SAN JUAN COUNTY

CUMULATIVE IMPACTS ANALYSIS
for San Juan County's Shorelines

Shoreline Master Program Update
SAN JUAN COUNTY, WA

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CUMULATIVE IMPACTS ANALYSIS

FOR SAN JUAN COUNTY'S SHORELINES

1 INTRODUCTION

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

The Guidelines do not include a definition of cumulative impacts; however, federal guidance has defined a cumulative impact as:

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency… or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (Council on Environmental Quality 1997).*

Consistent with Washington Department of Ecology (Ecology) guidance, cumulative impacts addressed in this analysis only include those that will result from development and uses within the shoreline jurisdiction of San Juan County (County) and are subject to regulation under its shoreline master program (SMP). Cumulative impacts that may result from development outside shoreline jurisdiction are not considered in this analysis (Ecology 2010).

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

> *When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. The concept of "net" as used herein, recognizes that any development has potential or actual, short-term or long-term impacts and that through application of appropriate*

> *development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist. Where uses or development that impact ecological functions are necessary to achieve other objectives of RCW 90.58.020, master program provisions shall, to the greatest extent feasible, protect existing ecological functions and avoid new impacts to habitat and ecological functions before implementing other measures designed to achieve no net loss of ecological functions (WAC 173-206-201(2)(c)).*

In short, updated SMPs must contain goals, policies and regulations that are designed to direct development activities and uses in a manner to prevent degradation of ecological functions relative to the existing conditions as documented in an inventory and analysis report. For those projects that result in degradation of ecological functions, the required mitigation must at a minimum return the resultant ecological function back to the baseline. This is illustrated in the figure below (Figure 1-1). The jurisdiction must be able to demonstrate that it has accomplished that goal through an analysis of cumulative impacts that might occur through implementation of the updated SMP. WAC 173-26-186(8)(d) states that the "[e]valuation of such cumulative impacts should consider:

(i) current circumstances affecting the shorelines and relevant natural processes;
(ii) reasonably foreseeable future development and use of the shoreline; and
(iii) beneficial effects of any established regulatory programs under other local, state, and federal laws."

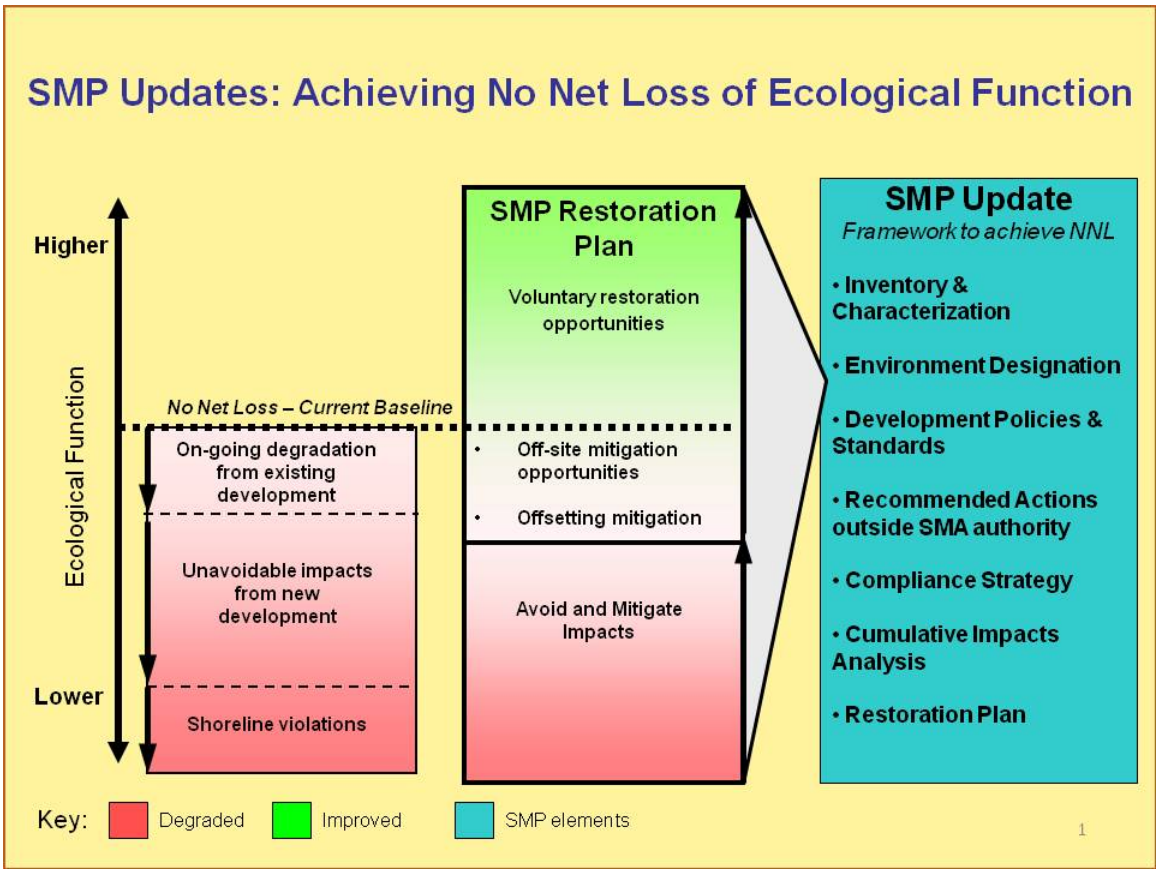


Figure 1-1. Achieving the no net loss standard through the shoreline master program process (Source: Ecology).

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

2 METHODOLOGY

2.1 Evaluation of Existing Conditions

This Cumulative Impacts Analysis (CIA) was prepared consistent with direction provided in the Guidelines as described above. Existing conditions were first evaluated using the information, both textual and graphic, developed and presented in the *Shoreline Inventory and Characterization Report - San Juan County*

(Herrera Environmental Consultants (Herrera) et al. 2013). This document is supplemented by the *Analysis of San Juan County Best Available Science Synthesis* (Adamus Resource Assessment (Adamus) et al. 2011).

2.2 Evaluation of Likely Future Development

The discussion of future development in Chapter 4 of this report is based on data from the land capacity analysis conducted as part of the *Shoreline Inventory and Characterization Report - San Juan County* (Herrera et al. 2013), as well as spatial data on past permitting and code investigation history from the *Analysis of Shoreline Permit Activity in San Juan County, Washington, 1972-2005* (Whitman 2007), County shoreline permit records from 2005-2009, and County building permit records from 2010.

It is important to note that this CIA does not rely solely upon these data to provide a highly accurate prediction of future development in the County. Instead, these data serve to inform the cumulative impacts analysis of the general types and extents of potential future development in the County.

The shoreline land capacity analysis is discussed in Chapter 5 of the *Shoreline Inventory and Characterization Report – San Juan County*. The purpose of the shoreline land capacity analysis was to "gauge the potential level of development that may occur in the future along shorelines given adopted Comprehensive Plan land use designations" in order to "provide an understanding of the future level of intensity that may occur given current plans and regulations." The report notes that the "land use plans contained in the County's Comprehensive Plan give a more specific picture of likely future activities on the shorelines than the present SMP, which allows more uses/activities in each of the shoreline environments compared to the County's Comprehensive Plan land use designations." Finally, the report gives the caveat that the "analysis is intended to give an overall picture of the potential for development along shorelines, but is not an exact predictor of which parcels may develop or redevelop" and that "the analysis does not provide a 'rate' of development."

Methodology for the land capacity analysis can be found in Section 5.1 and Appendix C of the *Shoreline Inventory and Characterization Report*. Summary results of the land capacity analysis by were provided in Table 41 of the *Shoreline Inventory and Characterization Report*. This table is reproduced in Chapter 4 of this analysis as Table 4-1. The *Shoreline Inventory and Characterization Report* also included, in Section 5.2, a discussion of the results of the land capacity analysis in the context of each management area. These management area-specific discussions are not reproduced in Chapter 4.

A review of the County's shoreline permit records from 2005-2009 was used to estimate and inform the projected frequency of different shoreline uses and modifications. Permit data was derived from the San Juan County Permit Database. Preliminary data processing on the 2005-2009 data was conducted by the Friends of the San Juans, and the data was reviewed, summarized and analyzed by The Watershed Company for this report. Any permits that were denied were excluded from the analysis. The permit database included code investigation incidents, but because the outcomes of such investigations are not noted in the permit database, these incidents are noted separately from permit activity to provide an indicator of the potential extent of unpermitted activities in the County.

Assumptions, limitations, and data gaps associated with the approach to estimating future development are identified below:

- It is expected that the rate of development has decreased since the onset of the economic recession in 2008. Shoreline permit history for the time period from 2005 to 2009 includes data from before and during the recession, and the average permit activity may be representative of foreseeable future trends.

- Where feasible, shoreline permits were separated by type of activity (e.g., new, addition, replacement, and repair); however, the detail provided in the permit records was not always specific enough to determine what type of activity occurred. In these cases, the activity type was categorized as "unknown."

- In some cases, a single permit involved several types of shoreline modifications. In these cases, the permit record was duplicated for each modification type. In other cases, a single permit was issued for multiple structures (notably, mooring buoys). In these cases, only the single permit is noted in the permit summary.

The Friends of the San Juans conducted a similar analysis of major shoreline permit activity in San Juan County from 1972 through 2005 that included spatial data on permit activity (Whitman 2007). The spatial information was referenced in this document to infer approximate areas where certain shoreline modifications may occur. These data were compared to shoreline inventory data on shoreforms to identify whether certain permitted modifications were associated with specific shoreforms.

Certain types of development exempt from shoreline permit requirements are not captured in the shoreline data (e.g. single-family residence construction). To evaluate such development, a review of shoreline building permits issued in

2010 was conducted as part of the preparation of this report. The County codes building permits according to permit type (e.g. "demolition"). The classification scheme used in this document relies heavily on these codes, but has been simplified to meet the needs of this report.

2.3 Effects of the Proposed SMP and Cumulative Impacts

The analysis of the cumulative effects of impacts and the proposed SMP integrates the understanding of existing conditions, likely future land use changes, the potential effects of shoreline activities on ecological functions, and the proposed SMP standards to manage and regulate shoreline uses and modifications. This analysis is based on information and analysis described in Sections 3 through 6 of this report, the *Shoreline Inventory and Characterization Report - San Juan County* (Herrera et al. 2013), the *Analysis of San Juan County Best Available Science Synthesis* (Adamus et al. 2011), and the proposed SMP.

3 Existing Conditions Summary

A detailed summary of existing conditions on the shorelines of San Juan County is presented the County's *Shoreline Inventory and Characterization Report – San Juan County* (Herrera et al. 2013). The *Shoreline Inventory and Characterization Report* described geological, ecological, and land use setting for management areas throughout the County, defined as Blakely, Decatur, East Sound, Fisherman Bay, Friday Harbor, Mud Bay, North Coast Eastsound, Olga, Roche Harbor, San Juan Channel, Shaw, Spencer Spit, Strait of Juan de Fuca, Turtleback, Waldron, Westsound, Public Lakes, and Private Lakes (see Figure 3-1). A GIS-based analysis of functions was also completed based on a finer reach scale. The County referred to this geographically based analysis to determine appropriate shoreline shoreline designations and management standards in the proposed SMP.

Figure 3-1. Management Area boundaries.

Significant habitats in the County's shoreline areas and the species that rely on those habitats are described in the *Analysis of San Juan County Best Available Science Synthesis* (Adamus et al. 2011). Habitat areas of particular relevance to the County's shoreline ecological functions include shellfish areas, kelp and eelgrass beds, forage fish spawning areas, lakes, as well as other marine, freshwater, and terrestrial areas that provide important habitat for threatened and endangered species. This report will not provide a detailed description of each of these habitats and species; however, this analysis will rely on the descriptions provided in the *Best Available Science Synthesis* of the significance of and potential impacts that development can pose to these habitats and the species that rely on them.

Approximately 80 percent of shoreline in San Juan County is rocky. The remaining shoreline consists of feeder bluffs, transport zones, accretion shoreforms, and pocket beaches. Shallow-water sand- and gravel-dominated shoreforms, such as pocket beaches, tombolos, and estuaries, provide particularly significant nearshore habitats, and the feeder bluffs and transport zones support the habitat-forming processes that maintain these significant habitats.

Residential uses and associated shoreline modifications are responsible for the predominant anthropogenic changes to shoreline conditions in unincorporated San Juan County. Detailed descriptions of existing shoreline uses and modifications are provided in the *Shoreline Inventory and Characterization Report – San Juan County* (Herrera et al. 2013). A summary table of existing shoreline modifications, geologic hazards, and species and habitats from the *Shoreline Inventory and Characterization Report* is provided below in Table 3-1.

Table 3-1. Summary table of Management Area conditions from Herrera et al. 2013

Management Area	Length (miles)	Shoreline Armoring[1] (%)	Total Overwater Structures[2]	Geologic hazards	Species and Habitats Present	Streams[3]
Blakely	13.9	1.2	10	Landslides, Landslide tsunamis	Surf smelt spawning, eelgrass, kelp, seal haul-outs, numerous birds and shellfish	1
Decatur	19.6	2.8	37	Landslides, Liquefaction, Landslide Tsunamis	Surf smelt spawning, eelgrass, kelp, seal haul-outs, numerous birds and shellfish	0
Doe Bay	23.4	1.4	6	Tsunamis	Surf smelt spawning, eelgrass, kelp, seal haul-outs, raptors and shellfish	14
East Sound	17.5	3.4	22	Landslides, Landslide Tsunamis	Sand lance and herring spawning, eelgrass, seal haul-outs, cutthroat trout, several birds and shellfish	16
Fisherman Bay	14.0	19.6	31	Liquefaction, Landslides, Landslide Tsunamis	Eelgrass, kelp, numerous birds and shellfish	0
Friday Harbor	24.2	6.6	82	Liquefaction, Landslides, Landslide Tsunamis	Surf smelt and sand lance spawning, eelgrass, kelp, seal haul-outs, raptors and shellfish	10
Mud Bay	28.4	4.2	25	Liquefaction, Landslides, Landslide Tsunamis	Surf smelt and herring spawning, eelgrass, kelp, seal haul-outs, numerous birds and shellfish	1
North Coast Eastsound	4.4	25.0	4	Liquefaction, Tsunamis, Landslides	Eelgrass, kelp, bald eagle and shellfish	4
Olga	15.0	4.9	26	Landslides, Landslide Tsunamis	Surf smelt spawning, eelgrass, kelp, seal haul-outs, various salmonids, numerous birds and shellfish	9
Roche Harbor	33.7	5.8	157	Tsunamis, Liquefaction	Surf smelt and herring spawning, eelgrass, kelp, seal haul-outs, numerous birds and shellfish	11
San Juan Channel	13.2	2.3	14	Tsunamis, Landslides	Eelgrass, kelp, seal haul-outs, various salmonids, bald eagle and numerous species of shellfish	11
Shaw	38.2	4.4	55	Liquefaction, Landslide Tsunamis	Surf smelt and herring spawning, eelgrass, kelp, seal haul-outs, numerous birds and shellfish	3
Spencer Spit	12.7	8.3	25	Landslides, Liquefaction, Landslide Tsunamis	Sand lance, herring and surf smelt spawning, eelgrass, kelp, big brown bats, numerous birds and shellfish	3
Strait of Juan de Fuca	57.7	2.0	17	Liquefaction, Tsunamis, Landslides	Sand lance, surf smelt, and rocksole spawning, eelgrass, kelp, seal haul-outs, coho	13
Stuart	36.0	0.8	31	Landslides, Tsunamis, Liquefaction	Surf smelt spawning, eelgrass, kelp, seal haul-outs, numerous birds and shellfish	0
Turtleback	15.5	3.7	10	Landslides, Tsunamis	Surf smelt spawning, eelgrass, kelp, seal haul-outs, raptors, and shellfish	7

Management Area	Length (miles)	Shoreline Armoring[1] (%)	Total Overwater Structures[2]	Geologic hazards	Species and Habitats Present	Streams[3]
Waldron	45.6	0.8	5	Tsunamis, Landslides, Liquefaction	Surf smelt spawning, eelgrass, kelp, seal haul-outs, numerous birds and shellfish	0
Westsound	25.5	6.7	98	Landslide Tsunamis	Sand lance, herring and surf smelt spawning, eelgrass, kelp, various salmonids, numerous birds and shellfish	9
Public Lakes	7.6	NDA	NDA	None	Various salmonids and bald eagle	NDA
Private Lakes	17.8	NDA	NDA	None	Various salmonids, numerous species of birds, and California myotis	NDA

NDA = No data available

[1] Shoreline armoring data from the Friends of the San Juans (2009) as referenced by Herrera et al. 2013

[2] Overwater structures data from WA Department of Natural Resources (2007) as referenced by Herrera et al. 2013

[3] Based on watercourse layer provided by Ecology (2000) as referenced by Herrera et al. 2013

4 FUTURE DEVELOPMENT

As stated in Chapter 1, Introduction, WAC 173-26-186(8)(d) says that a cumulative impacts analysis should evaluate the "reasonably foreseeable future development and use of the shoreline." This chapter presents the results of such an evaluation. For a detailed discussion on the methodologies used in the evaluation, please see Section 2.2 of this document.

4.1 Land Capacity Analysis

A shoreline land capacity analysis was performed as part of the *Shoreline Inventory and Characterization Report* to "gauge the potential level of development that may occur in the future along shorelines given adopted Comprehensive Plan land use designations" in order to "provide an understanding of the future level of intensity that may occur given current plans and regulations." The report gave the caveat that the "analysis is intended to give an overall picture of the potential for development along shorelines, but is not an exact predictor of which parcels may develop or redevelop" and that "the analysis does not provide a 'rate' of development." Summary data from the land capacity analysis are reproduced below as Table 4-1.

Because the land capacity analysis did not provide rates at which development might occur, the results of the analysis do not allow for projections of the amount of future development that might occur over a given time period to be made (past permit activity is reviewed in Section 4.2 to assess potential amounts of future development). Despite this limitation, the findings of the land capacity analysis are still valuable to this CIA because they indicate what potential there is—if any—for certain types of development in the County. A review of the findings of the land capacity analysis suggests the following about future development.

To begin, Table 4-1 conveys that the County has capacity for nearly 3,000 additional single-family residences in shoreline jurisdiction. In contrast, Table 4-1 indicates that County shorelines have limited potential for multi-family residences (only two management areas have capacity). Moreover, based on a qualitative analysis (no supporting data are shown in Table 4-1), the land capacity analysis concluded that only "a small fraction" of County shorelines have capacity for commercial development and that there is "no measurable industrial land capacity." These findings strongly suggest that this CIA should primarily focus on the potential cumulative impacts associated with typical single-family residential development activities.

The findings of the land capacity analysis also suggest that new single-family residences could be developed on both existing vacant parcels and new parcels created through subdivision. Over half of the capacity for new single-family residences is on currently vacant parcels (including both "Potential New SFRs in Lots Unable to Subdivide" and a portion of "Potential New SFRs in Vacant and Partially Used Land"). This finding is useful because vacant parcels and parcels with existing development frequently have different development implications. For instance, vacant parcels may offer more flexible development options due to the lack of existing development.

Finally, the land capacity analysis suggests that there are many existing structures in close proximity to the shoreline. Table 4-1 conveys that 14 percent, or one in seven, shoreline parcels currently have at least one existing nonconforming structure (note that existing nonconforming structures may be legal). This finding suggests that this CIA should include a thorough assessment of provisions that preclude future structures from being located within the structure setback.

Table 4-1. Shoreline land capacity analysis summary results.

Management Area	Shoreline Length (Miles)	Number of Parcels Within Shoreline Jurisdiction	Vacant Parcels[1]		Protected Lands Parcels (approximate)		Parcels with Nonconforming Structures[2]		Potential New SFRs[3] in Vacant and Partially Used Land	Potential New SFRs in Lots Unable to Subdivide	Potential New Multi-Family Dwelling Units	Total Dwelling Units
			#	% of Total #	#	% of Total #	#	% of Total #				
Blakely	13.9	138	59	43%	9	7%	8	6%	62	38	0	100
Decatur	19.6	265	78	29%	5	2%	38	14%	128	66	0	194
Doe Bay	23.4	265	115	43%	8	3%	22	8%	31	90	0	121
East Sound	17.5	279	121	43%	20	7%	37	13%	120	67	66	253
Fisherman Bay	14.0	350	112	32%	14	4%	30	9%	42	86	0	128
Friday Harbor	24.2	450	122	27%	15	3%	109	24%	48	101	0	149
Mud Bay	28.4	323	145	45%	20	6%	25	8%	46	111	0	157
North Coast Eastsound	4.4	162	47	29%	0	0%	17	10%	3	43	0	46
Olga	15.0	328	116	35%	5	2%	34	10%	54	96	0	150
Private Lakes	17.8	103	64	62%	21	20%	4	4%	56	35	0	91
Public Lakes	7.6	12	6	50%	4	33%	1	8%	10	0	0	10
Roche Harbor	33.7	719	222	31%	11	2%	137	19%	121	198	0	319
San Juan Channel	13.2	228	62	27%	3	1%	54	24%	39	54	0	93
Shaw	38.2	323	129	40%	21	7%	67	21%	151	87	0	238
Spencer Spit	12.7	291	88	30%	16	5%	28	10%	3	74	0	77
Strait of Juan de Fuca	57.7	547	209	38%	34	6%	25	5%	73	154	0	227
Stuart	36.0	260	134	52%	9	3%	29	11%	158	99	0	257
Turtleback	15.5	122	43	35%	5	4%	30	25%	105	34	0	139
Waldron	45.6	149	68	46%	15	10%	12	8%	61	48	0	109
West Sound	25.5	383	119	31%	18	5%	65	17%	108	41	84	233
TOTAL	**464.0**	**5,697**	**2,059**	**36%**	**253**	**4%**	**772**	**14%**	**1,419**	**1,522**	**150**	**3,091**

[1] Assessed building value of less than $10,000.
[2] Presence of building within 50 feet of shoreline which are non-conforming under the existing SMP.
[3] Single-family residence.

4.2 Permit Activity

This section reviews past permit activity to better understand shoreline development activity in the future. Shoreline permit data do not track residential development within the shoreline, which were likely approved through shoreline exemptions; therefore, residential development was assessed using building permit data for areas within shoreline jurisdiction. As discussed in Section 2.2, this CIA does not rely upon these permit data to provide a highly accurate prediction of future development in the County; nevertheless, the data provide an indication of how commonly different shoreline activities have been permitted and an estimate of how likely they are to occur in the future along the County's shorelines. These data serve to inform the cumulative impacts analysis of the general types and extents of potential future development in the County.

Summary permit data for shoreline modifications from 2005 to 2009 are shown in Table 4-2. In terms of the total number of permits issued, mooring buoys, piers and docks, shoreline stabilization, utilities, and shoreline access were, in that order, the most common types of shoreline modifications in the County. When considered on an annual basis, the average number of permits issued per year for these more common shoreline modification types ranged from 5 (shoreline access) to 33 (mooring buoys). Table 4-2 also indicates that most shoreline modifications, across almost all types, were most frequently processed as shoreline exemptions. Of further note in Table 4-2 is the high number of code investigations related to shoreline clearing and grading, particularly when compared to the low number of total permits issued. Permit records do not indicate the outcome of code investigations; therefore, it should not be assumed that every code investigation resulted in a violation.

Table 4-2. Number of shoreline permits and code investigations by shoreline modification and permit type from 2005 to 2009. Number does not include denied permits.

Shoreline Modification	Permit Types					Total Permits	Code Investigation
	SSDP	Exempt	CUP	Variance	Other		
Clearing and Grading	1	2	-	1	4	**8**	70
Piers and Docks	28	65	1	2		**96**	11
Mooring Buoys	2	163	-	-	-	**165**	-
Shoreline stabilization	3	43	-	-	-	**46**	14
Shoreline access	6	20	-	-	-	**26**	3
Utilities[1]	13[2]	16	8	-	6	**43**[2]	2
Desalination	9	-	-	-	-	**9**	-
Boat ramp	2	7	-	-	-	**9**	-
Barge ramp	-	-	-	-	1	**1**	1
Breakwater	1	4	-	-	-	**5**	-
Dredge project	-	1	-	-	-	**1**	-
Road	1	4	-	-	1	**6**	2
Parking	-	3	1	-	1	**5**	-
Ferry	-	2	-	-	-	**2**	-
Mining	-	-	-	-	-	**0**	3

SSDP= Shoreline Substantial Development Permit, CUP=Conditional Use Permit
[1] Includes accessory utilities
[2] Total includes desalination facilities

Summary permit data for the type (e.g. new, replacement, repair) of shoreline modifications during the 2005 to 2009 time period are shown in Table 4-3. Note that the source data in some cases did not allow for a conclusive determination of the nature of a shoreline modification. For example, Table 4-3 indicates that 165 permits were issued for mooring buoys; however, the activity type could be determined for only three of the permits. Whether the remaining 162 permits were issued for new mooring buoys or for mooring buoy replacement, repair, or removal could not be determined.

For other shoreline modifications, the data provide valuable information on the nature of shoreline modifications. To begin, permits issued for joint-use docks far outpaced permits issued for single-use docks. Also, the number of permits issued for pier or dock replacement or repair outnumbered permits issued for new, and additions to, pier and dock structures by more than two to one. Finally, permits issued for replacement or repair of shoreline stabilization appear to have far outnumbered permits for new shoreline stabilization.

Table 4-3. Number of shoreline permits issued by shoreline modification activity from 2005 to 2009. Number does not include code investigations or denied permits.

Shoreline Modification	New	Addition	Replace	Repair	Remove	Other/ Unknown	Total
Clearing and Grading	-	-	-	-	-	8	8
Piers and Docks	21[1]	7	29	31	2	6	96[1]
Single Use Docks	3	-	-	-	-	-	3
Joint Use Docks	18	-	-	-	-	-	18
Mooring Buoys	-	-	2	1	-	162[2]	165
Shoreline stabilization	4	-	7	24	-	11	46
Shoreline access	2	-	6	6	-	12	26
Utilities[4]	6	4	12	6	-	15[5]	43[5]
Desalination	-	-	-	-	-	9	9
Boat ramp	1	1	4	3	-	-	9
Barge ramp	-	-	-	-	-	1[3]	1
Breakwater	-	1	1	3	-	-	5
Dredge project	-	-	-	-	-	1	1
Road	-	-	-	4	-	2	6
Parking	-	-	-	-	-	5	5
Ferry	-	-	-	-	-	2	2

[1] Total includes single and joint-use docks
[2] 20 permit records specify existing buoys
[3] Temporary barge ramp usage
[4] Includes accessory utilities
[5] Total includes desalination facilities

Table 4-4 shows the number of shoreline building permits issued in 2010 by building activity type. The data clearly indicate that shoreline building permits related to residential structures were by far the most common type issued by the County. Also, the data suggest that most building permits issued in shoreline jurisdiction were for new single-family residences or accessory structures, or for additions to single-family residences. While the data only portray a one-year time period, the overall trends suggested by the data are in line with expectations for the County and would not be expected to change markedly if the data reflected a longer time period.

Table 4-4. Number of shoreline building permits in shoreline jurisdiction issued in 2010 by building activity type.

Building Activity	New	Addition	Remodel or Repair	Remove	Other	Total
Residential habitable structure[1]	40	30	2	9	3	**84**
Residential accessory structure[2]	-	2		2	19[3]	**23**
Commercial habitable structure	-	1	1	-	-	**2**
Commercial accessory structure	-	-	-	-	1	**1**
Other	-	-	-	2	1	**3**
Total	-	-	-	-	-	**113**

[1] Primarily includes single-family residences, but also includes structures identified as cabins.
[2] Typically includes garages, carports, and decks.
[3] These appear likely to be new structures, but the nature of accessory structure construction is not conclusively indicated in the data.

Summary data for countywide subdivisions from 2005 to 2009 are shown in Table 4-5. Although the data are countywide, the data provide an upper limit for the number of subdivisions that occurred in shoreline jurisdiction during this time period. In general, the data suggest that individual subdivisions in shoreline jurisdiction are most likely to result in the creation of only a limited number of new lots.

Table 4-5. Countywide subdivisions from 2005 to 2009.

Subdivision Type	2005	2006	2007	2008	2009	Annual Average
Simple land division[1]	36	33	21	27	22	**28**
Short subdivision[2]	10	10	6	8	3	**7**
Long subdivision[3]	5	7	3	4	1	**4**

[1] Division of a parcel of land into two lots, each of which is greater than five acres, when the original tract is unchanged for five years.
[2] The change and addition of boundary lines where four of fewer lots are to be created from the original parcel.
[3] The change and addition of boundary lines where five or more lots are to be created from the original parcel or into two or more parcels where the land has previously been divided less than five years prior to the application.

4.3 Summary of Likely Future Development

In summary, future shoreline development, including shoreline modifications, is expected to be predominantly related to single-family residential uses. A comparison of the results of the land capacity analysis to the results of the building permit analysis indicates that the capacity for new residential

development (approximately 3,000 units) is likely to far exceed demand (40 units in 2010, or 800 projected over a 20-year planning horizon) for the foreseeable future. New single-family residences, as well as expansions, remodels, and repairs of existing residences, should continue to occur commonly in the County; similarly, development activities associated with residential accessory structures should continue to occur commonly. Subdivision within the County tends to result in the creation of only a limited number of new lots, and new residential development is likely to occur on both existing vacant or underutilized lots and lots that have been recently subdivided. In contrast to single-family residential development, minimal multi-family residential, commercial, or industrial development should be expected in shoreline areas.

The most frequently occurring shoreline modifications include: moorage facilities (mooring buoys and new, replaced, and repaired piers or docks), shoreline stabilization (predominantly repair), utility facilities, and shoreline access structures. Other shoreline modifications are less commonly permitted at a rate less than two per year.

Because of the frequency of implementation, the most commonly occurring shoreline development activities have the greatest potential to result in unanticipated cumulative impacts from incremental impacts; these potential cumulative impacts will be assessed in greater detail below.

5 Effects of the Proposed SMP to Maintain Shoreline Functions

5.1 Shoreline Designations

The first line of protection of the County's shorelines is the shoreline designation assignments. According to the Guidelines (WAC 173-26-211), the assignment of shoreline designations must be based on the existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through a comprehensive plan.

The assignment of shoreline designations can help minimize cumulative impacts by concentrating development activity in lower functioning areas that are not likely to experience significant function degradation with incremental increases in new development or redevelopment.

Consistent with the Guidelines, the County's shoreline designation system is based on the existing use pattern, the biological and physical character of the shoreline, and community interests. The *Shoreline Inventory and Characterization*

Report provided information on shoreline conditions and functions that informed the development of shoreline designations for each of the shoreline waterbodies. The proposed shoreline designations include: Urban, Rural, Rural Residential, Rural Farm-Forest, Conservancy, Natural, and Port, Marina and Marine Transportation. Generally, the Aquatic designation applies to all areas waterward of the ordinary high water mark (OHWM). Upland shoreline designations are described below:

1. Urban: The Urban designation applies to areas characterized by medium- and high-density residential, commercial, industrial, and institutional uses. The Urban designation is intended to direct new shoreline development to already developed areas. Redevelopment and renewal are encouraged in substandard shoreline areas to make maximum use of the available shoreline resources. Shoreline functions may be expected improve when redevelopment occurs, as new regulatory standards are applied.

2. Rural: The Rural designation is intended for residential development and mixed-use forms of development, such as restaurants, resorts, and rural commercial and industrial activities. The Rural designation includes existing and new medium-density residential and mixed-use development.

3. Rural Residential: The Rural Residential designation is intended for residential shoreline development only, excluding areas where further residential development would cause adverse ecological impacts to sensitive environments (e.g., steep slopes, floodplains, wetlands).

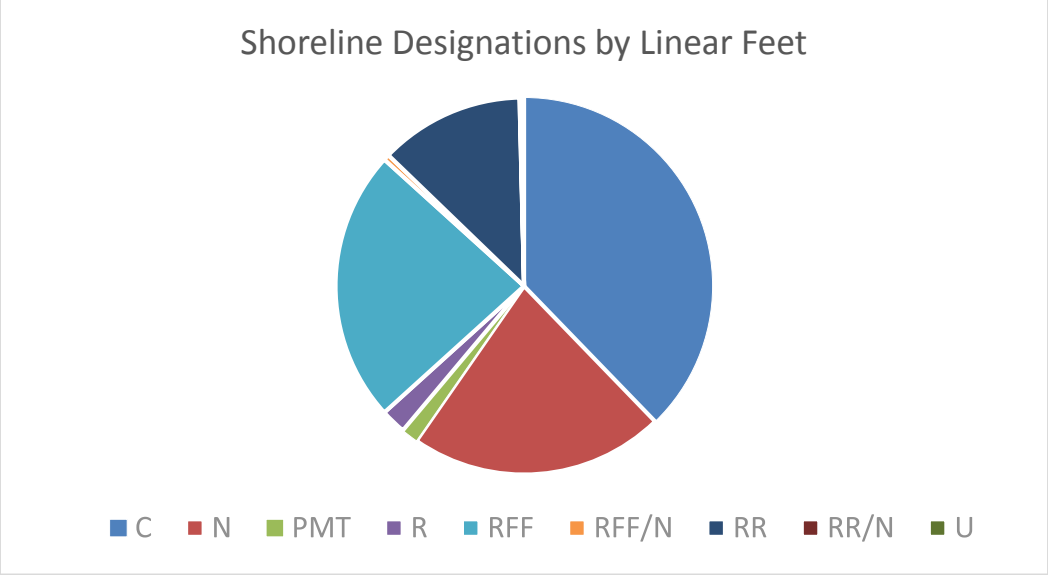
4. Rural Farm-Forest: The purpose of the Rural Farm-Forest designation is to protect agricultural and timber lands and to maintain and enhance the rural, low-density character of the County's shorelines. This designation includes areas where residential development is or should be low density because of biological or physical shoreline conditions.

5. Conservancy: The Conservancy designation is the most suitable for shoreline areas which possess a specific resource or value which can be protected without excluding or severely restricting all other uses and for areas where primarily non-consumptive uses of the physical and biological resources are preferred. The goal of the designation is to protect, conserve and manage existing natural resources and systems and/or valuable historic, educational, or scientific research areas without precluding compatible human uses.

6. Natural: The Natural shoreline designation was recommended for shorelines with unique features that are generally incompatible with intensive human use. These areas include undisturbed portions of wetlands, estuaries, salt marshes, unstable bluffs, spits, and Fish and Wildlife Habitat Conservation

Areas. Uses that would diminish the ecological functions and values of these features would be prohibited under the proposed SMP.

7. Port, Marina and Marine Transportation: The Port, Marina and Marine Transportation designation is limited to areas that support existing port and marina uses or natural basins or bays, which, due to their combination of geography and infrastructure, may accommodate protected moorage without compromising ecological functions.



5.2 Mitigation Sequencing

The proposed SMP requires that all uses and developments on County shorelines must be designed, located, sized, constructed and maintained to achieve no net loss of shoreline ecological functions (New Sections 7 (B), 16 (B) 17 (A), 18, 19 (A) 20, 21).

The County's Critical Areas Ordinance has been legally challenged; however, on August 10, 2015, the Washington State Court of Appeals upheld a superior court decision rejecting the final challenges to the County's critical areas ordinance in Case No. 72235-2-1 (Common Sense Alliance, P.J. Taggares Company, and Friends of the San Juans v. GMHB, Western Washington region and San Juan County.) The protections offered by the County's critical area regulations and SMP regulations are the backbone of the County's strategy for achieving no net loss of shoreline ecological functions.

New Section 19 (A) states where development projects and proposals do not comply with the critical area protections, applicants must submit a mitigation

sequence analysis.

When considering the following mitigation sequence, New Section 19(B) states that "The applicant must demonstrate that each mitigation action is not feasible or applicable before proceeding to the next option or action."

The county's mitigation sequence, below, is consistent with WAC 173-26-201(2)(e) :

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations;
5. Compensating for the impact by replacing or providing substitute resources or environments; and
6. Monitoring the impact and the compensation projects and taking appropriate corrective measures.

The SMP requires an analysis of mitigation sequencing for any project with unavoidable impacts on shoreline functions (New Section 19(A)).

Where the mitigation sequence analysis demonstrates that adverse impacts on shoreline ecological functions are unavoidable, New Section 20 requires that mitigation, monitoring and, adaptive management plans are developed by qualified professionals to offset the expected effects of the project. New Section 20 also establishes the minimum necessary standards for the mitigation plan submittal while New Section 21 establishes the mitigation plan approval criteria.

All new shoreline uses and activities must be located and designed to prevent the need for shoreline defense and stabilization measures and flood protection works, such as bulkheads, other bank stabilization, levees, dikes, or substantial site regrades (New Section 17 (D)).

New Section 17(A) requires developments that include vegetation removal, fill, excavation, or grading to be designed, located, sized, constructed and maintained in a manner that results in no net loss of shoreline ecological functions.

New Section 17(E) prohibits the entry of herbicides and pesticides into water bodies or wetlands.

New Section 17(F) prohibits the cultivation of genetically modified crops, livestock or other organisms.

These general SMP provisions set a standard for no net loss at an individual project level.

5.3 Proposed Regulations for Shoreline Uses and Modifications

The following pairs of tables provide a brief summary of the primary potential ecological impacts that may arise from various shoreline uses and modifications, as well as a summary of the proposed SMP regulations intended to conserve ecological functions and prevent adverse cumulative impacts. The first general table of each pair combines the vegetative and habitat functions as these two parameters are often so closely related that it would often be redundant to separately identify potential impacts of a particular use or modification on those functions. However, the second table of each pair separately shows the relationship between a given regulation and those two functions as the specificity of regulations sometimes provides a more straightforward connection to either or both vegetative and habitat functions. The most likely uses and modifications, based on analysis in Chapter 4, are described first, followed by less common modifications.

The potential impacts described in the tables are based on relationships described in the *Shoreline Inventory and Characterization Report - San Juan County* (Herrera et al. 2013) and the *Analysis of San Juan County Best Available Science Synthesis* (Adamus et al. 2011). In the interest of brevity, the basis for each relationship is not repeated in the tables below. The tables account for the more significant or most likely impacts, but may not account for the full suite of potential impacts from a given use or modification. These less significant or less likely impacts, while not specifically discussed below, would be addressed during the permitting process through mitigation sequencing requirements. Also, the listing of potential impacts does not mean that these impacts occur in every instance of a certain use or modification. For example, Table 5-1 lists potential for residential development to result in temperature impacts on forage fish incubation; however, these impacts would only be realized if the residential development occurs on a beach with potential forage fish spawning habitat and if nearshore vegetation removal is associated with the residential development.

Regulations that help ensure that impacts are avoided, minimized, and mitigated include provisions that can be separated in the following three general categories: (1) provisions that allow, condition, or prohibit specific types of development depending on Shoreline Designation; (2) provisions that apply specific standards that help avoid and minimize potential impacts; and

(3) provisions that require mitigation of impacts and/or demonstration of no net loss of functions. The tables that describe proposed SMP provisions also provide an indication of how potential activities may relate to ecological functions or which function or functions the regulations help to protect. It should be noted that an "X" in the following tables indicates a direct relationship between an SMP provision and a shoreline ecosystem function. A blank cell indicates that the SMP provision either does not affect the function or has a less direct effect on the function.

5.3.1 Residential Development

As noted in Section 4, residential development is likely to be the most common type of development in the County's shoreline area in the foreseeable future. The following tables (Tables 5-1 and 5-2) describe the potential impacts of residential development and the SMP provisions that help ensure that those impacts are avoided, minimized, or mitigated to avoid a net loss of functions. Many shoreline modifications may be considered accessory to residential development; however, these modifications are addressed separately in the following sections, and not addressed in this section.

Table 5-1. Summary of potential impacts from residential development.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
	Decrease hydrologic connectivity between backshore
Water Quality	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
	Water quality contamination from failed septic systems
	Increase in pesticide and fertilizer use
	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
Vegetative/ Habitat	Reduced shoreline habitat complexity, increased water temperatures, and less Large Woody Debris (LWD)
	Loss of or disturbance to riparian habitat during upland development
	Temperature impacts on forage fish incubation

Table 5-2. Summary of key SMP regulations relating to residential development that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Natural designation: Residential development is prohibited except that a single-family residence for personal use may be allowed. Vacation rentals and accessory dwelling units are prohibited. Alteration of natural topography and vegetation is restricted to what is absolutely necessary. (New Section 60(F)). Land division is prohibited (New Section 59(I)).	X	X	X	X
	Aquatic: Live aboard vessels are only allowed in marinas. (New Section 60(E)).		X		
General Provisions	All structures shall be set back sufficiently to ensure no net loss of ecological functions and values. On non-bedrock shorelines coastal geologic buffers consistent with SJCC 18.35.130 are required. A geotechnical report must demonstrate the proposed buffer will be sufficient to avoid the need for stabilization measures for a minimum of 75 years. (New Section 60(C)). New shoreline residential structures are subject to critical area buffers of SJCC Chapter 18.35.	X	X	X	X
	Where there is adequate screening, residential structures shall be located behind the treeline and are subject to an aesthetic set back of 50 feet from the OHWM. (New Section 60(C)(3)).	X	X	X	X
	If there is no adequate screening, then residential and appurtenant structures shall be located a minimum aesthetic setback of 100 feet landward from the OHWM. (New Section 60(C)(3)).	X	X	X	X
	Setbacks and buffers may be reduced if houses on adjoining lots are closer to the water than the minimum setback or buffer. In such case, impacts must be mitigated. (New Section 60(C)(6)).	X	X	X	X
	New development to avoid the need for future shoreline stabilization. (New Section 60(C)(1)).	X			X
	Development on waterfront parcels to cover no more than 50 percent of the width of the parcel. (New Section 60(A)(2)).			X	X
Clearing and Grading	Land clearing, grading, filling, and alteration of natural drainage features and land forms must be designed to prevent adverse impacts to adjacent properties or shoreline features. (New Section 16(B) and (C)).	X	X	X	X
	Alteration of wetlands, natural drainage, and topography limited to the area necessary. (New Section 16(C)).	X		X	X
Land divisions	All land divisions including non-bedrock lots are to be designed, configured and developed in a manner that prevents the need for shoreline stabilization. (New Section 59(D)).	X			X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Accessory Uses	Accessory structures that are not water-dependent, with the exception of decks attached to the primary structure and patios, are prohibited seaward of the most landward extent of the residence. (New Section 60 (D)(1)).	X	X	X	X

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

5.3.2 Overwater Structures (piers, docks, mooring buoys)

Overwater structures are among the most commonly permitted shoreline modifications. The permit analysis in Table 4-3 indicates that the majority of permits relate to the repair and replacement of existing structures, and that most new moorage structures are mooring buoys. Overwater structures have the potential for a variety of impacts primarily stemming from the shading of nearshore areas (indirectly through boat moorage in the case of buoys) and disturbance of sediment transport (Table 5-3). The SMP generally addresses overwater structures by implementing measures to limit the proliferation of structures and through measures that avoid, minimize and mitigate effects on sediment transport, water quality, and nearshore habitat (Table 5-4).

Table 5-3. Summary of potential impacts from overwater structures.

Functions	Potential Impacts to Functions
Hydrologic	Potential interference with movement of sediments, altering substrate composition
Water Quality	Water quality impacts associated with construction of docks and other in-water structures (e.g., spills, harmful materials use) and related uses of new docks (e.g., boat maintenance and operation)
Vegetative/ Habitat	Increased shading in nearshore habitat areas resulting from dock and pier construction can limit macrophyte growth and alter habitat for and behavior of aquatic organisms, including juvenile salmon
	Disturbance of substrate and submerged aquatic vegetation from pilings and anchors
	Nighttime lighting effects on fish behavior
	Loss of habitat for benthic community, less LWD for habitat complexity

Table 5-4. Summary of key SMP regulations relating to overwater structures that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	New marinas are prohibited in the Natural, Conservancy, Rural Residential, and Rural Farm-Forest designations. (New Section 66, (C) Table X)	X	X	X	X
	Ports and water related port facilities are prohibited in Natural, Conservancy, Rural, Rural Farm Forest, and, Rural Residential shoreline designations. (New Section 66, (C) Table X)				
	Boating facilities and docks are prohibited in the Natural designation. (New Section 66, (C) Table X)	X	X	X	X
General Standards	Multiple use and expansion of existing overwater structures is preferred over construction of new docks and piers. (New Section 29(A)(8))				X
	Mooring buoys and floats are preferred over docks and piers on all marine shorelines. (New Section 29(A)(9))				X
	Overwater structures shall be designed to minimize impacts to ecological functions. Joint use docks serving two households may not exceed 1,400 square feet. Joint use docks serving between 3 and 4 users may not exceed 2,000 square feet. Single family docks may not exceed 700 square feet. Marinas are directed to design to the minimum size necessary. (New Section 31(D) Table X)	X	X	X	X
	Overwater structures shall be sited and designed to avoid and minimize the need for new and maintenance dredging. (New Section 50(A)(2))		X		X
	Marinas that propose live aboard spaces must demonstrate the location of the long term moorage slips will not result in a net loss of shoreline ecological functions (New Section 33(P))		X		
	Overwater structures that can be expected to interfere with erosion-accretion process of feeder bluffs are prohibited. (New Section 29(A)(11))	X			
	Abandoned or unsafe overwater structures shall be removed or repaired promptly by the owner. (New Section 29(A)(12))	X	X		X
	Regular float plane access and moorage allowed as conditional use, and only at commercial, public, or community docks. (New Section 61(G)(1))		X		X
	All floats shall include stops that keep the bottom off of the benthic substrate. (New Section 29(B)(3))		X		X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Dock lighting must be directed downward and away from critical areas including FWHCAs, wetlands and wetland buffers. (New Section 25 and New Section 29(B)(7))				X
	Where feasible, floats to be secured with anchored cables and mechanisms to keep the cable from disturbing the bottom substrates and vegetation. (New Section 29(B)(8))		X	X	X
	Only one form of moorage will be permitted per parcel, with limited exceptions. (New Section 29(A)(5))		X		X
Boating Facilities, private and commercial docks and floats	Demonstration of need is required. (New Section 31(C)(1) and (2) and New Section 38(A) and (B))	X	X	X	X
	Boating facilities must avoid critical habitats as feasible and avoid a net loss of functions. (New Section 30(A) and (B))			X	X
	Dimensional standards and limits on the number of moorage slips per lots served. (New Section 30(C))	X	X	X	X
	If proposed structure affects critical habitats, applicant must demonstrate that alternative measures are not feasible. (New Section 30(A)(2))	X		X	X
Single and Joint Use (<4 units) Facilities	Structures must avoid and mitigate for any impacts to critical habitats. (New Section 31(B))	X		X	X
	Dimensional and materials standards for piers, docks, and floats to minimize impacts of new or replacement piers. (New Section 31(D))	X	X	X	X
	Effective grating standards for new or replacement piers. (New Section 31(D))			X	X
Land Division	If docks are proposed as part of land divisions, the proposal may include no more than one joint-use moorage facility in a designated and reserved area of the waterfront. (New Section 59(G))	X		X	X
Commercial/ Industrial Facilities	Bulk storage for petroleum products is prohibited on piers and docks. (New Section 32(B))		X		
	New piers serving single commercial or industrial enterprises prohibited if more than one enterprise could realistically make use of a single facility. (New Section 32(A))	X		X	X
	Spill clean-up facilities to be available at all piers and docks involved in oil and hazardous product transfer. (New Section 32(C))		X		

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	When feasible, public access and ecological restoration shall be incorporated into publicly financed projects. (New Section 29(A)(7))	X	X	X	X
Marinas	Dredging or filling of wetlands for the sole purpose of constructing a marina is prohibited. (New Section 33(C))	X			X
	All service facilities associated with a marina to include measures to prevent pollutants from entering the water. (New Section 33(E))		X		
	Commercial covered moorage permitted only where vessel construction or repair work requires it. (New Section 33(F))			X	X
	Surface runoff from marina areas to be controlled so that pollutants will not enter water bodies. (New Section 33(K))		X		
	Marinas shall not be permitted on Class I beaches or where they would interrupt driftways feeding Class I beaches. (New Section 33(L))	X			X
	Commercial uses, including ports and marinas shall be equipped to contain and clean up polluting spills. (New Section 33(E) and New Section 49(A)(4))		X		
	Live aboard moorage is permitted over publicly owned lands in up to 25% of a marina's slips, provided best management practices and waste disposal facilities are used. (New Section 60(E)(2))		X		
Mooring buoys	Private recreational buoys on state-owned aquatic lands shall not be used for live aboards or commercial purposes. (New Section 35(E))		X		
	Mooring buoys shall be located to avoid eelgrass beds and other critical saltwater habitats (New Section 35(C))			X	X
	Mooring buoys to use device to minimize adverse effects on aquatic ecosystem and fish. (New Section 35(F))		X	X	X

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

5.3.3 Shoreline Stabilization

Shoreline stabilization structures are common features on the County's marine shorelines. Recent permit history (Table 4-3) indicates that new shoreline stabilization measures are permitted relatively infrequently, but that repair and replacement of existing structures occur more commonly. Shoreline stabilization measures have potentially significant impacts on sediment transport processes,

which in turn affect submerged aquatic vegetation and nearshore habitat functions (Table 5-5). The proposed SMP substantially limits the development of new shoreline stabilization structures by establishing strict permitting criteria. The proposed SMP further ensures that new and replacement structures evaluate and implement the stabilization approach with the least potential for impacts to shoreline functions (Table 5-6). Any new or replacement structure must ensure that no net loss of functions is achieved.

Table 5-5. Summary of potential impacts from shoreline stabilization.

Functions	Potential Impacts to Functions
Hydrologic	Increase in wave energy at the shoreline resulting in increased nearshore turbulence and uprooting of aquatic vegetation
	Disruption of shoreline wetlands
	Marine shorelines: impoundment of sediment recruitment from backshore areas alters sediment balance, resulting in coarsening of substrate and loss of eelgrass beds (particularly significant for historical feeder bluffs and accretion shoreforms)
Water Quality	Water quality impacts associated with construction
	Removal of shoreline vegetation increases erosion and water temperatures
Vegetative/ Habitat	Reduction in nearshore vegetation - loss of eelgrass beds associated with sediment coarsening.
	Increased slope of the nearshore reduces shallow nearshore habitat area

Table 5-6. Summary of key SMP regulations relating to shoreline stabilization that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Breakwaters, jetties and groins are not permitted in the Natural designation. (New Section 40(B)(2))	X			X
General Standards	New and expanded stabilization is prohibited, except when geotechnical analysis documents need. (New Section 48(A))	X			
	Feasibility of non-structural and soft measures must be evaluated prior to use of hard measures. (New Section 42(A)–(C))	X			X
	Shoreline stabilization must minimize and mitigate short-term impacts to ecological functions (New Section 43(B))	X			X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	New, enlarged, or replacement hard structural shoreline stabilization must avoid and minimize long-term adverse impacts by limiting size; shifting or sloping structure landward; and avoiding areas of ecological importance where possible. (New Section 44(A))	X			X
	New and enlarged stabilization must mitigate impacts by supplementing substrate, planting vegetation, and additional mitigation depending on impact. (New Section 44(C)(1)and(2))	X		X	X
	Shoreline stabilization must not significantly interfere with drainage. (New Section 43(C))	X			
	Shoreline stabilization must not extend waterward more than necessary, except for enhancement features. (New Section 43(G))	X			X
	Residential structures that will require shoreline stabilization within 75 years are prohibited. (New Section 59(D) and New Section 60 (C)(1))	X			X
Replacement of Existing Shoreline Stabilization	Application for replacement of soft or hard stabilization must include evaluation of need and of stabilization alternatives. (New Section 48(A))	X			
Subdivision and Existing Lots without structures	Subdivisions to be designed and configured to prevent the need for shoreline stabilization or flood hazard reduction measures and ensure no net loss of ecological functions at full build-out of all lots. (New Section 59(D))	X			X
Breakwaters, Jetties, and Groins	Breakwaters to be designed and constructed to prevent impacts on the water circulation, sand transport, and aquatic life. (New Section 40(A)(3))	X		X	X
	Where no prohibited, jetties and groins are shoreline conditional uses. (New Section 66(C))	X		X	X

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

5.3.4 Shoreline Access

Similar to shoreline stabilization measures, shoreline access structures are common on the County's marine shorelines, and recent permit history (Table 4-3) indicates that few new access structures are permitted compared to the number of repairs and replacements of existing structures. Ecological impacts from shoreline access structures could occur through the disturbance caused by the clearing of shoreline vegetation and from any armoring that is required to

protect the structure (Table 5-7). The proposed SMP limits the potential impact from shoreline access structures by limiting the allowed dimensions, and specifically addressing bank stability, potential impacts on erosion processes, and vegetation disturbance (Table 5-8).

Table 5-7. Summary of potential impacts from shoreline access.

Functions	Potential Impacts to Functions
Hydrologic	Where shoreline access requires shoreline armoring, potential hydrologic and habitat impacts may occur.
Water Quality	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
Vegetative/ Habitat	Removal of vegetation to accommodate access may reduce habitat complexity, increase water and substrate temperatures, and limit LWD
	Wildlife disturbance and trampling of aquatic vegetation from increased access

Table 5-8. Summary of key SMP regulations relating to shoreline access structures that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Shoreline access structures are not permitted in the Natural designation. (New Section 66(C))	X	X	X	X
Shoreline Exemption	Residential beach access structures may qualify for a letter of exemption if they meet the following criteria, among others: • No structure seaward of the OHWM unless connected to a dock. • Stairs or ramps when no other beach access is feasible. • Maximum vertical height is 15 feet and maximum width is three feet. Stairways not located on rock faces or bluffs over a 60-degree angle. • The bank stability requirements are met. (New Section 11(2)(a) – (g))	X	X	X	X
General Standards	Substantial shoreline development permits for shoreline access structures will be evaluated on impacts on bank stability, vegetation removal, visual impacts, structural stability, and achievement of no net loss of ecological functions. (New Section 56(C))	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Shoreline access structures which are likely to interfere with the normal erosion/accretion process associated with feeder bluffs are prohibited. (New Section 56(D))	X			
	The construction of trails, stairs, or raised walkways is allowed in FWHCAs and buffers, provided that structure directs runoff to adjacent vegetation; does not exceed five feet in width; is constructed of non-toxic materials; and does not include the placement of fill. (SJCC 18.35.100(C), Table 18.35 100-4)	X	X	X	
	Access structures must not extend waterward of the shoreline stabilization measure and the OHWM. (New Section 43(E))	X			X

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

5.3.5 Utilities

Utility infrastructure is commonly needed as an accessory for other shoreline uses, particularly residential development. Permit history indicates that new, expanded, replaced, and repaired utility infrastructure occurs periodically in the County's shoreline jurisdiction (Table 4-3). The potential impacts of desalination facilities, identified in Table 5-9, are of particular interest, because of their water-oriented nature and their potential value in the County. The proposed SMP requires that utilities ensure no net loss of functions and specific regulations are provided for desalination facilities (Table 5-10).

Table 5-9. Summary of potential impacts from utilities.

Functions	Potential Impacts to Functions
Hydrologic	Where utilities require shoreline armoring, associated hydrologic impacts are likely
	Alteration of water and sediment transport caused by pre-filtration wells (desalination)
	Erosion at outfall location can alter sediment transport processes
Water Quality	Potential for contaminant spill or leakage
	Increased salinity (distillation and reverse osmosis) and temperature (distillation only) at desalination discharge location (desalination)
	Release of pre-treatment chemicals (biocides) at desalination discharge location (desalination)
Vegetative/ Habitat	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing

Table 5-10. Summary of key SMP regulations relating to utilities that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Utilities are prohibited in the Natural designation, except when no other feasible alternative exists. Desalination may be permitted. (New Section 62(C))	X	X	X	X
General Utilities	Land based utilities must be buried where feasible and developers must coordinate with other agencies to allow for multiple uses of existing easements and Rights of Way. (New Section 62 (A)(2) and (3))		X	X	
	Utilities shall not be installed in shoreline areas unless there is no feasible alternative. (New Section 62 (A)(1))		X		
	Outfalls and underwater pipelines that transport potentially harmful substances may not result in significant adverse impacts. (New Section 62 (A)(7))		X		
	All utilities, uses and activities in shoreline jurisdiction shall be located, designed, constructed, and managed to ensure no net loss of shoreline ecological functions and processes. (New Section 62 (A)(8))	X	X	X	X
Desalination	Desalination systems shorelines require design and engineering to result in no net loss of ecological functions. (New Section 62(B)(3))	X			

	Desalination facilities with an intake of greater than one hundred thousand (100,000) gallons per day shall not be permitted unless a detailed assessment and mitigation analysis are completed. The study must show how the project will ensure no net loss of shoreline functions. (New Section 62(B)(6))		X		
	The use of wells with salt water contamination or salt water intrusion as the intake source for desalination system is prohibited, unless specifically permitted by Department of Health. (New Section 62(B)(7)(e))	X			X
	Desalination projects shall be located, designed, constructed, and managed to ensure no net loss of shoreline functions. (New Section 62(B)(3))	X	X	X	X

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

5.3.6 Transportation Facilities-Upland (Roads/Parking)

Shoreline permit history indicates that road repair occurs periodically (four permits from 2005-2009, and an additional two permits where the permit activity was not specified) (Table 4-3). An additional five permits for parking areas were issued from 2005-2009 (Table 4-3).

Roads and parking areas are common features along the County's more developed shorelines. Roads, parking areas, and associated traffic tend to impair habitat and hydrologic connectivity, and stormwater runoff can have a substantial impact on water quality conditions (Table 5-11). Proposed SMP standards require that new primary roads, as well as parking areas, are constructed outside of shoreline jurisdiction where feasible (Table 5-12). As such, with the exception of driveways and access roads for new residential development, new roads are not anticipated in shoreline jurisdiction.

As the County's public works website notes, "Most of the roads in the County system have just evolved. Roads were built with little or no load design or drainage, and are in poor condition requiring more maintenance." The County continues to upgrade roads by seal coating gravel roads, improving drainage, and replacing culverts. Seal coating of roads and improved drainage (even outside of jurisdiction) reduces the permeability of the road surface and likely increases surface runoff and road contaminants reaching receiving waters. These effects are likely to have a negative impact on water quality. The proposed SMP would affect ongoing road maintenance within shoreline jurisdiction by requiring that roads are located, designed, constructed, and managed to ensure no net loss of shoreline ecological functions and processes (Table 5-12). For road work outside of shoreline jurisdiction, the County's clearing and grading regulations (18.60.060), stormwater regulations (18.60.070), and road standards (18.60.080-.100) apply.

In addition to SMP standards that apply to road maintenance and improvements, completed road projects will reduce impacts on shoreline function. For example, the County's relocation of Cattle Point Road on San Juan Island away from an eroding feeder bluff. This measure allows natural erosion processes to continue, rather than implementing shoreline stabilization measures to protect the road. Other planned or possible road projects will restore functions that have been impaired by existing roads. One of these potential projects include constructing a bridge or a causeway at Bayshore Road on the Fisherman Bay tombolo to restore tidal flushing, improving natural sediment transport processes and water quality, constructing a box culvert or causeway under Driftwood Drive to improve circulation and connectivity between Neck Point and Shaw Island, and replacing the Deer Harbor bridge with a spanning bridge to restore full tidal exchange to the estuary. These projects will significantly reduce the existing impacts of roads in shoreline jurisdiction.

Table 5-11. Summary of potential impacts from upland transportation facilities.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with more impervious surfaces
Water Quality	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
Vegetative/ Habitat	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
	Fish passage impacts associated with stream crossings

Table 5-12. Summary of key SMP regulations relating to upland transportation facilities that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Rural Residential: Roads permitted in shoreline jurisdiction if no feasible alternative exists. (New Section 61(J)(1))	X	X	X	X
	Conservancy and Rural Farm Forest: Roads and parking areas serving allowed uses may be permitted with a shoreline substantial development permit if no feasible alternative exists. (New Section 61(J)(2)(b))	X	X	X	X
	Natural: Roads are prohibited. Parking lots are prohibited unless there is no feasible alternative and require a Conditional Use Permit. (New Section 61(J)(3))	X	X	X	X

General Standards	The filling of wetlands is not permitted unless no feasible alternative exists and mitigation will ensure no net loss of ecological functions. (New Section 16(E))	X	X	X	X
	Transportation uses shall be located, designed, constructed, and managed to ensure no net loss of shoreline functions. (New Section 61(A)(1))	X	X	X	X
Roads	Major collector roads shall not be constructed in shoreline areas if an alternative alignment is feasible and practicable. (New Section 61 (B)(1))	X	X	X	X
	Major collector roads in shoreline areas shall follow the most direct route possible, consistent with protection of the physical environment ecological processes. (New Section 61 (B)(2))	X	X	X	X
	New major collector roads built in the shoreline must ensure no net loss of ecological functions. (New Section 61 (A)(1))	X	X	X	X
	Roads shall not be constructed on or seaward of a beach berm. (New Section 61(B)(6))	X			X
	Roads shall be set back a safe distance (far enough from the waterward edge to ensure that there will be no need for shoreline stabilization for a minimum of 75 years), behind the tops of feeder bluffs. (New Section 61(B)(7))	X			X
	Unless infeasible, roads and driveways may not be constructed across streams, buffers, or Tree Protection Zones. (SJCC 18.35.100(F)(1)–(11) and SJCC 18.35.130(E)(1)– (11))	X	X	X	X
	Bridges, culverts and crossings shall meet WDFW and NMFS standards and not interfere with fish passage, water or gravel movement, large woody debris, or other processes. (SJCC 18.35.130(E)(2))	X			X
	When practicable, new roads, driveways, and trails shall be located on existing road grades, utility corridors or previously disturbed areas. (SJCC 18.35.100(F)(2); SJCC 18.35.130(E)(3))			X	X
	Roads and driveways must direct runoff from the road surface into vegetated areas.(SJCC 18.35.100(F)(10); SJCC 18.35.135(E)(11))	X	X		
Parking	Parking areas shall not be located in shoreline areas unless they are essential accessories to a permitted use, they cannot be located on upland sites, and they ensure no net loss of functions. (New Section 61(C)(1)(a)-(c))	X	X	X	X
	Parking is prohibited over water. (New Section 61(C)(4))		X	X	X

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

5.3.7 Transportation Facilities - Marine (Ferry and Float Plane Terminals, and Barge Landings)

Because the County is composed of numerous islands, marine transportation facilities are an important component of the County's transportation infrastructure. The County's six-year transportation improvement plan includes plans for replacement of floats, piles, docks, and boat ramps at County facilities. Any dock, float, or boat ramp replacement projects will need to comply with the appropriate shoreline modification standards in the SMP. The proposed SMP requires that ferry terminals and associated parking be located, designed and constructed to ensure no net loss of ecological functions (Table 5-14). Any commercial watercraft and seaplane operations at public access points require a conditional use permit, and no net loss must be demonstrated on an individual project basis (Table 5-14).

Table 5-13. Summary of potential impacts from marine transportation facilities.

Functions	Potential Impacts to Functions
Hydrologic	Increase in stormwater runoff and discharge in association with impervious parking surfaces
	Alter sediment transport processes along beaches
Water Quality	Increase in contaminants associated with the creation of new impervious surfaces (e.g. metals, petroleum hydrocarbons)
	Potential for spills associated with operation and maintenance
	Turbidity caused by prop wash
Vegetative/ Habitat	Greater potential for increased erosion, bank instability, and turbidity associated with vegetation clearing
	Shading and/or physical cover/replacement of intertidal habitat
	Associated boat use may damage aquatic vegetation (eelgrass) by physical damage, turbidity from prop wash

Table 5-14. Summary of key SMP regulations relating to marine transportation facilities that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Conservancy and Rural Farm Forest: Ferry terminals may be permitted as conditional uses if no feasible alternative exists. (New Section 61(J)(2)(c))	X	X	X	X

	Natural: Transportation facilities are generally prohibited. Trails are allowed. Parking lots may be allowed if there are no feasible alternatives and require a Conditional Use Permit. (New Section 61(J)(3))	X	X	X	X
Ferry Terminals	Ferry terminals and related parking shall be located, designed, and constructed to ensure no net loss of functions. (New Section 61(E))	X	X	X	X
Float Plane Terminals	Use of docks for scheduled commercial float plane service shall be allowed only in public or private marinas or established port areas and shall be subject to conditional use permit for float plane use. (New Section 61(G)(1))		X		
County Docks	County docks shall be designed and located to increase public access to the shoreline and to ensure no net loss of ecological functions and values. (New Section 61(F))	X	X	X	X
Barge Landings	Demand must be demonstrated for new permanent barge landing sites. (New Section 61(H)(2))	X	X	X	X
	Barge landing sites shall be located, designed, constructed, and maintained in a manner which ensures no net loss of shoreline ecological functions and which maximizes the opportunity to serve multiple users on a given island. (New Section 61(3))	X	X	X	X
	The development of a new permanent facility for barge landings shall be a shoreline conditional use.(New Section 61(H)(2))	X	X	X	X

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

5.3.8 Agriculture

Permit history does not identify any new agricultural uses in the past 30 years, and new agriculture is not anticipated. Ongoing agriculture is not regulated under the SMA. The proposed SMP includes standards to ensure that new agriculture will ensure no net loss of ecological functions, including establishing buffers to avoid surface water runoff to adjacent waterbodies.

Table 5-15. Summary of potential impacts from agriculture.

Functions	Potential Impacts to Functions
Hydrologic	Agricultural irrigation from wells may affect ground water.
Water Quality	Increased erosion from removal of trees or tilling of soil.
Vegetative/ Habitat	Reduction in forest cover associated with conversion of lands to agricultural uses.

Table 5-16. Summary of key SMP regulations relating to agriculture that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	New agriculture in the Natural shoreline designation may only be permitted as a conditional use. (New Section 27(B))	X	X	X	X
Agriculture	Buffers sufficient to prevent surface runoff and reduce siltation shall be established and maintained between tilled or grazed areas and associated water bodies. (New Section 27(A)(1))		X		
	New agricultural activities shall be located, designed, constructed, and managed to ensure no net loss of ecological functions and values. (New Section 27(A)(4))	X	X	X	X

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

5.3.9 Aquaculture

Based on County permit history (Table 4-2), no applications for new aquaculture were received from 1995-2009. Therefore, applications for new aquaculture are likely to be rare to non-existent in the foreseeable future. Several aquaculture facilities exist within the County, and a change in the use of these facilities would require a shoreline permit.

Overwater aquaculture facilities and commercial mechanical harvest practices have the potential to disrupt sediment processes and benthic habitat assemblages (Table 5-17). The proposed SMP prohibits mechanical harvest in areas with kelp or moderate to high densities of eelgrass, and prohibits any new aquaculture facilities that would result in adverse effects on natural shore-forming processes (Table 5-14).

Whereas all aquaculture facilities have some potential to affect water quality through turbidity caused by sediment disturbance, aquaculture facilities that raise filter-feeding organisms may have the potential to reduce nutrient loads. The SMP requires that all aquaculture facilities comply with state and federal water quality standards (Table 5-18).

On the other hand, net pen aquaculture facilities or any facilities that use supplemental feeding practices, antibiotics, pesticides, or herbicides have the potential for significant water quality impacts. The County's SMP prohibits net pen aquaculture. When new data about potential impacts and best management

practices is available, the prohibition on net pen aquaculture will be reconsidered.

Table 5-17. Summary of potential impacts from aquaculture.

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

Table 5-18. Summary of key SMP regulations relating to aquaculture that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Only aquaculture that does not require structures, facilities, or mechanized harvest and that will not alter natural features is allowed in the Natural designation. (New Section 28(C)(3))	X	X	X	X
Aquaculture	No structures or facilities which would have a significant adverse impact on shoreline ecological functions are prohibited. (New Section 28(A)(2))	X			X
	No aquatic organism shall be introduced into San Juan County waters without written approval by the appropriate regulatory agency. (New Section 28(A)(4))				X
	Aquaculture shall comply with all applicable governmental noise, air pollution, and water quality standards. (New Section 28(A)(6))		X		
	New commercial aquaculture that is likely to affect water quality or quantity of an established commercial aquaculture project may require research or analysis of water quality impacts. (New Section 28(A)(28))		X		
	Proposals for activities that involve substantial substrate modification shall not be allowed in eel grass beds. (New Section 28(A)(23))			X	X
	The SMP prohibits commercial fin fish net pen aquaculture.	X	X	X	X

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

5.3.10 Boat Ramps (including marine railway)

Permit history from 2005-2009 includes one permit for a new boat ramp, one permit for a boat ramp addition, and seven permits for repair or replacement of existing boat ramps (Table 4-3). Past permitted boat ramps (2000-2005) are distributed along both rocky shorelines and beach shoreform types (Whitman 2007).

As hardened structures that extend below the OHWM, motorized boat ramps have the potential to alter wave energy distribution and sediment transport processes (Table 5-19). Boat use associated with ramps can cause turbidity, disturb benthic substrate, and damage submerged aquatic vegetation (Table 5-19). The proposed SMP prohibits boat ramps from disrupting longshore drift, and it protects the highest functioning beaches (Class I) and their driftways by prohibiting boat ramps in these locations (Table 5-20). Proposed standards that prohibit private residential boat ramps or marine railways where significant fill or shoreline defense measures would be required will help limit the effects on shoreline processes. Furthermore, standards that require habitat surveys and slope bathymetry for new boat ramps will help ensure that boat ramps are not permitted where the natural beach slope would not accommodate such use or where habitat functions would be degraded as a result of use of the structure (Table 5-20).

Table 5-19. Summary of potential impacts from boat ramps.

Functions	Potential Impacts to Functions
Hydrologic	Alter wave energy and sediment transport processes along beaches
Water Quality	Associated boat use may cause increased turbidity and increased potential for contaminant spills
Vegetative/ Habitat	Physical cover/replacement of intertidal habitat
	Associated boat use may damage aquatic vegetation (eelgrass) by physical damage, turbidity from prop wash
	Habitat impacts of altered sediment transport processes

Table 5-20. Summary of key SMP regulations relating to boat ramps that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Community, commercial, and public boat ramps are prohibited in the Natural designation. (New Section 66(C))	X	X	X	X
General Standards	Boat launching ramps and marine railways shall be designed to not obstruct longshore drift. (New Section 34(A))	X			
	Boat launching ramps and marine railways prohibited on Class I beaches or where their presence would interrupt driftways feeding Class I beaches. (New Section 34(D))	X			X
	Marine railways for boat launching shall be located on existing grade, avoiding fill where feasible. A boathouse at the landward end of a marine railway, landward of the OHWM, is allowed provided it meets required buffers or setbacks.(New Section 28(E))	X			
	Applications for new and expanded boating facilities require habitat surveys, critical area studies, and mitigation sequencing. A slope bathymetry map may be required. (New Section 38(A) and (B))	X	X	X	X
Private Residential	Residential boat launching ramps may be permitted where the upland slope within 25 feet of the OHWM does not exceed 25% and where cutting, grading, or filling that exceeds 250 cubic yards or defense works is not necessary. (New Section 34(B))	X			
Multi-lot Ramps	Applications for new or expanded boat ramps serving five or more lots must provide an assessment of demand. (New Section 38(A))	X			

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

5.3.11 Commercial/Industrial Development

As noted in the land capacity analysis (Section 4.1), there is little shoreline land available for commercial or industrial development, and much of the industrially zoned shoreline is already occupied by essential industrial uses, such as boat repair facilities. Shoreline building permit history (Table 4-4) also indicates that commercial development occurs infrequently in the County (approximately 3% of total shoreline building permits).

Shoreline designation standards in the proposed SMP limit where and what type of commercial and industrial development may occur. These standards help

avoid potential use conflicts and appropriately locate high intensity development in shoreline areas with higher levels of existing alterations. The proposed SMP also includes provisions requiring commercial and industrial development to ensure that these facilities do not result in a net loss of shoreline ecological functions (Table 5-22). Specific standards for shoreline modifications also apply to commercial and industrial development, including clearing and grading, boating facilities, dredge and fill, and aquaculture, among others.

Table 5-21. Summary of potential impacts from commercial and industrial development.

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

Table 5-22. Summary of key SMP regulations relating to commercial and industrial development that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	New nonwater-oriented industrial development is prohibited in all designations in shoreline jurisdiction. (New Section 52(A)(1))		X	X	X
	Natural: Commercial and industrial developments are prohibited. (New Section 66(C))	X	X	X	X
	Conservancy: Industrial development is prohibited. Low-intensity commercial recreational development is permitted, provided structures are set back 100 ft from OHWM. (New Section 66(C) and New Section 49(B)(4)(a) and (b))	X	X	X	X

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
	Rural: Commercial development and water-oriented industrial development are conditional uses. (New Section 66(C) and New Section 49(B)(2))	X	X	X	X
	Rural Residential: Industrial development is prohibited. Commercial development is prohibited, except that alteration or expansion of small resorts, camps or facilities associated with a commercial marina may be permitted. (New Section 66(C) and New Section 49(B)(3))	X	X	X	X
	Rural Farm Forest: Commercial development is prohibited, except that alteration or expansion of small resorts, camps or facilities associated with a commercial marina may be permitted. (New Section 66(C) and New Section 49(B)(3))	X	X	X	X
	Ports, Marinas, and Transportation: Marine fueling and sewage pump out facilities may be allowed, and all other industrial facilities are prohibited. Water-oriented commercial development is permitted. (New Section 66(C) and New Section 49(B)(5) and New Section 52(B)(3))	X	X	X	X
General Standards	Commercial development shall not result in a net loss of shoreline functions. Impacts to shoreline resources must be mitigated by public access and ecological restoration unless such improvements are infeasible or inappropriate. (New Section 49(A)(6))	X	X	X	X
	Industrial uses and activities in shoreline jurisdictions shall be located, designed, constructed, and managed to ensure no net loss of shoreline functions and processes. (New Section 52(A)(9))	X	X	X	X
	Log storage - preference for dry-land storage; effective debris clean-up measures required; surface runoff control required. (New Section 54(A)(1),(5) and (6))		X		

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

5.3.12 Dredge and Dredge Disposal

Only one dredge permit was issued from 2005-2009 (Table 4-2), and that permit involved maintenance dredging of a marina. Because the SMP establishes standards for new development to avoid the need for future maintenance dredging, the most likely dredging applications are expected to be related to maintenance dredging of previously dredged channels where habitat functions are already altered.

Dredging can have significant effects on sediment transport, short-term effects on water quality, and by creating deep water, the act of dredging can eliminate valuable shallow, nearshore habitat (Table 5-23). The proposed SMP requires physical, chemical and biological evaluation of the proposed dredge material, and surveys of habitat areas must be conducted in order to ensure that potential impacts are avoided, minimized, or offset, such that no net loss of functions is achieved on a project-by-project basis (Table 5-24).

Table 5-23. Summary of potential impacts from dredging and dredge disposal.

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

Table 5-24. Summary of key SMP regulations relating to dredge and dredge disposal that protect ecological functions.

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Natural- Dredging and dredge disposal are prohibited. (New Section 66(C))	X	X	X	X
	Conservancy- Dredging limited to maintenance of existing navigation channels and facilities. Spoils disposal limited to existing sites designated by DNR. (New Section 50(B)(2))	X	X	X	X
General Standards	Dredging and dredge material disposal must avoid or minimize significant ecological impacts. Unavoidable impacts must be mitigated to ensure no net loss of shoreline functions. (New Section 50(A)(1))	X	X	X	X
	New development must be sited and designed to avoid or minimize the need for new and maintenance dredging. (New Section 50(A)(2))	X	X	X	X
	Application must identify location and describe physical, chemical, and provide biological evaluations of proposed dredge site and dredge spoils.(New Section (A)(6)(a)-(e))		X	X	
Boating Facilities	Facilities shall be sited and designed to avoid and minimize the need for new and maintenance dredging. (New Section 29(A)(2))	X	X	X	X

	Dredging or filling of wetlands for the sole purpose of constructing a marina is prohibited. (New Section 33(C))	X	X	X	X

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

5.3.13 Mining

No permits were issued for mineral extraction in San Juan County from 2005-2009 (Table 4-2), and mining permits are not anticipated in the foreseeable future. Large-scale mining has potential to significantly impact erosion and sediment transport processes, water quality, and nearshore habitat (Table 5-25). Commercial mining is prohibited on beaches or feeder bluffs. Any proposals for mineral extraction would be required to follow mitigation sequencing and to establish buffer zones, utilize erosion control measures, and a follow a detailed reclamation plan (Table 5-26).

Table 5-25. Summary of potential impacts from mining.

Functions	Potential Impacts to Functions
Hydrologic	Alteration in erosion processes; elimination/reduction of potential sediment recruitment
Water Quality	Reduction in water quality from turbidity and dredge material disposal
Vegetative/ Habitat	Disruption of benthic community
	Reduction in shallow-water habitat

Table 5-26. Summary of key SMP regulations relating to mining that protect ecological functions. "X" indicates direct relationship between SMP provision and shoreline function

Location in SMP	SMP Provision Providing Protection of Ecological Functions	Primary Function*			
		Hydrologic	Water Quality	Vegetation	Habitat
Shoreline Desig.	Mineral extraction is permitted in the Rural and Urban designations. (New Section 66(C) and New Section 55(B))	X	X	X	X
General Standards	Mineral extraction is subject to mitigation sequencing. (New Section 55(A)(1))	X	X	X	X
	Commercial mineral extraction from beaches and feeder bluffs is prohibited, and non-commercial extraction from any marine or lake beach is prohibited. (New Section 55(A)(4) and (5))	X	X	X	X

	Mineral extraction must employ buffer zones, erosion control measures, and must establish a detailed reclamation plan. (New Section 55(A)(7) and (8)		X	X	

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

5.4 Critical Areas

5.4.1 Fish and Wildlife Habitat Conservation Areas

Fish and Wildlife Habitat Conservation Areas (FWHCA) include critical saltwater habitats, lakes, streams, bluff backed beaches (including feeder bluffs), pocket beaches, and other habitats with which specified fish and wildlife species have a primary association (SJCC 18.35.115). Shoreline buffer standards apply to all areas within 200 feet of any FWHCA.

Three separate components are considered in determining the required FWCHA buffer width: (1) a water quality buffer that applies in all cases; (2) a tree protection zone that applies to areas with trees; and (3) a coastal geologic buffer that applies to areas subject to erosion caused by currents, tidal action, or waves (SJCC 18.35.130(A)). When determining the size of the required FWHCA buffer, the largest of the three components applies. The method of calculating the three buffer components was developed based on the County's *Best Available Science Synthesis*, which evaluated buffer characteristics necessary to maintain functions (Adamus et al. 2011). The approach to calculating required buffers provides a site-specific assessment based on existing conditions, including erosion risk, slope, runoff coefficients of various surfaces, and existing vegetation. In fact, for properties with characteristics that vary within the parcel, the size of the required buffer and tree protection zone may vary (SJCC 18.35.130(A)).

On non-bedrock shorelines, building setback widths are required to maintain natural erosive processes for the next 75 years, and water quality buffer widths are designed to achieve 60% filtration of surface runoff. The tree protection zone widths and standards maintain trees and associated beach shading and detritus recruitment within Zone 1, which extends 35 feet landward from the OHWM. Tree protection standards in the outer portion of the tree protection zone are more permissive, but the standards are designed to maintain habitat, shading, and detritus recruitment functions farther from the shoreline. The proposed SMP describes allowable activities within buffers and within the tree protection zone separately.

In the tree protection zone, no tree removal is allowed within 35 feet of the OHWM (Zone 1). Within Zone 2 of the tree protection zone (the area beyond 35 feet from the OHWM), tree removal is permitted to allow for construction of a primary residence and to maintain views. Within Zone 2, several criteria must

be met, including that (1) no more than 40% of the volume of trees over 6 inches diameter at breast height (DBH) may be removed over a ten year period, and (2) a minimum established basal area density is maintained (SJCC 18.35.130(B)(1)(c) and (d)).

In established buffer areas, limited development is permitted (SJCC 18.35.130, Table 18.35.130-3, Structures, Uses and Activities Allowed In and Over Aquatic FWHCAs and their Water Quality Buffers). Examples of some of the allowed development within the buffer area are provided below:

- Establishment and expansion of organic orchards and gardens in the outer 25% of the buffer area, provided that an undisturbed buffer of 30 feet is retained.
- The construction of trails, stairs and walkways, provided that sheet flow runoff is directed to adjacent vegetation and the width does not exceed 5 feet, among other standards.
- Wells in the outer 25% of the buffer area.
- Minor trimming and pruning of trees.
- Components of stormwater management facilities.
- Fences.
- Stream crossings.

In addition to buffer width standards, additional habitat standards apply depending on species and habitats present at a given property location (SJCC 18.35.135).

5.4.2 Wetlands

Similar to the FWHCA standards, two separate components are considered in determining the required wetland buffer width: (1) a water quality buffer, and (2) a habitat buffer. When determining the size of the required wetland buffer, the largest of the two components applies. The method of calculating the two buffer components is based on the Washington State Wetland Rating System for Western Washington – Revised. This rating system is designed to differentiate between wetlands based on their sensitivity to disturbance, rarity, irreplaceability and the functions they provide. Water quality buffers may range from 25-250 feet. Habitat buffers range from 25-300 feet. Limited development is permitted within the wetland buffer, including examples listed above in Section 5.4.1 for FWHCAs.

5.4.3 Geologically Hazardous Areas

Proposed regulations specific to geologically hazardous areas apply siting and design standards to minimize and manage risks and ecological impacts to areas of high and moderate geologic hazards (SJCC 18.35.065 and 18.35.070).

5.5 Shoreline Restoration Plan

As discussed above, one of the key objectives that the SMP must address is "no net loss of ecological functions necessary to sustain shoreline natural resources" (Ecology 2011). Although the implementation of restoration actions to restore historic functions is not required by SMP provisions, the Guidelines state that "master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program" (WAC 173-26-201(2)(f)). Pursuant to that direction, the County prepared the *Shoreline Restoration Plan* (Herrera 2016), which identifies opportunities for voluntary restoration, enhancement and protection actions.

The *Shoreline Restoration Plan* represents a long-term vision for restoration that will be implemented over time, resulting in a gradual improvement over the existing conditions. Although the SMP is intended to achieve no net loss of ecosystem functions through regulatory standards, practically, despite required practices to follow mitigation sequencing to avoid, minimize, and compensate for impacts on a site-specific scale, an incremental loss of shoreline functions may still occur at a cumulative level. These losses may occur through minor, exempt development; illegal development; failed mitigation efforts; or a temporal lag between the loss of existing functions and the realization of mitigated functions. The *Shoreline Restoration Plan*, and the voluntary actions described therein, are an important component in making up that difference in ecological function that would otherwise result.

The County's *Shoreline Restoration Plan* (Herrera 2016) identifies planned, and completed site-specific restoration projects, as well as ongoing and potential outreach and incentive programs to improve shoreline functions and processes. Major *Shoreline Restoration Plan* components that will contribute to an improvement in ecological functions are summarized below:

- Site-specific projects to restore ecological processes and eliminate barriers. Projects include, among others:
    - Removal and/or modification of overwater infrastructure; and
    - Removal and/or modification of nearshore infrastructure.
- Protection of intact processes and functions through property or easement acquisitions where existing systems are largely intact.
- Provide programmatic approaches such as education and outreach.

Examples of specific projects that have been proposed or are in the process of implementation are briefly described in Table 5-27. These projects represent a subset of the restoration projects that are likely to occur in the foreseeable future.

Table 5-27 Description of active and completed restoration projects from the Shoreline Restoration Plan (Herrera 2016). Conceptual and monitoring projects are not included in this table.

Project Type	Project Name and Description	Status	Primary Function Restored*			
			Hydrologic	Water Quality	Vegetative	Habitat
Estuary circulation	*Restore Circulation in Fisherman Bay* - Create a bridge or elevate Bayshore Road to enhance tidal circulation in Fisherman Bay.	Feasibility pending. Dormant	X	X		
	Pickett Springs Salt Marsh Restoration - Restore tidal exchange by removing culverts and restoring channel capacity.	Design complete: Dormant	X			X
	Deer Harbor Bridge Replacement - Increase the Bear Harbor Bridge span and remove the rock sill below the bridge to restore natural tidal flow patterns in Cayou Lagoon.	Construction of new bridge and improved tidal flow into the lagoon is underway	X			X
Bulkhead removal	*Mud Bay Bulkhead Removal* - Bulkheads along the county road and the private property would be removed to restore natural beach processes to Mud Bay.	Feasibility complete- Lacks sponsor: Dormant	X			X
	Shaw Landing Creosote Bulkhead Removal - Replace creosote-treated bulkhead.	Feasibility studies complete – no sponsor- Dormant		X		
Protect	*Buckhorn Road Beach Acquisition* - Protect over 0.5 acre of shoreline habitat and remove boathouse deck.	No sponsor- Dormant	X		X	
Beach nourishment	*Blind Bay Forage Fish Habitat Restoration* - Beach nourishment will be used in Blind Bay to improve spawning habitat substrate at a documented surf smelt spawning beach.	Final Design complete- project ongoing.	X			X
Debris removal	*False Bay Riparian Enhancement*	Final Design Complete – Project ongoing.		X	X	X

Project Type	Project Name and Description	Status	Primary Function Restored*			
			Hydrologic	Water Quality	Vegetative	Habitat
Riparian and Fish Passage	*Deer Harbor Estuary Restoration* - Restore vegetation around Cayou Lagoon and address a fish passage barrier on Fish Trap Creek.	Nearly complete			X	X

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

The County's restoration plan also references restoration projects that were included in the original 2012 draft of the plan as prospective projects that have been completed in the interim. These completed projects are included here as indicative examples of the scope and scale of future shoreline restoration projects voluntarily undertaken by non-county organizations.

Project Type	Project Name and Description	Status	Primary Function Restored*			
			Hydrologic	Water Quality	Vegetative	Habitat
Bulkhead removal	*Brown Island Historic Feeder Bluff Restoration* - Removal of hard bulkhead and restoration of feeder bluff erosion and littoral transfer	Completed December 2015	X	X	X	X
Protect	*President Channel Shoreline Acquisition* - Protect over 19.61 acres of adjacent habitat and 2,500 linear feet of undeveloped shoreline.	Completed, Fall 2012	X		X	
	Webb Property Acquisition - Protect approximately 2,800 feet of shoreline on lower Doe Creek and Westcott Bay.	Completed December 2013			X	X
Beach nourishment	*Blind Bay Forage Fish Habitat Restoration* - Beach nourishment will be used in Blind Bay to improve spawning habitat substrate at a documented surf smelt spawning beach.	Final Design complete-project ongoing.	X			X
Debris remo	*Barlow Bay Nearshore Ecosystem Restoration* - Remove derelict dock, creosote pilings, and degraded rock armoring in Barlow Bay.	Completed, February 2014	X		X	X

Project Type	Project Name and Description	Status	Primary Function Restored*			
			Hydrologic	Water Quality	Vegetative	Habitat
	Thatcher Bay Nearshore Restoration - Remove 12,900 cubic yards of wood waste contaminated material	Completed, Dec, 2015.		X		X
	North Thatcher Bay Forage Fish Restoration Project - Enhance forage fish spawning habitat through removal of intertidal beach debris, riparian enhancement.	Completed, Dec, 2015. Completed, Nov. 2013.	X		X	X

6 EFFECTS OF OTHER REGULATORY PROGRAMS

6.1 County Regulatory Programs

In addition to the SMP, other County regulatory programs that influence development activity in the shoreline are listed below.

6.1.1 Comprehensive Plan

The state legislature adopted the Growth Management Act (GMA) in 1990 in response to concerns that "uncoordinated and unplanned growth, together with a lack of common goals expressing the public's interest in the conservation and wise use of our lands, pose a threat to the environment, sustainable economic development, and the health, safety, and high quality of life enjoyed by the residents of this state." The GMA offers tools to local jurisdictions to manage and direct growth to urban areas where public facilities and services can be provided most efficiently, to protect rural character, to protect critical areas, and to conserve natural resource lands. The goals and policies of a jurisdiction's SMP are an element of the County's Comprehensive Plan.

While the County first adopted a comprehensive plan in 1979, the County's first GMA-compliant Comprehensive Plan was adopted in 1998.

County development regulations, including SMP regulations, must be consistent with and implement the comprehensive plan.

6.1.2 Unified Development Code

San Juan County Code Title 18, Unified Development Code (UDC), is the principal tool for implementing the County's Comprehensive Plan. Pertinent components of the UDC are discussed briefly below.

Land Use Districts

The San Juan County Comprehensive Plan establishes four principal land use classes for the County. Each class permits a different level of activity. The four general classes are: growth areas, activity centers (which include areas of more intensive rural development and master planned resorts), rural lands, and resource lands. The individual land use categories within the classes are referred to as "districts." SJCC Title 18 identifies uses and activities which may or may not be established in the districts. These regulations limit more intensive uses and activities to the more intensively developed districts, thereby limiting the potential for use conflicts and maintaining ecological functions in areas of more limited development.

Critical Areas Regulations

Activities outside of shoreline jurisdiction can impact conditions within shoreline jurisdiction through effects on water quality, freshwater inputs, and physical habitat conditions. The County's critical areas regulations (SJCC 18.35.020 - 18.35.140) will continue to apply outside of shoreline jurisdiction once the SMP has been adopted and help limit the effects of activities to critical areas.

Development Standards

The UDC establishes residential density requirements; bulk, area, and dimensional standards; and specific rules for all uses. It includes regulations related to clearing and grading (SJCC 18.60.060) and storm drainage (SJCC 18.60.070). The County's stormwater standards require that all new development and redevelopment conform to the minimum requirements of Ecology's 2005 *Stormwater Management Manual for Western Washington*. These standards help maintain ecological functions both within and outside of shoreline jurisdiction. Stormwater and clearing and grading standards are particularly significant in ensuring that development outside of shoreline jurisdiction does not degrade water quality entering shoreline jurisdiction.

6.2 State Regulatory Programs

Aside from the Shoreline Management Act, state regulations most pertinent to development in the County's shorelines include the Aquatic Lands Act, Forest Practices Act, Hydraulic Code, State Environmental Policy Act, and Watershed Planning Act. Other relevant state regulations (not discussed in this section) include the Water Resources Act and Salmon Recovery Act.

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

Depending on the nature of the proposed development, state regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized and/or mitigated. During the SMP update, the County considered other state requirements to ensure consistency as appropriate and to promote streamlining of the shoreline permitting process.

A summary of pertinent state regulations follows.

6.2.1 Aquatic Lands Act

In 1984, the Washington State Legislature passed what is commonly referred to as the Aquatic Lands Act (Chapter 79.105 through 79.135) and delegated to the Department of Natural Resources (DNR) the responsibility to manage state-owned aquatic lands. The aquatic lands statutes (RCW 79.100 through 79.145) direct DNR to manage aquatic lands to achieve a balance of public benefits, including public access, navigation and commerce, environmental protection, renewable resource use, and revenue generation, when consistent with the other mandates. In addition, the statutes also identify water-dependent uses as priority uses for the transport of useful commerce.

If a proposed project requires the use of state-owned aquatic lands, the project may be required to obtain an Aquatic Use Authorization from DNR and enter into a lease agreement. DNR recommends that all proponents of a project waterward of the OHWM contact DNR to determine whether the project will be located on state-owned aquatic lands, and, if so, to determine whether the land is available, whether the proposed use is appropriate, and how the project can be constructed to avoid or minimize impacts to aquatic resources.

6.2.2 Forest Practices Act

The Forest Practices Act (Chapter 76.09 RCW) regulates activities related to growing, harvesting, or processing timber. The Forest Practices Act is implemented by the Forest Practices Rules, which are administered by the DNR. The Forest Practices Rules establish standards for forest practices such as timber harvest, pre-commercial thinning, road construction, fertilization, and forest

chemical application. The rules are designed to protect public resources such as water quality and fish habitat while maintaining a viable timber industry.

Forest practices are not regulated under the SMA unless the land is being converted to a use besides growing trees, or the commercial harvest is within 200 feet of a shoreline of statewide significance and exceeds the harvest limits established in the SMA. Conversions must comply with the provisions in the SMP for the new use.

6.2.3 Hydraulic Code

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

6.2.4 State Environmental Policy Act

The State Environmental Policy Act (SEPA) provides a way to identify possible environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified.

6.2.5 Watershed Planning Act

The Watershed Planning Act of 1998 (Chapter 90.82 RCW) was passed to encourage local planning of local water resources, recognizing that there are citizens and entities in each watershed that "have the greatest knowledge of both the resources and the aspirations of those who live and work in the watershed; and who have the greatest stake in the proper, long-term management of the resources." The County constitutes WRIA 2 (San Juan).

In October 2004, the San Juan County Board of Commissioners voted unanimously to adopt the San Juan Water Resource Management Plan. The plan contains numerous water management recommendations, related to

establishment of a county water resource review board, usage of exempt wells, and long-term monitoring of surface and ground water, among others.

The implementation plan was completed in January 2006. Key plan recommendations include ongoing ground water monitoring and analysis, developing an expedited permitting process for rainwater collection systems, and developing a memorandum of understanding with Ecology on water management issues.

6.3 Federal Regulatory Programs

Federal regulations most pertinent to development in the County's shorelines include the Clean Water Act, Endangered Species Act, and the Rivers and Harbors Act. Other relevant federal regulations (not discussed in this section) include the Anadromous Fish Conservation Act, Clean Air Act, Migratory Bird Treaty Act, and the National Environmental Policy Act.

A variety of agencies (e.g. the U.S. Army Corps of Engineers (Corps), National Marine Fisheries Service, U.S. Fish and Wildlife Service) are involved in implementing these regulations, with review of shoreline development typically triggered by in- or over-water work, or discharges of fill or pollutants into the water. Depending on the nature of the proposed development, federal regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized and/or mitigated.

A summary of pertinent regulations follows.

6.3.1 Clean Water Act, Section 402

Section 402 of the Clean Water Act required the U.S. Environmental Protection Agency (EPA) to develop and implement the NPDES program. The NPDES program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Municipal, industrial, and other facilities must obtain permits if their discharges go directly to surface waters. In Washington State, Ecology has been delegated the responsibility by the EPA for managing implementation of this program.

6.3.2 Clean Water Act, Section 404

Section 404 of the federal Clean Water Act provides the Corps, under the oversight of the EPA, with the authority to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Under Section 404, the extent of Corps jurisdiction in tidal waters extends to the high tide line. While the extent of the Corps' authority and the definition of fill have been the subject

of considerable legal activity, it generally means that the Corps must review and approve many activities in the shoreline, including, but not limited to, depositing fill, dredged, or excavated material in waters and/or adjacent wetlands; shoreline and wetland restoration projects; and culvert installation or replacement.

6.3.3 Endangered Species Act (ESA)

Section 9 of the ESA prohibits "take" of listed species. Take has been defined in Section 3 of the ESA as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The take prohibitions of the ESA apply to everyone, so any action of the County that results in a take of listed fish or wildlife would be a violation of the ESA and expose the County to risk of lawsuit. Per Section 7 of the ESA, the Corps must consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service on any projects that fall within Corps jurisdiction (e.g. Section 404 or Section 10 permits) that could affect species listed under the Endangered Species Act. These agencies ensure that the project includes impact minimization and compensatory mitigation measures for protection of listed species and their habitats. Any projects that receive federal funding must also include ESA consultation.

6.3.4 Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 provides the Corps with the authority to regulate activities that may affect "navigable" waters of the U.S. These are waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Under Section 10, the extent of Corps jurisdiction in tidal waterways extends to the mean high water line. Proposals to construct new or modify existing in-water structures (including, but not limited to, piers, marinas, bulkheads, and breakwaters), to excavate or dredge, or to "alter or modify the course, location, condition, or capacity of" navigable waters must be reviewed and approved by the Corps.

7 POTENTIAL FOR CUMULATIVE IMPACTS

As discussed previously, WAC 173-26-186(8)(d) directs local governments to evaluate and consider cumulative impacts of "reasonably foreseeable future development on shoreline ecological functions." Based on the land capacity and permit analyses described in Section 4, the most commonly anticipated changes in shoreline development involve residential development and associated shoreline uses and modifications. Based on the permit history, the most common shoreline modifications include clearing and grading (associated with residential

development), overwater structures, shoreline stabilization, beach access, and utility and upland transportation infrastructure. Further analysis of potential cumulative effects of these commonly occurring uses and modifications is provided in Section 7.1.

Although future development may include other less common types of development, the location, timing, and impacts of less common uses and development projects are less predictable. WAC 173-26-201(3(d)(iii) states:

> *For those projects and uses with unanticipatable or uncommon impacts that cannot be reasonably identified at the time of master program development, the master program policies and regulations should use the permitting or conditional use permitting processes to ensure that all impacts are addressed and that there is not net loss of ecological function of the shoreline after mitigation.*

Based on the analysis in Section 4.2, potential uses and projects less likely to occur include such activities as new aquaculture, boat ramps, mining, and marine transportation facilities, as well as any other development not explicitly addressed in the SMP. Because such less common types of development will be required to demonstrate no net loss on an individual basis, they will generally not be addressed in further detail below.

7.1 Cumulative Impacts of Common Types of Development

7.1.1 Residential Development

As described in Chapter 4, the most commonly anticipated shoreline uses and developments in the County are residential in character. Because the availability of existing vacant and underutilized lands exceeds the foreseeable demand for new residential development, the density of residential development is expected to increase over time. Residential development is expected to occur as a combination of new development and redevelopment and/or expansion of existing structures. Based on past subdivision permit data, subdivision of land is expected to result in development of few additional rural residential lots. Single-family residential development is exempt, meaning that it does not require a shoreline substantial development permit, yet exempt development must still be carried out in compliance with policies and standards of the SMP and building permits are reviewed for SMP compliance. The residential use and development of shoreline uplands (associated shoreline modifications are addressed in subsequent sections of this chapter), including accessory development such as utility and transportation infrastructure, generally involves impacts to shoreline ecological functions that result from the replacement of pervious, vegetated areas with impervious surfaces and/or a landscape management regime that includes chemical treatments of lawn and landscaping. Shoreline permit history indicates

that residential-type development is often used for vacation rentals; however, given the similar impacts, both uses will be addressed together in this analysis.

The impacts of upland development on physical processes, water quality, and existing vegetative functions will vary depending on the shoreline site characteristics. For example, development along a steep, rocky shoreline may have a minimal effect on physical processes, yet the potential of the site to adversely affect water quality impacts may be quite high. On the other hand, without regulations, development along pocket beaches, barrier beaches, or bluff-backed beaches has a significant potential of adverse impacts to longshore drift, erosion, or accretion processes, as well as potential for water quality and vegetative impacts.

The proposed SMP establishes building setback widths that depend on whether trees are present on the parcel. If possible, residential setbacks shall be behind the treeline and a minimum of 50 feet from OHWM. If trees are not present, the minimum building setback is 100 feet from OHWM. A reduced setback may also be accepted if neighboring houses are farther waterward than the established setback. These standards help limit potential impacts of development adjacent to the shoreline, but depending on the shoreline conditions, in some cases the setback alone may not be sufficient to protect ecological functions. For example, where the top of a feeder bluff is located 150 feet from the OHWM, the setback standards alone would not protect ecological functions. In this case, critical area water quality and habitat buffers and tree protection zones would help ensure that critical areas are maintained.

The proposed SMP takes a tailored approach to critical area buffer regulations to ensure that water quality, vegetation, and hydrologic/geologic and habitat-forming processes are maintained at a specified level, as described above in Section 5.4. The buffer standards are designed to achieve 70% filtration of pollutants, to minimize impacts to shoreline vegetative functions, and ensure that structures will not require stabilization or otherwise affect natural erosion processes for at least 75 years. The buffer standards allow for limited disturbance within the buffer and tree protection zone, but the standards are designed to minimize disturbance in the most critical areas for ecological functions and processes. By accounting for site differences in geologic stability, slope, infiltration potential, and vegetative characteristics, the proposed buffer and use standards ensure that adverse effects to shoreline functions will be avoided or minimized.

In addition to buffer standards, other SMP standards are essential to ensuring that on a cumulative level, residential development does not result in a loss of functions. These standards include stormwater standards and a requirement for mitigation if vegetation removal results in adverse impacts to shoreline

functions. The SMP addresses potential effects of impervious surface development and upland accessory structures by establishing lot coverage limits and prohibiting non-water dependent accessory structures from being located waterward of the most landward extent of the primary structure.

Based on the combination of use and buffer standards tailored to specific site conditions, as well as universally applicable minimum setback standards, site coverage limits, and stormwater standards, the proposed SMP is expected to help avoid and minimize potential cumulative effects of residential development. In addition to these measures which minimize the potential impacts of residential development, the proposed SMP standard that requires mitigation for adverse impacts for any development would also apply to residential development. Since the proposed SMP buffer and setback standards do not explicitly limit the clearing of vegetation other than trees, the strict evaluation and implementation of the critical area and clearing and grading regulations restricting vegetation removal for every residential project is critical to ensuring that residential development does not result in a loss of shoreline functions on a cumulative basis.

7.1.2 Overwater Structures (docks and mooring buoys)

Nearly 500 docks and nearly 2,000 buoys and floats are present along the County's shorelines. Based on the analysis in Chapter 4, permits for new, replacement, and repaired docks are among the most common shoreline modification permits issued for San Juan County's shorelines. From 2005-2009, the number of permits for new docks (21) was slightly less than the number of dock repairs (31) or replacements (29).

Spatial data on dock and buoy permit locations from 1973-2005 indicate that dock and mooring buoy permits tend to be located along shorelines that are sheltered from significant wind fetch and wave energy (i.e. interior shorelines, described by Beamer and Fresh (2012), or along protected shorelines along the exterior of the islands)(Whitman 2007). Additionally, dock and buoy permits are most commonly associated with pocket beaches, bluff-backed beaches, and barrier beach shoreforms, and they are less commonly associated with rocky shorelines.

As discussed in the County's *Best Available Science Synthesis* (Adamus et al. 2011), although the potential individual impact of docks and buoys may be relatively minor, given the density of residential moorage facilities in the County, the cumulative impact of residential structures on sediment transport and beach composition may be significant. These impacts are most likely to affect erosion and accretion shoreforms, and shallow water shorelines that support eelgrass beds. The proposed SMP addresses these potential concerns by prohibiting boating facilities that can be expected to interfere with erosion and accretion

processes of feeder bluffs. Size limits, grating, material, and pile standards for piers help limit overwater coverage, minimize impacts to aquatic vegetation, and minimize effects on hydrologic processes. As existing docks are rebuilt, they will need to conform to new dimensional and material standards that are expected to reduce their impact to hydrologic, vegetative and habitat functions in the nearshore environment over time. New and expanded boating facilities require habitat surveys, and must demonstrate compliance with mitigation sequencing.

As an additional measure to ensure that the highest functioning shoreline areas are not degraded by overwater structures, marinas, which are likely to have a greater singular impact on sediment transport processes than individual residential piers, are prohibited on Class I beaches or where their presence would interrupt driftways feeding Class I beaches. Recent permit history (2005-2009) includes two permits to repair marina docks, but no new marina permits. Similar to private docks, as marina docks are repaired and replaced, they will be required to comply with new materials and/or dimensional standards, which are expected to gradually reduce impacts on shoreline functions.

Under the proposed SMP, single-use facilities are only permitted if existing facilities are not adequate or feasible for use and alternative moorage is not adequate or feasible. The proposed SMP establishes a preference for the use of mooring buoys and floats rather than fixed piers because of their reduced ecological impact. These standards are also included in the existing SMP, and they are reflected in permit trends, in which over 80% of the permits for new docks from 2005-2009 were for joint use, and only three new single-use docks were permitted. Additionally, the number of permits for mooring buoys comprised over 60% of the total number of permits for mooring facilities. The effects of mooring buoys are generally limited to substrate disturbance and potential for water quality degradation from boating related activities. The SMP limits the potential for substrate disturbance by requiring anchored cables rather than pilings, where feasible, and by requiring a mechanism to prevent the cable from grounding at low tides. The proposed SMP also includes a provision that mooring buoys shall be located to avoid eelgrass beds and other critical saltwater habitats.

In addition to SMP standards, any new or replacement structure would require an HPA from WDFW and a Section 10 Rivers and Harbors Act permit from the Corps. Mitigation measures for overwater structures encouraged by WDFW include the installation of grated decking, removal of unused piles (especially those formerly treated with creosote), reduction of pile size and quantity on modified structures, and general reduction in overall square footage of cover. Because of the presence of listed salmonids, a Corps permit would also entail consultation with the National Marine Fisheries Service, which would likely require similar mitigation measures noted above for WDFW.

The SMP encourages joint use of private residential, as well as commercial and industrial moorage facilities. The SMP also includes several provisions to maintain water quality functions, particularly for commercial (including marinas) and industrial facilities.

In summary, SMP standards will effectively limit the number and potential impact of new moorage facilities. The proposed SMP prohibits boating facilities that would interfere with natural erosion and accretion processes of feeder bluffs. New docks will be required to follow mitigation sequencing and to mitigate for any unavoidable impacts to shoreline functions. The number of repairs and replacement of docks is expected to be approximately twice the number of new docks; and as existing structures are replaced, they will be required to conform to new dimensional and materials standards, which are expected to reduce the net impact on shoreline functions. In summary, new, replacement, and repaired overwater structures are not expected to result in a loss of shoreline functions.

In addition to SMP standards guiding overwater structures, at least one large derelict structure is planned for removal. The Friends of the San Juans plans to remove numerous creosote pilings, the remains of a derelict dock, and 150 square feet of rock armoring that once protected the dock. The removal of this dock will improve water quality and intertidal and shallow subtidal habitat functions in Barlow Bay.

7.1.3 Shoreline Stabilization

The impacts of shoreline stabilization in the County's nearshore environment are discussed in the *Best Available Science Synthesis* (Adamus et al. 2011). To briefly summarize, compared to an unaltered shoreline environment, shoreline armoring typically has the following effects on ecological functions:

1. Reduction in nearshore habitat for both aquatic and terrestrial species. Specifically, shoreline complexity, emergent vegetation, and eelgrass and other submerged aquatic vegetation that provide forage and cover may be reduced or eliminated. Shoreline armoring that extends into the intertidal zone, in particular, limits shallow nearshore habitat, as well as beach and forage fish spawning habitat. Sediment recruitment and transport processes are particularly affected by shoreline armoring at the base of potential eroding bluffs.

2. Reduction of natural sediment recruitment from the shoreline. This recruitment is necessary to replenish substrate and preserve shallow water conditions.

Permit data from 2005 to 2009, presented in Chapter 4, indicates that 46 shoreline stabilization permits were issued. Eleven permit records for shoreline

stabilization did not specify whether the permit was for new, replacement, or repair of stabilization structures. Of those permit records that specified the type of work conducted, new bulkheads were permitted relatively infrequently (4 permits), and bulkhead replacements occurred at a slightly greater frequency (7 permits). Bulkhead repairs were the most frequently permitted shoreline stabilization activity (24 permits). In addition to bulkhead permits, five shoreline permits were issued relating to repair (3), replacement (1), and expansion (1) of existing breakwaters. No permits were issued for jetties or groins. Occasional repair and maintenance of existing breakwaters may be expected. Similar trends in shoreline stabilization permits are expected in the future.

As bulkheads are replaced over time, they must meet the new SMP standards, which require evaluation and implementation of stabilization measures with the least ecological impact practicable (using non-structural or soft-structural approaches where feasible and locating the new structure as far landward as possible). The proposed SMP will also require mitigation for the short-term effects of construction, and the longer-term impacts relating to sediment supply and vegetation for both new and replacement bulkheads. Replacement stabilization must be constructed landward of the OHWM or in the same location as the existing structure.

The SMP limits the future need for stabilization to protect primary structures and essential infrastructure by prohibiting new development or subdivisions that will require shoreline stabilization measures in the next 75 years.

In addition to County oversight and permitting, the Corps and WDFW have jurisdiction over new shoreline stabilization projects, and repairs or modifications to existing shoreline stabilization. As part of their efforts to minimize and compensate for shoreline stabilization-related impacts, both agencies encourage implementation of native shoreline enhancement for new shoreline stabilization projects. Further, they also promote additional impact compensation measures for many shoreline armoring modification projects, including placement of gravel at the toe of the armoring to create shallow-water habitat, angling the armored face landward to reduce wave turbulence, and shifting the armoring as far landward as feasible.

Given the proposed SMP standards that establish a requirement to document a specific need for new bulkheads, as well as provisions that restrict new development that would have a future need for stabilization, new bulkhead permits are expected to be very rare in the County. Where new or replacement bulkheads are needed, the potential use of soft shoreline stabilization will need to be evaluated, and alternatives with the least ecological impact will need to be implemented, as feasible. As a result, it is expected that the SMP standards will result in an incremental reduction in the effects of shoreline armoring over time.

On a cumulative basis, despite site-specific mitigation requirements, the infrequent addition or expansion of shoreline stabilization measures will likely result in some level of alteration of sediment transport processes. This incremental loss is expected to be offset by the incremental gains achieved as existing bulkheads are replaced, and their impacts on sediment transport are reduced.

In addition to proposed SMP standards that will avoid a net loss of functions, several restoration projects are planned by the County and its restoration partners that will reduce the existing impacts of shoreline armoring and result in a net improvement in shoreline functions. These projects include the removal of existing rip rap armoring at Mud Bay on Lopez Island and a beach nourishment project to supplement natural longshore drift processes at Blind Bay on Shaw Island, which have been impaired by existing bulkheads and groins. Together, the SMP provisions guiding new, replacement and repaired shoreline stabilization measures and the planned restoration projects are expected to result in a gradual improvement in sediment transport processes and associated functions.

Breakwaters, jetties and groins are designed to moderate wave energy and alter sediment erosion and accretion processes. Given the inherent changes to erosion and accretion processes that accompany these structures, they receive significant scrutiny through the state and federal permitting process. The County's proposed SMP requires that any breakwaters be designed and constructed to avoid detrimental impacts to sediment transport and habitat, and any new breakwaters would be required to mitigate for potential impacts. Jetties and groins would only be allowed under a Shoreline Conditional Use Permit. In order to obtain a Shoreline Conditional Use Permit, an individual project would be required to demonstrate that no net loss of functions would be achieved.

7.1.4 Shoreline Access

Permit history, reviewed in Chapter 4, indicates that a total of 26 permits were issued for new, replacement and repaired access structures from 2005-2009. Twelve permits for shoreline access structures did not specify whether the permit was for new, replacement or repair of access structures. Of those permit records that specified the type of work conducted, two permits were issued for new structures, six for replacements, and six for repairs. Approximately two-thirds of shoreline access permits were shoreline exemptions. As exemptions, stairs and ramps are only allowed when other access options are not feasible. These structures are limited in size to 3 feet in width and 15 feet in height under the SMP, and exempt development is required to avoid significant vegetation removal and ensure that disturbed slopes are stabilized with native vegetation.

Any non-exempt shoreline access structures must be evaluated for impacts on bank stability, vegetation, and ecological functions.

Geographic mapping of permit data for shoreline access structures from 1973-2005 indicates that shoreline access structures are typically built on rocky shorelines and along bluff-backed beaches (Whitman 2007). In general, shoreline access structures are likely to have less of an impact on rocky shorelines, where additional stabilization will not be required. Removal of vegetation to accommodate access structures on bluff-backed beaches could destabilize slopes or require ongoing maintenance. In the proposed SMP, any shoreline access structures that would be expected to interfere with normal erosion and accretion processes of the shoreline are prohibited. Additionally, under the proposed SMP, shoreline stabilization measures would not be justified to protect access structures.

Proposed SMP standards that require avoidance and minimization of impacts, as well as mitigation for any unavoidable impacts, are expected to result in no net loss of shoreline functions. In addition to SMP standards that avoid a loss of shoreline functions, at least one project is planned to reduce the impacts of an existing shoreline access structure at Aleck Bay. The revised structure will reduce the extent of shoreline stabilization measures needed to protect access, thereby restoring sediment transport processes that are presently degraded by the structure.

7.1.5 Utilities

Utility infrastructure is commonly needed as an accessory for other shoreline uses, particularly residential development. As identified in Chapter 4, from 2005-2009, 43 permits were issued for new, expanded, replacement, and repaired utility infrastructure.

Desalination is an emerging technology that provides the opportunity to accommodate the increasing demand for freshwater associated with population growth in the County. From 2005-2009, nine shoreline permits for desalination facilities were issued by the County. As desalination technology becomes more accepted, it is expected that the permit activity relating to desalination facilities will increase. The most likely ecological impacts from desalination facilities relate to water quality degradation associated with the discharge. There is also potential for erosion caused by discharge and alteration of sediment transport processes by in-water infrastructure. The proposed SMP includes several provisions that specifically address desalination facilities. These standards address the potential for erosion caused by outfalls and require that projects are located, designed, and maintained to result in no net loss of functions. For areas with the potential for poor mixing, an additional demonstration of no net loss is required at the time of project review.

The SMP requires that utilities are not installed in shoreline jurisdiction unless other options are not feasible. Where other options are not practicable, the location, design and maintenance of utilities must ensure no net loss of function.

7.2 Cumulative Effects of Less Common Types of Development

Based on the future land use analysis in Section 4, several shoreline uses and modifications are expected to occur infrequently in the County's shoreline jurisdiction. These uses and modifications include new agriculture, aquaculture, boat ramps, commercial and industrial development, dredging, and the creation or repair of transportation facilities.

As noted in Chapter 5, the proposed SMP standards require that less common shoreline uses and modifications include measures to avoid, minimize and mitigate for potential impacts. The proposed SMP also requires that applicants for these less common types of development demonstrate no net loss of ecological functions on an individual project basis. Given the infrequent implementation of these less common types of development and the requirement that each project demonstrate no net loss, the cumulative impacts of less common development are expected to result in no net loss of shoreline functions and processes.

8 Tracking Cumulative Impacts

The County maintains a database of shoreline permit activity, which was used as the source of shoreline permit trends in this report. This existing database structure could be improved to aid in a simpler analysis of trends in permit data. The database would benefit from pre-defined fields that specify the uses and modifications addressed by each permit. Regarding shoreline stabilization, a pre-defined field for identifying whether the stabilization is hard, soft, or both would also be useful. The database would benefit from a category that identifies whether the permit addresses new development, expansion, reconstruction, replacement or repair of existing development.

Additionally, shoreline exemption data do not fully account for development of single-family residences in shoreline jurisdiction, but instead, these developments are recorded in the building permit database. It would be helpful to document all exempt development in the shoreline permit database to be able to better gauge the rate of residential development. These changes would enable simpler tracking of trends of shoreline uses and modifications over time, allowing a more accurate projection of likely future cumulative impacts. The

County anticipates implementing a new permit tracking system in the near future.

9 NET EFFECT ON ECOLOGICAL FUNCTION

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

As discussed above, major elements of the SMP that help ensure no net loss of ecological functions fall into three general categories: 1) shoreline designations, 2) general policies and regulations (Exhibit A, Section B, Element 3 San Juan County Comprehensive Plan); (Section 4, Section 5, New Sections 7-66). The *Shoreline Restoration Plan* identifies ongoing and planned voluntary restoration that will provide an opportunity to improve shoreline conditions over time.

Shoreline designations: The *Shoreline Inventory and Characterization* report provided the information necessary to assign shoreline designations by segment to each of the shoreline waterbodies. Shoreline uses and modifications were individually determined to be either permitted (as substantial developments or conditional uses) or prohibited in each shoreline designation. The most uses and modifications are allowed in areas with the highest level of existing disturbance.

General provisions: Sections 4 and 5 and New Sections 7 - 25 of the SMP includes regulations that provide the basis for achieving no net loss of shoreline functions, such as mitigation sequencing, vegetation conservation standards, and critical areas regulations.

Shoreline modification and use provisions: New Sections 26 - 66 of the SMP contain a number of regulations that contribute to protection and restoration of ecological functions. Shoreline modification regulations emphasize minimization of size of structures and use of designs that do not degrade shoreline functions. Use regulations prohibit uses that are incompatible with the

existing land use and ecological conditions, and emphasize appropriate location and design of the various uses.

Shoreline Restoration Plan: The ***Shoreline Restoration Plan*** identifies a number of project-specific opportunities for restoration within shoreline jurisdiction, and also identifies ongoing County programs and activities, restoration partners, and recommended actions consistent with a variety of watershed-level efforts.

Key features identified in the proposed SMP and this evaluation that protect and enhance shoreline ecological functions are identified in Table 7-1.

Table 7-1. Key features of the proposed SMP to achieve no net loss of shoreline ecosystem functions.

SMP Actions to Maintain Shoreline Functions	Voluntary Actions to Restore Degraded Shoreline Functions and Processes
Fish and Wildlife Habitat Conservation Area (FWHCA) buffers are based on Best Available Science to maintain an acceptable level of function for water quality, physical processes, and vegetation on all marine and lake shorelines.	Planned restoration along the shorelines of the County will help identify and prioritize opportunities to restore shoreline ecological functions.
The County's undisturbed shorelines were designated as Natural, and it is anticipated that proposed development standards will provide the necessary protection of those areas in shoreline jurisdiction.	
SMP provisions require any projects with potential for significant adverse ecological effects to follow mitigation sequencing to avoid, minimize and mitigate any anticipated impacts.	
Emphasis is placed on achieving no net loss of shoreline ecological functions throughout shoreline jurisdiction.	

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

10 REFERENCES

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APPENDIX A

CUMULATIVE EFFECTS OF THE EXISTING SMP

APPENDIX A: CUMULATIVE EFFECTS OF THE EXISTING SMP

This document reviews the potential cumulative effects of the existing SMP. Though a review of the potential cumulative effects of an existing SMP is not a required element of a SMP update, such a review can help a jurisdiction identify provisions in an existing SMP that may need to be revised in order to ensure no net loss of ecological function.

As discussed in Chapter 7 of the Cumulative Impacts Analysis (CIA), the most commonly anticipated changes in shoreline development in the County involve residential development (including redevelopment). The potential cumulative impacts arising from common residential development activities are the focus of this chapter; however, less common development is briefly discussed at the end of the chapter.

1. Cumulative Impacts of Common Development

1.1 Residential Development

This section addresses the residential use and development of shoreline uplands. Shoreline modifications commonly associated with residential development are addressed in subsequent sections of this Appendix.

Residential development is specifically addressed in the existing SMP in SJCC 18.50.330; however, the regulations of 18.50.060, Clearing and grading, and 18.50.130, Vegetation management, also include important provisions that address the potential impacts of residential development. Summaries of some of the key provisions in these sections follow:

- Developments on waterfront parcels generally must not cover more than 50 percent of the width of the parcel.
- Accessory structures which are not water-dependent are not permitted seaward of the most landward extent of the residence.
- Clearing and grading activities are allowed only if associated with an approved shoreline development, if conducted landward of the shoreline setback, and if disturbed areas not converted to another use are replanted with native species.

Current setback standards for residential development are located in SJCC 18.50.330(D). In general, if a treeline is present, residential structures must be located behind the treeline and set back a minimum of 50 feet from the OHWM or the top of bank or berm (whatever is greater); if a treeline is not present, the setback must be at least 100 feet from the OHWM or the top of bank or berm (whichever is greater). Moreover, if feeder bluffs are present, structures must be set back a safe distance.

The current setback standards for residential development help protect vegetative, water quality, and habitat functions by limiting structural development and tree removal adjacent to shoreline waterbodies; however, depending on specific site conditions, including topography and vegetation coverage, a 50-foot setback may not be sufficient to maintain shoreline functions. And because the existing setback standards do not specify what it means for a structure to be set back a "safe distance" from feeder bluffs, there is no assurance that shoreline stabilization will not be required at some point in the future.

In addition to the structural setback standards contained in the existing SMP, additional standards may apply if a development is proposed near a critical habitat because of critical areas regulations. The critical areas regulations that currently apply in shoreline jurisdiction.

Vegetation management provisions in the existing SMP could result in cumulative effects. The existing SMP does not limit clearing of shrubs and trees less than three inches in diameter, nor does it require mitigation to offset the adverse impacts caused by such vegetation removal but the County's approved critical area regulations do. As shrubs and emergent vegetation provide significant vegetative and habitat functions along the shoreline, the removal of such vegetation could be expected to result in adverse impacts to shoreline functions. The existing SMP also allows "normal nondestructive pruning and trimming of vegetation for maintenance purposes," but lacks specific standards to reduce the potential adverse impacts associated with pruning and trimming methods (for example, limits on the proportion of limbs trimmed and limits on topping of trees are not included in the existing SMP).

Finally, regarding residential subdivisions, the existing SMP lacks clear language stipulating that they must be developed in a manner that ensures that no net loss of ecological functions will result at full build-out and in a manner that generally prevents the need for new shoreline stabilization or flood hazard reduction measures.

1.2 Overwater Structures (docks and mooring buoys)

In the existing SMP, overwater structures are primarily regulated by SJCC 18.50.190, Boating facilities. SJCC 18.50.190 includes numerous provisions that limit the potential for overwater structures to result in cumulative impacts. Summaries of some key provisions (many of which have been incorporated into the proposed SMP) follow:

- Only one form of moorage or other structure for boat access to the water is generally allowed on a single parcel. (A mooring buoy may be allowed in conjunction with another form of moorage.)

- Every application for a substantial development permit for dock or pier construction must be evaluated on the basis of multiple considerations, including potential impacts on littoral drift, sand movement, water circulation and quality, and fish and wildlife.

- Docks or piers which can reasonably be expected to interfere with the normal erosion-accretion process associated with feeder bluffs are not permitted.

- New boathouses or covered moorages are prohibited on floats, piers, and docks.

- All waterfront subdivisions must include or provide for construction of a single joint-use moorage facility by the lot owners if moorage is desired by the owners, in a designated, reserved area of the waterfront.

- Dimensional standards for maximum area and length for residential docks, piers, and floats.

- Applications for nonexempt docks and piers associated with single-family residences shall not be approved until it can be shown by the applicant that existing facilities are not adequate or feasible for use and that alternative moorage is not adequate or feasible.

- Marinas, boat launches, docks, boathouses, and marine railways are prohibited in the natural environment.

Despite the many provisions that address overwater structures, the existing SMP could still potentially allow overwater structures to result in cumulative impacts in a variety of ways. Concerning piers and docks, the existing SMP does not include regulations that require a demonstration of need in order to construct

new structures (this is now required under state law, though piers and docks associated with single-family residences are exempt from this requirement). Also, the existing SMP only requires residential piers and docks—not all piers and docks—to be the minimum size necessary. The existing SMP does not establish a maximum width for residential piers, which is an important tool to minimize the impacts on shading in the nearshore environment. Furthermore, the existing SMP does not contain any requirements for grating, which is a significant tool to mitigate shading resulting from overwater structures. Similarly, the existing SMP does not provide dimensional standards for joint-use or marina piers and docks. Last, the existing SMP does not include standards that address the replacement and repair of piers and docks, increasing the likelihood that some adverse impacts associated with existing structures would be allowed to continue.

Regarding mooring buoys, the existing SMP does not contain any provisions that directly address any of their potential ecological impacts. For example, the existing SMP lacks language addressing the siting of mooring buoys and the types of buoy anchoring systems that must be used.

Finally, the existing SMP lacks language regarding mitigation of adverse impacts associated with overwater structures. While the existing SMP includes regulations requiring avoidance and minimization, the SMP does not address mitigation for unavoidable impacts.

In summary, under the existing SMP, new, replacement and repaired overwater structures would be expected to result in detrimental impacts to habitat and vegetative functions on a cumulative basis.

1.3 Shoreline Stabilization

Shoreline stabilization is mainly addressed in two sections of the existing SMP: SJCC18.50.210, Bulkheads, and 18.50.360, General shoreline modification activities. Summaries of some the key provisions in these two sections (many of which have been incorporated into the proposed SMP) follow:

- All new development activities must be located and designed to prevent or minimize the need for shoreline stabilization.

- Nonexempt bulkheads only permitted when nonstructural shoreline protection, restoration, or modification techniques have been shown to be ineffective and certain conditions exist.

- Bulkheads not permitted in conjunction with new projects or development when practical alternatives are available.

- Bulkheads permitted on marine feeder bluffs only where (a) a clear and significant danger to established development exists, and (b) there is reasonable cause to believe that the bulkhead will in fact arrest the bluff recession and will not seriously disrupt the feeder action or the driftway.

- Shoreline modification for stabilization and flood control work prohibited in the Natural environment.

There are a variety of opportunities for the existing SMP to further limit the potential cumulative impacts resulting from shoreline stabilization. An important way an SMP can limit the cumulative effects of shoreline stabilization is by requiring documentation that shoreline stabilization is in fact necessary to protect a primary structure. The existing SMP could better prevent cumulative impacts by bolstering its requirements for demonstrations of need, in particular by specifying when demonstrations of need are required, who is qualified to prepare them, and specific contents that must be included.

In general, the existing SMP lacks regulations regarding the design of shoreline stabilization. For example, the existing SMP does not include regulatory language requiring the evaluation and use of soft shoreline stabilization measures where feasible. The existing SMP could better limit cumulative impacts by providing regulations that address the design of both hard and soft shoreline stabilization measures.

The existing SMP does not contain specific regulations that address the replacement of existing shoreline stabilization, and the existing SMP would potentially allow a new bulkhead to be constructed waterward of an existing bulkhead, which could be expected to increase the effective encroachment on shoreline physical processes. Similarly, the existing SMP does not explicitly identify the enlargement of existing structures as new stabilization measures and state that such enlargements must adhere to the regulations for new shoreline stabilization.

Given the permitting standards for shoreline stabilization measures under the existing SMP, shoreline stabilization measures could result in continued and intensified impacts on shoreline physical processes as new bulkheads are installed and bulkheads replacements continue with limited regulatory guidance.

1.4 Shoreline Access

The existing SMP includes several provisions to help ensure that shoreline access developments will not result in a net loss of ecological functions. The existing SMP provides specific criteria under which shoreline access developments may qualify for a shoreline exemption (these criteria are consistent with the proposed

SMP). Nonexempt shoreline access developments must be evaluated on the basis of multiple considerations, including, but not limited to, potential impacts on bank stability (bank stability requirements must be met) and the extent of vegetation removal. Structures which can reasonably be expected to interfere with the normal erosion accretion process associated with feeder bluffs are prohibited.

It is also worth noting that beach access structures are permitted in the Natural environment.

However, omissions from the existing SMP provisions addressing shoreline access developments may yield cumulative impacts. First, the existing SMP does not explicitly state that nonexempt shoreline access developments must satisfy applicable provisions in SJCC 18.50.020. Therefore, the existing SMP does not explicitly require non-exempt shoreline access developments to demonstrate that no other beach access exists or is reasonably feasible. Second, the existing SMP places no upper limits on the size (e.g. maximum walkway width) of non-exempt development. Although the existing SMP standards will limit the extent of potential impacts from shoreline structures, non-exempt shoreline access structures could be more clearly specified under the existing SMP to ensure that cumulative impacts do not occur.

1.5 Utilities

Utilities are principally addressed by the existing SMP in SJCC 18.50.350, Utilities. Summaries of some of the key provisions in this section (many of which have been incorporated into the proposed SMP) applicable to common utility development activities follow:

- Utility lines must utilize existing rights-of-way whenever possible.
- Immediately following the completion of utilities installation or maintenance projects on shorelines, disturbed areas must be replanted with local vegetation.
- Utilities must not be installed in shoreline areas unless there is no feasible alternative.
- Where utilities must cross shoreline areas, they must do so by the route which will cause the least damage to the shoreline.

As indicated in regulation G of SJCC 18.50.020, General applicability, accessory utilities are a normal appurtenance to single-family residential development and are therefore exempt from shoreline permit requirements. Nonetheless, as stated in SJCC 18.50.020(F) “exemption from the substantial development permit

requirements…does not constitute an exemption from the policies of the Shoreline Management Act [and] the policies and regulations of this SMP." But regulation B(4) of SJCC 18.50.330, Residential development, the only regulation in that section that directly references utilities, states that "utility lines installed within subdivisions and nonexempt developments shall be placed underground and shall comply with applicable provisions of SJCC 18.50.130 [Vegetation management] and 18.50.350 [Utilities]." Given the prevalence of accessory utility installation in the County and their common impacts (e.g. clearing), a clearer reference in SJCC 18.50.330(B)(4) or elsewhere in the residential development section that states that exempt development must comply with all applicable standards would be a beneficial addition.

One increasingly common type of utility development in the County is related to desalination facilities. The existing SMP includes provisions relating to desalination. These regulations are similar to the proposed SMP, with a few notable exceptions that could allow desalination facilities to contribute to a loss of ecosystem functions on a cumulative basis.

First, the existing SMP does not include provisions to ensure that cumulative impacts from desalination discharge into areas with limited mixing potential will not impair water quality. The potential effects of desalination facilities on an individual basis are largely related to the size of the facility; however, the existing SMP does not specify any limits on the size of desalination facilities that would require special review. Finally, the existing SMP allows the use of pre-filtration wells in the intertidal zone. These wells could interfere with sediment transport processes in the intertidal zone, and they are prohibited landward of mean lower low water in the proposed SMP.

2. Cumulative Impacts of Less Common Development

Besides the more common development activities reviewed above, a wide variety of other development activities occur in the County. These activities also have the potential to yield cumulative impacts. While a detailed review of the potential impacts that could occur from all development activities under the *existing* SMP is beyond the scope of this CIA, this section sets forth some general comments.

The existing SMP lacks the "no net loss" language that is a defining feature of the Guidelines. The existing SMP includes numerous ecologically protective provisions, most of which stress the avoidance and minimization of impacts. However, the provisions of the existing SMP generally appear to fall short of requiring no net loss of ecological functions.

Additionally, the existing SMP lacks clear language regarding mitigation. Another defining feature of the Guidelines is the mitigation sequence contained in WAC 173-26-201(2)(e). While the existing SMP has numerous provisions that address the first two steps of the mitigation sequence, avoidance and minimization, other steps of the mitigation sequence, particularly compensatory mitigation, receive less attention in the existing SMP. The lack of clear language regarding mitigation for unavoidable impacts increases the likelihood that development activities in the County could result in cumulative impacts.