed SMP prohibits armoring of feeder bluff shorelines.</p>
Summary of Anticipated Future Development	<p>Intensified use on existing developed residential properties (redevelopment with larger structures; some additional riparian vegetation impact and more impervious surfaces);</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>Highest potential for riparian alteration and feeder bluff impacts comes through: intensified uses through subdivision (as well as development on existing vacant residential lots). Residential subdivision is not anticipated to occur at levels approaching the maximum potential amount (most parcels are already developed, with structures situated at the center of 1 - .5 acre residential properties).</p> <p>Additional threats are primarily associated with redevelopment of residential properties, including: intensification of uses (more impervious surfaces, more lawns, increased vegetation clearing within and outside of riparian buffers).</p>
Identified Restoration Opportunities	Siebert Creek ecosystem protection (HWS)
	Restore Morse Creek estuary
	Revegetate disturbed areas along the bluffs, where possible
Necessary Restoration to Account for Threats	Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.

5.10.7 Marine Reach 7 – Angeles Point

The “Angeles Point” reach contains 7.3 miles of marine shoreline, which extends from the western Port Angeles city limits to just south of Observatory Point. The reach contains Freshwater Bay, the estuary of the Elwha River (a shoreline of statewide significance) and the mouth of Colville Creek (a shoreline of the state).

Shoretupes within the reach are primarily bluff backed beach and Elwha River delta shores. Within 300 feet of the shore, more than half of the shoreland area contains forest cover, and another quarter is natural shrub and herbaceous vegetation. These vegetation communities, along with the wetland habitat at the Elwha River estuary, provide habitat for a diversity of species.

Land ownership within the reach is 58% private, 18% public, and 24% tribal. The majority of the private and tribal-owned land is used for residential development, with some agriculture land present. Within this reach there are two areas where the reasonably foreseeable future development pressure is considered high because of existing lot patterns, future development potential based on underlying zoning, and the potential impacts such development could have on shoreline ecological components (and functions). Within these two Analysis Areas new development has the potential to threaten shoreline functions if not carefully planned and designed. The Analysis Areas are:

- East Angeles Point
- Freshwater Bay

In the limited areas outside of these two Analysis Areas, Reach 7 includes large lots which are primarily preserved as open space / park lands (public and Lower Elwha Tribe owned areas around the mouth of the Elwha River; additional park lands near Observatory Point). The proposed SMP designates these areas Natural, requiring 175 foot habitat buffers. Due to existing ownership and use patterns and protective standards of the proposed SMP, there is limited threat to marine shoreline ecological functions in these areas.

Table 5-16. Reasonably foreseeable future development – Marine Reach 7 – Angeles Point

Feature	Description
<i>Analysis Area: East Angeles Point</i>	
Zoning	R2 and RCC3
Existing Shoreline Condition	40% forested. S end mostly built out. Existing setbacks > 100'
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy / Natural
Major New Development	No major new development is currently anticipated within the East Angeles Point Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 24 total parcels in the Analysis Area, 16 of which have existing residential development; 8 are undeveloped. <u>There is no apparent subdivision potential.</u> The large majority of parcels have intact riparian forest, suggesting high potential for impact through view corridor / shoreline access allowances.</p> <p>Developed Parcels: Of the 16 parcels developed with residential use, 36% (4 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 8 vacant parcels, none would be dimensionally constrained by proposed SMP buffer areas.</p> <p>Potential for New Shoreline Modification: There are no areas appropriate for new residential armoring or new overwater docks.</p>
Summary of Anticipated Future Development	<p>Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces); New residential development on 8 vacant parcels (predominantly occurring consistent with standard buffers and other requirements of the proposed SMP); Riparian impacts associated with view corridor / shoreline access allowances provided in the Draft SMP.</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through clearing allowances for view / shoreline access corridors.</p>
Identified Restoration Opportunities	<p>Restore stream mouth and reconfigure shoreline armoring/fill associated with boat ramp.</p> <p>Revegetate disturbed areas along Angeles Point, where possible</p>
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; encourage or incentivize voluntary restoration of riparian buffers on private property.</p>
Analysis Area: Freshwater Bay	
Zoning	R1 (east end), RLM, and R2
Existing Shoreline Condition	40% forested. S end mostly built out. Existing setbacks > 100'
Proposed Shoreline Environment Designation	Shoreline Residential - Conservancy
Major New Development	No major new development is currently anticipated within the Freshwater Bay Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 122 total parcels in the Analysis Area, 77 of which have existing residential development, 44 are undeveloped (1 nonresidential parcel). <u>This analysis area has substantial subdivision potential (11 new lots possible).</u></p> <p>Developed Parcels: Of the 77 parcels developed with residential use, 25% (17 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 44 vacant parcels, only 5 would be dimensionally constrained by proposed SMP buffer areas. Of these, 3 parcels have existing intact riparian buffer (that would be impacted).</p> <p>Potential for New Shoreline Modification: There is some potential for future residential docks; despite this potential, very few are anticipated due to past development patterns and the exposed nature of the shoreline. No apparent potential for new armoring related to minor development.</p>
Summary of Anticipated Future Development	<p>Moderate potential for subdivision and development on existing vacant lots; Intensified use on existing developed residential properties (redevelopment with larger structures; some additional riparian vegetation impact and more impervious surfaces);</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through clearing allowances for view / shoreline access corridors, as well as development outside of buffer areas on existing vacant parcels and future parcels created through subdivision.</p> <p>Additional threats are primarily associated with redevelopment of residential properties, including: intensification of uses (more impervious surfaces, more lawns, increased vegetation clearing within and outside of riparian buffers).</p>
Identified Restoration Opportunities	<p>Restore stream mouth and reconfigure shoreline armoring/fill associated with boat ramp.</p> <p>Revegetate disturbed areas along Angeles Point, where possible</p>
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.</p>

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5.10.8 Marine Reach 8 – Observatory Point

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The “Observatory Point” reach contains 4.9 miles of marine shoreline, which extends from

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Observatory Point to Tongue Point, along the Strait of Juan de Fuca. Virtually the entire

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shoreline of this reach consists of rocky platform shore. The rocky shoreline is relatively stable

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compared to most of the reaches to the east; minimal landslide or erosion hazards are mapped

1 within the reach. There are no identified shorelines modifications (such as armoring or docks)
2 identified within the reach.

3 Under current zoning regulations, only 6% of the reach has potential for new residential
4 development. Private development within the reach is limited to moderate-density residential
5 development in the east third of the reach, where the zoning is rural low mixed. Parcel sizes
6 range from approximately 3 to 5 acres, cannot be further subdivided, and most homes are set
7 back over 200 feet from the shoreline. A significant amount of forest coverage remains on the
8 developed parcels. Potential development would consist of residential infill adjacent to existing
9 developed parcels. As a result, this area is not as likely to experience shoreline development
10 impacts as other reaches to the east. For the eastern most parcels within this reach, we assessed
11 cumulative impacts as part of the Freshwater Bay Analysis Area (see Table 5-X, above).

12 At the western end of the reach, surrounding Tongue Point, is the Salt Creek Recreation Area,
13 one of the County's premier marine parks. Bordering the park to the east is the Striped Peak
14 Recreation Area, managed by DNR. Over half of the shoreline in this reach is publicly owned,
15 and can be accessed from these recreation areas

16 Given that the majority of the reach is a publicly owned and managed as park and/or resource
17 land – and that limited remaining areas are largely built-out - the threat of future development is
18 very low. The proposed SMP designates these areas Resource Conservancy or Natural, requiring
19 150 to 175 foot habitat buffers. Due to existing ownership and use patterns and protective
20 standards of the proposed SMP, there is limited threat to marine shoreline ecological functions in
21 these areas.

22 **5.10.9 Marine Reach 9 – Crescent Bay / Low Point**

23 The “Crescent Bay-Low Point” reach contains 10.7 miles of marine shoreline, which extends
24 from the east end of Crescent Bay to approximately 2 miles west of Low Point. The reach
25 contains shoreline along Crescent Bay, the mouths of Salt, Whiskey, and Murdock creeks, and
26 the Lyre River estuary. Salt Creek and the Lyre River are shorelines of the state.

27 Shoretypes within the reach are primarily bluff backed beach and Elwha River delta shores.
28 Within 300 feet of the shore, more than half of the shoreland area contains forest cover, and
29 another quarter is natural shrub and herbaceous vegetation. These vegetation communities, along
30 with the wetland habitat at the Elwha River estuary, provide habitat for a diversity of species.

31 Land uses and ownership within the shoreland area vary throughout the reach. The eastern end of
32 Crescent Bay is within the Salt Creek Recreation Area. The remainder of Crescent Bay is a
33 privately owned campground (the Crescent Beach and RV Park) zoned Tourist Rural and Parks
34 and Recreation. Lands from the west end of Crescent Bay to the mouth of Whiskey Creek are
35 DNR-managed commercial forest lands. The land at the west end of the reach is also publicly
36 owned commercial forest land. The remaining land within this reach is zoned Commercial Forest
37 Residential or Residential (R5). Parcels vary in area, with an average size of approximately 5
38 acres. A breakwater, associated with a boat ramp, is located at the Whiskey Creek Campground.
39 The breakwater is the only mapped shoreline modification within the reach.

1 Within this reach there are two areas where the reasonably foreseeable future development
 2 pressure is considered high because of existing lot patterns, future development potential based
 3 on underlying zoning, and the potential impacts such development could have on shoreline
 4 ecological components (and functions). Within these two Analysis Areas new development has
 5 the potential to threaten shoreline functions if not carefully planned and designed. The Analysis
 6 Areas are:

- 7 • Whiskey Creek Beach
- 8 • Lyre River Vicinity

9 In the areas outside of these two Analysis Areas, Reach 9 includes large lots which are primarily
 10 owned by WDNR as public forest lands. The proposed SMP designates these areas Resource
 11 Conservancy, requiring 150 foot habitat buffers. Due to existing ownership and use patterns and
 12 protective standards of the proposed SMP, there is limited threat to marine shoreline ecological
 13 functions in these areas.

14 **Table 5-17. Reasonably foreseeable future development – Marine Reach 9 – Crescent Bay / Low Point**

Feature	Description
<i>Analysis Area: Whiskey Creek Beach</i>	
Zoning	R5 and RNC
Existing Shoreline Condition	>90% forested; armoring at Whiskey Creek Resort
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy Marine Waterfront (small area around Whiskey Creek Resort)
Major New Development	No major new development is currently anticipated within the Whiskey Creek Beach Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 27 total parcels in the Analysis Area, 12 of which have existing residential development; 14 are undeveloped (1 nonresidential parcel). <u>Subdivision could result in the creation of approximately 4 new lots.</u> The large majority of parcels have intact riparian forest, suggesting high potential for impact through view corridor / shoreline access allowances.</p> <p>Developed Parcels: Of the 12 parcels developed with residential use, 67% (8 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 14 vacant parcels, 5 are dimensionally constrained such that new development would likely have to occur within the standard buffer area proposed by the SMP.</p> <p>Potential for New Shoreline Modification: Only one lot was identified with potential for new shoreline armoring and a new residential dock.</p>

Feature	Description
Summary of Anticipated Future Development	Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces); New residential development on 14 vacant parcels and/or on the minimal number of lots that could be created through subdivision. (predominantly occurring consistent with standard buffers and other requirements of the proposed SMP); Minimal potential for new shoreline modification.
Threats Associated with Anticipated Development	The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through clearing allowances for view / shoreline access corridors. Additional threats are primarily associated with redevelopment of residential properties, including: intensification of uses (more impervious surfaces, more lawns, increased vegetation clearing within and outside of riparian buffers).
Identified Restoration Opportunities	<i>Existing proposed project:</i> Salt Creek estuary restoration, involves installing openings in existing dike road
	Removal of shoreline armoring at mouth of Whiskey Creek
Necessary Restoration to Account for Threats	Identified restoration projects are focused on removing shoreline modifications; whereas anticipated impacts will likely occur landward of the shoreline (riparian clearing / land cover changes). Restoration should focus on ensuring riparian areas are enhanced when buffer averaging is proposed; encourage or incentivize voluntary restoration of riparian buffers on private property.
Analysis Area: Lyre River Vicinity	
Zoning	R2, R5, CFM5, RNC
Existing Shoreline Condition	>90% forested. Most homes set back >200'
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy Shoreline Residential – Intensive (immediately east of Lyre River mouth) Resource Conservancy (western end of Analysis Area)
Major New Development	No major new development is currently anticipated within the Lyre River Vicinity Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 38 total parcels in the Analysis Area, 20 of which have existing residential development, 16 are undeveloped (2 nonresidential parcels). <u>Subdivision could result in the creation of approximately 14 new lots.</u> Moderate potential for impact through view corridor / shoreline access allowances.</p> <p>Developed Parcels: Of the 20 parcels developed with residential use, 45% (9 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 16 vacant parcels, only 2 would be dimensionally constrained by proposed SMP buffer areas. Of these, 1 parcel has existing intact riparian buffer (that would be impacted).</p> <p>Potential for New Shoreline Modification: There is some potential for future residential docks; despite this potential, very few are anticipated due to past development patterns and the exposed nature of the shoreline. No apparent potential for new armoring related to minor development.</p>
Summary of Anticipated Future Development	<p>Substantial potential for subdivision and development on existing vacant lots; Intensified use on existing developed residential properties (redevelopment with larger structures; some additional riparian vegetation impact and more impervious surfaces);</p> <p>No other significant development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through clearing allowances for view / shoreline access corridors, as well as development outside of buffer areas on existing vacant parcels and future parcels created through subdivision.</p> <p>Additional threats are primarily associated with redevelopment of residential properties, including: intensification of uses (more impervious surfaces, more lawns, increased vegetation clearing within and outside of riparian buffers).</p>
Identified Restoration Opportunities	<p><i>Existing proposed project:</i> Salt Creek estuary restoration, involves installing openings in existing dike road</p> <p>Removal of soldier pile wall at western side of the Lyre River mouth</p>
Necessary Restoration to Account for Threats	<p>Identified restoration projects are focused on removing shoreline modifications; whereas anticipated impacts will likely occur landward of the shoreline (riparian clearing / land cover changes). Restoration should focus on ensuring riparian areas are enhanced when buffer averaging is proposed; encourage or incentivize voluntary restoration of riparian buffers on private property.</p>

1 **5.10.10 Marine Reaches 10 (Twin Rivers), 11 (Deep Creek), 12 (Pysht**
2 **River), 13 (Pilar Point) and 14 (Slip Point)**

3 Most of the land within the shoreland area in Reaches 10 through 14 is privately owned and
4 managed as timber land. Some DNR-managed forest land also occurs along the shoreline. The
5 shorelands within all reaches are largely undeveloped.

6 The vast majority of these reaches is zoned for Commercial Forestry, and unlikely to be
7 intensively developed. Zoning regulations allow single-family dwellings on Commercial Forest-
8 zoned land, but at a maximum density of one dwelling per 80 acres. The proposed SMP
9 designates these areas Resource Conservancy, requiring 150 foot habitat buffers. Due to existing
10 ownership and use patterns and protective standards of the proposed SMP, there is limited threat
11 to marine shoreline ecological functions in Reaches 10, 11, 12, 13, and 14.

12 **5.10.11 Marine Reach 15 – Clallam Bay**

13 The “Clallam Bay” reach contains 5.7 miles of marine shorelines which extends along Clallam
14 Bay from Slip Point to Sekiu Point, within the Clallam Bay Sekiu urban growth area. The reach
15 also contains the Clallam River estuary and the mouth of Falls Creek. The Clallam River is a
16 shoreline of the state.

17 The eastern half of the shoreline in this reach consists of low beaches (barrier estuary and barrier
18 beach), with bluff backed beach in the western portion. Most of the Clallam Bay shoreland area
19 is within a tsunami hazard zone and FEMA coastal and/or river 100-year floodplain.

20 This is one of the more heavily developed reaches in western Clallam County so the shoreline
21 vegetation has been significantly altered. Only about one-quarter of the shoreland area contains
22 forest cover, with natural shrub and herbaceous vegetation located along the Clallam River. The
23 remainder of the shorelands contains developed and lawn/landscaped area.

24 Major land uses within the shoreland area include open space, roads, lodging, high-density
25 residential, and commercial. Over 90% of the shoreland area is privately owned. Foreseeable
26 future development pressure is considered high throughout the Clallam Bay shoreline area
27 because of existing lot patterns, future development potential based on underlying zoning, and
28 the potential impacts such development could have on shoreline ecological components (and
29 functions). As such, we assessed the entire reach as an Analysis Areas, where new development
30 has the potential to threaten shoreline functions if not carefully planned and designed.

1 **Table 5-18. Reasonably foreseeable future development – Marine Reach 15 – Clallam Bay**

Feature	Description
Analysis Area: Clallam Bay	
Zoning	UC
Existing Shoreline Condition	10% forested, areas of armoring and breakwaters, several overwater structures, setbacks vary
Proposed Shoreline Environment Designation	Marine Waterfront (western half of Bay) Shoreline Residential – Intensive (primarily at eastern end of Bay) Shoreline Residential – Conservancy and Natural (areas surrounding the mouth of the Clallam River)
Major New Development	No major new development is currently anticipated within the Clallam Bay Analysis Area; however, some amount of water-related commercial development within the Marine Waterfront area is likely over the next 5 to 10 years.
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are approximately 47 total parcels in the Analysis Area, 31 of which have existing residential development; 6 are undeveloped (approximately 10 nonresidential parcels). <u>Subdivision could result in the creation of approximately 8 new lots.</u></p> <p>Developed Parcels: Of the 31 parcels developed with residential use, 61% (19 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 6 vacant parcels, only 1 parcel would likely be dimensionally constrained by proposed SMP buffer areas. Riparian vegetation is generally intact on this parcel.</p> <p>Potential for New Shoreline Modification: There is minimal potential for future shoreline armoring related to residential development (1 parcel). There is moderate potential for future residential docks (associated with as many as 13 lots); despite potential for residential docks, very few are anticipated due to past development patterns and the relatively exposed nature of the shoreline.</p>
Summary of Anticipated Future Development	<p>New development associated with the few remaining vacant lots, and on new lots created through potential subdivision;</p> <p>Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces);</p> <p>New residential development on 17 vacant parcels (predominantly occurring consistent with standard buffers and other requirements of the proposed SMP);</p> <p>Some potential for new shoreline modification and overwater coverage associated with any new residential docks.</p> <p>No other development or uses are anticipated.</p>

Feature	Description
Threats Associated with Anticipated Development	The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration and feeder bluff impacts comes through: subdivision (intensification of residential use); and intensification of use on existing, developed lots (many of which are closer to the shoreline than would be allowed by the proposed SMP).
Identified Restoration Opportunities	Removal of derelict creosote piling within the Clallam River estuary
	Enhancement of forage fish spawning beaches within Clallam Bay
	Potential removal of hard shoreline armoring where not necessary within Clallam Bay
	Revegetate disturbed areas along Clallam Bay, where possible
Necessary Restoration to Account for Threats	Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed. The restoration opportunities focused on removing derelict shoreline modifications and beach enhancement could provide significant opportunity if future shoreline modification is proposed (overwater / in-water structures); no such projects are currently proposed or anticipated in the immediate future.

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5.10.12 Marine Reach 16 – Sekiu-Kydaka Point and Marine Reach 17 – Shipwreck Point

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The “Sekiu-Kydaka Point” reach contains 5.7 miles of marine shoreline, which extends along the Strait of Juan de Fuca from Sekiu Point to Kydaka Point. This reach includes a very small segment of the western Clallam Bay-Sekiu urban growth area. The “Shipwreck Point” reach contains 6.9 miles of marine shoreline, which extends from Kydaka Point to the Jansen Creek mouth. The reach also contains portions of the Hoko and Sekiu River estuaries, and the mouths of Jansen and Olson Creeks. The Hoko and Sekiu rivers are shorelines of the state.

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Under current zoning regulations, the large majority of shorelands within these reaches is zoned for Commercial Forestry, and unlikely to be intensively developed. Zoning regulations allow single-family dwellings on Commercial Forest-zoned land, but at a maximum density of one dwelling per 80 acres. The proposed SMP designates these areas Resource Conservancy, requiring 150 foot habitat buffers. Due to existing ownership and use patterns and protective standards of the proposed SMP, there is limited threat to marine shoreline ecological functions in these areas of Reaches 16 and 17.

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The western portion of Reach 16 is zoned for very low density residential development (R20), and contains many vacant 1 to 2 acre lots. Some of these lots are have narrow water frontages (approximately 100 feet). Development in these lots could result in relatively dense shoreline

1 development. Extending immediately west into Reach 17, moderate density residential
 2 development occurs in the vicinity of the Hoko River mouth. Foreseeable future development
 3 pressure is considered high through this area because of existing lot patterns, future development
 4 potential based on underlying zoning, and the potential impacts such development could have on
 5 shoreline ecological components (and functions). As such, we assessed the Hoko River vicinity
 6 as an Analysis Areas.

7 **Table 5-19. Reasonably foreseeable future development – Marine Reaches 16 and 17**

Feature	Description
Analysis Area: Hoko River Vicinity	
Zoning	Mostly R1 and R2
Existing Shoreline Condition	60% forested, some armoring along low bank shoreline; setbacks generally >100'
Proposed Shoreline Environment Designation	Shoreline Residential – Intensive (west of Hoko River mouth) Shoreline Residential – Conservancy Natural – Immediately surrounding the Hoko River estuary
Major New Development	No major new development is currently anticipated within the Hoko River Vicinity Analysis Area.
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 58 total parcels in the Analysis Area, 40 of which have existing residential development; 15 are undeveloped (approximately 3 nonresidential parcels). <u>Subdivision could result in the creation of approximately 11 new lots.</u></p> <p>Developed Parcels: Of the 40 parcels developed with residential use, 55% (22 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 15 vacant parcels, only 1 parcel would likely be dimensionally constrained by proposed SMP buffer areas. Riparian vegetation is generally intact on this parcel.</p> <p>Potential for New Shoreline Modification: There is no apparent potential for future shoreline armoring related to residential development. There is moderate potential for future residential docks (associated with as many as 18 lots); despite potential for residential docks, very few are anticipated due to past development patterns and the relatively exposed nature of the shoreline.</p>
Summary of Anticipated Future Development	<p>New development associated with remaining vacant lots, and on new lots created through potential subdivision;</p> <p>Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces);</p> <p>Some potential for overwater coverage associated with any new residential docks.</p> <p>No other development or uses are anticipated.</p>

Feature	Description
Threats Associated with Anticipated Development	The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration impacts comes through: subdivision (intensification of residential use); and intensification of use on existing, developed lots (many of which are closer to the shoreline than would be allowed by the proposed SMP).
Identified Restoration Opportunities	Investigate potential setback of revetment and structures west of Hoko River mouth Replace undersized culvert at Olson Creek mouth
Necessary Restoration to Account for Threats	Identified restoration projects are focused on removing shoreline modifications; whereas anticipated impacts will likely occur landward of the shoreline (riparian clearing / land cover changes). Restoration should focus on ensuring riparian areas are enhanced when buffer averaging is proposed; encourage or incentivize voluntary restoration of riparian buffers on private property.

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5.10.13 Marine Reach 18 - Rasmussen (Bullman Creek)

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The “Rasmussen (Bullman Creek)” reach extends along the Strait of Juan de Fuca from just west of the mouth of Jansen Creek to the Makah Nation boundary. The reach also contains the mouths of Rasmussen/Bullman, and Snow Creeks.

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The predominant land usage within the reach is timber, with residential, lodging, and open space land at the west end of the reach. Throughout commercial forestry lands, zoning regulations allow single-family dwellings, but at a maximum density of one dwelling per 80 acres. The proposed SMP designates these areas Resource Conservancy, requiring 150 foot habitat buffers. Due to existing ownership and use patterns and protective standards of the proposed SMP, there is limited threat to marine shoreline ecological functions in these areas.

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A pocket of higher density residential development is located at Bullman Beach, and most of the homes are fairly close to the shoreline (approximately 50 feet) (Figure 5-6). A few of the homes are protected by shoreline armoring. The entire residential area is within mapped tsunami and coastal floodplain hazard areas. Foreseeable future development pressure is considered high through this area because of existing lot patterns, future development potential based on underlying zoning, and the potential impacts such development could have on shoreline ecological components (and functions). As such, we assessed the Hoko River vicinity as an Analysis Areas.

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Figure 5-6. Pocket of residential development at Bullman Beach (Photo: Ecology Coastal Atlas)

Table 5-20. Reasonably foreseeable future development – Marine Reach 18 – Rasmussen (Bullman Creek)

Feature	Description
Analysis Area: Bullman Beach	
Zoning	R1
Existing Shoreline Condition	<10% forested, some armoring present, setbacks 75' and greater. Mostly built out
Proposed Shoreline Environment Designation	Shoreline Residential – Intensive
Major New Development	No major new development is currently anticipated within the Bullman Beach Analysis Area.

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: There are 21 total parcels in the Analysis Area, 15 of which have existing residential development; 6 are undeveloped. <u>No apparent potential subdivision was identified for this area.</u></p> <p>Developed Parcels: Of the 15 parcels developed with residential use, 27% (4 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcels: Of the 6 vacant parcels, 2 parcels would likely be dimensionally constrained by proposed SMP buffer areas. Riparian vegetation is generally intact on these parcels.</p> <p>Potential for New Shoreline Modification: There is no apparent potential for future shoreline armoring related to residential development. There is moderate potential for future residential docks (associated with as many as 20 lots); despite potential for residential docks, very few are anticipated due to past development patterns and the exposed nature of the shoreline.</p>
Summary of Anticipated Future Development	<p>New development associated with remaining vacant lots.</p> <p>Intensified use on existing developed residential properties (redevelopment with larger structures; more vegetation impact and more impervious surfaces);</p> <p>Some potential for overwater coverage associated with any new residential docks (little to none is actually anticipated).</p> <p>No other development or uses are anticipated.</p>
Threats Associated with Anticipated Development	<p>The majority of anticipated development would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to feeder bluffs and riparian vegetation. Highest potential for riparian alteration comes through: intensification of use on existing developed lots (several of which are closer to the shoreline than would be allowed by the proposed SMP).</p>
Identified Restoration Opportunities	Enhancement of forage fish spawning beaches at Bullman Beach
	Revegetate disturbed areas along Bullman Beach, where possible
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced whenever development triggers shoreline habitat mitigation requirements. Encourage or incentive voluntary riparian restoration on private residential properties.</p>

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2 **5.11 Potential Loss of Functions and Restoration – Freshwater**
 3 **Shorelines**

4 **5.11.1 Freshwater Reaches With Limited Threat to Shoreline Ecological**
 5 **Functions**

6 Most of freshwater river shorelands within Clallam County is DNR-managed or privately owned
 7 and managed as timber land. The shorelands within all of these areas are largely undeveloped.

1 Shorelines are generally unmodified; where modifications do occur, they are limited to stream
2 crossings (bridges and culverts) for public roadways and forest roads.

3 These timber lands are zoned for Commercial Forestry; it is extremely unlikely these areas will
4 be intensively developed. Zoning regulations allow single-family dwellings on Commercial
5 Forest-zoned land, but at a maximum density of one dwelling per 80 acres. The proposed SMP
6 designates these areas Resource Conservancy, requiring 150 foot habitat buffers. Due to existing
7 ownership and use patterns and protective standards of the proposed SMP, there is limited threat
8 to freshwater shoreline ecological functions in all of these reaches. See Table 5-3 for a list of
9 these freshwater reaches.

10 **5.11.2 Freshwater Shoreline Analysis Areas**

11 Along many of Clallam County’s freshwater shorelines draining to the Strait of Juan de Fuca,
12 foreseeable future development pressure is considered high because of existing lot patterns,
13 future development potential based on underlying zoning, and the potential impacts such
14 development could have on shoreline ecological components (and functions). Areas with high
15 development pressure generally occur in the downstream reaches of the County’s freshwater
16 shorelines (Figure X-X, X-X, and X-X). We assessed each of the nine identified areas as an
17 Analysis Areas. The following tables provide the results of our analysis, and detail restoration
18 opportunities that are appropriate to alleviate identified threats from potential cumulative
19 impacts.

20 **Table 5-21. Reasonably foreseeable future development – Clallam River Analysis Area**

Feature	Description
<i>Analysis Area: Clallam River</i>	
Zoning	R4 (majority), R2, UC
Existing Shoreline Condition	>60% forested, significant armoring (along SR 112), setbacks vary
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy
Major New Development	No major new development is currently anticipated within the Clallam River Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 33 total parcels in the Analysis Area, 9 of which have existing residential development, 24 are undeveloped (1 nonresidential parcel). <u>This analysis area has substantial subdivision potential (18 new lots possible).</u> Potential view / shoreline access clearing impacts are substantial in this Analysis Area (possible effect on intact riparian vegetation for 48.5% of total parcels).</p> <p>Developed Parcels: Of the 9 parcels developed with residential use, 78% (7 parcels) have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 24 vacant parcels, 9 would be dimensionally constrained by proposed SMP buffer areas. Of these, 6 parcels have existing intact riparian buffer (that would be impacted).</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: Moderate potential - 12% of parcels with potential for future floodplain and CMZ development</p> <p>Potential for New Shoreline Stabilization: There is moderate potential for new armoring related to minor (residential) development (6 parcels).</p>
Summary of Anticipated Future Development	<p>Substantial potential for subdivision and development on existing vacant lots;</p> <p>Substantial potential for riparian forest loss (buffer clearing on constrained lots, and other lots through view / access allowances);</p> <p>Substantial potential for floodplain / CMZ development</p> <p>Moderate potential for future shoreline stabilization (protection of existing development)</p>
Threats Associated with Anticipated Development	<p>Riparian impacts associated with new residential development on constrained lots, as well as modifications allowed through view / access corridor allowances.</p> <p>The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes.</p> <p>Additional threats associated with potential for new shoreline stabilization to protect existing residential structures.</p>
Identified Restoration Opportunities	<p>Riparian revegetation</p> <p>Tributary culvert replacement</p>
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.</p> <p>Any floodplain / CMZ development permits should ensure impacts to riverine and floodplain processes are minimized and mitigated to the extent feasible.</p> <p>Need for additional restoration of River shoreline (removal of unnecessary revetments) if new stabilization is permitted.</p>

1 Table 5-22. Reasonably foreseeable future development – Dungeness River Analysis Area

Feature	Description
Analysis Area: Dungeness River	
Zoning	mostly R5
Existing Shoreline Condition	>80% forested, levees present along lower river, existing setbacks vary
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy
Major New Development	No major new development is currently anticipated within the Dungeness River Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 277 total parcels in the Analysis Area, 203 of which have existing residential development, 74 are undeveloped (11 nonresidential parcels). <u>This analysis area has moderate subdivision potential (15 new lots possible).</u> Potential view / shoreline access clearing impacts are moderate in this Analysis Area (possible effect on intact riparian vegetation for 14% of total parcels).</p> <p>Developed Parcels: Of the 203 parcels developed with residential use, a substantial portion has existing structures within proposed SMP buffer areas (115 parcels). The assessed buffer area for Dungeness included the CMZ, consistent with requirements of the Draft SMP.</p> <p>Vacant Parcel: Of the 74 vacant parcels, approximately 45% would be dimensionally constrained by proposed SMP buffer areas. Of these, 26 parcels have existing intact riparian buffer (that would be impacted if development were to occur).</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: Moderate potential - 4% of parcels with potential for future floodplain and 12% of parcels with potential for future CMZ development.</p> <p>Potential for New Shoreline Stabilization: There is low potential for new stabilization related to minor (residential) development (5 parcels).</p>
Summary of Anticipated Future Development	<p>Substantial potential for development on existing vacant lots, with a considerable portion occurring on lots dimensionally constrained by buffers of the proposed SMP.</p> <p>Substantial potential for riparian forest loss (buffer clearing on constrained lots, and other lots through view / access allowances);</p> <p>Moderate potential for floodplain / CMZ development</p> <p>Limited potential for future shoreline stabilization (protection of existing development)</p>

Feature	Description
Threats Associated with Anticipated Development	<p>Riparian impacts associated with new residential development on constrained lots, as well as modifications allowed through view / access corridor allowances.</p> <p>The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes.</p>
Identified Restoration Opportunities	<p><i>In-progress project:</i> Dungeness River floodplain restoration project (HWS). Project elements include Rivers End acquisition (complete), dike setback and channel reconstruction, Ward Road reconfiguration, railroad bridge trestle replacement, Dungeness Meadows dike reconfiguration, Ribson side channel restoration, and upper Haller dike setback</p> <p>Dungeness River dike setbacks and logjams (HWS)</p> <p>Lower Dungeness River channel re-meander and engineered log jam placement (HWS)</p> <p>Riparian conservation for landowners</p> <p>Setback/removal of structures in channel migration zone</p> <p>Revegetate disturbed riparian areas, where possible</p>
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.</p> <p>Any floodplain / CMZ development permits should ensure impacts to riverine and floodplain processes are minimized and mitigated to the extent feasible.</p>

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Table 5-23. Reasonably foreseeable future development – Elwha Tributaries Analysis Area

Feature	Description
<i>Analysis Area: Elwha Tributaries</i>	
Zoning	mostly R5
Existing Shoreline Condition	>90% forested, existing residential setbacks vary
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy
Major New Development	No major new development is currently anticipated within the Elwha Tributaries Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 44 total parcels in the Analysis Area, 21 of which have existing residential development, 23 are undeveloped (5 nonresidential parcels). <u>This analysis area has high subdivision potential (11 new lots possible).</u> Potential view / shoreline access clearing impacts are substantial in this Analysis Area (possible effect on intact riparian vegetation for 45% of total parcels).</p> <p>Developed Parcels: Of the 21 parcels developed with residential use, 8 have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 23 vacant parcels, only 3 would be dimensionally constrained by proposed SMP buffer areas. Of these, 2 parcels have existing intact riparian buffer (that would be impacted if development were to occur).</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: No apparent potential for future residential floodplain or CMZ development.</p> <p>Potential for New Shoreline Stabilization: There is moderate potential for new stabilization related to minor (residential) development (5 parcels).</p>
Summary of Anticipated Future Development	<p>Substantial potential for development on existing vacant lots; however majority would occur outside of required standard buffers.</p> <p>Substantial potential for riparian forest loss through view / access allowances;</p> <p>Moderate potential for future shoreline stabilization (protection of existing development)</p>
Threats Associated with Anticipated Development	<p>Riparian impacts associated with modifications allowed through view / access corridor allowances.</p> <p>The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes.</p> <p>Additional threats associated with potential for new shoreline stabilization to protect existing residential structures.</p>
Identified Restoration Opportunities	<p>Supporting restoration efforts upstream (along the Lake Sutherland shoreline)</p> <p>Revegetate disturbed riparian areas, where possible</p>
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.</p> <p>Need for additional restoration of River shoreline (removal of unnecessary shoreline stabilization) if new stabilization is permitted.</p>

1 Table 5-24. Reasonably foreseeable future development – Lake Sutherland Analysis Area

Feature	Description
Analysis Area: Lake Sutherland	
Zoning	mostly R1
Existing Shoreline Condition	>50% forested, many overwater structures, extent of existing shoreline modification is unknown, however appears common from review of aerial photography. Setbacks vary (30 feet to more than 100 feet).
Proposed Shoreline Environment Designation	Shoreline Residential – Intensive
Major New Development	No major new development is currently anticipated within the Lake Sutherland Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 267 total parcels in the Analysis Area, 203 of which have existing residential development, 32 are undeveloped (1 nonresidential parcel). <u>This analysis area has limited subdivision potential (10 new lots possible).</u> Potential view / shoreline access clearing impacts are limited to 10.5% of total parcels).</p> <p>Developed Parcels: Of the 234 parcels developed with residential use, 159 have existing structures within proposed shoreline habitat buffer.</p> <p>Vacant Parcel: Of the 27 vacant parcels, only 5 would be dimensionally constrained by proposed 35 foot minimum buffer. Of these, 4 parcels have existing intact riparian buffer (that would be impacted if development were to occur).</p> <p>Potential for New Shoreline Stabilization: None apparent</p> <p>Potential for New Residential Docks: Substantial potential (47 parcels; 17% of total parcels)</p>
Summary of Anticipated Future Development	<p>Moderate potential for development on existing vacant lots; however majority would occur outside of required standard buffers.</p> <p>Substantial potential for riparian and shoreline impacts associated with intensified use on residential lots (redevelopment, resulting in more impervious surface, vegetation impacts);</p> <p>Substantial potential for additional future overwater structures (residential docks)</p>
Threats Associated with Anticipated Development	<p>The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes. Intensified use and limited new development on vacant parcels would increase threats to lake water quality and riparian condition.</p> <p>Overwater coverage and associated modification to shoreline (habitat impacts; related water quality impacts)</p>
Identified Restoration Opportunities	Shoreline stewardship information programs
	Septic system maintenance/remediation
	Revegetate disturbed riparian areas along Lake Sutherland, where possible

Feature	Description
Necessary Restoration to Account for Threats	Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer averaging is proposed; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.

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Table 5-25. Reasonably foreseeable future development – Lyre River Analysis Area

Feature	Description
Analysis Area: Lyre River	
Zoning	R2, R5, RNC
Existing Shoreline Condition	>80% forested; residential structures setback 150 or more feet from the shoreline
Proposed Shoreline Environment Designation	Shoreline Residential - Conservancy Shoreline Residential – Intensive (west bank near the mouth)
Major New Development	No major new development is currently anticipated within the Lyre River Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 22 total parcels in the Analysis Area, 12 of which have existing residential development, 10 are undeveloped. <u>4 new lots could be created through future subdivision potential.</u></p> <p>Developed Parcels: Of the 12 parcels developed with residential use, only 3 have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 10 vacant parcels, only 1 would be dimensionally constrained by proposed SMP buffer areas.</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: Low potential for future residential floodplain or CMZ development.</p> <p>Potential for New Shoreline Stabilization: There is low potential for new stabilization related to minor (residential) development (only 1 lot).</p>
Summary of Anticipated Future Development	Substantial potential for development on existing vacant lots; however majority would occur outside of required standard buffers.
Threats Associated with Anticipated Development	The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes.
Identified Restoration Opportunities	Estuary protection and restoration; involves property purchase and potential revegetation and stream channel restoration (HWS)
Necessary Restoration to Account for Threats	No major threats from future development are identified in this Assessment Area; as development on vacant parcels occurs (or if new residential lots are created through subdivision), the County should ensure shoreline ecological functions are protected by enforcing standards included in the Draft SMP.

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Table 5-26. Reasonably foreseeable future development – McDonald Creek Analysis Area

Feature	Description
Analysis Area: McDonald Creek	
Zoning	R1, R2, RCC5
Existing Shoreline Condition	>90% forested; stream flows through a forested ravine with little existing development; existing residential structures setbacks vary – typically 200 or more feet from the shoreline
Proposed Shoreline Environment Designation	Shoreline Residential - Conservancy
Major New Development	No major new development is currently anticipated within the McDonald Creek Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 137 total parcels in the Analysis Area, 109 of which have existing residential development, 28 are undeveloped. <u>9 new lots could be created through future subdivision potential.</u></p> <p>Developed Parcels: Of the 109 parcels developed with residential use, only 17 have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 28 vacant parcels, only 3 would be dimensionally constrained by proposed SMP buffer areas.</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: No apparent potential for future residential floodplain or CMZ development.</p> <p>Potential for New Shoreline Stabilization: There is no apparent potential for new stabilization related to minor (residential) development.</p>
Summary of Anticipated Future Development	Moderate potential for development on existing vacant lots and on new lots created through subdivision; however majority would occur outside of required standard buffers.
Threats Associated with Anticipated Development	The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes.
Identified Restoration Opportunities	Fish passage barrier removal
	Channel restoration
	Revegetate disturbed riparian areas, where possible
Necessary Restoration to Account for Threats	No major threats from future development are identified in this Assessment Area; as development on vacant parcels occurs (or if new residential lots are created through subdivision), the County should ensure shoreline ecological functions are protected by enforcing standards included in the Draft SMP. Otherwise the County should implement identified opportunities as shoreline development and redevelopment occurs – especially if development does occur that impacts intact riparian vegetation (view / shoreline access clearing; limited development on constrained lots).

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Table 5-27. Reasonably foreseeable future development – Morse Creek Analysis Area

Feature	Description
Analysis Area: Morse Creek	
Zoning	R1, R2, RCC5
Existing Shoreline Condition	>90% forested, existing setbacks vary
Proposed Shoreline Environment Designation	Natural (upstream two thirds of Analysis Area) Shoreline Residential – Conservancy / Shoreline Residential – Intensive (upstream of SR 101)
Major New Development	No major new development is currently anticipated within the Morse Creek Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 199 total parcels in the Analysis Area, 131 of which have existing residential development, 68 are undeveloped. <u>This analysis area has substantial subdivision potential (40 new lots possible).</u> Potential view / shoreline access clearing impacts are high.</p> <p>Developed Parcels: Of the 131 parcels developed with residential use, a substantial portion have existing structures within proposed SMP buffer areas (34 parcels).</p> <p>Vacant Parcel: Of the 68 vacant parcels, approximately 29% would be dimensionally constrained by proposed SMP buffer areas. Of these 20 parcels, the majority have intact riparian buffer (that would be impacted if development were to occur).</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: Low potential for future residential floodplain or CMZ development (although there is substantial existing residential use within the mapped floodplain and CMZ areas)</p> <p>Potential for New Shoreline Stabilization: There is high potential for new stabilization related to minor (residential) development (33 parcels).</p>
Summary of Anticipated Future Development	<p>Substantial potential for development on existing vacant lots, as well as additional residential use through subdivision.</p> <p>Substantial potential for riparian forest loss (buffer clearing on constrained lots, and other lots through view / access allowances);</p> <p>High potential for future shoreline stabilization (primarily protection of existing development).</p>
Threats Associated with Anticipated Development	<p>Riparian impacts associated with new residential development on constrained lots, as well as modifications allowed through view / access corridor allowances.</p> <p>The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes.</p> <p>Additional threats associated with potential for new shoreline stabilization to protect existing residential structures.</p>

Feature	Description
Identified Restoration Opportunities	Large woody debris restoration
	Property acquisition / conservation easements
Necessary Restoration to Account for Threats	<p>Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer development occurs, and in-channel habitat is enhanced if new shoreline hardening is permitted; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs.</p> <p>Need for additional in-stream restoration (in-channel and bank habitat enhancement; removal of unnecessary revetments) if new stabilization is permitted.</p>

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Table 5-28. Reasonably foreseeable future development – Pysht River Analysis Area

Feature	Description
Analysis Area: Pysht River	
Zoning	R5
Existing Shoreline Condition	>70% forested, setbacks vary, SR 112 parallels the shoreline through much of the Analysis Area
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy
Major New Development	No major new development is currently anticipated within the Pysht River Analysis Area
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 31 total parcels in the Analysis Area, 11 of which have existing residential development, 20 are undeveloped. <u>5 new lots could be created through future subdivision potential.</u></p> <p>Developed Parcels: Of the 11 parcels developed with residential use, 4 have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 20 vacant parcels, 5 would be dimensionally constrained by proposed SMP buffer areas.</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: Moderate potential for future residential floodplain or CMZ development.</p> <p>Potential for New Shoreline Stabilization: There is substantial potential for new stabilization related to minor (residential) development (on as many as 6 parcels).</p>
Summary of Anticipated Future Development	<p>Substantial potential for development on existing vacant lots and on new lots created through subdivision; however majority would occur outside of required standard buffers.</p> <p>High potential for future shoreline stabilization (primarily protection of existing development).</p>

Feature	Description
Threats Associated with Anticipated Development	The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes. Additional threats associated with potential for new shoreline stabilization to protect existing residential structures.
Identified Restoration Opportunities	In-progress example project: Floodplain acquisition and restoration, involves property acquisition, engineered log jam placement, and floodplain restoration (HWS)
	In-progress example project: Large woody debris restoration (HWS)
	Revegetate disturbed riparian areas, where possible
Necessary Restoration to Account for Threats	Implementation of identified opportunities as shoreline development and redevelopment occurs; focus on ensuring riparian areas are enhanced when buffer development occurs, and in-channel habitat is enhanced if new shoreline hardening is permitted; and encouraging or incentivizing voluntary buffer enhancement landward of feeder bluffs. Need for additional in-stream restoration (in-channel and bank habitat enhancement; removal of unnecessary revetments) if new stabilization is permitted.

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Table 5-29. Reasonably foreseeable future development – Salt Creek Analysis Area

Feature	Description
<i>Analysis Area: Salt Creek</i>	
Zoning	R5, RLM
Existing Shoreline Condition	>80% forested, setbacks generally more than 200 from the stream shoreline
Proposed Shoreline Environment Designation	Shoreline Residential – Conservancy
Major New Development	No major new development is currently anticipated within the Salt Creek Analysis Area

Feature	Description
Minor New Development	<p>Existing Parcel Pattern and Subdivision Potential: 16 total parcels in the Analysis Area, 8 of which have existing residential development, 8 are undeveloped. <u>5 new lots could be created through future subdivision potential.</u></p> <p>Developed Parcels: Of the 8 parcels developed with residential use, none have existing structures within proposed SMP buffer areas.</p> <p>Vacant Parcel: Of the 8 vacant parcels, only 1 would be dimensionally constrained by proposed SMP buffer areas.</p> <p>Floodplain / CMZ Development on Existing Vacant Lots: No apparent potential for future residential floodplain or CMZ development.</p> <p>Potential for New Shoreline Stabilization: No apparent potential for new stabilization related to minor (residential) development</p>
Summary of Anticipated Future Development	Substantial potential for development on existing vacant lots; however majority would occur outside of required standard buffers.
Threats Associated with Anticipated Development	The majority of anticipated development, including future parcels created through subdivision, would occur consistent with proposed SMP habitat and safety buffer provisions, limiting potential impacts to riparian vegetation, channel migration, and floodplain processes.
Identified Restoration Opportunities	In-progress example project: Large woody debris placement, phase II (HWS)
	Fish passage improvements / barrier correction projects
	Salt Creek estuary restoration, involves installing openings in existing dike road (HWS)
	Revegetate disturbed riparian areas, where possible
Necessary Restoration to Account for Threats	No major threats from future development are identified in this Assessment Area; as development on vacant parcels occurs (or if new residential lots are created through subdivision), the County should ensure shoreline ecological functions are protected by enforcing standards included in the Draft SMP. Otherwise the County should implement identified opportunities as shoreline development and redevelopment occurs – especially if development does occur that impacts intact riparian vegetation (view / shoreline access clearing; limited development on constrained lots).

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6.0 HOW DOES THE DRAFT SMP ADDRESS IDENTIFIED THREATS?

The Draft SMP is designed to address the potential threats to shoreline ecological functions that are present in Clallam County. The SMP provides comprehensive standards that work together to ensure that future uses and developments do not result in cumulative adverse impacts. This chapter describes the protective elements of the Draft SMP and the role they play in achieving no net loss.

6.1 Mitigation Sequencing

Mitigation sequencing is one of the main mechanisms for achieving no net loss. Mitigation sequencing is a common hierarchical protocol for avoiding and minimizing impacts associated with individual development proposals and actions¹⁹. Mitigation sequencing directs all proposed uses and developments avoid adverse impacts, include measures to minimize impacts and compensate for any impacts that cannot be avoided or minimized. The Draft SMP (Section 4.4.3) specifies that the Administrator shall require compensatory mitigation for development proposals that:

- Do not fully conform to one or more of the dimensional requirements, performance standards, and/or design criteria in the SMP; or
- Require a variance or conditional use permit; or
- Result in measureable damage, loss and/or displacement of a wetland, aquatic habitat conservation area, wildlife habitat conservation area, flood storage or conveyance area, or critical aquifer recharge area; or
- Result in measureable damage, loss and/or displacement of kelp beds, eelgrass beds, spawning and holding areas for forage fish, such as herring, smelt and sand lance; subsistence, commercial and recreational shellfish beds; mudflats; intertidal habitats with vascular plants; and areas with which priority species have a primary association

In instances where impacts to ecological functions have the potential to occur all reasonable efforts must be taken to avoid, and where unavoidable, minimize and mitigate impacts such that no net loss of shoreline ecological functions is achieved.

In mitigation sequencing, possible adverse impacts are avoided altogether by not taking a certain action or parts of an action, or by moving the action. For example, a development project adjacent to a wetland would be required to avoid construction activities that could directly impact (vegetation removal or draining) or indirectly impact (increased sedimentation or runoff) the wetland habitat.

¹⁹ Per WAC 173-26-201(2)(e)

1 When adverse impacts to ecological functions are unavoidable, the magnitude or severity of the
 2 impact resulting from an activity should be minimized. This may include reducing or eliminating
 3 certain elements of a development proposal (e.g., fewer lots within a subdivision), scaling back
 4 the size or scope of a development proposal (e.g., building a smaller residential structure, re-
 5 aligning a road to avoid damaging valuable resources), implementing design alternatives or
 6 strategies that require less in-water work, or are timed to avoid impacting sensitive species (e.g.,
 7 “fish / salmon work windows”), and a variety of other measures. In most cases, it is up to the
 8 County planning staff to work with the development proponent to identify the best ways of
 9 minimizing the impacts based on the specific parcel characteristics, the functional needs of the
 10 development, and other factors.

11 When avoiding or minimizing impacts is unfeasible, the development proponent must provide
 12 compensation for the impact. This may include includes replacing damaged resources (e.g., re-
 13 establishing or enhancing a wetland), reseeded or replanting impacted areas, restoring water
 14 quality and quantity, or otherwise improving the ecological functions such that there is no net
 15 loss *for that development proposal*. Mitigation sites must be monitored and maintained until
 16 they achieve the desired functions and fully compensate for the impacts.

17 **6.2 Shoreline Environment Designations (SEDs)**

18 The Draft SMP proposes shoreline environment designations that reflect the ecological
 19 conditions of the shoreline ecology and are consistent with the Shoreline Guidelines (WAC 173-
 20 26-211) (Table 6-1). The designations recognize that there are a range of ecological conditions
 21 along the shoreline. Areas that are the least altered and have the highest integrity with respect to
 22 existing functions are designated Natural. Areas that are very minimally altered with high
 23 ecological integrity have a Conservancy designation—either Resource Conservancy if they are
 24 designated resource lands) or Shoreline Residential – Conservancy if they are rural residential
 25 lands. Areas that are more noticeably altered and have diminished functional integrity are
 26 designated Shoreline Residential – Intensive (if they are supported primarily residential uses) or
 27 Marine Waterfront (if they are supporting water-related recreational uses).

28 The shoreline environment designations were developed and discussed with the Clallam County
 29 SMP Committee over a 15 month period between 2011 and 2013. Feedback from the Committee
 30 and from the general public was taken into account in developing and assigning the proposed
 31 designations. The following designations are proposed to be assigned to County shorelines (see
 32 Chapter 2 of the Draft SMP for a complete description):

33 **Table 6-1. Proposed Shoreline Environment Designations for Clallam County (includes WRIA 20)**

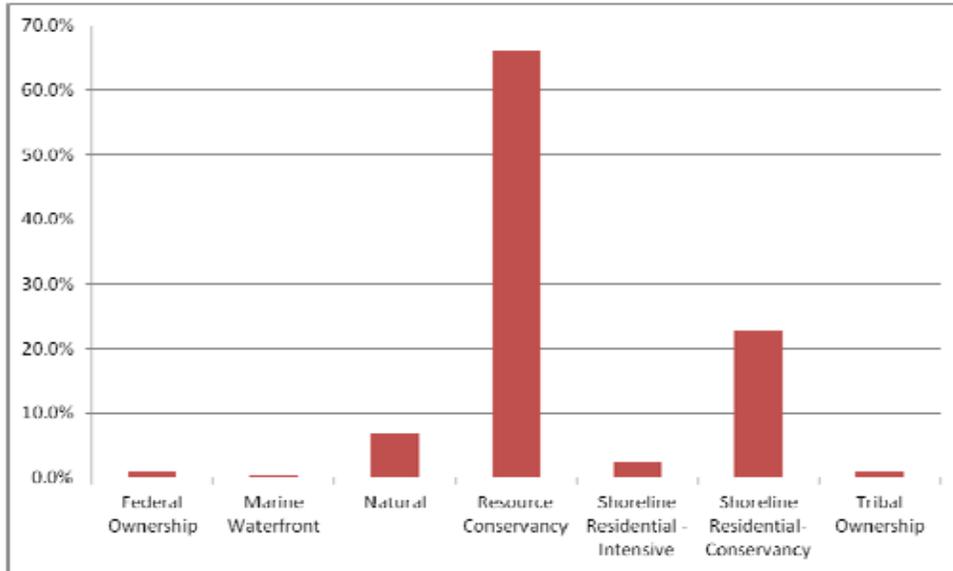
Designation	Application	Defining Characteristics	Example Locations
Natural	Applied to lands that are not zoned for Commercial Forestry and are considered generally undevelopable because of ecological characteristics or	<ul style="list-style-type: none"> Densely forested riparian or floodplain habitat; Largely free of development and modification; existing residential development is scattered at low densities; 	North end of Miller Peninsula; Gibson and Travis spits, at the north end of Sequim Bay; Areas being actively restored on the lower

Designation	Application	Defining Characteristics	Example Locations
	hazardous conditions.	<ul style="list-style-type: none"> • Mostly undeveloped and unaltered estuarine wetland or marine spit habitat; • Mostly encumbered by erosion or landslide hazards, including areas of feeder bluff and channel migration; 	Dungeness River; Lower Elwha River; and Salt Creek estuary
Resource Conservancy	Applied to lands managed primarily for timber production, habitat conservation, wilderness or outdoor recreational use.	<ul style="list-style-type: none"> • Dispersed, scattered or relatively isolated residential or recreational developments; • High percentages of closed-canopy forest and minimal constrains to overbank flood or channel migration. Forest fragmentation or conversion of forest cover to other land cover types is minimal 	Upper Dungeness River and tributaries; Most of the western County freshwater shorelines, including the Twin Rivers, the majority of the Pysht River, and the mid- to upper- Hoko River and tributaries; Most of the western County marine shoreline, including the majority of shoreline between Low Point and Clallam Bay and the shoreline along Highway 112 west of Clallam Bay Dickey River; North Fork Calawah River
Shoreline Residential – Conservancy	Applied to rural shorelines and unincorporated urban growth area shorelines. These shorelines support a mixture of existing residential uses, including some platted lands with moderate potential for future development.	<ul style="list-style-type: none"> • Minimal shoreline modifications; • Partially encumbered by landslide, flooding or channel migration hazards but with sufficient developable area outside of hazard zones to support rural residential uses; • Less intensively developed compared to Shoreline Residential – Intensity; • Properties zoned Commercial Forest that are adjacent to non-commercial forest zoned parcels which meet criteria above; 	Sequim Bay; Agricultural and low-density residential areas along the Dungeness River; Dungeness bluffs; Freshwater Bay; Lower Clallam and Hoko Rivers East bank of the Bogachiel River, south of Forks

Designation	Application	Defining Characteristics	Example Locations
		<ul style="list-style-type: none"> Public lands providing moderate levels of shoreline access that are adjacent to parcels which meet criteria above. 	
Shoreline Residential – Intensive	Applied to shorelines that have moderate- to high-density shoreline residential use, including urban growth areas and areas designated as limited areas of more intensive rural development.	<p>Moderately to mostly developed with existing residential use occurring on relatively small rural residential lots, or with recreational and transportation uses;</p> <p>Native forest cover has been cleared or highly fragmented with areas of minimal native riparian vegetation;</p> <p>Shoreline is armored with structural armoring because of exposure to strong wind and wave action.</p>	<p>Diamond Point;</p> <p>Dungeness Meadows subdivision along the Dungeness River</p> <p>3 Crabs Road vicinity;</p> <p>4 Seasons Ranch vicinity along Morse Creek;</p> <p>Bullman Beach</p> <p>Lower Elk Creek, within the Forks Urban Growth Area;</p> <p>South and east shoreline of Lake Pleasant</p>
Marine Waterfront	Applied to shorelines: 1) within or bordering urban growth areas; or 2) characterized as moderately to mostly developed with existing intensive, water-oriented commercial or recreational uses or transportation uses.	<p>Native forest cover has been cleared or is highly fragmented with minimal native riparian vegetation;</p> <p>Shoreline is modified with overwater and in-water structures supporting water-oriented uses; or</p> <p>Shoreline is armored with structural armoring.</p>	<p>Marlyn Nelson County Park (Port Williams);</p> <p>Western Clallam Bay shoreline (Sekiu)</p>
Aquatic	Applied to all shoreline waters waterward of the ordinary high water mark together with their underlying lands and their water column.		All SMA streams, lakes and marine waters extending out to xxx.

- 1
- 2 The majority of the County shorelines are proposed to have a Conservancy designation.
- 3 Approximately 66 percent would be designated Resource Conservancy and 23 percent would be
- 4 designated Shoreline Residential –Conservancy. Figure 6-1 indicates the designations that were
- 5 assigned to the County’s shorelines by percentage of total shoreland acreage (percentage are for

1 the entire County including WRIA 20). The Aquatic designation is not represented in these
2 acreage totals.



3
4 **Figure 6-1. Percent of Shoreland area in each Environment Designation (includes all of Clallam County**
5

6 For each designation, the Draft SMP identifies:

- 7 • Permitted uses and developments – These are uses and developments that are consistent
8 with the SMA such as residential development and water-dependent development. Such
9 uses/developments require a shoreline substantial development permit, a shoreline
10 conditional use permit, a shoreline variance, and/or a statement that the use/development
11 is exempt from a shoreline substantial development permit.
- 12 • Prohibited uses and developments – These are uses and developments that are
13 inconsistent with the SMA and which cannot be allowed through any permit or variance.
- 14 • Minimum shoreline habitat buffers and safety buffers – Vegetative buffers and safety
15 buffers are established for each shoreline environment designation, with the exception of
16 the Aquatic designation. Buffers are intended to protect shoreline ecological functions
17 while supporting other priority uses of the shoreline.

18 The ecological condition and sensitivity of the land and water were considered when determining
19 the appropriate uses to allow for each designation. As a result, the type and intensity of uses
20 allowed in areas designated Natural, Shoreline Residential – Conservancy and Resource
21 Conservancy are tightly controlled since these areas are the most sensitive to future development
22 and the most vital to protect. Conversely, a broader range of uses are allowed in Marine
23 Waterfront and Shoreline Residential – Intensive since the ecological functions are less sensitive
24 or have already been altered by past development. Existing and planned development patterns

1 were considered as well to ensure the designations are compatible with existing and future land
2 uses.

3 There are several land uses and development activities that are prohibited in all designations due
4 to their potential to have a substantial impact to shoreline ecological functions or public health
5 and safety. For example, floating homes and overwater residences are prohibited in all
6 designations. This avoids the immediate and long term impacts associated with overwater
7 shading, substrate modifications, and degradation of water quality.

8 Parking as a primary (or stand-alone) use is also prohibited in all designations. Parking is not a
9 preferred or water-related use and can unnecessarily impact on shoreline habitat (displacement
10 and fragmentation), water quality (runoff from pollution-generating impervious surface) and
11 hydrology (reduced infiltration) functions. Parking associated with another allowed use (such as
12 a parking lot associated with a marina in Clallam Bay) is allowed as long as the buffer, clearing
13 and grading and other SMP requirements are met.

14 Conditional uses are activities that can be allowed in specific instances as long as they do not
15 result in an overall degradation of the quality or health of the shoreline environment. The
16 following uses are subject to the conditional use criteria in one or more SEDs: geoduck
17 aquaculture, net pens/finfish aquaculture, commercial or industrial development, dredging and
18 dredge material disposal, flood control structures, mining, underwater parks, and major utility
19 facilities such as dams, off-shore wind energy systems, and sewage systems. These uses warrant
20 a high level of scrutiny due to variations in their scope, scale, location, and their potential for
21 impacts to shoreline ecological functions, public health, and safety.

22 **6.3 Shoreline Buffers and Vegetation Conservation**

23 In addition to limiting the types of uses allowed, each shoreline environment designation has
24 corresponding shoreline habitat buffers and safety buffers (Table 6-2). The intent of establishing
25 shoreline habitat buffers and safety buffers for each designation is to ensure that structures in the
26 shoreline area are placed a suitable distance from the ordinary high water mark to protect
27 existing ecological functions, views, and public safety. Buffers also provide physical separation
28 from marine waters or freshwater and proposed development, which reduces need for shoreline
29 stabilization and helps retain riparian vegetation.

1
2

Table 6-2. Summary of Shoreline Habitat Buffer and Safety Buffer Requirements (See SMP Section 2.9, Table 2-3)

	Marine Waterfront	Shoreline Residential – Intensive	Shoreline Residential – Conservancy	Resource Conservancy	Natural
Shoreline Habitat Buffer (measured from the ordinary high water mark)					
Minor New Development ¹ (<i>Buffer varies depending on lot depth</i>)	50-75 feet	50-75 feet	100-125 feet	150 feet	175 feet
Major New Development ² and Land Divisions	100 feet	100 feet	150 feet	150 feet	175 feet
Shoreline Safety Buffer					
Freshwater Shorelines (<i>Applies to areas located in mapped channel migration zones. Buffers is measured from the OHWM.</i>)	N/A	150 feet	150 feet	150 feet (outside of CMZ if buildable area exists)	150 feet (outside of CMZ if buildable area exists)
Marine Shorelines (<i>Applies to areas mapped as landslide hazard area, feeder bluff, or exceptional feeder bluff. Buffer measured from the top of the bluff.</i>)	100 feet 150 feet for exceptional feeder bluff	100 feet 150 feet for exceptional feeder bluff	100 feet 150 feet for exceptional feeder bluff	100 feet 150 feet for exceptional feeder bluff	100 feet 150 feet for exceptional feeder bluff
Shoreline-specific Buffer					
Dungeness River	New development must be located landward of the mapped channel migration zone or 150 feet from the OHWM, whichever is greater.				
Lake Sutherland	New development must be at least 35 feet landward of the OHWM.				

3 ¹Minor new development applies to single-family development or low intensity, water-dependent recreational use on existing lots
4 of record. To be considered minor new development, the proposal must be below certain thresholds for clearing, impervious
5 surface and structural footprint areas.

6 ²Major new development applies to any development that does not qualify as minor new development.

7 To ensure that the buffers protect the full range of shoreline habitat, water quality and hydrologic
8 functions, habitat and safety buffers must be maintained in a predominantly well vegetated and
9 undisturbed condition. The SMP defines this to mean an average density of at least 150 woody
10 stems per acre or 55 percent areal cover of woody vegetation. The vegetated areas must comprise

1 at least 80 percent of the buffer area. The remaining 20 percent, or at least fifteen linear feet of
2 the water frontage, whichever is greater, may be retained as an ‘active use’ area (meaning its
3 primary purpose is for the enjoyment and use of the property owners not protection of the habitat
4 or hazard area).

5 To minimize conflicts between vegetation conservation and the desire to have expansive
6 shoreline views, the Draft SMP states that development proposals that involve extensive
7 vegetation removal to create views or expansive lawns should not be allowed and that property
8 owners should not assume that an unobstructed view of the water is guaranteed.

9 The SMP allows limited and selective tree removal, pruning, and/or limbing in the buffer to
10 create a view of the shoreline, as long as the buffer condition following selective clearing
11 conforms to the stem density and/or percent cover targets defined in the SMP (section 4.2.3.8).
12 The Administrator may approve a greater area or amount of clearing if the development
13 proponent provides a view clearance plan prepared by a qualified ecologist, forester, arborist, or
14 landscape architect. The view clearance plan must identify and describe the location and extent
15 of the proposed tree removal, pruning, or limbing.

16 For properties within designated landslide or erosion hazard areas, the view clearance plan must
17 be prepared by an engineering geologist or geotechnical engineer to ensure that the proposed
18 removal, pruning, and/or limbing will not cause or exacerbate hazards associated with soil or
19 slope instability.

20 Because the same buffers will apply to a wide variety of parcel conditions and land
21 configurations (even within the same shoreline designation), the SMP allows some flexibility in
22 administering the buffer requirements. There are a limited set of circumstances under which the
23 County can allow buffer modifications without requiring a shoreline variance or additional
24 compensatory mitigation. The flexibility is available only when: 1) that the amount and extent of
25 buffer modification is the minimum necessary to accommodate the allowed use; and 2) the
26 modification is located within pre-existing disturbed areas with low habitat value (meaning areas
27 that have been cleared or altered, areas dominated by invasive species, areas that do not support
28 priority habitats or species, etc.) or within the allowed active use area; and 3) will not impact
29 geologically hazardous areas.

30 One type of flexibility is buffer averaging. Shoreline habitat buffers may be averaged provided
31 the total area of buffer remains the same and the buffer meets the stem density or percent cover
32 targets described above. If the existing vegetation conditions do not meet the stem density or
33 percent cover targets then the buffer would need to be enhanced through planting. To minimize
34 impacts on shoreline functions, the SMP limits the extent of the buffer that can be reduced
35 through averaging to 40 percent of the buffer length along the shore frontage and the width of the
36 buffer can only be reduced by up to 25 percent. Even with some allowance for averaging, the
37 remaining buffers are sufficiently wide to protect the habitat functions of the adjacent shorelines.
38 (the smallest minimum buffer through averaging ranges from 25 to 131 feet).

39 Shoreline safety buffers may also be averaged. Standards differ for marine and freshwater
40 shorelines:

- 1 • Marine shorelines – the total area of buffer must remain the same and the buffer must
2 meet the required stem density or percent cover targets. If the existing vegetation
3 conditions do not meet the stem density or percent cover targets then the buffer would
4 need to be enhanced accordingly. The applicant must submit a geotechnical report and a
5 geologist’s estimate of when the residence would be undermined. The reduced portion of
6 the buffer is limited to 40 percent of the buffer length along the shore frontage. The width
7 of the buffer can be reduced for single-family residence equivalent to the estimated
8 annual rate of erosion times 75 plus allowance for bank recession equal to the largest
9 documented landslide in the vicinity. In no instances can the safety buffer be reduced to
10 less than 50 feet.
- 11 • Freshwater shorelines – the same requirements for averaging safety buffers along marine
12 shorelines apply to freshwater shorelines except that instead of a geotechnical report and
13 geologist’s estimate of when the residence would be undermined, documentation is
14 required showing that the parcel is protected from channel movement or the risk of
15 channel migration during the next 75 years is minimal. Estimating annual rates of
16 erosion is not required for freshwater shorelines.

17 The common-line setback is another type of buffer flexibility. With the common-line setback,
18 new residences on vacant lots with legally established residences within 50 feet (of the proposed
19 location of the structure) on each side may be set back from the ordinary high water mark to a
20 common line drawn between the nearest corners of the adjacent residences (instead of following
21 the standard habitat buffer requirement). A similar allowance is provided when a legally
22 established residence is only present on one side of the proposed site. Parcels located in mapped
23 channel migration zones, or in landslide or erosion hazard areas are not eligible for the common
24 line buffer. This option cannot be used to deviate from wetland or non-SMA stream buffers. The
25 common-line setback option is not likely to be widely in Clallam County used since there are
26 relatively few areas where the shorelines development are spaced closely enough to meet the 50-
27 foot requirement.

28 Certain modifications may be made within shoreline buffers as long as they conform to the
29 dimensions and design specifications prescribed in the SMP (Table 6-3). The specifications are
30 intended to limit the size and scale of these features and ensure they are located and constructed
31 in the least environmentally damaging ways.

- 32 • View corridors;
- 33 • Private pathways;
- 34 • Hazard tree removal;
- 35 • Invasive species management;
- 36 • Boat launches, docks, piers and floats accessory to an approved single-family residential
37 development;
- 38 • Boathouses accessory to an approved recreational development;

- 1 • Public trails and public access improvements; and
- 2 • Utilities and essential public facilities that are water-dependent or water-related.

3 **Table 6-3. Summary of Modifications allowed in Shoreline Buffers (See SMP Section 4.2.3)**

Allowed Modification	Rationale for Allowance	Summary of Potential Threat
Clearing for view corridors (not more than 20% of the buffer)	It is reasonable to provide property owners an allowance for views. By specifying a reasonable threshold, the goal is to promote compliance and minimize unauthorized view clearing.	See Chapter 5 for detailed discussion
Private pathways	It is reasonable to provide property owners a way to access the water. Providing some accommodation promotes compliance and unauthorized trail constriction.	Pathways must be located within the active use area and cannot exceed 6 feet in width and be made of pervious material. These specifications limit impacts to a minimal level.
Hazard tree removal	Hazard tree removals are typically isolated or infrequent instances that are triggered by human safety concerns. Not a source of widespread impact.	SMP contains requirements to document presence of the hazard to prevent abuse of the allowance
Invasive species management	Removing invasive species enhances shoreline conditions.	This activity is generally beneficial. The SNP requires large removal projects (> 0.25 acre) to include a vegetation management plan.
Boat launches, docks, piers and floats accessory to an approved single-family residential development;	Shoreline Guidelines consider docks associated with a single-family development to be a water—dependent use and is designed to minimize impacts.	The SMP requires docks to be designed and constructed to avoid and minimize shading and other impacts on nearshore habitats and processes. Docks also must be spaced and oriented to minimize hazards and obstructions and designed to avoid the need for maintenance dredging. See Chapter 5 for additional details.
Public trails and public access improvements; and	Public access is a primary policy goal of the SMA so some accommodation for public access is appropriate.	Depending on site conditions, siting some or all of a portion of a public access trail in the buffer can occur without causing significant impact and the impacts are offset by the benefits provided.

Allowed Modification	Rationale for Allowance	Summary of Potential Threat
Utilities and essential public facilities that are water-dependent or water-related	By definition, water-dependent and water-related facilities must be located near the water. With some utilities and other types of essential public infrastructure it is impossible to avoid crossing or encouraging on shoreline buffers without creating substantial economic or logistical obstacles	Depending on site conditions, siting some or all of a portion of a utility in the buffer can occur without causing significant impact and the impacts are offset by the benefits provided.

1
2 Pedestrian beach access structures accessory to an approved single-family residential
3 development are allowed to be located within the shoreline buffer (without a variance), but they
4 require compensatory mitigation if they are shown to cause adverse impacts. To minimize the
5 potential for impacts, individual beach access structures are prohibited in new subdivisions (only
6 shared access structures are allowed). Structures must be located in the least environmentally
7 damaging location on a given site, be designed to minimize the amount of clearing/grading, and
8 must not destabilize slopes. Access structures are prohibited in areas mapped as Feeder Bluff or
9 Exceptional Feeder Bluff. No structure is allowed on any type of shoreline if it is likely to
10 require structural shoreline stabilization in the foreseeable future.

11 Other water-dependent and water-related uses are allowed within the buffer if they provide
12 compensatory mitigation. These types of uses are not required to fully avoid impacts (because by
13 definition they need to be located close to the water) so the first step of the mitigation sequence
14 is not applicable. They are still required to minimize impacts but unlike the modifications listed
15 above, they are reasonably likely result in more than minimal impacts. As a result, compensatory
16 mitigation is required so that the individual actions do not cause a net loss of functions.

17 **6.4 Critical Areas**

18 Critical area protections must be included in the SMP as required by RCW 36.70A.480. SMPs
19 are required to incorporate protections for critical areas that assure no net loss of shoreline
20 ecological functions necessary to sustain shoreline natural resources. Regulations for wetlands,
21 aquatic habitat conservation area, wildlife habitat conservation areas, geologically hazardous
22 areas, frequently flooded areas and critical aquifer recharge areas that occur within shoreline
23 jurisdiction are established in Section 4.3 of the Draft SMP.

24 Critical area buffers are required to protect critical areas such as wetlands, aquatic habitat
25 conservation areas and landslide hazard areas. Critical area buffers are shown in Table 6-4.

1 **Table 6-4. Summary of buffer requirements for wetlands, aquatic habitat conservation areas and landslide**
 2 **hazard areas**

Critical Area		Standard Buffer
Wetlands (Section 4.3.5)	Class I	200 feet
	Class II	150 feet
	Class III	75 feet
	Class IV	50 feet
Aquatic Habitat Conservation Area (Section 4.3.8)	Type F Waters	100 feet
	Type Np Waters	80 feet
	Type Ns Waters	50 feet
Geologically Hazardous Areas (Section 4.3.13)		Development on marine bluffs mapped as unstable slope, unstable slope-recent slide, unstable slope-old slide, feeder bluff or exceptional feeder bluff and development in channel migration zones must conform to shoreline safety buffer requirements per Section 4.2.3. All other landslide hazard areas must maintain a 50 foot buffer from the top, toe and edge.

3
 4 Buffers are generally required to be left undisturbed but there are some exceptions that allow for
 5 buffer alterations:

- 6 • Buffer averaging is allowed for wetlands, aquatic habitat conservation areas and landslide
 7 hazard areas provided the total area of buffer remains the same, the buffer meets certain
 8 vegetation density and cover targets, and a specified minimum width is maintained for
 9 the reduced portion of the buffer.
- 10 • Buffer reduction is allowed on sites lacking well-vegetated buffers for wetlands and
 11 aquatic habitat conservation areas provided the reduced buffer is planted and enhanced to
 12 meet certain vegetation density or cover targets, a specified minimum width is
 13 maintained, and the reduced portion does not exceed a specified length of the buffer.

14 The County also designates wildlife habitat conservation areas, frequently flooded areas and
 15 critical aquifer recharge areas and establishes standards and use limitations to conserve and
 16 protect underground waters and aquifers and minimize flood losses. Standards and limits on
 17 certain uses for these critical areas are described in Table 6-5 below.

1
2

Table 6-5. Summary of Requirements for wildlife habitat conservation areas, frequently flooded areas and critical aquifer recharge areas

Critical Area (SMP section)	Standards and Use Limitations
Class I and II Wildlife Habitat Conservation Areas (Section 4.3.11)	<p>New uses and developments on or adjacent to sites with known locations of Class I wildlife species must submit a habitat management plan (HMP). Buffers set forth by other critical area standards are considered to be the minimum to protect Class I Wildlife species, except when a HMP sets forth additional measures.</p> <p>Major new development in Class II wildlife habitat conservation areas may have to submit a HMP. This requirement is to be determined during the SEPA threshold determination on the project or by the Administrator.</p>
Frequently Flooded Areas (Section 4.3.16)	<p>Critical facilities are prohibited within areas designated as frequently flooded.</p> <p>New land divisions containing frequently flooded areas must be consistent with the requirement to minimize flood damage; must have utilities and common facilities located and constructed to minimize flood damage; must have adequate drainage provided to reduce exposure to flood damage; and where base flood elevation data is not provided or available, it must be generated for development proposals that contain at least 50 lots or 5 acres (whichever is less).</p> <p>Land disturbing activities are prohibited within floodways unless a civil engineer demonstrates that such activities would not result in more than a one-foot increase in flood levels during a base flood discharge. Cumulative effect of existing and anticipated development should be considered.</p> <p>Repairs, reconstruction or structure improvements of residential structures which do not increase the ground floor area or do not exceed 50% of the market value of the structure are allowed in floodways.</p> <p>Residential, commercial and industrial buildings are prohibited in special flood hazard areas unless placed on lots of land platted by a final plat approved and recorded prior to December 10, 1980 for the Dungeness and Elwha Rivers and the effective date [insert date] for all other special flood hazard areas. If a portion of an existing lot lies outside the flood hazard area, building must be directed to the nonhazard portion to the maximum extent feasible.</p>

Critical Area (SMP section)	Standards and Use Limitations
Critical Aquifer Recharge Areas (Section 4.3.18)	<p>Facilities with storage tanks or vaults used for storing chemicals, biological hazards, dangerous wastes, or solids or liquids identified as a risk to groundwater quality must be designed so as to prevent releases to the ground, groundwaters, or surface waters; use material in the storage containment area which is compatible with stored substance; provide for release detection; provide written response and spill notification procedures to the local fire district; and be contained in an impervious containment area equal to the volume of the tank to avoid overflow.</p> <p>The use of fertilizers, herbicides, pesticides or other chemicals for vegetation management must adhere to best management practices to prevent impacts to water quality and water supply. A mitigation plan must be prepared when application of such chemicals covers five or more acres.</p>

1
 2 Critical area buffers are intended to protect aquatic habitats and priority species as well as protect
 3 water quality. Protection and restoration of wetland and stream buffers is important for
 4 improvement of water quality and maintenance of cool water for salmon recovery. Protection of
 5 existing native vegetation and enhancement of degraded riparian areas is a key component in
 6 protecting water quality and improving in-stream habitat for listed salmon to support salmon
 7 recovery.

8 **6.4.1 Channel Migration Zones (CMZs)**

9 In addition to shoreline safety buffers and shoreline-specific buffers that under certain
 10 circumstances require development to be located outside of channel migration zones as described
 11 above, the Clallam County Draft SMP establishes the following standards to address potential
 12 risks to life and property and impacts to ecological functions and processes:

- 13 • New residential uses and developments in the Resource Conservancy and Natural
 14 environments must be located outside of mapped CMZs on all existing lots where there is
 15 buildable area outside of the CMZ. If buildable area does not exist outside of the CMZ,
 16 new residential uses and developments must be located as far landward within the CMZ
 17 as is feasible.
- 18 • Proposals for new residential lots created within mapped CMZs in the Marine Waterfront
 19 and Shoreline Residential (Intensive and Conservancy) designations must submit a
 20 geotechnical evaluation to ensure that all news lots provide building sites outside of the
 21 established CMZ.
- 22 • Flood control structures must be placed landward of CMZs except when the primary
 23 purpose of such structures is to improve ecological functions.
- 24 • Revetments are prohibited in CMZs.

1 Limiting development within channel migration zones maintains riverine processes and provides
2 long-term protection for instream habitat functions.

3 **6.5 Clearing and Grading and Protection of Water Quality**

4 Clearing and grading standards are established in Section 4.5 of the Draft SMP. These standards
5 work in concert with the water quality standards in Section 4.7 to prevent impact caused by
6 stormwater runoff. Clearing and grading must be located, designed and carried out to minimize
7 land disturbance to the minimum necessary for the intended development. Best management
8 practices must be used to minimize erosion and exposed areas must be revegetated or stabilized.
9 Net shore-drift toward sensitive marine environments (e.g., spits, estuaries, river deltas) must not
10 be impeded. Proposals for fill must submit a description of proposed means to control surface
11 runoff and a temporary erosion and sediment control (TESC) plan.

12 Best management practices which serve to prevent or reduce the movement of sediments,
13 nutrients, or other pollutants from the land to surface or ground water; or to otherwise protect
14 water quality from potential adverse effects serve to protect critical areas and reduce erosive
15 potential from near or adjacent projects. For example, silt fences placed between the grading and
16 clearing activity and a critical area help capture and store water and sediment runoff that would
17 otherwise have entered the critical area. The clearing and grading standards will result in
18 minimal impacts to soils, water quality, and native vegetation

19 The Draft SMP requires all shoreline uses and developments shall use effective temporary
20 erosion and sediment control methods during project construction. Project proponents must
21 submit a TESC plan for County review and approval prior if they meet any of the following
22 criteria:

- 23 • Disturb seven thousand (7,000) square feet or more of land;
- 24 • Result in slopes over twenty five percent (25%) and greater than five (5) feet in height;
- 25 • Impound water exceeding a volume of one (1) acre-foot;
- 26 • Divert existing drainage courses; or
- 27 • Involve clearing and grading in an erosion hazard area or on slopes steeper than twenty
28 five percent (25%).

29 Developments that disturb less than one (1) acre and do not meet any other of the above criteria
30 are exempt from the TESC requirements if they can demonstrate to the Administrator that no
31 significant increase in offsite runoff will be produced.

32 The Draft SMP also required that shoreline development proposal take specific actions to protect
33 water quality as follows. These are first-of-their kind water quality standards for Clallam County
34 which should contribute to noticeable improvements in water quality conditions compared to
35 baseline conditions:

- 1 • Residential development with up to two thousand (2,000) square feet of new or replaced
2 impervious surface - All new, replaced, and disturbed topsoil must be amended with
3 organic matter, roof runoff must be routed to a drywell or, if a dry well is not appropriate
4 for site conditions, runoff must be dispersed to a vegetated area, a rain garden or
5 bioswale, an infiltration system or permeable pavement. Project proponents must submit
6 a one page drainage plan showing how stormwater runoff will be controlled and design
7 standards implemented.

- 8 • Single-family residential development with more than 2,000 SF of new or replaced
9 impervious surface, other residential development which disturbs more than seven
10 thousand (7,000) square feet of land or generates two thousand (2,000) to five thousand
11 (5,000) square feet of impervious surface, and all commercial development smaller than
12 five thousand (5,000) square feet in size that do not use hazardous substances - All new
13 developments shall provide for on-site stormwater management according to the Clallam
14 County Small Project Drainage Manual. In addition to other requirements, all new,
15 replaced, and disturbed topsoil must be amended with organic matter.

- 16 • All industrial development; commercial and residential development which generates
17 more new or replaced impervious surface than is allowed in Tier 2, converts three-
18 quarters acre or more of native vegetation to lawn or landscaped areas, or converts 2.5
19 acres or more of native vegetation to pasture; and all commercial projects that use
20 hazardous substances – must provide a stormwater management site plan prepared by a
21 licensed engineer must be prepared in accordance with the [INSERT DATE] Ecology
22 Stormwater Management Manual for Puget Sound. In addition to other requirements, all
23 new, replaced, and disturbed topsoil must be amended with organic matter.

24 **6.6 Shoreline Stabilization**

25 Regulations for shoreline stabilization are organized in 8 different categories corresponding to
26 the type of structure: 1) existing structural shoreline armoring; 2) subdivisions and existing lots
27 without structures; 3) new or expanded shoreline stabilization; 4) design standards for new or
28 expanded shoreline stabilization; 5) bulkheads; 6) revetments; 7) breakwaters, jetties and
29 seawalls; and 8) application requirements. The following summarizes regulations within key
30 categories.

31 Existing structural shoreline stabilization can be replaced in kind if there is a demonstrated need
32 to protect public transportation infrastructure, essential public facilities, or principal uses or
33 structures (meaning the residence or other main/primary structure on the property. Out-buildings,
34 accessory structures and undeveloped lands are not principal uses/structures) from erosion
35 caused by currents, tidal action or waves. The replaced structure must perform the same
36 stabilization function as the existing structure and must not encroach further waterward than the
37 existing structure (unless the residences occupied prior to 1992—in which case limited
38 waterward encroachment may be allowed).

39 Subdivisions must be designed to assure that development or use of the lots will not require
40 structural shoreline armoring in the foreseeable future—meaning during the expected life of the
41 structure which is generally assumed to be 75 or more years. Shoreline armoring to protect a

1 platted lot where no primary use or structure presently exists is prohibited. Armoring cannot be
2 put into place for the sole purpose of leveling or extending property or preserving lawns, yards or
3 landscaping. Nonstructural measures are preferred means of protecting structures from erosion.

4 The Draft SMP allows new or expanded shoreline stabilization only when necessary to support
5 an enhancement or restoration project; to remediate hazardous substances; to protect public
6 transportation infrastructure or essential public facilities when non-structural stabilization
7 options are infeasible; or to protect a water-oriented use or an existing, lawfully established,
8 primary structure where a geotechnical analysis documents that the structure is in danger from
9 shoreline erosion (As a general matter, hard armoring solutions should not be authorized except
10 when a report confirms that there is a significant possibility that such a structure will be damaged
11 within three years as a result of shoreline erosion in the absence of such hard armoring measures,
12 or where waiting until the need is that immediate, would foreclose the opportunity to use
13 measures that avoid impacts on ecological functions). All new or expanded structural shoreline
14 stabilization must demonstrate that erosion is not being caused by upland conditions, landslides
15 or sloughing; nonstructural measures are infeasible; the design is the least environmentally
16 damaging alternative; unavoidable adverse impacts are mitigated according to the prescribed
17 mitigation sequence; and the size of the stabilization measures is limited to the minimum
18 necessary.

19 Structural shoreline armoring is prohibited on shorelines mapped as feeder bluffs and exceptional
20 feeder bluffs. Effects of new stabilization structures, including replacement structures, on feeder
21 bluffs or beach-sediment producing areas must be avoided.

22 Design standards for new or expanded shoreline stabilization include a requirement to take sea
23 level rise, storm surges and other climate induced effects into consideration. Shoreline
24 stabilization must be designed to permit the passage of surface or groundwater.

25 The shoreline stabilization regulations mirror the suggested standards in the WAC and are
26 therefore assumed to be sufficient to prevent cumulative impacts on shoreline functions. The
27 regulations place considerable limitations on new and expanded shoreline stabilization
28 structures, which will substantially reduce future impacts to the marine and freshwater
29 environments.

30 The outright prohibition on new structural shoreline stabilization along feeder bluff shorelines
31 will ensure that impacts to natural erosion and sedimentation processes are avoided. Limitations
32 and design standards for all shoreline stabilization, including provisions for replacement
33 shoreline stabilization, ensure that where stabilization is determined necessary, impacts will be
34 mitigated to the greatest extent feasible.

35 **6.7 Role of the Shoreline Restoration Plan**

36 During the SMP Update Process, the County developed a Shoreline Restoration Plan that
37 provides recommendations for restoring the County's shorelines as well as a framework under
38 which shoreline restoration can be successfully achieved (ESA, 2013). The Restoration Plan
39 builds on and incorporates information from the Final Shoreline Inventory and Characterization
40 Report (ESA, 2012) and other ongoing local and regional efforts to understand and manage the

1 County's diverse shorelines. As required by the Shoreline Guidelines, the Restoration Plan
2 includes the following key elements of the shoreline restoration planning process:

- 3 • Identification of degraded areas, impaired ecological functions, and sites with potential for
4 ecological restoration.
- 5 • Identification of existing and ongoing projects and programs that are currently being
6 implemented which are designed to contribute to local restoration goals (such as capital
7 improvement programs [CIPs] and watershed planning efforts [WRIA habitat/recovery
8 plans]).
- 9 • Identification of additional projects and programs needed to achieve local restoration goals,
10 and implementation strategies including identifying prospective funding sources for those
11 projects and programs.
- 12 • Establishment of overall goals and priorities for restoration of degraded areas and impaired
13 ecological functions.
- 14 • Identification of timelines and benchmarks for implementing restoration projects and
15 programs and achieving local restoration goals.
- 16 • Establishment of mechanisms or strategies to ensure that restoration projects and programs
17 will be implemented according to plans and to appropriately review the effectiveness of the
18 projects and programs in meeting the overall restoration goals (e.g., monitoring of restoration
19 project sites).

20 The Restoration Plan identifies shorelines that are high priorities for restoration, shorelines that
21 have good restoration potential, and specific actions that can be taken throughout the County to
22 improve shoreline conditions. Examples of restoration actions identified in the plan include areas
23 where shoreline vegetation can be enhanced through planting, areas where overwater structures
24 can be removed or replaced with more environmentally friendly designs, areas where bulkheads
25 could be replaced by soft shore bioengineered stabilization, culverts that can be
26 removed/replaced to restore fish passage, and salt marsh habitats that can be restored through fill
27 removal. As components of the plan are implemented voluntarily or as mitigation for
28 development impacts, the County expects to see a gain in shoreline ecological functions, which
29 will counteract some of the effects of past and expected future development to improve
30 conditions over time.

31 **6.8 Other Programs that Protect Shorelines**

32 Several county, state, and federal programs and regulations work in concert with the SMP to
33 protect shorelines and accommodate appropriate shoreline uses. In addition, there are established
34 non-regulatory programs that provide resources and implement restoration actions that have and
35 will continue to enhance and protect the County's shorelines. The following regulatory and non-
36 regulatory programs will continue to support the overall goals and policies of the County's SMP
37 and have beneficial effects on shoreline functions and processes.

1 **6.8.1 Clallam County Code (CCC)**

2 Various sections of the CCC regulate development in ways that benefits the County’s diverse
3 shoreline environments. Regulations are focused on surface water management, flood damage
4 prevention, clearing and grading activities, land use and development standards including
5 management of environmentally critical areas, and low impact development techniques.

6 The County adopted its first comprehensive plan in 1967, and has made several updates to the
7 plan to identify long-range planning goals and policies that address issues of a county-wide
8 nature. Issues that have been identified through this process include the management of forest
9 and mineral lands, urban growth and sprawl, transportation, economic development, affordable
10 housing, natural, historical and cultural resources, utilities and capital facilities (CCC 31.01.300).
11 The plan also fulfills the County’s responsibilities to manage growth as mandated by the Growth
12 Management Act (GMA).

13 The current Comprehensive Plan, adopted August 28, 2007, provides guidance for development
14 within the unincorporated areas, as well as those lands held by the State. Although the County
15 works cooperatively with the Tribes to achieve common goals, the Comprehensive Plan does not
16 cover tribal trust lands.

17 CCC Title 33 establishes zoning districts in the County. These districts, which generally follow
18 land use designations established in the Comprehensive Plan, include 6 resource and public
19 zones, 13 rural zones, 7 urban zones, 13 commercial zones, and 2 industrial zones.

20 The CCC also establishes a special shellfish district to protect shellfish resources. The legal
21 boundaries of the district include the Dungeness Watershed and those waters influenced by it
22 through the irrigation system, and other independent tributaries to the Strait of Juan de Fuca from
23 Bagley Creek east to and including the Sequim Bay Watershed. This encompasses the
24 Dungeness and Graywolf rivers, the creeks of Bagley, McDonald, Matriotti, Meadowbrook,
25 Cooper, Cassalery, Gierin, Bell, Johnson, Dean, Jimmycomelately, Chicken Coop and their
26 tributaries.

27 **6.8.2 Water Resources Inventory Area (WRIA) Plans**

28 Watershed planning occurs under enabling legislation passed in 1998 (Watershed Management
29 Act, RCW 90.82). It is closely tied to planning for other water and watershed resources,
30 including local land use planning and other federal, state, regional, and local laws, regulations,
31 and planning initiatives. The watershed planning process provides a framework for locally based
32 resource management. The primary goals of local watershed planning are to assess the status of
33 water resources within each WRIA and determine how to address competing demands for water.
34 The statute states one of its purposes is “...to develop a more thorough and cooperative method
35 of determining the current water situation in each water resource inventory area of the state and
36 to provide local citizens with the maximum possible input concerning their goals and objectives
37 for water resources management and development” (RCW 90.82.005).

38 The WRIA 18 Elwha-Dungeness Watershed Plan was adopted by the Clallam County Board of
39 Commissioners in 2005. The WRIA 18 Initiating Governments include Clallam County, the City

1 of Port Angeles, the Elwha Klallam Tribe, the Jamestown S'Klallam Tribe, and the Agnew
2 Irrigation District. The WRIA 17 Quilcene-Snow planning area within Clallam County includes
3 Sequim Bay and Miller Peninsula. These areas have been incorporated into the planning area
4 WRIA 18. A Draft WRIA 19 Lyre-Hoko Watershed Plan was issued in 2008. The WRIA 19
5 Initiating Governments include Clallam County, the Lower Elwha Klallam Tribe, the Makah
6 Tribe, and the Clallam Public Utility District. Portions of WRIA 20 Soleduc-Hoh planning area
7 fall within Clallam County, but are not included in the current SMP update planning area.

8 **6.8.3 State and Federal Regulations**

9 In addition to local regulations and non-regulatory organizations and agencies, a number of state
10 and federal agencies have regulatory jurisdiction over resources in the County's shoreline
11 jurisdiction. As with local requirements, state and federal regulations apply throughout the
12 County and substantially reduce the potential for cumulative impacts to shorelines. The major
13 state and federal regulations affecting shoreline-related resources include, but are not limited to:

- 14 • **Endangered Species Act (ESA):** The federal ESA addresses the protection and recovery of
15 federally listed species. Depending on the listed species, the ESA is administered by either
16 the National Oceanic and Atmospheric Administration National Marine Fisheries Service or
17 the United States Fish and Wildlife Service (collectively called 'the Services') Many of the
18 County's shoreline waterbodies provide critical migration, spawning, and rearing habitat for
19 threatened salmon species. Any project that has a 'federal nexus' (meaning it requires a
20 federal permit, occurs on federal land or uses federal funding) must be reviewed to ensure
21 that effects of the project will not result in a 'take' of listed species. The Services require
22 project to implement specific conservation measures to ensure that listed species are not
23 jeopardized.
- 24 • **Clean Water Act (CWA):** The federal CWA requires states to set standards for the protection
25 of water quality. It also regulates excavation and dredging in waters of the U.S., including
26 lakes, streams, and wetlands. Certain activities affecting shorelines, including all in-water
27 work requires a permit from the U.S. Army Corps of Engineers (Corps) and/or Washington
28 State Department of Ecology under Section 404 and Section 401 of the CWA, respectively.
29 Aquaculture operations, construction of bulkheads, docks, launching ramps, beaches, and
30 shoreline restoration projects all have the potential to require permits under Section 404 and
31 Section 401. The Corps and Ecology review all projects and require mitigation for adverse
32 impacts.
- 33 • **National Pollutant Discharge Elimination System (NPDES) (also under the federal Clean**
34 **Water Act):** Ecology regulates activities that result in wastewater discharges to surface water
35 from industrial facilities or municipal wastewater treatment plants. NPDES permits are also
36 required for stormwater discharges from industrial facilities and construction sites of one or
37 more acres.
- 38 • **Rivers and Harbors Act Section 10:** The federal Rivers and Harbors Act requires any project
39 that creates an obstruction or alteration in, over, or under navigable U.S. waters to obtain a
40 permit. Permits are issued by the Corps for construction and maintenance of docks, piers,
41 pilings, bulkheads, and certain other in-water and over-water structures. Corps standards for
42 Section 10 approval will dictate construction techniques, materials, and size and bulk allowed

- 1 for construction of docks, piers, shoreline armoring, and other in-water / over-water
2 structures. The Corps also requires mitigation for adverse effects caused by these
3 construction activities.
- 4 • Hydraulic Project Approval (HPA): The Washington Department of Fish and Wildlife
5 regulates activities that use, divert, obstruct, or change the natural flow of the beds or banks
6 of waters of the state and may affect fish habitat. Projects in the shoreline jurisdiction
7 requiring construction below the ordinary high water mark could require an HPA. These
8 projects would include construction of docks, bulkheads, culverts, and other in-water
9 structures. Projects creating new impervious surface that could substantially increase
10 stormwater runoff to waters of the state may also require approval.
- 11 • Aquatic Land Leasing: Much of the aquatic lands (tidelands) within Clallam County are
12 publically owned and managed by DNR. A DNR authorization to use state-owned aquatic
13 lands is required if a project will occur on or over state-owned aquatic lands.

7.0 TRACKING AND RESPOND TO CHANGES IN SHORELINE FUNCTION

The proposed policies and regulations in the Draft SMP provide effective tools for managing future shoreline use and development in Clallam County. The Proposed SMP will have a positive influence on the size, location, design, and operation of future shoreline uses and developments, reducing the threats that those uses and developments pose to shoreline functions. That said, rural residential use will continue to put pressure on the marine, lake and lower river shores and forestry will continue to put pressure on river shores in the upper watersheds.

Anticipating these and other future uses, the Draft SMP contains specific regulations aimed at preventing impacts related to vegetation clearing, armoring, buffer encroachment, overwater structures, floodplain encroachment, subdivision, etc. These regulations were developed based on a detailed inventory of shoreline conditions and assessment of the shoreline ecological functions and processes. This chapter offers some initial conclusions about the potential for cumulative impacts and some recommendations for how to track and respond to development actions to ensure no net loss.

7.1 Does the SMP Fully Address Potential Cumulative Impacts?

Based on our review of the Draft SMP policies and regulations and our preliminary analysis of the areas of the County where future development is most likely to occur (our Analysis Areas), we contend that the Draft SMP will be effective in preventing cumulative impacts on habitat, hydrology and water quality functions because:

1. Most new development will be located outside of protective buffers.
 - Most new development will not trigger riparian buffer clearing because there is ample space to locate structures outside of the buffers. Exceptions to this occur along portions of Morse Creek and the Dungeness River. Within the Morse Creek Analysis Area (primarily within the reach extending upstream from the SR 101 crossing), infill development will occur on existing parcels constrained by proposed habitat buffers. In the Dungeness River Analysis Area, the proposed SMP requires new development to occur landward of the mapped channel migration zone. There are a relatively high number of existing parcels within this zone. As development occurs in these areas, the Draft SMP includes allowances for buffer averaging and/or reduction (including reduction of the CMZ buffer area); allowances are only available when technical analysis is provided that ensures impacts are mitigated to the highest extent feasible and that development would not create new hazards (to human property and safety).
 - Although development of existing parcels along Diamond Point will not be able to conform to the proposed buffers, this area generally lacks riparian buffer vegetation, so clearing impacts are not a serious concern. Development of existing parcels along the Dungeness Bluffs also will not be able to conform to the proposed buffers. These areas also lack riparian buffer vegetation, so clearing

1 impacts are not a serious concern. This area is mapped as feeder bluff and there is
2 evidence of active erosion. The Draft SMP would require new developments
3 within this area to have a detailed geotechnical review, which gives the County
4 ample means to ensure that impacts are fully mitigated.

- 5 • The Draft SMP provides reasonable assurances that there will be only a few areas that
6 would experience forest cover loss outside of required habitat and safety buffer areas
7 (fewer than 10% of the total parcels in our Analysis Areas).
- 8 • The Draft SMP effectively prevents cumulative impacts due to subdivision. The potential
9 for new lot creation along the marine shoreline is relatively low and mostly confined to
10 the areas between Morse Creek and the City of Port Angeles. Parcels along Tavis Spit,
11 Lyre River, Clallam Bay, and Sequim Bay will likely also be subdivided. On the rivers,
12 there is potential for new lot creation along the Clallam River, Lyre River, Morse Creek
13 and Salt Creek. Most of these areas are designated Shoreline Residential – Conservancy,
14 which means that the new development will generally be 125 feet or more from the
15 ordinary high water mark. Subdivisions are considered Major New Development and the
16 Draft SMP requires that new lots have adequate buildable areas outside of buffers and
17 critical areas so development on these lots will generally not result in buffer
18 encroachment or riparian buffer clearing. These standards appear adequate to prevent
19 cumulative impacts from new lot creation.
- 20 • The SMP effectively addresses the threat of armoring along feeder bluffs, but may not
21 fully prevent cumulative impacts of armoring on low bank marine shores. Because the
22 lots on low bank shores are small and constrained, new developments may not be able to
23 set back far enough to be protected from erosion. The bioengineered stabilization
24 techniques (preferred in the Draft SMP) may not be feasible in these areas, so additional
25 bulkheading is expected. Other strategies may be required to offset these impacts.

26 We also note several items that require additional consideration to ensure that the no net loss
27 standard can be met:

- 28 • Small parcels along low bank shores such as Diamond Point may require protection from
29 storms, flooding and/or erosion in the future, which means there is an obvious threat due
30 to armoring along Diamond Point. Most of this area is armored already, but there may be
31 additional loss of habitat functions as a result of new armoring.
- 32 • The SMP substantially reduces the potential for armoring along rivers, but there are some
33 areas (Clallam River, Morse Creek, and Dungeness River), where it may not be feasible
34 to set back a sufficient distance to reduce the need for future bank stabilization. Along the
35 Clallam River and Morse Creek, these areas are primarily associated with existing parcels
36 have either residential structures very close to the shoreline or are undeveloped but
37 dimensionally constrained such that future development may require armoring. There are
38 few total parcels along the Clallam that have this situation; however they represent a
39 substantial portion of all parcels within the relatively small Analysis Area. Along the
40 Dungeness, areas where armoring may be necessary are primarily associated with
41 existing, developed parcels where residential structures occur within the mapped channel

1 migration zone. These impacts may be able to be offset though effective site design,
2 restoration and other measures, but this is an area that will require careful scrutiny during
3 the SMP implementation process.

- 4 • The Draft SMP may not fully prevent cumulative impacts due to view clearing. Along the
5 marine shore roughly half of the vacant parcels would loss riparian cover through the
6 view clearance allowances. On the freshwater shores, about a quarter of the undeveloped
7 parcels could experience clearing impacts, although typically there is less “demand” for
8 vies corridors along rivers as compared to marine shorelines. The numbers of parcels
9 where vegetation enhancement would be required appears relatively low on both the
10 marine and freshwater shorelines, which means view clearing impacts may not be fully
11 offset based on the proposed SMP.
- 12 • There is a need to identify additional restoration actions that can be implemented to offset
13 impacts related to vegetation clearing and stream bank stabilization. It is unclear that
14 there are an adequate number of realistic opportunities to implement such restoration if it
15 becomes necessary.

16 **7.2 Tracking and Responding to Development Actions**

17 In order to fully ensure that the SMP achieves no net loss we need tools and procedures for
18 assessing the effects of development proposals and evaluating them against the assumptions
19 made in this analysis. To that end, we have created a tracking checklist for planning staff to use
20 while administering the program (Appendix A). The checklist allows the County to consider the
21 effects of development proposal on specific functions, record information pertaining to the
22 selected indicators of function and show compliance with the SMP standards. The checklist can
23 serve a dual purpose as a statement of exemption form. The goal is that by using the checklist the
24 County can monitor their decision-making and provide transparency with respect to meeting the
25 no net loss standard.

26 **7.3 Final Thoughts**

27 With analysis we attempt to assess changes to shoreline conditions that may affect shoreline
28 functions and show how that assessment has been used to shape policies and regulations in the
29 Draft SMP. The no net loss standard discussed here is specific to the Shoreline Management Act.
30 Local governments are held accountable for achieving this through shoreline master programs.
31 Development actions within the narrow ribbon of land and water under the jurisdiction of local
32 shoreline master programs are only a subset of the actions that can affect ecological functions.
33 We need to be better able to differentiate ecological changes that occur due to SMA-regulated
34 development from those that occur due to actions outside shoreline jurisdiction. This can be a
35 substantial challenge. Although we may not always be able to conclusively determine cause and
36 effect, we need to create a better system of accounting for and managing functional losses across
37 a suite of regulatory and non regulatory programs including shoreline master programs, the Puget
38 Sound Action Agenda, and others. Hopefully, this effort to define and measure no net loss will
39 serve as a template for how to create management accountability systems for the other programs
40 that affect ecosystem functions in Puget Sound.

1 In doing this analysis we encountered a number of other challenges that can hopefully be
2 addressed in future effort in other jurisdictions.

- 3 • Lack of data – There is a paucity of data that can be measured systematically and
4 repeatedly at the parcel and reach scales to inform assessment of ecological functions.
5 Most of the data we have concerning species presence and water quality conditions is
6 spotty or intermittent. Data on shoreline modifications is lacking, especially on rivers. If
7 we want to be able to comprehensively tie shoreline management decisions to changes in
8 shoreline attributes we need better tools.
- 9 • Tradeoffs – We acknowledge that no net loss implies tradeoffs are being made between
10 impacts and mitigation/restoration. These tradeoffs need further consideration.
- 11 • Baseline Conditions – Defining the baseline condition based on present conditions does
12 not account for much of the ecological function that has been lost already.
- 13 • Climate Change – Future assessments of no net loss will need to take into account
14 implications of climate change.

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**APPENDIX A: SHORELINE CHECKLIST & STATEMENT OF
EXEMPTION FORM**

DRAFT

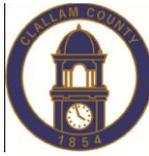


Exhibit B

Shoreline Checklist & Statement of Exemption Form

for Ensuring Consistency with SMP Policies and Regulations and No Net Loss Policy

Checklist Purpose

The purpose of this checklist is to demonstrate consistency with the policies and regulations of Clallam County's Shoreline Master Program. The checklist helps identify and track the implications of a shoreline use/development on the ecological functions and processes in accordance with the SMP. The checklist applies to all use/development proposals within marine and freshwater shoreline jurisdiction.

Date _____ Permit # _____

Landowner Information

Name: _____
Address: _____
City: _____ State: _____ Zip Code: _____
Telephone: _____
E-Mail: _____

Applicant or Agent Information (if different than landowner)

Name: _____
Address: _____
City: _____ State: _____ Zip Code: _____
Telephone: _____
E-Mail: _____

Project Information

Project Name: _____
Project Location/Street Address: _____
State: _____ Zip Code: _____
Tax Parcel Number: _____
Type of Ownership: Federal _____, State _____, Local _____, Tribal _____, Private _____

Type of Shoreline:

Marine River Lake

Name of the adjacent waterbody: _____

Name of the shoreline reach (from Inventory and Characterization): _____

Shoreline Environment Designation: _____

What type of shoreline approval does the project require?

- | | |
|---|---|
| <input type="checkbox"/> Shoreline exemption | <input type="checkbox"/> Substantial development permit |
| <input type="checkbox"/> Conditional use permit | <input type="checkbox"/> Variance |

Project Description

Briefly summarize the purpose of the project:

Indicate the project category/primary use (provide use category consistent with those listed in SMP Table 2-1 and / or Table 2-2; several potentially common examples: 'Residential – Single family', 'Residential – Subdivision', 'Boating facilities – Public boat launch', 'Restoration – ecological restoration', or 'Utility – Stormwater facilities'): _____

Rapid Review – Single family and other developments exempt from an SSDP

1. Does the project exceed the thresholds of 'Minor New Development'? (Section 4.2.3, Regulation 6)

Yes No
2. Is the existing shoreline buffer modified or unvegetated to an extent that it is inconsistent with the buffer condition requirements of SMP Section 4.2.3, Regulation 7? (less than 80% vegetated, and less than 150 woody stems per acre or 55 % areal cover of woody vegetation)

Yes No
3. Does the project require shoreline habitat buffer averaging? (Section 4.2.3, Regulation 8)

Yes No
4. Does the project require shoreline safety buffer averaging? (Section 4.2.3, Regulation 9 or 10)

Yes No
5. Will development include view clearance, shoreline access, or other modification within a standard habitat buffer or safety buffer? (Allowances under Section 4.2.3, Regulation 12)

Yes No
6. Does the project include shoreline stabilization (of any kind)? (See Tables 2-1 and 2-2, Section 3.18)

Yes No
7. Does the project include boating facilities (of any kind)? (See Tables 2-1 and 2-2, Section 3.14)

Yes No
8. Will the project permanently impact any wetland or wetland buffers? (Sections 4.3.5 and 4.3.6)

Yes No
9. Marine Only - Does the project require a geotechnical report due to proposed development's proximity to on-site or adjacent landslide hazard areas, including feeder bluffs and exceptional feeder bluffs? (Sections 4.2.3, 4.3.13 and 4.3.14)

Yes No
10. Freshwater Only – Will elements of the project occur within the regulatory floodplain (Sections 4.3.15 and 4.3.16)?

Yes No
11. Freshwater Only – Will elements of the project occur within a channel migration zone safety buffer such that the proposal requires documentation by an experienced geologist, hydrologist or licensed civil engineer? (Section 4.2.3, Regulation 10)

Yes No

If the answer is 'No' to all of the above questions, there is likely minimal potential for net loss of ecological function associated with the project. In such instances, additional review included in

the 'Detailed Review' section of this Checklist may be unnecessary – please skip to the 'Summary' section.

If any of the Rapid Review questions were answered 'Yes', please complete all of the associated 'Detailed Review' sections that follow.

Detailed Review

Complete all sections that apply based on 'Rapid Review' questions and responses. For all responses, reference specific sections in technical reports completed for the project, as needed and relevant.

1. Answered 'Yes' that project exceeds the thresholds of 'Minor New Development' (Section 4.2.3, Regulation 6)

How much new impervious surface will be created?: _____ acres

How much new pollution generating impervious surface will be created?: _____ acres

How much forest canopy would be permanently impacted throughout shoreline jurisdiction?: _____ acres

Describe approach to minimize impacts to forest canopy throughout shoreline jurisdiction (Section 4.4.3, Regulation 1):

Describe approach to treat stormwater, and detail consistency with SMP Water Quality and Water Management regulations (Section 4.7.3):

2. Answered 'Yes' that existing shoreline buffer modified or unvegetated to an extent that it is inconsistent with the buffer condition requirements of SMP Section 4.2.3, Regulation 7 (less than 80% vegetated, and less than 150 woody stems per acre or 55 % areal cover of woody vegetation).

Describe current buffer condition (forested, shrub dominated, cleared; dominant invasive species; existing structures); include percent vegetated, and density of woody stems and/or aerial coverage of woody vegetation: _____

Describe any existing structures or modifications within the buffer (if any): _____

Are existing structures or modifications to be utilized as part of the proposed use / development?

Yes No

Describe approach to restore and/or enhance the buffer such that it meets minimum buffer condition requirements of the SMP: _____

3. Answered 'Yes' that development will occur within standard habitat buffer or safety buffer areas (Section 4.2.3; Rapid Review Questions 3, 4, and 5).

Development will occur within a Habitat buffer? Safety buffer? [Check all that apply]

Describe current buffer condition (forested, shrub dominated, cleared; dominant invasive species; existing structures); include percent vegetated, and density of woody stems and/or aerial coverage of woody

vegetation – reference back to Detailed Review Part 2, if already completed:

Describe any existing structures or modifications within the buffer (if any) – reference back to Detailed Review Part 2, if already completed::

If proposed, is buffer averaging consistent with SMP allowances? (Section 4.2.3, Regulation 8, 9 or 10).
 Yes No

If 'Yes', document how averaging will occur as to not degrade existing buffer conditions (highlight conditions of reduced areas, proposed mitigation / restoration actions) – reference Habitat Management Plan completed for the project (for habitat buffer averaging):

If safety buffer reduction is proposed, has reduction been verified / approved by qualified professional consistent with SMP? Yes No If 'No', see geotechnical report requirements in Section 4.2.3, Regulations 9 or 10; a geotechnical evaluation and report must be completed and approved by the County before safety buffer averaging can be permitted. If 'Yes', also see 'Detailed Review' section #7.

Describe proposed project elements / alterations to occur within the buffer area:

Describe approach to minimize buffer impacts and provide buffer restoration / enhancement areas – reference Habitat Management Plan completed for the project when appropriate:

4. Answered 'Yes' that development will include shoreline stabilization. (Tables 2-1 and 2-2, Section 3.18; Rapid Review Question 6)

Development will require: structural shoreline stabilization (revetment / bulkhead / riprap)?

Bioengineered shoreline stabilization? [Check all that apply] *Note: Gabions are prohibited outright.*

The proposal is for: Replacement of existing stabilization (Section 3.18.3); New or expanded shoreline stabilization (Section 3.18.5)

Note: Land divisions must be designed as to assure that development or use of the established lots will not require structural shoreline armoring in the foreseeable future (Section 3.18.4, Regulation 1)

Note: New structural shoreline armoring is prohibited on shorelines mapped as feeder bluff and exceptional feeder bluff (Section 3.18.5, Regulation 1)

Describe current shoreline conditions (Does existing armoring occur? Is existing erosion evident?):

How much new shoreline armoring is proposed?:

Will existing armoring be removed or replaced as part of the proposal? Yes No

If 'Yes', how much (linear feet of removal / linear feet of replacement):

What development / use necessitates shoreline armoring?:

Has applicant applied for other permits for shoreline stabilization?: Yes No

REPLACEMENT SHORELINE STABLIZATION STRUCTURES: Is the proposed structure consistent with criteria of Section 3.18.3? (Including, but not limited to: structure performs the same stabilization function as existing structure, with no additions or increases in size; structure is located landward of OHWM or existing structure, unless as allowed for residences occupied prior to Jan 1, 1992; structure is designed, located, sized, and constructed to minimize effects on shoreline processes and fish and wildlife habitat) Yes No

NEW OR EXPANDED SHORELINE STABILIZATION STRUCTURES (Section 3.18.5)

Document how non-structural shoreline stabilization measures have been considered, including relocating structures away from the water, enhancing vegetation, managing drainage and runoff, and other measures (Section 3.18.4): _____

Is the proposed shoreline stabilization consistent with the criteria for allowances for such structures under Section 3.18.5 Regulation 2? Yes No

Where structural shoreline stabilization is proposed, summarize how alternatives to structural shoreline stabilization were determined to be infeasible or insufficient; and how the stabilization design is the least environmentally damaging alternative? _____

Detail how unavoidable adverse impacts are to be mitigated (consistent with the SMP prescribed mitigation sequence) such that there is no net loss of shoreline ecological functions or processes (in completing this response, detail the specific type of shoreline stabilization proposed and consistency with the regulations of Sections 3.18.6 [design standards]; 3.18.7 [bulkheads], 3.18.8 [revetments]; 3.18.9 [breakwaters, jetties and seawalls]; reference studies or other application materials prepared for the proposed shoreline stabilization): _____

5. Answered 'Yes' that development will include boating facilities (Tables 2-1 and 2-2, Section 3.14; Rabid Review Question 7)

Development includes (check the boating facility that applies)

Accessory to Residential Development: Dock, pier, float, and/or lift; Mooring buoy; Other _____ (specify)

Non-residential boating facility: Dock, pier, float, and/or lift; Mooring buoy; Public boat launch; Marina; Float plane moorage; Other _____ (specify)

Does existing overwater structure exist on the site?: _____

Has applicant applied for other permits for proposed boating facility?: Yes No

If yes, summarize mitigation required for state and/or federal permits: _____

Will existing overwater structures be removed or replaced as part of the proposal? Yes No

If 'Yes', how much (linear feet of removal / linear feet of replacement): _____

Is overwater structure in the proposed location a-typical to conditions / development on neighboring and/or nearby properties?: Yes No If 'Yes', document how proposed overwater structure is necessary where it has not been needed and/or does not occur along neighboring shoreline areas: _____

Document consistency with requirements for proposed boating facility (Sections 3.14.3 [Marinas]; 3.14.4 [Boat launches] 3.14.5 [Piers, Docks, and Floats, Non-residential]; 3.14.6 [Piers, Docks, Floats, and Lifts, Accessory to Residential Development and Private Recreational Use]; 3.14.7 [Mooring buoys]); attach materials and reference here: _____

Summarize approach to minimize shoreline impacts / restore temporary impacts associated with construction and ongoing use of proposed boating facility(s): _____

6. Answered 'Yes' that development will require wetland impacts. (Sections 4.3.5 and 4.3.6; Rapid Review Question 8)

Development will require: Permanent wetland impacts; Permanent buffer impacts; Temporary wetland and/or wetland buffer impacts

Describe wetland(s) that will be impacted (category): _____

Has applicant applied for other permits for wetland alteration?: Yes No

If yes, summarize mitigation required thru other permits: _____

Describe how 'all reasonable measures have been taken to avoid adverse effects on wetland functions and values', as required by SMP: _____

Summarize impacts and compensatory mitigation approach consistent with Sections 4.3.6 and 4.4.5; cite and reference Wetland Mitigation Plan: _____

7. Marine Only - Answered 'Yes' that development requires a geotechnical report due to proposed development's proximity to on-site or adjacent landslide hazard areas, including (but not limited to) feeder bluffs and exceptional feeder bluffs? (Sections 4.2.3, 4.3.13 and 4.3.14; Rapid Review Question 9)

Development will occur within: Feeder bluff or exceptional feeder bluff; other landslide hazard area; Shoreline safety buffer for exceptional feeder bluff; Shoreline safety buffer for feeder bluff Shoreline safety buffer for other marine-shoreline associated landslide hazard area Critical area buffer [Check all that apply]

Describe current safety and/or critical area buffer condition (forested, shrub dominated, cleared; dominant invasive species; existing structures); include percent vegetated, and density of woody stems and/or aerial coverage of woody vegetation – reference back to Detailed Review Part 2, if already completed: _____

Describe proposed alterations within landslide hazard areas (if applicable) (detail consistency with allowances within 4.2.3 and 4.3.14): _____

Describe proposed alterations within landslide hazard area buffer (detail consistency with allowances within 4.2.3 and 4.3.14): _____

Provide name of geotechnical report and qualified professional: _____

Describe how proposal location, design, construction, and ongoing use and maintenance avoids impacts to the marine shoreline landslide hazard area(s) to the greatest extent feasible. Impact avoidance measures could include: reducing the number, size or scale of buildings, driveways and other features; altering the configuration or layout of the proposed development; using environmentally favorable construction materials; implementing special drainage or runoff management practices; foregoing construction of accessory structures; preserving native vegetation; and other reasonable measures: _____

Would the proposed use impact natural sediment and erosion processes integral to the health and sustainability of marine nearshore ecosystems?: _____

8. Freshwater Only - Answered 'Yes' that development will occur within the regulatory floodplain. (Sections 4.3.15 and 4.3.16; Rapid Review Question 10)

Verify that no new lots that require development within the floodplain will be created as a result of the proposed action (Section 4.3.16, Regulation 3): _____

Verify that no land disturbing activities would occur within the floodway (unless permitted by the SMP) and that land disturbing activities throughout the floodplain (including consideration of cumulative impacts) would not result in more than a one-foot increase in flood levels during the occurrence of the base flood discharge (Section 4.3.16, Regulation 5): _____

9. Freshwater Only - Answered 'Yes' that elements of the project will occur within a channel migration zone safety buffer such that the proposal requires documentation by an experienced geologist, hydrologist or licensed civil engineer to allow development within the standard safety buffer (Section 4.2.3, Regulation 10; Rapid Review Question 11)

Describe current CMZ condition (signs of recent and/or active channel migration, forested, shrub dominated, cleared; dominant invasive species; existing structures): _____

Provide name of report and qualified professional: _____

Describe proposed project elements / alterations to occur within the CMZ standard safety buffer area: _____

Verify that safety buffer averaging is consistent with limitations included under Section 4.2.3, Regulation 10 (never reduced to less than 50 feet; reduced portion of the buffer cannot exceed forty percent (40%) of the buffer length): Yes No

Summary / Conclusion

Provide any additional information needed to verify that the project is not expected to result in a net loss of shoreline ecological functions: _____

Applicant: Based on available information, the project is not expected to result in a net loss of shoreline ecological functions. Yes No

Signature: _____

Date: _____

County Reviewer: Based on available information, the project is not expected to result in a net loss of shoreline ecological functions. Yes No

Signature: _____

Date: _____

DRAFT