

DRAFT

**SKAGIT COUNTY
GRANT No.1100205**

SHORELINE ANALYSIS REPORT

**for Shorelines in Skagit County and the Towns of
Hamilton and Lyman**

Prepared for:



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TABLE OF CONTENTS

	Page #
1 Introduction	1
1.1 Background and Purpose	1
1.2 Shoreline Jurisdiction	2
1.3 Study Area.....	3
1.3.1 Skagit County.....	3
1.3.2 Town of Lyman	4
1.3.3 Town of Hamilton.....	4
2 Summary of Current Regulatory Framework	5
2.1 Shoreline Management Act	5
2.2 Skagit County.....	5
2.3 Towns of Lyman and Hamilton	7
2.4 State Agencies and Regulations.....	7
2.5 Federal Regulations.....	9
3 Summary of County Ecosystem Conditions	12
3.1 Geographic and Ecosystem Context.....	12
3.2 Historic Geology, Topography, and Drainage Patterns	15
3.3 Major Land Use Changes and Current Shoreline Condition.....	18
4 Shoreline Inventory.....	25
4.1 Introduction.....	25
4.2 Inventory Data Summary, Assumptions, Limitations, and Data Gaps	27
4.2.1 Management Unit Determination	28
4.2.2 Land Use Patterns	28
4.2.3 Current Land Use.....	30
4.2.4 Future Land Use	33
4.2.5 Existing Skagit County Shoreline Master Program Designations.....	35
4.2.6 Transportation	36
4.2.7 Utilities	37
4.2.8 Impervious Surfaces	38
4.2.9 Vegetation	38
4.2.10 Shoreline Modifications	38

4.2.11	Existing and Potential Public Access	39
4.2.12	Geologically Hazardous Areas.....	41
4.2.13	Frequently Flooded Areas	41
4.2.14	Wetlands.....	41
4.2.15	Fish and Wildlife Habitat Conservation Areas.....	42
4.2.16	Critical Aquifer Recharge Areas	42
4.2.17	Historical or Archaeological Sites	42
4.2.18	Water Quality.....	43
4.3	Management Unit Conditions.....	44
4.3.1	Management Unit 1- Samish River.....	55
4.3.2	Management Unit 2- Samish Island, Padilla Bay, and East Side of Swinomish Channel	58
4.3.3	Management Unit 3- Swinomish Tribal Reservation.....	62
4.3.4	Management Unit 4- Fidalgo Island and Other Islands.....	65
4.3.5	Management Unit 5- Skagit Bay/Delta	71
4.3.6	Management Unit 6- Lower Skagit Diking Districts	74
4.3.7	Management Unit 7- Samish River.....	79
4.3.8	Management Unit 8- Middle Skagit River	82
4.3.9	Management Unit 9- Upper Skagit River	86
4.3.10	Management Unit 10- Nooksack Watershed.....	93
4.3.11	Management Unit 11- Stillaguamish Watershed	95
5	Reach-scale Functions and Processes	98
5.1	Functional Evaluation Approach, Rationale and Limitations	98
5.1.1	Reach Delineation.....	98
5.1.2	Functions and Impairments.....	100
5.1.3	Limitations.....	106
5.2	Management Unit Functional Evaluation	107
5.2.1	Samish Bay	107
5.2.2	Samish Island, Padilla Bay, and East Side of Swinomish Channel.....	108
5.2.3	Swinomish Tribal Reservation	111
5.2.4	Fidalgo Island and Other Islands	115
5.2.5	Skagit Bay/Delta.....	121
5.2.6	Lower Skagit- Diking Districts.....	127
5.2.7	Samish River	131
5.2.8	Middle Skagit.....	135
5.2.9	Upper Skagit (WRIA 4)	141
5.2.10	Nooksack (WRIA 1).....	157
5.2.11	Stillaguamish (WRIA 5)	160
6	Land Use Analysis and Implications	164

6.1	Shoreline Land Capacity Analysis.....	164
6.1.1	Land Capacity Analysis	164
6.1.2	Potential Use Conflicts	169
6.1.3	Samish Bay	169
6.1.4	Samish Island, Padilla Bay, and East Side of Swinomish Channel.....	170
6.1.5	Swinomish Tribal Reservation	171
6.1.6	Fidalgo Island and Other Islands	172
6.1.7	Skagit Bay/Delta.....	173
6.1.8	Lower Skagit Diking District.....	173
6.1.9	Samish River	174
6.1.10	Middle Skagit.....	175
6.1.11	Upper Skagit (WRIA 4)	176
6.1.12	Nooksack (WRIA 1).....	177
6.1.13	Stillaguamish (WRIA 5)	177
7	Public Access Analysis and Implications	178
7.1	Goals and Policies	178
7.2	Opportunities for Future Public Access	181
7.2.1	Roads/Street Ends.....	183
7.2.2	Vacant and "No owner" Parcels.....	183
7.2.3	Land Trusts	184
7.2.4	Parks and Recreation Easements	187
8	Shoreline Management Recommendations	189
8.1	Environment Designations.....	189
8.1.1	Background.....	189
8.1.2	Methodology	200
8.1.3	Recommendations	201
8.2	General Policies and Regulations	202
8.3	Shoreline Modification Provisions	203
8.4	Shoreline Uses.....	205
8.5	Restoration Plan	206
9	References.....	208
10	List of Acronyms and Abbreviations	216
	Zoning Abbreviations:	218

APPENDIX B Shoreline Inventory Map Folio

APPENDIX C List of Historic and Cultural Resources

APPENDIX D Maps of Reaches Used in Functional Analysis

APPENDIX E Functional Analysis Scoring Results by Reach

APPENDIX F Methodology for Land Use Capacity Analysis

LIST OF FIGURES

	Page #
Figure 1.	Map of Water Resource Inventory Areas in Skagit County 12
Figure 2.	Map of Management Unit 1- Samish Bay55
Figure 3.	Map of Management Unit 2- Samish Island, Padilla Bay and East side of Swinomish Channel58
Figure 4.	Map of Management Unit 3- Swinomish Tribal Reservation62
Figure 5.	Map of Management Unit 4- Fidalgo Island and Other Islands66
Figure 6.	Map of Management Unit 5- Skagit Bay/Delta72
Figure 7.	Map of Management Unit 6- Lower Skagit river- Diking Districts75
Figure 8.	Map of Management Unit 7- Samish River80
Figure 9.	Map of Management Unit 8- Middle Skagit River.....83
Figure 10.	Map of Management Unit 9- Upper Skagit River87
Figure 11.	Map of Management Unit 10- Nooksack Watershed (WRIA 1)94
Figure 12.	Map of Management Unit 11- Stillaguamish Watershed (WRIA 11)96
Figure 13.	Example Tributary Mouth Reach Determinations 100

LIST OF TABLES

	Page #
Table 1.	Shoreline Inventory Elements and Information Sources.25
Table 2.	Water-Oriented Uses Definitions and Examples.....32
Table 3.	Comprehensive Plan Land Use Designations and Associated Zoning....35
Table 4.	Existing Trails and Water Access Facilities40
Table 5.	Summary of Shoreline Inventory by Management Unit.....45
Table 6.	Category 2 Waterbodies (Waters of Concern) by Management Unit52
Table 7.	Category 4 Waterbodies by Management Unit53
Table 8.	Category 5 Waterbodies (Impaired) by Management Unit54
Table 9.	Lakes in Shoreline Jurisdiction in Management Unit 6- Lower Skagit Diking Districts 76
Table 10.	Rivers and Streams in Shoreline Jurisdiction in Management Unit 8- Middle Skagit River83
Table 11.	Lakes in Shoreline Jurisdiction in Management Unit 8- Middle Skagit River83
Table 12.	Rivers and Streams in Shoreline Jurisdiction in Management Unit 9- Upper Skagit River87
Table 13.	Lakes in Shoreline Jurisdiction in Management Unit 9- Upper Skagit River88
Table 14.	Rivers and Streams in Shoreline Jurisdiction in Management Unit 11- Stillaguamish Watershed.....96
Table 15.	Lakes in Shoreline Jurisdiction in Management Unit 11- Stillaguamish Watershed.....96
Table 16.	Criteria for Determining Reach Breaks99
Table 17.	Summary of Reaches per Management Unit..... 100
Table 18.	Summary of Functional Scoring Approach 103
Table 19.	Functional Score Ranking by Indicator Metric 105
Table 20.	Reach Functional Analysis Scores for Management Unit 1- Samish Bay 107
Table 21.	Restoration Opportunities in Management Unit 1- Samish Bay 108
Table 22.	Reach Functional Analysis Scores for Management Unit 2- Samish Island, Padilla Bay, and East Side of Swinomish Channel..... 109
Table 23.	Restoration Opportunities in Management Unit 2- Samish Island, Padilla Bay, and east side Swinomish Channel 110
Table 24.	Reach Functional Analysis Scores for Management Unit 3- Swinomish Tribal Reservation 112
Table 25.	Restoration Opportunities in Management Unit 3- Swinomish Tribal Reservation 113

Table 26.	Reach Functional Analysis Scores for Management Unit 4- Fidalgo Island and Other Islands.....	116
Table 27.	Restoration Opportunities in Management Unit 4- Fidalgo Island and Other Islands.....	119
Table 28.	Reach Functional Analysis Scores for Management Unit 5- Skagit Bay/Delta	121
Table 29.	Restoration Opportunities in Management Unit 5- Skagit Bay/Delta.....	124
Table 30.	Reach Functional Analysis Scores for Management Unit 6- Lower Skagit-Diking Districts	128
Table 31.	Restoration Opportunities in Management Unit 6- Lower Skagit Diking District.....	130
Table 32.	Reach Functional Analysis Scores for Management Unit 7- Samish River	133
Table 33.	Restoration Opportunities in Management Unit 7- Samish River	134
Table 34.	Reach Functional Analysis Scores for Management Unit 8- Middle Skagit River	136
Table 35.	Restoration Opportunities in Management Unit 8- Middle Skagit River.	138
Table 36.	Reach Functional Analysis Scores for Skagit River mainstem within Management Unit 9.....	141
Table 37.	Reach Functional Analysis Scores for Rivers, Creeks, and Lakes other than the Skagit River mainstem within Management Unit 9.....	143
Table 38.	Degraded Watershed Administrative Units in Upper Skagit watershed within Skagit County (data from Beamer et al. 2000).....	146
Table 39.	Restoration Opportunities in Management Unit 9- Upper Skagit River .	150
Table 40.	Reach Functional Analysis Scores for Management Unit 10- Nooksack Watershed (WRIA 1)	158
Table 41.	Restoration Opportunities in Management Unit 10- Nooksack Watershed (WRIA 1)	159
Table 42.	Reach Functional Analysis Scores for Management Unit 11- Stillaguamish Watershed (WRIA 5)	161
Table 43.	Restoration Opportunities in Management Unit 11- Stillaguamish Watershed (WRIA 5)	163
Table 44.	Estimated Land Capacity in Skagit County Shoreline Jurisdiction	168
Table 45.	Public Access/Trail Improvement Opportunities in Shoreline.....	182
Table 46.	Number of No Owner Parcels in Shoreline	184
Table 47.	OSRSI and Easements in Shoreline.....	187
Table 48.	Comparison of Existing and Ecology Shoreline Environment Designations	191

SHORELINE ANALYSIS REPORT

SKAGIT COUNTY AND THE TOWNS OF LYMAN AND HAMILTON

1 INTRODUCTION

1.1 Background and Purpose

Skagit County (County) obtained a grant from the Washington Department of Ecology (Ecology) in 2010 to complete a comprehensive update of its Shoreline Master Program (SMP). The Towns of Lyman and Hamilton (Towns) are working in partnership with Skagit County to update their SMPs prepared through a coordinated process. One of the first steps of the update process is to inventory and characterize the County's shorelines as defined by the state's Shoreline Management Act (SMA) (RCW 90.58). This analysis was conducted in accordance with the Shoreline Master Program Guidelines (Guidelines, Chapter 173-26 WAC) and project Scope of Work promulgated by Ecology, and includes all unincorporated areas within the County and the incorporated Towns of Lyman and Hamilton. Under these Guidelines, the County must identify and assemble the most current, applicable, accurate and complete scientific and technical information available.

This shoreline inventory and analysis will describe existing conditions and characterize ecological functions in the shoreline jurisdiction. This assessment of *current* conditions will serve as the baseline against which the impacts of future development actions in shoreline jurisdiction will be measured. The Guidelines require that the County demonstrates that its updated SMP yields "no net loss" in shoreline ecological functions relative to the baseline (current condition) due to its implementation. The no net loss requirement is a new standard in the Guidelines that is intended to be used by local jurisdictions to test whether the updated SMP will in fact accomplish the SMA objective of protecting ecological functions.

Collected information included Watershed Resource Inventory Area (WRIA) documents, Skagit County studies, Town documents, scientific literature, personal communications, aerial photographs, internet data, and a brief physical inventory of the County and Towns' shorelines.

1.2 Shoreline Jurisdiction

As defined by the Shoreline Management Act of 1971, shorelines include certain waters of the state plus their associated “shorelands.” At a minimum, the waterbodies designated as shorelines of the state are streams whose mean annual flow is 20 cubic feet per second (cfs) or greater, lakes whose area is greater than 20 acres, and all marine waters. Shorelands are defined as:

“those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward 200 feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters which are subject to the provisions of this chapter...Any county or city may determine that portion of a one-hundred-year-floodplain to be included in its master program as long as such portion includes, as a minimum, the floodway and the adjacent land extending landward two hundred feet therefrom... Any city or county may also include in its master program land necessary for buffers for critical areas (RCW 90.58.030)”

The ordinary high water mark is:

“that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, That in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water” (RCW 90.58.030(2)(b)).

The current Shoreline Master Program identified 228 miles of marine and estuarine shoreline, 343 miles of streams/rivers and 26 lakes as Shorelines of the State. As considered in this shoreline inventory and during analysis of improved mapping and stream/river flow data, 598 miles of streams/rivers and 53 lakes may meet shoreline jurisdiction criteria. The total acreage of upland shorelands is 56,710 acres, this includes floodways, and associated floodplains and wetlands. Federal lands make up 21 percent of that acreage, or 11,877 acres total. The three federal entities that own the majority of

the federal land are the U.S. Forest Service (USFS), the National Park Service (NPS), and the U.S. Bureau of Land Management (BLM).

All areas waterward of the extreme low tide throughout Puget Sound are also considered Shorelines of Statewide Significance. Additionally, Skagit Bay and adjacent area from Brown Point to Yokeko Point along with Padilla Bay, from March Point to William Point, are also identified as specific estuarine areas and are considered Shorelines of Statewide Significance waterward from the ordinary high water mark. All streams and rivers which have mean annual flow of 1,000 cfs or greater are considered Shorelines of Statewide Significance. This applies to the Skagit, Baker, Cascade, Sauk, and Suiattle Rivers. All lakes greater than 1,000 acres are also considered Shorelines of Statewide Significance. Only Shannon Lake meets this criterion. For Shorelines of Statewide Significance, the Shoreline Management Act (SMA) sets specific preferences for uses and calls for a higher level of effort in implementing its objectives. A detailed discussion of the entire jurisdiction assessment and determination process can be reviewed in full in Appendix A of this report.

1.3 Study Area

The study area for this report includes all land currently within proposed shoreline jurisdiction of the County or Towns. Further, the study area includes relevant discussion of the contributing watersheds. The total area subject to the updated SMPs, not including aquatic area, is approximately 88.6 square miles in Skagit County, with 218 and 304 acres of that falling within the Towns of Lyman and Hamilton, respectively. An additional 18,770 acres, of potentially associated wetland may also be part of the County's shoreline jurisdiction.

1.3.1 Skagit County

Skagit County encompasses 1,920 square miles and is located in the north-central part of Washington. The county is bordered to the south by Snohomish County, to the southeast by Chelan County, to the northeast by Okanogan County, and to the north by Whatcom County. San Juan County lies mainly to the west across short stretches of marine waters, and Island County lies similarly to the southwest. Skagit County also includes Fidalgo, Guemes, Cypress, and some smaller islands. It is predominantly rural in nature, with unincorporated areas making up most of the land area. Incorporated areas of the County include the cities of Anacortes, Mount Vernon, Burlington, and Sedro-Woolley and the towns of La Conner, Lyman, Hamilton, and Concrete. Skagit County is also home to the Sauk-Suiattle Indian Tribe, the Samish Indian Nation, the Swinomish Tribal Community, and the Upper Skagit Tribe.

The shoreline area is distributed among 598 miles of rivers and streams, 53 lakes and reservoirs, and 228 miles of marine and estuarine shoreline. Federal lands on which shoreline waterbodies lie are included in this report, but discussion is more limited in keeping with the application of the future SMP only to certain actions undertaken by non-federal parties on those lands.

1.3.2 Town of Lyman

The Town of Lyman covers 0.76 square miles in Skagit County. Lyman is situated on the Skagit River, and it is surrounded by unincorporated agricultural land to the East, South, and West and rural residential land to the North. Much of the town of Lyman lies in the channel and floodway of the Skagit River (60.6%); however, most of the developed portion of the Town is outside of the floodway. A rip-rap revetment runs along 550 feet of the Skagit River in the Town of Lyman.

1.3.3 Town of Hamilton

The Town of Hamilton covers 1.2 square miles in Skagit County. Hamilton is situated east of Lyman on the Skagit River, and it is surrounded by unincorporated Skagit County. Approximately 300 acres and ninety percent of the residential development in the Town of Hamilton were established within the floodway of the Skagit River. In 2008, Skagit County expanded the Urban Growth Area to the north of Hamilton by 107 acres to allow for the relocation of commercial and residential areas away from the floodway. Over time, the Town plans to move residents out of the floodway and into the expanded Urban Growth Area.

2 SUMMARY OF CURRENT REGULATORY FRAMEWORK

2.1 Shoreline Management Act

The Shoreline Management Act of 1971 brought about many changes for local jurisdictions. The legislative findings and policy intent of the SMA states:

“There is, therefore, a clear and urgent demand for a planned, rational, and concerted effort, jointly performed by federal, state, and local governments, to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines (RCW 90.58.020).”

While protecting shoreline resources by regulating development, the SMA is also intended to provide balance by encouraging water-dependent or water-oriented uses while also conserving or enhancing shoreline ecological functions and values. SMPs will be based on state guidelines, but should be tailored to the specific conditions and needs of the local community.

2.2 Skagit County

Skagit County adopted its first Shoreline Master Program in 1976, and has subsequently made amendments to the document (most recently in 1995). The Shoreline Master Program Guidelines require that updated Shoreline Master Programs *plan* for restoration, typically accomplished in the future Shoreline Restoration Plan, and also in the use of incentives in the SMP itself which can foster restoration.

The County Comprehensive Plan provides goals and policies that have been used in development of the County's regulations, such as those found in the Title 14 of the Skagit County Code (including critical areas regulations) and the Shoreline Master Program. The Natural Resource Lands Element of the County's Comprehensive Plan contains Countywide Planning Policies (CPPs) that are intended to balance protection and restoration of the County's shorelines with continued commercial resource development. For example, these include:

- Identified critical areas, shorelands, aquatic resource areas and natural resource lands shall be protected by restricting conversion. Encroachment by incompatible uses shall be prevented by maintenance of adequate buffering between conflicting activities. (CPP 8.1)

- Land uses adjacent to agricultural, forest, or mineral resource lands and designated aquatic resource areas shall not interfere with the continued use of these designated lands for the production of food, agricultural and aquatic based products, or timber, or for the extraction of minerals. (CPP 8.2)
- Long term commercially significant natural resource lands and designated aquatic resource areas shall be protected and conserved. Skagit County shall adopt policies and regulations that encourage and facilitate the retention and enhancement of natural resource areas in perpetuity. (CPP 8.5)
- When plats, short plats, building permits and development permits are issued for development activities on or adjacent to natural resource lands and aquatic resource areas, notice shall be provided to those seeking permit approvals that certain activities may occur that are not compatible with residences. (CPP 8.6)
- Fishery resources, including the county's river systems inclusive of their tributaries, as well as the area's lakes, associated wetlands, and marine waters, shall be protected and enhanced for continued productivity. (CPP 8.7)
- Skagit County shall encourage sustainable use of the natural resources of the county, including by no limited to agriculture, forestry, and aquatic resources. (CPP 8.8)

County regulations applicable to critical areas were adopted in 1996 and updated in 2009 to be consistent with Growth Management Act requirements to update comprehensive land use plans and development regulations every 7 years. In those regulations, the County specified general stream/river buffers of 200 feet for shorelines of the state. The regulations required buffer widths ranging from 140 to 200 feet for marine and lake shorelines and wetland buffers between 25 and 300 feet based on wetland classification and the intensity of the proposed land use. Many shoreline and wetland areas within the County contain functioning buffers of the required widths. Smaller functioning buffers are found where developments existed prior to the critical areas regulations or where buffers of different widths were previously established in approved site plans or protected critical area easements.

Shoreline uses, developments, and activities regulated under the critical areas regulations are also subject to the County's Comprehensive Plan, Skagit County Code, and various other provisions of County, state and federal laws. Any applicant must comply with all applicable laws prior to commencing any use, development, or activity.

The County will ensure consistency between the SMP and other County codes, plans and programs by reviewing each for consistency during periodic updates of the County's Comprehensive Plan.

2.3 Towns of Lyman and Hamilton

The Towns of Lyman and Hamilton both adopted the existing Skagit County Shoreline Master Program. Each Town has its own comprehensive plan that establishes overarching goals and policies for the respective areas. Lyman's Comprehensive Plan and Code was adopted in 2002 and amended in 2005. The Town of Hamilton's 1994 Comprehensive Plan outlines a plan to reduce development in the approximately 300 acres within the Skagit River floodway. The floodway area would be restored for fish and wildlife habitat, and the town would be relocated out of the floodway.

2.4 State Agencies and Regulations

Aside from the Shoreline Management Act, State regulations most pertinent to development in the County and Towns' shorelines include the State Hydraulic Code, the Growth Management Act, State Environmental Policy Act, tribal agreements and case law, Watershed Planning Act, Water Resources Act, and Salmon Recovery Act. A variety of agencies (e.g., Washington Department of Ecology, Washington Department of Fish and Wildlife, Washington Department of Natural Resources) are involved in implementing these regulations or otherwise own shoreline areas. The Department of Ecology reviews all shoreline projects that require a shoreline permit, but has specific regulatory authority over shoreline conditional use permits and shoreline variances. Other agency reviews of shoreline developments are typically triggered by in- or over-water work, discharges of fill or pollutants into the water, or substantial land clearing.

Depending on the nature of the proposed development, state regulations can play an important role in the design and implementation of a shoreline project, ensuring that impacts to shoreline functions and values are avoided, minimized, and/or mitigated. During the comprehensive SMP update, the County and Towns will consider other state regulations to ensure consistency as appropriate and feasible with the goal of streamlining the shoreline permitting process. A summary of some of the key state regulations and/or state agency responsibilities follows.

Section 401 Water Quality Certification: Section 401 of the federal Clean Water Act allows states to review, condition, and approve or deny certain federal permitted actions that result in discharges to State waters, including wetlands. In Washington, the

Department of Ecology is the State agency responsible for conducting that review, with their primary review criteria of ensuring that State water quality standards are met. Actions within streams or wetlands within the shoreline zone that require a Section 404 permit (see below) will also need to be reviewed by Ecology.

Washington Department of Natural Resources: Washington Department of Natural Resources (WDNR) is charged with protecting and managing use of state-owned aquatic lands. Toward that end, water-dependent uses waterward of the ordinary high water mark require review by WDNR to establish whether the project is on state-owned aquatic lands. Certain project activities, such as single-family or two-party joint-use residential piers, on state-owned aquatic lands are exempt from these requirements. WDNR recommends that all proponents of a project waterward of the ordinary high water mark contact WDNR to determine jurisdiction and requirements.

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.” Whatcom County and other partners completed the watershed management plans for the Nooksack watershed (WRIA 1) in 2005. The Upper and Lower Skagit watersheds (WRIAs 3 & 4) and the Stillaguamish watershed (WRIA 5) have not adopted watershed management plans under RCW 90.82..

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.” These activities may include stream alteration, culvert installation or replacement, pier and bulkhead repair or construction, among others. WDFW can condition projects to avoid, minimize, restore, and compensate adverse impacts.

Water Pollution Control Act: Chapter 90.48 RCW establishes the State’s policy “to maintain the highest possible standards to insure the purity of all waters of the State consistent with public health and public enjoyment thereof, the propagation and protection of wild life, birds, game, fish and other aquatic life, and the industrial development of the State, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the State of Washington.” The Department of Ecology is the agency charged

with crafting and implementing rules and regulations in accordance with this legislation.

Instream Resources Protection Program-Upper and Lower Skagit watershed, Water Resource Inventory Areas (WRIA) 3 & 4: WAC 173-503 applies minimum water flow and water level requirements to waters within the Lower and Upper Skagit River watershed (WRIA 3 & 4), excluding the Samish River sub-basin and any islands (i.e., Fidalgo, Guemes, Cypress, Hope, and Goat Islands). The purpose of this rule is to “retain perennial rivers, streams, and lakes in the Lower and Upper Skagit water resources inventory area, including the Cultus Mt. Tributaries, as defined in WAC 173-503-040, with in-stream flows and levels necessary to provide protection for wildlife, fish, scenic, aesthetic, and other environmental values, and navigational values, as well as recreation and water quality” (WAC 173-503-020).

2.5 Federal Regulations

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

Section 404: Section 404 of the federal Clean Water Act provides the Corps, under the oversight of the U.S. Environmental Protection Agency, with authority to regulate “discharge of dredged or fill material into waters of the United States, including wetlands” (http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf). The extent of the Corps’ authority and the definition of fill have been the subject of considerable legal activity. As applicable to the County’s shoreline jurisdiction, however, it generally means that the Corps must review and approve most activities in streams and wetlands.

These activities may include wetland fills, stream and wetland restoration, and culvert installation or replacement, among others. Similar to SEPA requirements, the Corps is interested in avoidance, minimization, restoration, and compensation of impacts.

Section 10: Section 10 of the federal Rivers and Harbors Appropriation Act of 1899 provides the U.S. Army Corps of Engineers (Corps) with authority to regulate activities that may affect navigation of “navigable” waters. Designated “navigable” waters in Skagit County include the Puget Sound, the Skagit River from Marblemount to the mouth of Skagit Bay, the entirety of the Sauk and Suiattle Rivers within Skagit County, and the lower 4 miles of the Samish River. Accordingly, proposals to construct new or modify existing over-water structures (including bridges), to excavate or fill, or to “alter or modify the course, location, condition, or capacity of” navigable waters must be reviewed and approved by the Corps.

Federal Endangered Species Act (ESA): Section 9 of the ESA prohibits “take” of listed species. Take has been defined in Section 3 as: “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The take prohibitions of the ESA apply to everyone, so any action that results in a take of listed fish or wildlife would be a violation of the ESA and is strictly prohibited. Per Section 7 of the ESA, activities with potential to affect federally listed or proposed species and that either require federal approval, receive federal funding, or occur on federal land must be reviewed by the National Marine Fisheries Service (NOAA Fisheries) and/or U.S. Fish and Wildlife Service (USFWS) via a process called “consultation.” Activities requiring a Section 10 or Section 404 permit also require such consultation if these activities occur in waterbodies with listed species. Since the listing of Chinook salmon, sockeye salmon, steelhead trout, and bull trout as Threatened under the ESA, the Corps, NOAA Fisheries and USFWS have jointly developed a number of Regional General Permits (RGPs) or programmatic consultations to streamline permitting of projects in waterbodies containing listed fish, including:

RGP 1: Authorizes installation, maintenance, repair, replacement, and retention of noncommercial watercraft lifts at existing residential waterfront structures.

RGP 6: Authorizes the maintenance, modification, and construction of residential overwater structures in inland marine waters.

Clean Water Act: The federal Clean Water Act has a number of programs and regulatory components, but of particular relevance to Skagit County is the National Pollutant Discharge Elimination System (NPDES) program. In Washington State, the Department of Ecology has been delegated the responsibility by the U.S. Environmental

Protection Agency for managing implementation of this program. The County is engaged in compliance with the NPDES Phase II Municipal Stormwater General Permit requirements that address stormwater system discharges to surface waters.

3 SUMMARY OF COUNTY ECOSYSTEM CONDITIONS

3.1 Geographic and Ecosystem Context

Portions of three major watersheds are located within Skagit County, the Nooksack watershed, the Skagit Watershed, and the Stillaguamish Watershed. Generally, these watersheds are identified by the state as Water Resource Inventory Areas (WRIA). Because of its large size, the upper and lower portions of the Skagit watershed were divided into two WRIs. A map of the WRIs within Skagit County is provided in Figure 1.

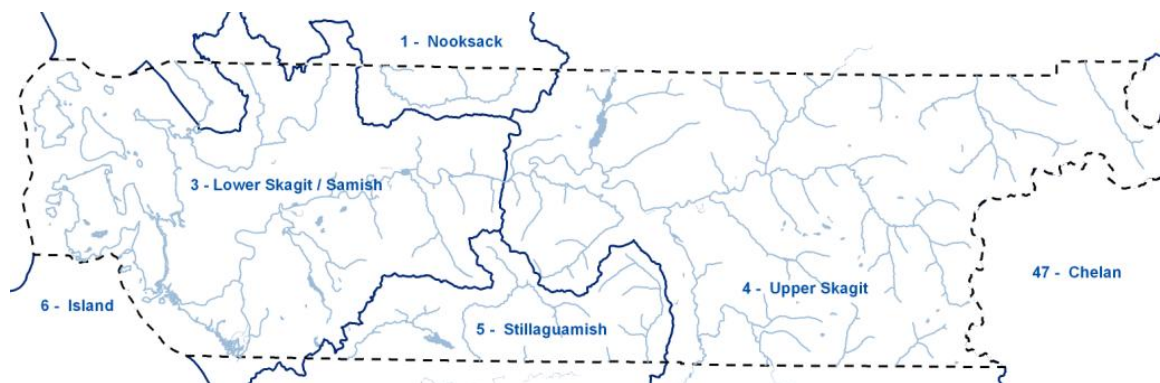


Figure 1. Map of Water Resource Inventory Areas in Skagit County

Nooksack (WRIA 1)

The Nooksack watershed covers over 1,410 square miles across Whatcom County, Skagit County and British Columbia; approximately 21 square miles of the watershed fall within Skagit County. The watershed includes over 1,000 miles of streams and over 100 lakes. The Nooksack River originates in the north Cascade Mountains, and the eastern third of the watershed primarily lies within National Forest and National Park boundaries. The western portion of the watershed supports agricultural, residential, commercial, and industrial development, and forestry.

Historically, the lower mainstem Nooksack River flowed through a broad, low gradient valley bounded by extensive wetlands (Collins and Sheikh 2002). The three forks of the river, the North, Middle, and South Forks are characterized by a relatively steep gradient, except in the lower South Fork Nooksack, which includes an extensive wetland system, as well as small channels and ponds (Collins and Sheikh 2002). Streamflow in

the Nooksack originates through a combination of groundwater, snow melt, and precipitation.

The Nooksack watershed supports three distinct runs of Chinook salmon, including two native early run stocks and one mainstem run of hatchery origin. Chinook salmon production in the South Fork Nooksack River is notable, because unlike in most other rivers in the state of Washington, the majority of juvenile Chinook salmon overwinter in the river and migrate to the ocean as yearlings.

Lower Skagit/Samish (WRIA 3)

The Skagit River is more than 160 miles long and the third largest river on the West Coast of the contiguous United States. It originates in Canada and flows south and west through the North Cascade Range. The Lower Skagit/Samish Water Resource Inventory Area (WRIA) 3, is located entirely within Skagit County, and includes the lower reaches of the Skagit River, the Samish River, as well as the majority of Skagit County's marine shoreline, including Padilla Bay, Skagit Bay, and Similk Bay, and the shorelines around Fidalgo Island. The lower Skagit River has the most extensive floodplain area in the watershed at an estimated 108 square miles (Smith 2003). The Towns of Lyman and Hamilton are located within the Lower Skagit/Samish watershed.

The Skagit is the only river system in Washington that supports all five species of salmon. It contains some of the largest runs of threatened wild Chinook salmon (*Oncorhynchus tshawytscha*) in Puget Sound and the largest chum salmon (*Oncorhynchus keta*) and pink salmon (*Oncorhynchus gorbuscha*) stocks in Washington (Beamer et al. 2000). The Skagit River has six separate stocks of Chinook salmon identified by their spawning location and the season that the adults return to freshwater. All of these stocks migrate through the lower watershed, but only the Lower Skagit Fall Chinook salmon spawn in the lower watershed.

Upper Skagit (WRIA 4)

The upper Skagit watershed stretches across Snohomish, Skagit, and Whatcom Counties and extends into Canada. The division between the lower Skagit watershed (WRIA 3) and the upper Skagit watershed (WRIA 4) occurs just east of the Town of Hamilton. Much of the upper watershed is within the boundaries of the Mt. Baker National Forest and the North Cascades National Park. The Sauk River is the largest tributary to the Skagit River; other major tributaries in the upper watershed include the Cascade, Suiattle, Whitechuck, and Baker Rivers. Over 300 active glaciers contribute to streamflow in the Skagit River watershed.

The Upper Skagit Water Resource Inventory Area (WRIA 4) has been identified in the statewide Habitat Limiting Factors report as the only WRIA within the state with overall “good” habitat ratings in all complete (i.e. no data gaps) categories (Smith 2003). These categories include floodplain, large woody debris (LWD), riparian, high flow, and sedimentation conditions. Five different stocks of Chinook salmon spawn in the upper watershed, including the Upper Skagit Summer, Lower Sauk Summer, Upper Sauk Spring, Suiattle Spring, and Upper Cascade Spring Chinook. The upper Skagit watershed also features one of the largest bald eagle concentrations in the lower 48 states.

Seattle City Light operates three dams (Gorge, Diablo, and Ross dams) in Whatcom County that regulate streamflow on the Skagit River. Puget Sound Energy operates another two dams in the Baker River sub-basin. Only the lower Baker River dam is within Skagit County.

Stillaguamish (WRIA 5)

The Stillaguamish River Basin includes more than 4,618 miles of streams and rivers [Stillaguamish Technical Advisory Group (STAG) 2000] and drains an area of 684 square miles, making it the fifth largest basin draining to Puget Sound. It extends from the Cascade Mountains along the eastern boundary to Port Susan Bay (Puget Sound) near Stanwood in the west. Elevations within the watershed range from sea level at Stanwood to 6,854 feet at the summit of Three Fingers. Flows within the Stillaguamish are supported by both snow and rain events, with a substantial baseflow from groundwater. Unlike other Puget Sound river basins, the Stillaguamish Basin does not extend all the way to the Cascade Crest; instead it is bordered to the east by two other Puget Sound basins, the Snohomish and Skagit.

WRIA 5 can be divided into three separate sub-watersheds or basins for categorization and discussion purposes: the North Fork, the South Fork, and the Mainstem below the confluence of the two forks near the City of Arlington. The North Fork Stillaguamish drains 284 square miles and the South Fork drains 255 square miles, with the remainder drained by the Mainstem or its tributaries (Williams et. al. 1975). Major tributaries include Church, Portage, and Pilchuck Creeks for the mainstem, Jim and Canyon Creeks for the South Fork, and the Boulder River and Deer, French, and Squire Creeks for the North Fork.

No dams or reservoirs occur along the Stillaguamish River, so flows in the basin are essentially unregulated.

3.2 Historic Geology, Topography, and Drainage Patterns

The Skagit Basin is the largest basin in the county, and indeed the largest basin in the entire Puget Sound, supplying over 30% of the freshwater that enters the Sound (Smith 2003). It drains an area of 3,115 square miles, originating in the Cascade Mountains of British Columbia and flowing south into Whatcom County, then bending to the southwest and entering Skagit County near the mouth of Damnation Creek. Its course continues to the southwest through the town of Marblemount, then begins to bend more directly west past Rockport, where it meets with the Sauk River, and on to Concrete, where the Baker River joins in. Below Concrete, the channel takes on a more sinuous character, still flowing primarily to the west to Burlington and Mount Vernon, and then heading more south until reaching Fir Island, where the channel divides into the North Fork and South Fork channels, which flow on either side of and define the island.

The upper basin of the Skagit is steep, falling from 8,000 feet at its source in Canada to 1,600 feet at the US/Canada border. Within the first 40 miles of the border, it falls another 1,100 feet, and the remaining 500' of elevation is lost over the lower 95 miles of river (Pacific International Engineering 2008). Precipitation in the upper basin can exceed 140" per year, mostly falling between October and March. In the lowlands, annual precipitation averages less than 80" per year (Smith 2003).

The geology of Skagit County reflects a complicated history of tectonic motion, volcanism, and glacial erosion and deposition. Rocks in the region are a mosaic of ancient volcanic island arcs, deep ocean sediments, basaltic ocean floor, and remnants of former continents (USGS Electronic source). These pieces were formed at various times and locations, and have drifted together and merged to the western boundary of the North American continent. The upper basin consists primarily of ancient metamorphic rock formed on a sub-continent (the North Cascades sub-continent) that joined with the North American continent some 50 million years ago. This sub-continent was a large, tropical island, with volcanoes along its crest, flanked by lush forests along its coasts (Alt & Hyndman 1994). This island was bounded by two subduction-zone trenches, the Okanagon Trench on the east, which was consumed as the subcontinent docked with the North American continent, and the Cascadia subduction zone, still active off the west coast of Washington. Much of the western portion of the micro-continent was formed by the Cascadia subduction zone, both before the subcontinent docked with the North American and after. It consists primarily of oceanic sedimentary and basaltic rocks that were pushed up at the margin of the Cascadia trench. The eastern portion of the sub-continent is primarily sedimentary rock derived from continental erosion and deposition between the island and the North American continent. Later granitic and andesitic

flows and pyroclastic deposits associated with Mount Baker and Glacier Peak (Pacific International Engineering 2008) have pushed their way into or through the ancient North Cascades rock. Valleys, carved by much later glaciers, are generally steep-walled and flat-bottomed. Valley walls can be mantled with rocky colluvium and both continental and alpine glacial deposits.

East of Darrington, the north-south trending Straight Creek Fault separates the Western Domain, primarily sedimentary and volcanic rocks, from the Metamorphic Core Domain, highly recrystallized metamorphic rock (USGS 2011). This fault, which was active between 40 and 50 million years ago, displaced rocks on the west side of the fault by over 60 miles, relative to those on the east side of the fault. By about 35 million years ago, the tectonic geometry of the region had shifted to a more east-west collision between the North American plate and the Juan de Fuca plate at the Cascadia Subduction Zone, and the northward migration slowed considerably. At the same time, the Cascade volcanoes, including Mount Baker and Glacier Peak, formed by the melting of the Juan de Fuca plate as it sinks beneath the North American Plate began to emerge.

Below Concrete, the floodplain widens into an extensive delta, spreading from Samish Bay in the north, where it combined with the delta from the Samish River, to Skagit Bay in the south. Much of this delta was built following glaciation, as glacial sediments in the basin were rapidly eroded and carried downstream (Church & Slaymaker 1989; Benda et.al. 1991 cited in Collins 1998).

Historically, wood played a large role in the development of the Skagit delta and the distribution of water and channels on the delta. For example, a nearly mile-long log jam complex near Mount Vernon, hundreds of years old and with mature trees growing on it, forced flood flows out of the channel and distributed it towards Samish and Padilla Bays, even while the main flow of the river was towards Skagit Bay. This jam complex was removed in the 1870's, increasing flows towards Skagit Bay and producing more flooding at Fir Island (Collins 1998). "Snagging", or the systematic removal of large wood in channels to aid navigation, was conducted extensively starting in the late 19th century. Between 1890 and 1910, federal records show that 35,000 snags were removed from the Skagit River, with diameters ranging from 3.7m to 5.2m (Collins 1998). While most of the wood was likely removed early on in the process, snagging continued through the better part of the 20th century.

Lahars, primarily from Glacier Peak, but also from Mount Baker, likely played a larger role than glaciation in the rapid build-out of the Skagit delta (Dragovitch, et. al. 2000 cited in Collins and Sheikh 2003). Lahar deposits also altered the fundamental

hydrology of the basin. Approximately 13,000 years ago, a lahar from Glacier Peak blocked the Sauk River near the present-day town of Darrington. Prior to the lahar deposit, the Sauk had been a tributary to the Stillaguamish River. The lahar blocked that path, and the Sauk was forced into its present configuration, flowing northward to join the Skagit River (USGS, Electronic source).

Adding to the complexity of the Sauk River and its altered course, the valley that conveys the Sauk to the Skagit was previously occupied by the Skagit River. Near the end of the last glacial period, ice, and later deposits from ice, blocked the Skagit River and forced flow southward where it joined the Stillaguamish. As a result, the present day Sauk River valley is wider at the upstream end than at the downstream end, when a typical river valley broadens at the downstream end (Booth et al. 2003).

The Stillaguamish River valley downstream of Darrington reflects this history as well. The valley once contained the combined flow of the Skagit, Sauk and Stillaguamish rivers, and is sized to accommodate that combined flow. Presently, without the flow from the Sauk or Skagit, the Stillaguamish is considered an “underfit” stream, too small to have created the valley in which it flows. The Stillaguamish is the fifth largest tributary to Puget Sound, draining about 700 square miles and consisting of over 3,100 miles of stream and marine shoreline (SIRC 2005). The mainstem of the Stillaguamish is in Snohomish County, but the North Fork and several major tributaries, including Deer Creek and Pilchuck Creek, are in Skagit County. The area drained by these tributaries is primarily Jurassic-era metamorphic rock, though a large fault brings the Jurassic rocks in contact with earlier Mesozoic rock in the upper North Fork basin. The Samish River originates in Whatcom County, and flows generally southward through a relatively broad valley mantled in glacial outwash, both terrestrial and marine. It then turns to the west, skirting the edge of the Skagit delta, to meet Friday Creek, its largest tributary. Friday Creek originates at Lake Samish, and flows primarily south through a valley of glaciomarine drift, marine sediments that glacial sediment deposited in marine water. The outlet is near the south end of Samish Bay.

The Baker River drains the east side of Mount Baker, the south side of Mount Shuksan, and the west side of Mount Challenger in Whatcom County. It flows southward into Skagit County and meets the Skagit River at Concrete. Two hydroelectric dams, the Upper and Lower, impound Baker Lake (in Whatcom County) and Shannon Lake (Skagit County). The valley bottom surrounding Lake Shannon is mantled primarily in glacial advance outwash, with till and other glacial deposits higher up the valley walls, and bedrock exposed in the divides.

The Sauk and Suiattle Rivers drain Glacier Peak, the most active of the Cascade volcanoes, having experienced at least six eruptive episodes in the past 15,000 years. The Sauk flows north into Skagit County to the Skagit River, flowing roughly parallel to, but in the opposite direction of, the Stillaguamish River. The Suiattle joins the Sauk a few miles north of Darrington. The Suiattle River crosses the Straight Creek fault. The Suiattle Valley and the southernmost portions of the Sauk Valley are mantled in lahar deposits from Glacier Peak

The islands of Skagit County all have outcroppings of (or in the case of Cypress Island, consist mostly of) Mesozoic rock surrounded by more recent glacial deposits. As with the North Cascades bedrock, these island rocks are part of an ancient continent that, through tectonic plate motion, was connected to the North American continent.

As a result of the historically unconfined nature of the Skagit River delta, the Skagit River delta historically spanned Samish Bay, Padilla Bay, and the present day Skagit River delta (Puget Sound Action Team 2005). Diking and draining of wetlands has reduced the area of the delta and the hydrologic connectivity between the Skagit River delta and Padilla Bay.

3.3 Major Land Use Changes and Current Shoreline Condition

This section is based on summaries of Skagit County History prepared for HistoryLink.org (Oakley 2004) and for the Skagit County Historical Museum (Anderson, undated).

Skagit County has been inhabited for over 10,000 years. Around the year 1300, native tribes collectively known as the Coast Salish inhabited Skagit County. Tribal groups formed villages of extended families living in cedar plank houses, socializing and trading with other villages and other regions. Typical activities included fishing for salmon, collecting shellfish, and modifying prairie landscapes to grow fern and camas, a food source.

Spanish and British explorers came to the County in the early 1800s, such as with the Hudson's Bay Company in 1824. European explorers noted about 11 different tribal groups at that time. Following the Point Elliot Treaty in 1855 several tribal groups moved to a reservation on Fidalgo Island. There are several tribal communities in the County today, including the Swinomish, Upper Skagit, Sauk-Suiattle, and Samish.

Euro-Americans settled the area in the mid-1800s and early enterprises included forestry as well as diking to allow for agriculture. In 1900 Skagit County had a population of

14,272 persons, growing to 119,300 in 2010 (US Bureau of the Census 1995, Washington State Office of Financial Management 2010).

Nooksack (WRIA 1)

The natural resources of the Nooksack watershed historically provided the subsistence base for the area's first residents, the Lummi, Nooksack, Samish, and Semiahmoo people. By the mid 1800's European settlers began to clear trees from the watershed's bays and valleys, which in turn allowed for the establishment of agriculture. Much of the extensive wetlands that historically occurred along the margins of the Nooksack River and the lower South Fork had been drained or filled for conversion to agriculture by 1910 (Collins and Sheikh 2002).

By 1938, logged land had been converted to agriculture in the lower mainstem and parts of the upper mainstem and the forks (Collins and Sheikh 2002). What was not converted to agriculture reverted to forest (Collins and Sheikh 2002).

Today, the eastern half of the Nooksack watershed is primarily under public ownership (primarily by the US Forest Service and Seattle City Light), while the western half is developed with a mix of agriculture, residential, and commercial uses.

Lower Skagit/Samish and Puget Sound Nearshore (WRIA 3)

The fur trade brought European settlers to what is now Skagit County in the early 1800s. It was not until after the first dikes were constructed in the mid-1850s that farming began in the Skagit Valley. Over time, the construction of dikes and drainage systems converted thousands of acres of marsh, mudflat, and floodplain in the Skagit Valley into prime farmland. Today, Skagit Valley agriculture continues to produce vegetable seeds, tulips, and dairy products, among other products.

Commercial salmon and cod fishing began in the 1870s in Skagit County. Fish canneries opened in Anacortes and elsewhere in the late 1890s, and were a main industry until the second half of the 20th Century. The dredging of 11 miles of the Swinomish Channel in 1937 allowed an industrial port to be established (NOAA, Date unknown). Fishing continues to be an important part of the Swinomish Tribal Community; however, the commercial fish processing plants have closed as a result of decreasing fisheries.

Following removal of a large log-jam in 1879, the Skagit River became navigable and communities such as Mount Vernon and LaConner began to grow. Mount Vernon and LaConner were incorporated in 1890. Anacortes followed in 1891 and Hamilton in 1892.

Sedro-Woolley and Burlington were platted at this time as well followed later by Concrete. With the advent of the automobile, more bridges were built across the Skagit River.

Approximately 73% of the tidal wetlands and 98% of non-tidal wetlands in the Skagit River delta have been lost to diking and drainage since the 1860s (SRSC and WDFW 2005). Many diked channels are separated from the full tidal prism by tide gates, which close on the rising tide, preventing salt water from entering farming channels. These tide gates restrict salmon access and limit the tidal flushing that would otherwise occur. Similarly, most of the pocket estuaries in the Whidbey Basin and around the Skagit delta have also been lost due to filling (SRSC and WDFW 2005).

The loss of Skagit estuarine habitat is one of the most important habitat issues for salmonids in the watershed. Beechie et al. (1994) found that coho salmon (*O. kisutch*) smolt production has been significantly reduced in the Skagit River basin due to the loss of side channel sloughs. Within the watershed, restoration of the Skagit delta habitat has been and continues to be a high priority in the basin. Recently, an estuarine restoration project helped begin to reverse the historical trend of losing estuarine marsh in the lower Skagit watershed by restoring tidal inundation to 200 acres of historically diked lands.

Juvenile salmon in the Skagit River system historically utilized Padilla, Samish, and Fidalgo bays, which were connected to the Skagit River delta through tidal sloughs. Due to alterations in the delta, these bays are no longer directly accessible to outmigrant Skagit Chinook (PSAT 2005). Juvenile Chinook salmon from the Nooksack populations utilize Padilla, Samish, and Fidalgo bays for feeding and growth, refuge, and physiological adaptation to saltwater.

The historic flow of fine sediments into Padilla Bay created a shallow basin, making almost the entire bay intertidal. Because of the shallow basin and extensive eelgrass beds, primary and secondary productivity is high, and this high productivity may be transported to and support food webs in nearby areas (PSAT 2005). Padilla Bay is designated as a National Estuarine Research Reserve.

Today, Skagit County's marine shorelines are home to industry, agriculture, recreation, and residential development. Two major refineries were constructed on March's Point, on the western shore of Padilla Bay in the late 1950s. Tankers transport crude oil through Guemes Channel and a railroad line runs east to west along the southern shore of Padilla Bay and across the Swinomish Channel. Increasing development in the lower

Skagit River watershed raises the potential impacts on water quality and flows. Recently, contaminants have forced shellfish harvest closures, and contaminated sediments are a problem in Padilla Bay, Fidalgo Bay, and Guemes Channel. Despite these issues, sediment quality is generally better in the WRIA 3 nearshore environment than many other areas in Puget Sound (Long et al. 1999 cited in Smith 2003).

Over 117,000 people now reside in the lower Skagit/Samish watershed. As Skagit County has developed, impervious surface and road coverage has also increased. Increases in impervious surface coverage, and the consequent reduction in soil infiltration, have been correlated with increased velocity, volume and frequency of surface water flows. This hydrologic shift alters sediment and pollutant delivery to streams and other receiving bodies (Booth 1991; Arnold and Gibbons 1996). Increased surface water flows associated with 20-30% impervious surface coverage of suburban areas has been linked to decreased bank stability and increased erosion (May et al. 1997). Impervious surfaces replace vegetation and speed the movement of runoff into waterbodies while increasing the volume of the runoff. Similarly, the cumulative impact of roads throughout the county has had a variety of adverse effects on watershed processes and shoreline functions by limiting channel migration, interfering with natural recruitment of gravels and woody debris, eliminating or minimizing riparian vegetation, constricting flows, and providing a source of pollutants such as hydrocarbons and heavy metals.

Shoreline modifications (e.g., bank armoring, dikes, levees) have had a significant impact on the lower Skagit River and the marine nearshore in WRIA 3. Constructed to protect properties and structures, shoreline armoring disrupts sediment transport processes, disconnects habitats, reduces shoreline habitat quality, and is often accompanied by a lack of shoreline riparian vegetation. Shoreline armoring may result in coarsening of sediment because 1) wave energy carries finer sediment away, or 2) because armoring prevents fine grained sediment released from upslope erosional processes from reaching the shoreline. Other changes may include steepening the slope of the shoreline. East Skagit Bay, Swinomish Channel, Padilla Bay, and north Fidalgo Island were all rated as poor in an analysis of shoreline armoring (Smith 2003). The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) estimated that hydromodifications have isolated 31% of the historic river floodplain from the river and altered the shoreline habitat along over 98 km of the lower Skagit River. Studies have found that the density of juvenile Chinook along unarmored banks is greater than along banks with riprap armoring (Beamer and Henderson 1998), and that the density of

juvenile Chinook rearing in off-channel habitats is greater than in the mainstem Skagit River (Hayman et al. 1996).

In addition to direct impacts, shoreline armoring reduces hydrologic and ecological connectivity between the river and its floodplain. Floodplain interactions are significant because they facilitate germination and survival of riparian vegetation, flush terrestrial macroinvertebrates and detritus into the stream, create off-channel rearing habitats and recruit LWD into the stream (Naiman and Decamps 1997). Riparian vegetation slows the rate of flow over floodplains, allowing for greater infiltration and groundwater recharge (Tabacchi et al. 2000). Subsurface water in the floodplain slowly percolates through the alluvium and recharges the river and streams, maintaining higher base flows and cooler in-stream temperatures during the drier months.

Overwater structures, primarily occurring in the marine and lake systems, also affect shoreline functions. Shading from overwater cover creates unnatural transitions in light intensity. Prey fish, including juvenile salmonids, tend to avoid overwater structures, causing them to move away from shallow water, potentially making them more vulnerable to predation. Overwater shading also reduces the potential for the establishment and growth of aquatic vegetation. Finally, overwater structures require an access point along the shoreline, cleared of vegetation.

Most of the lower Skagit tributaries, including Nookachamps, Hansen, Coal, Wiseman, Morgan, Sorensen, Mannser, Red Cabin, Day, Cumberland, lower Finney, Grandy, and Jackman Creeks and Gages and Hart Sloughs, have very warm water temperatures in the summer months (Smith 2003). These elevated temperatures are generally associated with poor riparian cover (Smith 2003) and low flows. The Nookachamps watershed has numerous other types of water quality problems, including elevated nutrients, low dissolved oxygen levels, and elevated turbidity (Smith 2003). Excess sedimentation is also suspected in the Miller, Alder, Day, Grandy, Nookachamps, Hansen, Finney, Loretta, and Gilligan WAUs (Beechie and Feist, NMFS, unpublished data in Smith 2003). Most of the lower Skagit tributary watersheds, including the lower Skagit River, Gages Slough, and Nookachamps, Hansen, Gilligan, Day, Alder, Grandy, and Finney Creeks, are also impaired for flow conditions (Beamer et al. 2000).

Upper Skagit (WRIA 4)

Much of the upper Skagit watershed (44%) is within National Forest boundaries or protected in North Cascades National Park, a national recreation area, or a designated wilderness area. Due to the rugged landscape and federally protected lands in much of

the upper watershed, the population has remained low (estimated around 7,500 people in 2010). Many of Skagit County's small towns, including Hamilton, originated as mining camps for resources including limestone, coal, iron, and talc.

Over 158 miles of the Skagit River and its tributaries, upstream of the Sedro-Woolley pipeline crossing, are federally designated as "Wild and Scenic Rivers" (WSR). Within the WSR, just over fifty eight miles of the Skagit River are designated "recreational," which applies to rivers or portions of rivers that are accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past. Another one hundred miles of the Cascade, Sauk, and Suiattle Rivers are designated as "scenic," meaning that they "are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads." Approximately half of the WSR lies within federal lands, and the other half flows through private property.

The greatest habitat alteration in the upper watershed is from the dams and their operation for flood storage and energy generation. Although the dam operators have worked to minimize impacts on fish by controlling ramping rates and other issues, dam operation has reduced the magnitude of peak flows in the Skagit River by 50% (Beamer et al. 2000). This greatly impacts sediment and water transport processes, as well as the development and maintenance of off-channel habitats, woody debris recruitment, and other functions.

Stillaguamish (WRIA 5)

Prior to European settlement, most of the drainage basin of the Stillaguamish River was forested, with conifers the dominant tree type. Mining and logging were the first economic drivers for the area. By 1940, most, if not all, of the anadromous zone riparian areas (those portions of the drainage system available for use by anadromous fish) had been cleared of large conifers. Much of this land was converted to agricultural or urban use, and not reforested. This deforestation reduces the amount of large woody debris (LWD) available to the stream, and LWD is an important component for both stream stability and fish habitat (STAG 2000). Along with the deforestation of the riparian areas, most of the logjams in the river were removed between 1877 and 1893 to facilitate rafting of logs to downstream mills. Splash-damming was also used to transport logs downstream, causing the complete destruction of riparian and in-stream structure and habitat in affected areas (STAG 2000).

Sediment loads in the Stillaguamish are predominantly generated by landslide or other mass-wasting events in the upper watersheds (STAG 2000). Large, deep-seated landslides contribute most of this sediment. In total, 1,080 landslides have been inventoried in the Stillaguamish basin; 75 percent of these associated with clear cuts and road building activities (Perkins and Collins 1997).

Population growth in the watershed was relatively high, at 27%, from 2000 to 2010. In 2010, the estimated population of the watershed was approximately 52,800 people.

4 SHORELINE INVENTORY

4.1 Introduction

Development of a shoreline inventory is intended to record the existing or baseline conditions upon which the development of shoreline master program provisions will be examined to ensure the adopted regulations provide no net loss of shoreline ecological functions. At a minimum, local jurisdictions shall gather the inventory elements listed in the Guidelines, to the extent information is relevant and readily available. Table 1 lists those relevant inventory elements for which data is available for the County and Towns' shorelines. The table also describes the information collected for each of the required inventory elements. Map Figures are provided in the Map Folio (Appendix B), and they depict the various inventory pieces listed in the table, as well as additional analysis. Data gaps and limitations are identified in Section 4.2.

Table 1. Shoreline Inventory Elements and Information Sources.

Inventory Element	Information Gathered	Data Source	Map Figures
Land Use Patterns	Current land use, zoning, land ownership, and future land use (comprehensive plan)	Skagit County, Assessor data 2010	4-6 (a-c)
Public Access Areas	<ul style="list-style-type: none"> • Parks • Trails • Utility Corridors • Boat Launches (handheld and motorized) • Shellfish recreation beaches • Public Lands 	<ul style="list-style-type: none"> • Skagit County • Washington State Parks and Recreation • Washington Department of Health (originated by DIRM and the Office of Shellfish and Water Protection) • Washington Interagency Committee for Outdoor Recreation • Washington Department of Natural Resources 	7(a-c)
Wastewater facilities	Sewer treatment facilities	Skagit County, 2011	8 (a-c)
Surface/ Stormwater facilities	Streams and ditches	Skagit County, 2011	9 (a-c)

Inventory Element	Information Gathered	Data Source	Map Figures
Impervious Surfaces	General impervious surface	NOAA Coastal Change Analysis Program (satellite imagery interpretation at 30-m resolution, developed to meet an 85% accuracy specification), 2006	10 (a-c)
Surficial Geology	Geologic classifications	WA Department of Natural Resources, Division of Geology and Earth Resources, Surface Geology, June 2010	11(a-c)
Soils	Soil types	USDA NRCS (SSURGO), 1989	12(a-d)
Aquifer Recharge Areas	<ul style="list-style-type: none"> • Group A Well Protection Areas • Potential Seawater Intrusion Area • Guemes Island Sole Source Aquifer • Closed Streams and low flow buffers 	<ul style="list-style-type: none"> • Skagit County, 2009 • WA Department of Health, originated by WA Department of Ecology, 2008 • Skagit County, originated by WA Department of Ecology, 2009 	13(a-c)
Vegetation	Terrestrial vegetation type and land cover	NOAA Coastal Change Analysis Program (satellite imagery interpretation at 30-m resolution, developed to meet an 85% accuracy specification), 2006	14(a-c)
Geologically hazardous areas	<ul style="list-style-type: none"> • Slope stability • Alluvial fans • Landslide hazard areas • Seismic and tsunami hazard areas 	<ul style="list-style-type: none"> • Skagit County, 2009 • Washington Department of Natural Resources, Geology and Earth Sciences Division, 2010 	15(a-c)
Marine Shorelines	<ul style="list-style-type: none"> • Marine shoreforms • Marine substrates • Drift cells 	<ul style="list-style-type: none"> • Puget Sound Nearshore Ecosystem Restoration Project, 2009 • WA Department of Natural Resources Shorezone dataset, 2007 	16-18
Floodplains	<ul style="list-style-type: none"> • Floodplains • Floodways • Channel Migration Zones 	<ul style="list-style-type: none"> • FEMA, DFIRM, not adopted, 2010 • Ecology, 2010 	19(a-c)

Inventory Element	Information Gathered	Data Source	Map Figures
Wetlands	Potential wetlands	<ul style="list-style-type: none"> • Skagit County Wetland Inventory (circa 1990's) • U.S. Fish and Wildlife Service National Wetland Inventory, 1979 • Hydric Soils, Natural Resource Conservation Service, Soil Survey Geographic, 1989 	20(a-c)
WDFW Priority Habitats & Species	<ul style="list-style-type: none"> • Priority fish, priority wildlife, priority habitats • Intertidal vegetation 	<ul style="list-style-type: none"> • WA Department of Fish and Wildlife, 2010 • WA Department of Natural Resources, Intertidal Habitat Inventory 1996, Skagit County and Northern Whidbey Island, WA- Generalized Vegetation Classification 	21-25(a-c)
Shoreline Modifications	<ul style="list-style-type: none"> • Docks and other overwater structures • Levees/berms/dikes / other armoring structures • Nearshore fill 	<ul style="list-style-type: none"> • WA Department of Natural Resources Shorezone dataset, 2007 • Puget Sound Nearshore Ecosystem Restoration Project, 2009 • Skagit County, 2010 	26 (a-c)
Water quality impairment	303(d) waters and regulated sites	WA Department of Ecology, Water Quality Assessment 305(b) Report, 2008	27-28(a-c)
Restoration opportunities	Site-specific and general projects	Various, including Habitat Work Schedule (hws.ekosystem.us)	NA
Historical Sites	Historical places available as point data, but not mapped in inventory	WA Department of Archaeology and Historic Preservation, Washington State Heritage Register, 2009	NA

4.2 Inventory Data Summary, Assumptions, Limitations, and Data Gaps

The following discussion identifies assumptions and limitations for each of the inventory elements, and may provide a brief Countywide or watershed-wide narrative where qualitative descriptions provide more information than quantitative measures. Despite data gaps and limitations, a substantial quantity of information is available for

the shorelines of Skagit County to aid in the development of the inventory and analysis report, as well as the shoreline master program.

4.2.1 Management Unit Determination

In order to facilitate the description of shoreline inventory, analysis, and characterization, the County was divided into large areas called “management units”. Management unit delineation was based on hydrologic and biological characteristics and dominant land use. Management units were divided by river basin where such division resulted in a unit area with relatively consistent biological, physical, and land use characteristics (i.e., Nooksack, Stillaguamish, Samish Rivers). Because of the inherently different processes and functions on marine versus freshwater shorelines, marine and freshwater shorelines were generally characterized in separate management units. Furthermore, mainland marine shorelines were considered separately from island shorelines. Tribal and federal ownership, as well as the overall relative impact of land use on shoreline areas were also weighed in developing management units. Based on this approach, County shorelines were divided into the following 11 Management units, described further in Section 4.3.

- 1- Samish Bay
- 2- Samish Island, Padilla Bay, and East side Swinomish Channel
- 3- Swinomish Tribal Reservation
- 4- Fidalgo Island and Other Islands
- 5- Skagit Bay/Delta
- 6- Lower Skagit River- Diking Districts
- 7- Samish River
- 8- Middle Skagit River
- 9- Upper Skagit River
- 10- Nooksack Watershed (WRIA 1)
- 11- Stillaguamish Watershed (WRIA 5)

The management unit discussions and calculations do not include data for the incorporated Cities and Towns except Lyman and Hamilton, but they do include urban growth areas.

4.2.2 Land Use Patterns

This Shoreline Characterization Report reviews current and planned land use within shoreline jurisdiction to provide a basis to establish a compatible use pattern over the 20-year planning period of the SMP and to identify current or planned preferred uses in shoreline jurisdiction that should be protected or promoted to meet SMA goals for

water-oriented uses, shoreline access, and ecological protection. The SMA promotes the following use preferences (RCW 90.58.020) for shorelines of statewide significance in the stated order:

- (1) Recognize and protect the statewide interest over local interest;
- (2) Preserve the natural character of the shoreline;
- (3) Result in long term over short term benefit;
- (4) Protect the resources and ecology of the shoreline;
- (5) Increase public access to publicly owned areas of the shorelines;
- (6) Increase recreational opportunities for the public in the shoreline;
- (7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.

The above preferences would apply to several waterbodies and shorelines as follows:

- The Skagit River, Sauk River, Suiattle River, and Baker River having a mean annual flow greater than 1,000 cfs ;
- Lake Shannon being more than 1,000 acres in size; and
- Marine waters, including “[t]hose areas of Puget Sound and adjacent salt waters and the Strait of Juan de Fuca between the ordinary high water mark and the line of extreme low tide as follows: Skagit Bay and adjacent area -- from Brown Point to Yokeko Point; and Padilla Bay -- from March Point to William Point” (RCW 90.58.030(2)(f)(ii)).

The following use preferences are established for shorelines of the state, such as the upland areas of marine waters as well as lakes over 20 acres and streams over 20 cfs in shoreline jurisdiction:

1. Reserve appropriate areas for protecting and restoring ecological functions to control pollution and prevent damage to the natural environment and public health. In reserving areas, local governments should consider areas that are ecologically intact from the uplands through the aquatic zone of the area, aquatic areas that adjoin permanently protected uplands, and tidelands in public ownership. Local governments should ensure that these areas are reserved consistent with constitutional limits.

2. Reserve shoreline areas for water-dependent and associated water-related uses. Harbor areas, established pursuant to Article XV of the state Constitution, and other areas that have reasonable commercial navigational accessibility and necessary support facilities, such as transportation and utilities, should be reserved for water-dependent and water-related uses that are associated with commercial navigation unless the local governments can demonstrate that adequate shoreline is reserved for future water-dependent and water-related uses and unless protection of the existing natural resource values of such areas preclude such uses. Local governments may prepare master program provisions to allow mixed-use developments that include and support water-dependent uses and address specific conditions that affect water-dependent uses.
3. Reserve shoreline areas for other water-related and water-enjoyment uses that are compatible with ecological protection and restoration objectives.
4. Locate single-family residential uses where they are appropriate and can be developed without significant impact to ecological functions or displacement of water-dependent uses.
5. Limit nonwater-oriented uses to those locations where the above described uses are inappropriate or where nonwater-oriented uses demonstrably contribute to the objectives of the Shoreline Management Act [WAC 173-26-201(2)(d)].

4.2.3 Current Land Use

Existing land use provides a baseline for types of land use and land cover found within the shoreline jurisdiction. Existing land use data for the area covered by Skagit County shoreline jurisdiction was obtained from the Skagit County Assessor's data which was overlaid on Folio maps for current land use, land ownership patterns, and aerial images. Mapped assessor use types were sorted into land use categories established in WAC 458-53-030. Note that existing land uses not classified by the County Assessor according to WAC 458-53-030 are considered "other land uses" for purpose of this analysis.

The predominant shoreline land use pattern across all shoreline jurisdiction in Skagit County is undeveloped land and low-density residential. The undeveloped land category includes land used for agricultural purposes and government-owned land (including forest land). More intense urban development is found in areas of shoreline jurisdiction located within the County's Urban Growth Areas (UGAs), which include portions of those UGAs associated with the cities of Anacortes, Burlington, and Mount Vernon, and the Swinomish UGA, which is not associated with any of the incorporated cities in Skagit County. In order to more accurately characterize land use in Skagit County and provide meaningful summaries of land use for shoreline management, the

resource production category was further classified by resource type (e.g., forestry, agriculture, and other) and the residential use category was divided into single-family and multi-family uses. Land use data from the County Assessor's office may not be updated as frequently as other property information; however, it represents the best readily available information on current land use at a countywide level.

According to Ecology's SMP Guidelines (173-26-020 WAC), "water-oriented use means a use that is water-dependent, water-related, or water-enjoyment, or a combination of such uses." The Shoreline Management Act promotes uses that are "unique to or dependent upon use of the state's shoreline" as well as "ports, shoreline recreational uses including but not limited to parks, marinas, piers, and other improvements facilitating public access to shorelines of the state, industrial and commercial developments which are particularly dependent on their location on or use of the shorelines of the state and other development that will provide an opportunity for substantial numbers of the people to enjoy the shorelines of the state." (RCW 90.58.020)

Definitions and examples of water-oriented uses are included in Table 2 below.

Table 2. Water-Oriented Uses Definitions and Examples.

Water-Oriented Use Definitions	Examples
<p>"Water-dependent use" means a use or portion of a use which cannot exist in a location that is not adjacent to the water and which is dependent on the water by reason of the intrinsic nature of its operations. (WAC 173-26-020(39))</p>	<p>Examples of water-dependent uses may include ship cargo terminal loading areas, ferry and passenger terminals, barge loading facilities, ship building and dry docking, marinas, aquaculture, float plane facilities and sewer outfalls.</p>
<p>"Water-related use" means a use or portion of a use which is not intrinsically dependent on a waterfront location but whose economic viability is dependent upon a waterfront location because:</p> <p>(a) The use has a functional requirement for a waterfront location such as the arrival or shipment of materials by water or the need for large quantities of water; or</p> <p>(b) The use provides a necessary service supportive of the water-dependent uses and the proximity of the use to its customers makes its services less expensive and/or more convenient. (WAC 173-26-020 (43))</p>	<p>Examples of water-related uses may include warehousing of goods transported by water, seafood processing plants, hydroelectric generating plants, gravel storage when transported by barge, oil refineries where transport is by tanker, log storage, and potentially agriculture.</p>
<p>"Water-enjoyment use" means a recreational use or other use that facilitates public access to the shoreline as a primary characteristic of the use; or a use that provides for recreational use or aesthetic enjoyment of the shoreline for a substantial number of people as a general characteristic of the use and which through location, design, and operation ensures the public's ability to enjoy the physical and aesthetic qualities of the shoreline. In order to qualify as a water-enjoyment use, the use must be open to the general public and the shoreline-oriented space within the project must be devoted to the specific aspects of the use that fosters shoreline enjoyment. (WAC 173-26-020 (40))</p>	<p>Primary water-enjoyment uses may include, but are not limited to, parks, piers and other improvements facilitating public access to the shorelines of the state; and general water-enjoyment uses may include, but are not limited to restaurants, museums, aquariums, scientific/ecological reserves, and resorts/hotels.</p>

Based on a review of County Assessor records, the current use categories that were considered most likely to meet the definition of water-oriented uses were selected as follows:

- Transportation, Communication and Utilities (water dependent when a port, marina, or ferry terminal)
- Cultural, Entertainment, and Recreational (water-enjoyment use where a park, or water-dependent where a marina or dock)
- Eating/drinking places (water-enjoyment use)

- Hotel/lodging (water-enjoyment use)
- Manufacturing (water-related when a use such as oil refinery in Anacortes UGA, which is dependent upon shipping)
- Undeveloped Land and Water Area (water-dependent when associated with an aquaculture use)
- Trade – Retail trade of automotive, marine craft, aircraft, and accessories (water-dependent when associated with marine craft).

Water-dependent uses in the rural parts of the County include, but are not limited to, aquaculture uses found in the marine tidelands, such as in the Samish Bay Management unit, ferry terminal on Guemes Island, and the lighthouse at Burrows Island. Water-dependent uses in the urban areas include, but are not limited to, the port facilities and boatyard/boat repair facilities in and near the Anacortes UGA.

In the rural portions of the County, much of the potential water-oriented uses are parks, open space, and cultural, entertainment, and recreational activities.

More urban examples of water-oriented uses, including eating/drinking places and hotel/lodging uses, are found in the cities and urban growth area portions of the County, and in a few rural areas where an historic unincorporated community exists, such as Edison.

4.2.4 Future Land Use

Future land use categories are based on the Skagit County Comprehensive Plan and are reported in distinct locally adopted categories. Future land use data is based on area-wide classifications, which includes roads and other features in the coverage area; this tends to make the calculated proportional coverage of future land use areas seem greater than existing land use area calculations for the same area.

The Comprehensive Plan establishes the overall direction and guidance for location of future growth in the County. It does this, in part, through establishing land use designations which are applied to property throughout the County that describe the types of uses that can occur on these properties. Land uses in Skagit County fall into four general categories recognized by the Comprehensive Plan: Urban, Rural, Natural Resource Lands, and Open Space. The various land use districts and a general description of their purpose are outlined below to provide context for future land discussion by management unit.

Urban

These areas include all incorporated areas not regulated by County land use policies; as such, most of them will not be discussed in this shoreline analysis. However, the Towns of Hamilton and Lyman are incorporated towns with Urban areas that will be addressed in this shoreline analysis.

Town of Lyman

The Town of Lyman includes areas zoned as Open Space and Parks (O-S) and Residential (R-1) within its shoreline jurisdiction.

Town of Hamilton

The majority of the developed portion of the Town of Hamilton is located within shoreline jurisdiction. The Town includes several residential (R-V, R-A, R-1, and RM), commercial or industrial (B-C and M-C), and open space (O-S) and public (P) zones within shoreline jurisdiction. .

UGA Zoning

Areas with this designated use are outside of and not associated with incorporated areas, but within municipal Urban Growth Areas (UGAs). They can include localized designations, development district designations, and a range of different Urban Reserve designations. Incorporated UGAs (i.e., UGAs associated with incorporated jurisdictions) in Skagit County that are within shoreline jurisdiction are: Anacortes, Burlington, and Mount Vernon. The Swinomish UGA is the only unincorporated UGA with a portion of its area within shoreline jurisdiction.

Rural

This designation applies in areas where very low development densities are appropriate.

Natural Resource Lands

Areas with this designation can be agricultural, mineral, or forest lands.

Commercial/Industrial

These areas are non-urban with commercial activities such as small businesses, freeway services, and rural village businesses.

Open Space

Areas with this designation are undeveloped lands of statewide or regional significance. Open Space areas can be in one of two categories: public or private. Public open space lands are areas that are dedicated or reserved for public use or enjoyment for recreation, scenic amenities, natural resource land management, or environmentally sensitive.

Private open space lands are areas that are privately owned, and have been set aside through open space taxation programs, by voluntary conservation, or by other means.

Table of Land Use Districts

The following table of land use districts describes Skagit County Comprehensive Plan Land Use Designations and their associated zoning.

Table 3. Comprehensive Plan Land Use Designations and Associated Zoning

Comprehensive Plan Land Use Designation	Zoning District
Rural Village Commercial	Rural Village Commercial (RVC)
Rural Center	Rural Center (RC)
Rural Freeway Services	Rural Freeway Services (RFS)
Small Scale Recreation and Tourism	Small Scale Recreation and Tourism (SRT)
Small Scale Business	Small Scale Business (SSB)
Rural Business	Rural Business (RB)
Natural Resource Industries	Natural Resource Industries (NRI)
Rural Marine Industrial	Rural Marine Industrial (RMI)
Urban Growth Area	Urban Reserve Commercial-Industrial (URC-I)
Urban Growth Area	Commercial – Swinomish (C)
Urban Growth Area	Urban Reserve Residential (URR)
Urban Growth Area	Urban Reserve Public – Open Space (URP-OS)
Urban Growth Area	Anacortes UGA Development District (A-UD)
Aviation Related	Aviation Related (AVR)
Airport Environs Overlay	Airport Environs Overlay (AEO)
Rural Intermediate	Rural Intermediate (RI)
Rural Village Residential	Rural Village Residential (RVR)
Rural Reserve	Rural Reserve (RRv)
Residential	Residential (R)
Agricultural – Natural Resources Lands	Agricultural – Natural Resources Lands (Ag-NRL)
Industrial Forest – Natural Resource Lands (IF-NRL)	Industrial Forest – Natural Resource Lands (IF-NRL)
Secondary Forest – Natural Resource Lands	Secondary Forest – Natural Resource Lands (SF-NRL)
Rural Resource – Natural Resource Lands	Rural Resource – Natural Resource Lands (RRc-NRL)
Mineral Resource Overlay	Mineral Resource Overlay (MRO)
Public Open Space of Regional/Statewide Importance	Public Open Space of Regional/Statewide Importance (OSRSI)

4.2.5 Existing Skagit County Shoreline Master Program Designations

The current Shoreline Master Program designations for Skagit County (including the Towns of Lyman and Hamilton) are briefly described below.

- **Urban:** The Urban Shoreline Area is a shoreline area of intensive development including, but not limited to, residential, commercial, and industrial uses. Areas with this designation are those presently subjected to intensive use, as well as those planned to accommodate urban expansion.
- **Rural Residential:** The Rural Residential Shoreline Area is a shoreline area characterized by low- to medium-intensity land uses that exhibit small-scale alterations to the natural shoreline environment. These land uses are generally of

a residential, commercial, recreational, and agricultural nature, with utilities and services provided on an individual or community basis.

- **Rural:** The Rural Shoreline Area is a shoreline area typified by low overall structural density and low- to moderate-intensity of uses. Primary uses include activities related to agriculture, residential development, outdoor recreation, and forestry operations.
- **Conservancy:** The Conservancy Shoreline Area is a shoreline area containing natural resources which can be used/managed on a multiple use basis without extensive alteration of topography or banks, and/or a shoreline area containing hazardous natural conditions or sensitive natural or cultural features which require more than normal restrictions on development and use of such areas.
- **Natural:** The Natural Shoreline Area is a shoreline area that has experienced little or no material encroachment and has not been materially affected by human use. Areas recognized as unique and reasonably capable of being restored to a natural condition may also qualify as well as those areas where former encroachment has been restored by natural processes.
- **Aquatic:** The Aquatic Shoreline Area is all water bodies, including marine waters, lakes, and all rivers of the state together with their underlying lands and their water column, including but not limited to bays, straits, harbor areas, waterways, coves, estuaries, lakes, streamways, tidelands, bedlands, and shorelands.

4.2.6 **Transportation**

As outlined below, there are several state and federal highway road sections and railroad corridors in Skagit County that either parallel, cross or are otherwise located in existing or future shoreline jurisdiction. In addition to the state and federal highway road sections outlined below, several County-owned and private roads are also located in existing or future shoreline jurisdiction. Road densities are highest in the western portion of the county near population centers, while forest roads are concentrated in the less developed eastern portion of the County.

Highways

- State Route 20 parallels the shoreline from Anacortes in the west, to Ross Lake National Recreational Area in the northeast portion of the County.

- Interstate 5 crosses shoreline jurisdiction in the Skagit Delta and Samish River management units.
- State Route 9 skirt shoreline jurisdiction along Lake McMurray and Big Lake, crosses and parallels Nookachamps Creek, crosses the mainstem Skagit River, and parallels the Samish River.
- State Route 530 parallels the Sauk River over its entire length within the County.

Railroads

- Burlington Northern Santa Fe (BNSF) rail lines run east-west from Anacortes, along Highway 20 to the Town of Concrete. The railroad generally parallels the northern shoreline of the Skagit River, passing in and out of shoreline jurisdiction between Lyman and Concrete.
- Another track runs north-south along the shoreline of Samish Bay, crossing over the Samish River and the Skagit River in the City of Mount Vernon, and skirting the southern edge of the Skagit River delta.

4.2.7 Utilities

Skagit County Public Utility District uses a combination of surface water diversions and reservoir storage to supply drinking water to its residents. The Utility operates over 22,400 metered services, serving approximately 65,000 people an average of nine million gallons of water per day. District facilities include almost 600 miles of pipe, and over 31-million gallons of storage volume. The Skagit River Instream Protection Program Rule, adopted by Ecology in 2001 and amended in 2006, establishes how Ecology will allocate water to provide uninterrupted water supplies for human use while protecting stream flows for fish and other natural resources. The rule established groundwater withdrawal limits and guidelines, and designated low-flow and closed streams. The Swinomish Indian Tribe and the City of Anacortes challenged the Skagit Rule in 2008, and the case is ongoing.

Puget Sound Energy (PSE) generates electricity through the Baker River Hydroelectric Project. It delivers energy to 56, 938 customers in Skagit County via 1,900 miles of overhead distribution lines, 240 miles of high-voltage lines, 17 distribution substations, and six transmission substations. Environmental upgrades include a floating surface fish collector (completed in 2008) and a trap-and-haul facility and hatchery completed in 2010 (Puget Sound Energy, Electronic source).

Other utility facilities, lines and corridors exist throughout the County. For example, Cascade Natural Gas pipelines and the City of Anacortes water treatment plant.

Towns of Lyman and Hamilton

Both Lyman and Hamilton own and operate public water utilities. The Town of Lyman draws on two wells. In order to comply with treatment requirements to meet health standards and ensure that environmental standards are met, the Town recently built a new well house with disinfection equipment, installed corrosion control, constructed a new reservoir, and replaced 6,000 feet of distribution lines. A new well water pumping and treatment station, as well as above ground storage tanks, and piping were installed for the Town of Hamilton in 2002.

4.2.8 Impervious Surfaces

Impervious surface data was generated using NOAA's C-CAP classification (2006) of multispectral satellite imagery with 30x30-meter cell resolution. Given the relatively broad resolution, in cases where only a portion of cell coverage is impervious surface, the impervious surfaces may or may not be detected. With this limitation in mind, comparisons of impervious surface between waterbodies provide useful information.

4.2.9 Vegetation

The data was generated using multi-spectral satellite imagery with 30x30-meter cell resolution. Spectral data was classified using NOAA's C-CAP classification. Similar to the impervious surface coverage, the classification may over or under represent coverage when the type of coverage within cells is mixed. Documented non-vegetated areas in shorelines are open water, bare land, and perennial ice/snow. Because the ordinary high water mark changes over time, particularly in large, dynamic river systems, water is occasionally included within the total shoreline area used for the calculation of vegetation coverage (generally limited to large, dynamic river reaches). The result is that vegetative coverage is underestimated in reaches where water is included in the total shoreline area.

4.2.10 Shoreline Modifications

Shoreline modifications are human-caused alterations to the natural water's edge. The most common types of shoreline modifications include overwater structures and shoreline armoring.

Countywide data is available for overwater structures. The Washington Department of Natural Resources has digitized piers and other in-water structures such as boatlifts, boathouses, and moorage covers. However, this dataset does not differentiate between each of these various types of overwater structures. Thus, reporting of overwater cover is usually an overstatement when assessing just piers, docks, and floats. Whereas various types of overwater structures are common in the marine and lake environments, overwater structures are generally limited to bridges in the streams and rivers in Skagit

County (though some small marinas and dock facilities can be found along larger rivers, such as the Skagit). Although not technically overwater structures, boat ramps are also reported in the inventory.

Shoreline armoring data is available for the nearshore and estuarine area (management units 1-4) from the Puget Sound Nearshore Ecosystem Project (PSNERP). This data includes all types of armoring, including dikes, levees, and bulkheads. The county also maintains a dataset on dikes and levees throughout the county, but this data does not include information on other forms of shoreline armoring (e.g., bulkheads). In addition to the PSNERP and County data, two surveys of shoreline armoring were completed in 1998 and 2003 for the Skagit Watershed Council's Strategic Application Assessment (Beamer et al. 2000). These surveys provide additional data on shoreline armoring in the upper and middle Skagit River, as well as the Sauk River.

In order to evaluate the most complete armoring data for the entire county, PSNERP coverage of shoreline armoring was used to assess armoring for management units 1-4; Skagit County data on dikes and levees was used to assess armoring impacts in management units 5-11; and armoring data from the Skagit Watershed Council was used to augment the County data for management units 6, 8, and 9. For the purpose of analysis, armoring data was compared to total shoreline length. Generally, armoring data is limited to the larger river systems, and armored shorelines along smaller tributaries may be missed in this analysis. Armoring data for lakes is lacking.

4.2.11 Existing and Potential Public Access

Information about Skagit County shoreline public access facilities and potential opportunities was obtained from the County's GIS data, the Skagit County Comprehensive Parks and Recreation Plan (2004), the Skagit Countywide UGA Open Space Concept Plan, the Skagit County Comprehensive Plan (2007), and other sources.

Currently there are almost 50 miles of public shoreline in Skagit County. Of the 50 miles, about 30 are saltwater, 5 miles are lake, and 13 miles are river/stream. Most of the public shoreline is in the western portion of Skagit County or along the Skagit River in the eastern portion of the County. Skagit County Parks and Recreation (SCPR) manages over 1,700 acres of parkland. The parks range from small neighborhood parks to large regional parks. Local cities and towns and State and Federal agencies also own and maintain parks and natural spaces in Skagit County.

Table 5 summarizes Skagit County's parks and open space areas by percent of overall jurisdictional area. Park and open space areas include national forest, parks and

recreation land, State parks, County-designated Open Space of Regional/Statewide Importance (OSRSI), land preserve or conservancy, and easements. The County designates OSRSI to areas for their recreational, environmental, scenic, cultural and other open space benefits that extend beyond the local area to be regional or statewide in significance. The County zoning code limits uses mainly to recreational purposes on properties designated OSRSI.

The County’s OSRSI-designated areas include:

- Deception Pass State Park,
- Montgomery-Duban Headlands Park,
- Burrows Island (portion of),
- Saddlebag Island,
- Hope Island,
- Ika Island,
- Huckleberry Island,
- Skagit Island,
- Larrabee, Rasar, and Bayview State Parks,
- PUD #1 Judy Reservoir,
- Skagit Wildlife Refuge,
- North Cascades National Park,
- Noisy Diobsud Wilderness,
- Glacier Peak Wilderness,
- Ross Lake National Recreation Area,
- Mount Baker National Forest,
- Seattle City Light Wildlife Mitigation Lands,
- Rockport State Park,
- WA Department of Natural Resources Natural Resource Conservation Areas and Natural Area Preserves, and
- Portions of the Northern State Recreation Area (Skagit County UGA Open Space Concept Plan, 2009).

Table 4 provides a summary of the trails and water access facilities in each management unit.

Table 4. Existing Trails and Water Access Facilities

Management Unit	Boat Launch	Float	Dock/Marina*	Trails (feet)
Samish Bay			36	
Samish Island, Padilla Bay	2		34	9,304

Management Unit	Boat Launch	Float	Dock/Marina*	Trails (feet)
and East Swinomish Channel				
Swinomish Tribe Reservation	8	6	93	
Fidalgo Island and Other Islands			69	13,550
Skagit Bay			15	
Lower Skagit Diking District		3	350	
Samish River			0	2,172
Middle Skagit	5		21	37,172
Upper Skagit	8	1	1	9,580
Nooksack			0	
Stillaguamish	1	1	423	

* Docks and marinas in the County are mostly privately owned and operated.

4.2.12 Geologically Hazardous Areas

Maps of geologically hazardous areas were developed using WDNR data. Presumably, WDNR based those designations on topographic information and soil types as catalogued by the Natural Resources Conservation Service (NRCS).

The presence of geologically hazardous areas in shorelines can be a factor in determining suitability of the area for certain activities, including restoration and development. Human safety is an important concern for development in geologically hazardous areas. In addition, geologically hazardous areas can be important sources of large woody debris and sediment to the aquatic system, the latter to the benefit or detriment of aquatic life.

4.2.13 Frequently Flooded Areas

For all practical purposes, “frequently flooded areas” are those areas within the 100-year floodplain. Maps were developed using FEMA’s floodplain data, as well as floodways where available. Channel Migration Zone data, derived by Ecology, is only available for the Skagit River watershed, not including the Samish River.

4.2.14 Wetlands

Wetland mapping was assembled from the National Wetlands Inventory and supplemented with hydric soils information contained in the Natural Resources Conservation Service’s Soil Survey Geographic (SSURGO) Database.

Many wetlands are not identified by NWI or hydric soils, and some NWI wetlands may not meet wetland criteria. Whether or not they are captured by this mapping effort, actual wetland conditions that may or may not be found on a site determine shoreline jurisdiction on a site-specific basis.

4.2.15 Fish and Wildlife Habitat Conservation Areas

WDFW maps do not capture every priority species location or habitat in shoreline jurisdiction, particularly rare species or species that use the water for foraging and drinking, but that nest or den farther from the shoreline. Absence of mapping information does not indicate that a particular species does not or could not utilize the shoreline or adjacent lands. Furthermore, the number of documented species may reflect the relative amount of past survey efforts rather than the presence or absence of suitable habitat.

4.2.16 Aquifer Recharge Areas

Per Skagit County Code (14.24.310), aquifer recharge areas include the following description:

Category I areas are those so designated because of the need to provide them special protection due to a specific pre-existing land use, or because they are identified by the County, State or Federal government as areas in need of special aquifer protection where a proposed land use may pose a potential risk which increases aquifer vulnerability. Category I includes areas served by groundwater which have been designated as a "Sole Source Aquifer Area" under the Federal Safe Drinking Water Act; areas identified within a "closed" or "low-flow" stream watershed designated by the Department of Ecology pursuant to RCW 90.22; areas identified by the County as sea water intrusion areas; and areas designated as "Wellhead Protection Areas" pursuant to WAC 246-290-135(4) and the groundwater contribution area in WAC 246-291-100 (2)(e). Wellhead protection areas shall, for the purpose of this regulation, include the identified recharge areas associated with either Group A public water supply wells, those Group B wells with a wellhead protection plan filed with the Skagit County Health Department, or plats served by 5 or more individual wells where the average lot size is equal to or less than 2 acres for which a well head protection plan has been completed and filed with the Skagit County Health Department. Category I areas are shown on the AquiferRecharge Area map.

The only mapped sole source aquifer recharge area covers Guemes Island. Group A wellhead protection areas have also been designated in areas throughout the County.

4.2.17 Historical or Archaeological Sites

Skagit County recognizes the value of cultural resources in its current Shoreline Master Program through the following goal: "Historical/Cultural/Educational – To identify, protect, and restore those shoreline areas and facilities that are of historical, cultural or educational value. Public or private organizations should be encouraged to provide

public access and protection of such areas and facilities.” Given the tribal presence in the County over several thousand years and their use of the shorelines for sustenance and spiritual practices, archaeological features have been documented and likely more are present. Further, early communities sprung up along the Puget Sound coast and the Skagit River; thus there are historic sites in the vicinity of shorelines. A table of historic sites across Skagit County is found in Appendix C; some of the sites by use and by location are located in shoreline jurisdiction while others are not. Due to the wealth of cultural resources, the State of Washington Department of Archaeology and Historic Preservation requires cultural resources assessments when development or activities are proposed that may affect archaeological or historic resources.

4.2.18 Water Quality

As a requirement of Section 303(d) of the federal Clean Water Act that all waterbodies be “fishable and swimmable,” Ecology classifies waterbodies into five categories:

- Category 1: Meets tested standards,
- Category 2: Waters of concern,
- Category 3: No data,
- Category 4: polluted waters that do not require a TMDL, and
- Category 5: polluted waters requiring a TMDL.

Individual waterbodies are assigned to particular “beneficial uses” (public water supply; protection for fish, shellfish, and wildlife; recreational, agricultural, industrial, navigational and aesthetic purposes). Waterbodies must meet certain numeric and narrative water quality criteria established to protect each of those established beneficial uses. Waterbodies may provide more than one beneficial use, and may have different levels of compliance with different criteria for those beneficial uses in different segments of the stream or lake. As a result, many waterbodies may be on the 303(d) list for more than one parameter in multiple locations.

Water Quality Improvement Projects or Total Maximum Daily Loads (TMDLs) have been established for 21 waterbodies in the county. Local governments and the local community that will be impacted by implementation of a cleanup plan develop the TMDL, with agency support. TMDLs include a description of the type, amount and sources of water pollution and analysis of the necessary pollutant reduction needed to meet water quality standards. The final result is a strategy for controlling the targeted pollutant.

4.3 Management Unit Conditions

Table 5 expands upon the relevant required inventory elements, providing specific detail and data for each management unit. Unless otherwise noted, Table 5 considers only information available within the boundaries of shoreline jurisdiction of each management unit. Additionally, water quality listings are identified by Ecology's 303(d) listing categories in Tables 6-8 (see Section 4.2.18 above for details).

Table 5. Summary of Shoreline Inventory by Management Unit.

Management Unit	Unit Area (Acres)	Unit Length (Miles)	Inventory Elements							
			Land Use Patterns	Impervious Surfaces	Vegetation	Armoring (% of shoreline length)*	Overwater Structures (#/shoreline length)	Floodplain, Floodway, and Channel Migration Hazard Area	Open Space/Parks	Critical Areas
Management Unit 1: Samish Bay	498	Marine: 18.9	Comprehensive Plan Zoning: Agricultural NRL:67.6% Secondary Forest NRL: 18.7% Public Open Space: 3.6% Rural Village Residential: 1.7% Small-scale business: 1.2%	2.4%	Cultivated: 29.2% Pasture/Grassland: 19.1% Emergent Wetland: 17.8%	Marine armoring: 74.3%	Marine: Bridges: 7 Docks: 9	Floodplain: 82% Floodway: NA	76 acres – 15%	Wetlands: 26.5 acres – 26.5% Steep Slopes: 17.2 acres – 3.4% Priority Habitat Areas: Biodiversity Areas and Corridors: 46.4 acres Cliffs/Bluffs:0.8 acres Estuarine Zone: 10.3 acres Slough: 7.0 acres Waterfowl Concentrations: 60.0 acres Wetlands: 199.9 acres
		River/Stream: 0.2	Current Land Use: Agriculture: 39.1% Undeveloped Land and Water Areas: 21.0% Not Classified (Water, ROW): 19.6% Single Family Residential: 13.0% Transportation, Communication, and Utilities: 3.8% Trade: 1.8%		Forested (Primarily Evergreen) 14.6% Scrub/Shrub: 6.9% Developed: 5.3%		Estuarine/Riverine: Bridges: 10 Docks: 27	Channel migration hazard area: 70%		
Management Unit 2: Samish Island, Padilla Bay, and East Side of Swinomish Channel	1059	Marine: 33.7	Comprehensive Plan Zoning: Agricultural NRL: 59.2% Rural Reserve: 8.3% Rural Marine Industrial: 1.7 Rural Village Residential: 1.6 Public Open Space: 1.2	3.5%	Cultivated: 30.2% Emergent Wetland: 24.5% Pasture/Grassland: 23.6%	Marine armoring: 68.5%	Marine: Bridges: 6 Docks: 34	Floodplain: 86% Floodway: NA	89 acres (8%)	Wetlands: 318 acres – 30.0% Steep Slopes: 0.03 acres Priority Habitat Areas: Brant: 15.3 acres Estuarine Zone: 29.0 acres Slough: 89.5 acres Waterfowl Concentrations: 59.9 acres Wetlands: 344.4 acres
		Lake: 1.6	Current Land Use: Agriculture: 38.3% Single Family Residential: 19.9% Not Classified (Water, ROW): 17.3% Undeveloped Land and Water Areas: 6.2% Cultural , Entertainment, and Recreational: 5.7% Other Resource Production: 4.2% Transportation, Communication, and Utilities: 2.8% Services: 2.5% Timber/Forestry: 2.2%		Forested (Evergreen and Deciduous) 10.3% Developed: 8.5% Scrub/Shrub: 8.3%		Estuarine/Riverine: Bridges: 5	Channel migration hazard area: 66%		

Management Unit	Unit Area (Acres)	Unit Length (Miles)	Inventory Elements							
			Land Use Patterns	Impervious Surfaces	Vegetation	Armoring (% of shoreline length)*	Overwater Structures (#/shoreline length)	Floodplain, Floodway, and Channel Migration Hazard Area	Open Space/Parks	Critical Areas
Management Unit 3: Swinomish Tribal Reservation	652	Marine: 28.1	Comprehensive Plan Zoning: Residential- Swinomish UGA: 33.9% Public Open Space: 18.6% Agricultural-NRL: 17.0% Rural Reserve: 9.5% Secondary Forest- NRL: 5.5% Commercial- Swinomish UGA: 4.4% Rural Resource- NRL: 4.0%	7.2%	Forested (Evergreen): 32.7% Cultivated: 31.2% Pasture/Grassland: 15.8% Developed: 15.4% Forested (Mixed and Deciduous): 10.0%	Marine armoring: 7.9%	Marine: Bridges: 3 Docks: 69	Floodplain: 36% Floodway: NA Channel migration hazard area: 42%	191 acres- 29%	Wetlands: 97.0 Acres—14.9% Steep Slopes: 11.3 acres—1.7% Priority Habitat Areas: Biodiversity Areas and Corridors: 7.1 acres Estuarine Zone: 2.6 acres Harbor Seal: 0.6 acres Islands: 112.9 acres Lagoons: 1.4 acres Waterfowl Concentrations: 24.0 acres Wetlands: 61.4 acres
			Current Land Use: Not Classified (Water, ROW): 37.7% Single Family Residential: 34.0% Undeveloped Land and Water Areas: 18.5% Timber/Forestry: 5.6% Cultural , Entertainment, and Recreational: 2.2%		Emergent Wetland: 9.2% Scrub/Shrub: 4.8%					
Management Unit 4: Fidalgo Island and Other Islands	2,567	Marine: 83.7 Lake: 7.7	Comprehensive Plan Zoning: Rural Reserve: 36.5% Public Open Space: 24.8% Rural Intermediate: 17.9% Anacortes UGA Development District: 9.9% Rural Resource- NRL: 2.4% Commercial- Swinomish UGA: 1.1%	3.5%	Forested (Evergreen): 41.6% Cultivated: 32.2% Forested (Mixed and Deciduous): 11.2% Pasture/Grassland:	Marine armoring: 9.7%	Marine: Bridges: 8 Docks: 34 Buoys/ Floats: 19	Floodplain: 34% Floodway: NA Channel migration hazard area: NA	987 acres- 38% Lake Campbell, Lake Erie, Pass Lake, Puget Sound, Puget Sound - Islands	Wetlands: 674.3 acres—26.3% Steep Slopes: 107.6 acres – 4.2% Priority Habitat Areas: Bald Eagle: 71.0 acres Biodiversity Areas and Corridors: 321.1 acres Brant: 14.2 acres Cavity-nesting Ducks: 38.9 acres

Management Unit	Unit Area (Acres)	Unit Length (Miles)	Inventory Elements							
			Land Use Patterns	Impervious Surfaces	Vegetation	Armoring (% of shoreline length)*	Overwater Structures (#/shoreline length)	Floodplain, Floodway, and Channel Migration Hazard Area	Open Space/Parks	Critical Areas
			<p>Current Land Use:</p> <p>Single Family Residential: 35.0%</p> <p>Undeveloped Land and Water Areas: 24.1%</p> <p>Not Classified (Water, ROW): 11.1%</p> <p>Cultural , Entertainment, and Recreational: 11.1%</p> <p>Manufacturing: 7.8%</p> <p>Agriculture: 6.0%</p> <p>Timber/Forestry: 5.6%</p>		<p>10.4%</p> <p>Emergent Wetland: 11.2%</p> <p>Developed: 9.3%</p> <p>Scrub/Shrub: 9.2%</p>		<p>Lake:</p> <p>Docks: 59</p> <p>Buoys/Floats: 1</p> <p>Lake- Boat Ramps: 2</p>			<p>Cliffs/Bluffs: 25.2 acres</p> <p>Estuarine Zone: 6.7 acres</p> <p>Harbor Seal: 34.7 acres</p> <p>Islands: 469.5 acres</p> <p>Lagoons: 0.2 acres</p> <p>Old-growth/Mature forest: 199.6 acres</p> <p>Waterfowl Concentrations: 60.2 acres</p> <p>Wetlands: 353.1 acres</p>
Management Unit 5: Skagit Bay/ Delta	3,743	<p>Marine: 63.7</p> <p>Estuary/ River/: 18.4</p>	<p>Comprehensive Plan Zoning:</p> <p>Public Open Space: 57.0%</p> <p>Agricultural- NRL: 28.0%</p> <p>Rural Reserve: 4.2%</p> <p>Current Land Use:</p> <p>Undeveloped Land and Water Areas: 20.9%</p> <p>Agriculture: 20.5%</p> <p>Not Classified (Water, ROW): 19.1%</p> <p>Cultural , Entertainment, and Recreational: 18.0%</p> <p>Services: 12.3%</p> <p>Single Family Residential: 5.2%</p> <p>Other Resource Production: 1.4%</p> <p>Timber/Forestry: 1.2%</p>	0.9%	<p>Emergent Wetland: 48.0%</p> <p>Cultivated: 33.2%</p> <p>Forested wetland: 14.1%</p> <p>Scrub/Shrub Wetland: 13.6%</p> <p>Pasture/Grassland: 8.3%</p> <p>Forested (Evergreen and Deciduous): 3.4%</p> <p>Developed: 1.7%</p>	<p>Estuarine/Riverine:</p> <p>Dikes/Levees: 100%</p> <p>Other Armoring: 1.5%</p>	<p>Marine:</p> <p>Bridges: 2</p> <p>Docks: 3</p> <p>Estuarine/ Riverine:</p> <p>Bridges: 8</p> <p>Docks: 12</p>	<p>Floodplain: 97%</p> <p>Floodway: NA</p> <p>Channel migration hazard area: 94%</p>	<p>2196 acres- 59%</p> <p>Carpenter Creek Skagit Delta</p> <p>Skagit Delta - North Fork</p> <p>Skagit Delta - South Fork</p>	<p>Wetlands: 2,885.5 acres—77.1%</p> <p>Steep Slopes: 8.1 acres – 0.2%</p> <p>Priority Habitat Areas:</p> <p>Biodiversity Areas and Corridors: 636.5 acres</p> <p>Estuarine Zone: 175.8 acres</p> <p>Harbor Seal: 23.0 acres</p> <p>Islands: 48.4 acres</p> <p>Sloughs: 43.4 acres</p> <p>Waterfowl Concentrations: 2,432.8 acres</p> <p>Wetlands: 3,287.9 acres</p>
Management Unit 6: Lower Skagit Diking District	2,794	<p>River/ Stream: 30.8</p> <p>Lake: 22.1</p>	<p>Comprehensive Plan Zoning:</p> <p>Agricultural- NRL: 51.2%</p> <p>Rural Resource- NRL: 12.8%</p> <p>Rural Village Residential: 7.0%</p> <p>Rural Reserve: 6.3%</p> <p>Industrial Forest- NRL: 6.3%</p> <p>Secondary Forest- NRL: 5.2%</p>	3.4%	<p>Cultivated: 34.2%</p> <p>Forested (Evergreen and Deciduous) 18.9%</p> <p>Forested Wetland:</p>	<p>Riverine:</p> <p>Dikes/Levees: 66.4%</p> <p>Other Armoring: 10.7%</p>	<p>Lake:</p> <p>Buoys/ Floats: 3</p> <p>Docks: 349</p>	<p>Floodplain: 75%</p> <p>Floodway: NA</p> <p>Channel migration hazard area:</p>	<p>355 acres- 13%</p> <p>Beaver Lake</p> <p>Big Lake</p> <p>Clear Lake</p> <p>Devil's Lake</p> <p>Lake Challenge</p> <p>Lake McMurray</p>	<p>Wetlands: 1,352.6 acres—48.4%</p> <p>Steep Slopes: 3.2 acres – 0.1%</p> <p>Priority Habitat Areas:</p> <p>Cavity-nesting Ducks: 29.9 acres</p> <p>Islands: 31.3 acres</p> <p>Trumpeter Swam: 449.9 acres</p>

Management Unit	Unit Area (Acres)	Unit Length (Miles)	Inventory Elements							
			Land Use Patterns	Impervious Surfaces	Vegetation	Armoring (% of shoreline length)*	Overwater Structures (#/shoreline length)	Floodplain, Floodway, and Channel Migration Hazard Area	Open Space/Parks	Critical Areas
			Current Land Use: Agriculture: 35.9% Undeveloped Land and Water Areas: 19.1% Not Classified (Water, ROW): 18.0% Single Family Residential: 10.6% Timber/Forestry: 8.0% Services: 3.0% Transportation, Communication, and Utilities: 1.5% Multi-Family Residential: 1.5% Cultural , Entertainment, and Recreational: 1.3%		18.7% Emergent Wetland: 15.4% Pasture/Grassland: 14.2% Scrub/Shrub wetland: 13.6% Developed: 10.0% Scrub/Shrub: 3.2%		Riverine: Bridges: 1 Docks: 1	34%	Nookachamps Creek Nookachamps Creek - East Fork Sixteen Lake Skagit Delta - North Fork Skagit River Walker Creek	Waterfowl Concentrations: 124.4 acres Wetlands: 875.4 acres
Management Unit 7: Samish River	2,630	River/ Stream: 32.4 Lake: 1.6	Comprehensive Plan Zoning: Agricultural- NRL: 73.3% Rural Reserve: 20.9% Rural Resource- NRL: 3.7%	1.7%	Cultivated: 35.2% Forested (Evergreen and Deciduous) 20.1% Forested Wetland: 18.2% Pasture/Grassland: 16.7% Emergent Wetland: 14.4% Scrub/Shrub wetland: 13.6% Scrub/Shrub: 5.2% Developed: 4.2%	Riverine: 14.5%	Riverine: Bridges:13	Floodplain: 72% Floodway: 27% Channel migration hazard area: 14%	267 acres- 10% Butler Pit Lake Friday Creek Samish River	Wetlands: 999.1 acres—38.0% Steep Slopes: NA Priority Habitat Areas: Estuarine Zone: 6.7 acres Waterfowl Concentrations: 47.9 acres Wetlands: 804.7 acres
			Current Land Use: Agriculture: 52.7% Undeveloped Land and Water Areas: 13.6% Single Family Residential: 11.9% Multi-Family Residential: 6.5% Not Classified (Water, ROW): 5.7% Timber/Forestry: 3.4% Other Resource Production: 2.5% Cultural , Entertainment, and Recreational: 1.8%							

Management Unit	Unit Area (Acres)	Unit Length (Miles)	Inventory Elements							
			Land Use Patterns	Impervious Surfaces	Vegetation	Armoring (% of shoreline length)*	Overwater Structures (#/shoreline length)	Floodplain, Floodway, and Channel Migration Hazard Area	Open Space/Parks	Critical Areas
Management Unit 8: Middle Skagit River (Including Towns of Lyman and Hamilton)	11,334	River/Stream: 57.6	Comprehensive Plan Zoning: Agricultural- NRL: 64.6% Industrial Forest-NRL: 9.16% Rural Reserve: 4.2% Incorporated Area: 3.7% Rural Resource- NRL: 2.5% Public Open Space: 1.6% Secondary Forest- NRL: 1.2%	1.2%	Cultivated: 36.2% Forested Wetland: 25.3% Forested (Evergreen and Deciduous) 19.1% Pasture/Grassland: 23.1% Emergent Wetland: 6.0% Scrub/Shrub wetland: 5% Scrub/Shrub: 3.6% Developed: 3.4%	Dikes/Levees: 2.1%	Lake: Docks: 20 Lake- Boat Ramps: 2 Riverine: Bridges: 2 Docks: 1	Floodplain: 87% Floodway: 77% Channel migration hazard area: 85%	1,196 acres- 11% Alder Creek Cumberland Creek Day Creek Day Lake Gilligan Creek Hansen Creek Jones Creek Judy Reservoir Minkler Lake O'Toole Creek Rocky Creek Skagit River Skagit River - Town of Hamilton Skagit River - Town of Lyman	Wetlands: 2,911.5 acres—25.7% Steep Slopes: 87.4 acres – 0.8% Priority Habitat Areas: Bald Eagle: 341.8 acres Islands: 446.8 acres Rocky Mountain Elk: 2,042.1 acres Snag-rich areas: 12.9 acres Swan Species: 18.4 acres Trumpeter Swan: 77.9 acres Waterfowl Concentrations: 40.0 acres Wetlands: 1,498.0 acres
		Lake: 11.7	Current Land Use: Agriculture: 33.7% Undeveloped Land and Water Areas: 24.6% Not Classified (Water, ROW): 17.4% Timber/Forestry: 13.0% Single Family Residential: 7.0% Services: 1.3% Multi-Family Residential: 1.1%							
Management Unit 9: Upper Skagit River	26,513	River/Stream: 362.0 Lake: 61.7	Comprehensive Plan Zoning: Public Open Space: 48.5% Industrial Forest-NRL: 22.1% Rural Reserve: 8.1% Secondary Forest- NRL: 5.7% Rural Resource- NRL: 3.7% Agricultural- NRL: 3.3% Rural Intermediate: 1.1%	0.9%	Evergreen Forest:47.3 Cultivated: 37.2% Forested Wetland: 17.2% Forested (Mixed and	Other armoring: 6.3%	Riverine: Bridges: 9 Buoys/Floats: 1 Docks: 1	Floodplain: 47% Floodway: 30% Channel migration hazard area: 34%	26,156 acres-99% See Table 13 for list of waterbodies	Wetlands: 4,102.9 acres—15.5% Steep Slopes: 839 acres – 3.2% Priority Habitat Areas: Bald Eagle: 1,459.4 acres Biodiversity Areas and Corridors: 1.4 acres Harlequin Duck: 2,388.3 acres Islands: 117.4 acres

Management Unit	Unit Area (Acres)	Unit Length (Miles)	Inventory Elements							Critical Areas
			Land Use Patterns	Impervious Surfaces	Vegetation	Armoring (% of shoreline length)*	Overwater Structures (#/shoreline length)	Floodplain, Floodway, and Channel Migration Hazard Area	Open Space/Parks	
			Current Land Use: Undeveloped Land and Water Areas: 55.0% Not Classified (Water, ROW): 14.8% Timber/Forestry: 9.7% Single Family Residential: 5.6% Agriculture: 4.7% Cultural , Entertainment, and Recreational: 3.2% Transportation, Communication, and Utilities: 2.9% Services: 2.2% Other Resource Production: 1.0%		Deciduous) 10.1% Scrub/Shrub: 7.3% Pasture/Grassland: 4.0% Scrub/Shrub wetland: 3.6% Developed: 1.9% Emergent Wetland: 1.5%					Lynx: 1,490.8 acres Rocky Mountain Elk: 972.1 acres Roosevelt Elk: 972.1 acres Trumpeter Swan: 38.7 acres Wetlands: 1,123.0 acres
Management Unit 10: Nooksack River	1,293	River/ Stream: 23.8	Comprehensive Plan Zoning: Industrial Forest-NRL: 57.5% Public Open Space: 42.5% Current Land Use: Undeveloped Land and Water Areas: 37.7% Timber/Forestry: 36.8% Not Classified (Water, ROW): 13.2% Transportation, Communication, and Utilities: 12.2%	0.2%	Evergreen Forest:49.5% Cultivated: 38.2% Forested (Mixed and Deciduous): 32.7% Scrub/Shrub: 11.5% Scrub/Shrub wetland: 1.2%	NA	Riverine: Bridges: 2	Floodplain: 44% Floodway: NA Channel migration hazard area: NA	1,036 acres- 80% Cavanaugh Creek Howard Creek Nooksack River - South Fork	Wetlands: 360.1 acres—27.8% Steep Slopes: 10.7 acres – 0.8% Priority Habitat Areas: Biodiversity Areas and Corridors: 594.5 acres Harlequin Duck: 41.4 acres Rocky Mountain Elk: 1,203.9 acres Wetlands: 235.2 acres
Management Unit 11: Stillaguamish River	3,627	River/ Stream: 69.5	Comprehensive Plan Zoning: Industrial Forest-NRL: 46.9% Public Open Space: 45.9 Rural Village Residential: 4.7% Secondary Forest- NRL: 2.3%	0.6%	Evergreen Forest: 74.9% Cultivated: 39.2% Forested (Mixed and	NA	Lake: Docks: 423 Buoy's/Floats:	Floodplain: 2% Floodway: NA Channel migration	3,269 acres- 90% Bear Creek Crane Creek Crevice Creek Deer Creek	Wetlands: 149.6 acres—4.1% Steep Slopes: 132.3 acres – 3.6% Priority Habitat Areas: Old-growth/Mature Forest: 11.7 acres

Management Unit	Unit Area (Acres)	Unit Length (Miles)	Inventory Elements								
			Land Use Patterns	Impervious Surfaces	Vegetation	Armoring (% of shoreline length)*	Overwater Structures (#/shoreline length)	Floodplain, Floodway, and Channel Migration Hazard Area	Open Space/Parks	Critical Areas	
			Current Land Use: Undeveloped Land and Water Areas: 62.5% Timber/Forestry: 24.1% Not Classified (Water, ROW): 9.4% Single Family Residential: 4.0%		Deciduous): 15.6% Scrub/Shrub: 6%			1	hazard area: NA	Lake Cavanaugh Lake Creek Little Deer Creek Pilchuck Creek Rollins Creek Segelsen Creek Stillaguamish River North Fork Summer Lake	Wetlands:81.8 acres

*Armoring occasionally occurred just landward of the area of shoreline jurisdiction (200 feet from OHWM). Because armoring effects extend waterward of the armoring itself (Hood 2004), in the evaluation of management unit area, the total armoring was considered, including armoring just outside of shoreline jurisdiction. .

Table 6. Category 2 Waterbodies (Waters of Concern) by Management Unit

Management Unit	Waterbody	Polychlorinated Biphenyls (PCBs)	Other Chemicals, including pesticides	Temperature	Fecal Coliform	Bioassessment	Dissolved Oxygen
1	Colony Creek*						
	Samish River Mouth		X	X			X
	Unnamed Ditch (trib To Alice Bay)*				X		
	Unnamed Slough*		X	X			
2	Indian Slough		X	X			
	Padilla Bay, Fidalgo Bay, And Guemes Channel		X	X	X		X
	Samish Bay		X				
3	Padilla Bay, Fidalgo Bay, And Guemes Channel				X		X
	Skagit Bay And Similk Bay		X				
4	Padilla Bay, Fidalgo Bay, And Guemes Channel				X		X
5	Browns Slough*		X	X			
	Carpenter Creek		X	X			
	Skagit River	X					
6	Nookachamps Creek		X	X			
	Nookachamps Creek, E.F.		X	X			
	Otter Pond Creek*						X
	Unnamed Creek*		X	X			X
7	Friday Creek				X		
	Samish River		X	X	X	X	X
	Silver Creek*				X		
8	Cumberland Creek		X	X			
	Day Creek		X	X			
	Hansen Creek		X	X			
	Jones Creek		X	X			
	O'toole Creek					X	
	Skagit River						X
	Wiseman Creek*		X	X			X
9	Diobsud Creek					X	
	Finney Creek		X	X		X	X
	Grandy Creek		X	X			
	Illabot Creek					X	
	Jackman Creek		X	X		X	
	Presentin Creek					X	
10	No listed waterbodies						
11	Deer Creek		X	X			
	Stillaguamish River, N.F.						X

* Tributary is not part of shoreline jurisdiction, but tributary mouth intersects with shoreline waterbody.

Table 7. Category 4 Waterbodies by Management Unit

Management Unit	Waterbody	Fecal Coliform	Fish Habitat	Temperature
5	Fisher Creek*	X		
	Hill Ditch*	X		
	Skagit River, N.F.	X		
	Carpenter Creek	X		X
6	Gages Slough*	X		
	Nookachamps Creek	X		X
	Nookachamps Creek, E.F.	X		X
	Otter Pond Creek*			X
	Turner Creek*			X
7	Parker Creek*		X	
8	Hansen Creek	X	X	X
	Red Creek*			X
	Skagit River	X		
	Sorenson Creek*		X	
	Turner Creek*			X
	Unnamed Creek*	X		
	Brickyard Creek*	X		
11	Stillaguamish River, N.F.			X
	Deer Creek			X
	Little Deer Creek			X
	Pilchuck Creek			X

* Tributary is not part of shoreline jurisdiction, but tributary mouth intersects with shoreline waterbody.

Table 8. Category 5 Waterbodies (Impaired) by Management Unit

Management Unit	Waterbody	Polycyclic Aromatic Hydrocarbons (PAHs)	Dissolved Oxygen	Fecal Coliform	Fine Sediment	pH	Temperature	Turbidity
1	Colony Creek*		X	X				
	Edison Slough		X	X		X		
	Samish Bay			X				
	Samish River Mouth			X				
	Unnamed Creek*						X	
	Unnamed Creek (trib To Alice Bay)*		X	X		X		
	Unnamed Creek (trib To Edison Slough)*		X	X		X		
	Unnamed Creek (trib To Samish Bay)*		X	X		X		
	Unnamed Ditch (trib To Colony Creek)*			X				
	Unnamed Ditch (trib To Samish Bay)*			X				
2	Indian Slough		X	X				
	Joe Leary Slough*		X	X				
	Noname Slough*		X					
	Padilla Bay, Fidalgo Bay, And Guemes Channel			X				
	Samish Bay			X				
	Swinomish Channel	X						
3	Swinomish Channel	X						
4	Padilla Bay, Fidalgo Bay, And Guemes Channel	X						
5	Big Ditch / Maddox Creek*		X	X		X	X	
	Browns Slough*		X	X				
	Fisher Creek*		X					
	Hill Ditch*		X					
	Skagit Bay And Similk Bay			X				
	Unnamed Creek (trib To Skagit River, N.F.)*		X	X				
	Wiley Slough*		X	X		X		
6	Nookachamps Creek		X					
	Nookachamps Creek, E.F.		X					
	Otter Pond Creek*			X				
	Unnamed Creek*			X				
7	Butler Creek*			X				
	Friday Creek		X	X		X		
	Parson Creek*			X				
	Samish River		X	X		X	X	X
	Skarrup Creek*			X				
	Swede Creek*		X	X				
	Thomas Creek*		X	X		X		
8	Brickyard Creek*		X			X		

Management Unit	Waterbody	Polycyclic Aromatic Hydrocarbons (PAHs)	Dissolved Oxygen	Fecal Coliform	Fine Sediment	pH	Temperature	Turbidity
	Coal Creek*		X	X				
	Hansen Creek		X					
	Mannser Creek*		X	X		X		
	Wiseman Creek*			X				
9	Prairie Creek*			X				
	Skagit River						X	
10	Cavanaugh Creek						X	
	Howard Creek				X		X	
	Nooksack River, S.F.				X		X	
	Roaring Creek						X	

* Tributary is not part of shoreline jurisdiction, but tributary mouth intersects with shoreline waterbody.

4.3.1 Management Unit 1- Samish Bay

The Samish Bay Management Unit includes 498 acres along 18.9 miles of marine shoreline and 0.2 miles of estuarine/riverine shoreline (Figure 2). A summary of shoreline characteristics is provided in Table 5.

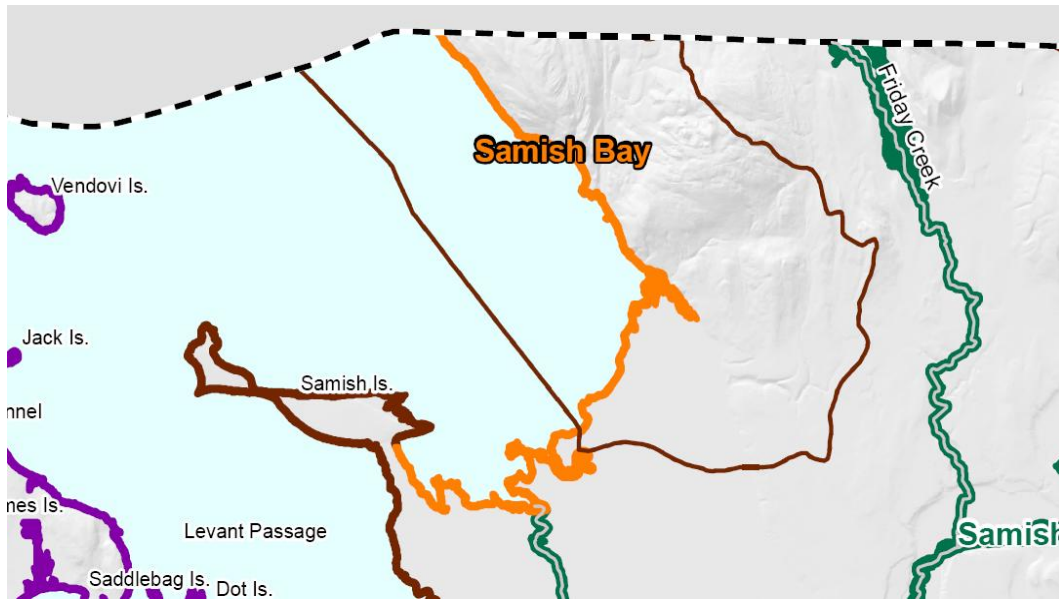


Figure 2. Map of Management Unit 1- Samish Bay

Critical Areas

Marbled murrelet presence has also been identified within the shoreline area of Samish Bay. Herring spawn in the eelgrass beds offshore, and a few beaches in the northern portion of the unit provide potential forage fish spawning habitat. Coho and chum salmon and coastal cutthroat spawn and rear in the small streams along Samish Bay, and other anadromous salmonids use the marine shorelines. According to the NWI, as much as 26.5% of the total shoreline area may be wetlands. Steep slopes occur occasionally, covering 3.4% of the shoreline area. The majority of the shoreline (82%) is in the coastal floodplain and much of the shoreline falls within the channel migration zone of the Skagit River.

Current Land Use

The Samish Bay Management Area contains mostly agricultural uses, with some residential uses along SR 11 between Oyster Creek Lane and Chuckanut Ridge Drive, and several cultural/ recreation parcels located near the Whatcom County boundary, where Larrabee State Park is located.

Additionally, existing transportation, communication, and utilities land uses are located in and near the shoreline jurisdiction in the form of a railroad line from the Whatcom County line to the point where Colony Creek enters Samish Bay. Another transportation, communication and utilities facility is located near the SR 11 residential uses described above. Within Samish Bay, there are large areas of resource production and extraction (Washington Department of Natural Resources tidelands). Within the unincorporated town of Edison, near the southern end of the management unit, there are several residential parcels and trade parcels on small lots. The trade uses include a timber company and several small retail establishments.

Water-Oriented Uses

The primary water-dependent use in the Samish Bay Management Area is aquaculture; Taylor Shellfish Farms operates in Samish Bay near SR 11 and the shoreline. There are some water-enjoyment uses, including Larrabee State Park and a few restaurants along SR 11 and in the Town of Edison.

Future Land Use

The County's land use designations (Comprehensive Plan and zoning designations) in this management unit generally correspond with existing land use patterns. The resource lands are active in agriculture and timber production and are designated Agricultural Natural Resource Lands (Ag-NRL) or Secondary Forest Natural Resource Lands (SF-NRL), respectively. On the north, Larrabee

State Park is designated as OSRSI, which, as described earlier in this report, is the designation that the County applies to all lands in public ownership or otherwise dedicated to public purposes or to environmentally sensitive areas of regional or statewide significance. This designation is applied to all state parks, wilderness areas, and federal protected lands within the County. The OSRSI designation does not allow residential uses or commercial and industrial uses. Uses allowed are restricted to those related to recreation, such as camping. The trade lands in Edison are categorized as either Small Scale Business (SSB) or Rural Village Commercial (RVC), while the residential parcels in this area are categorized as Rural Village Residential (RVR).

Existing Shoreline Designations

The existing shoreline designations are a mix of Aquatic, Conservancy, and Rural. From the Whatcom-Skagit County line south to Oyster Creek, the shoreline is designated Conservancy, with the waters of Samish Bay being Aquatic. From Oyster Creek continuing south along the Samish Bay shoreline, the designation is Rural. The Rural designation also applies to the areas where the Samish River and Edison Slough converge with Samish Bay.

Existing and Potential Public Access

The Samish Bay Management Area has approximately 497 acres of land in shoreline jurisdiction, of which 76 are in park and open space. Larrabee State Park is the most significant public access facility in this management unit. Larrabee State Park is designated as an OSRSI on the Skagit County Comprehensive Plan. Larrabee State Park within Skagit County has over 2,600 acres within and beyond shoreline jurisdiction with more than 8,000 feet of saltwater shoreline on Samish Bay, two freshwater lakes, and a campground. The park boundary crosses over to Whatcom County and the majority of the park lies within Whatcom County. Washington State Parks is making improvements on storm water and wastewater treatment systems in 26 state parks, including Larrabee State Park, as part of water quality improvement in Puget Sound and Hood Canal. Improvement work for Larrabee Park has been completed (Washington State Parks, Clean Water Projects, 2011).

State Route 11 and the BNSF railroad run parallel to most of the shoreline in this management unit. The railroad limits direct public access to the shoreline for the northern part of the management unit. Rock Point Road off of Chuckanut Drive crosses over the railroad for access to Taylor Shellfish Farms. Blanchard Forest Block lower trailhead, south of the Larrabee Park offers shoreline public access

and connects with the upper trailhead and Lizard Lake outside this management unit. Shoreline views exist from lookout points at Chuckanut Mountain and Larrabee Park. Multiple roads access the shoreline at the southern end of the management unit, but they are mostly private for existing water-oriented uses.

The UGA Open Space Concept Plan shows a possible trail called the PNW/Interurban Trail extending south from the Interurban Trail in Whatcom County through Bayview to the Swinomish Channel, then west through Anacortes to Deception Pass and Whidbey Island.

4.3.2 Management Unit 2- Samish Island, Padilla Bay, and East Side of Swinomish Channel

Management Unit 2 includes 1,059 acres of shoreline along 33.7 miles of marine shoreline and 1.6 miles lake shoreline along Old Channel Lake (located east of the Swinomish Channel, approximately 1000 feet south of SR 20) (Figure 3). A summary of shoreline characteristics is provided in Table 5.

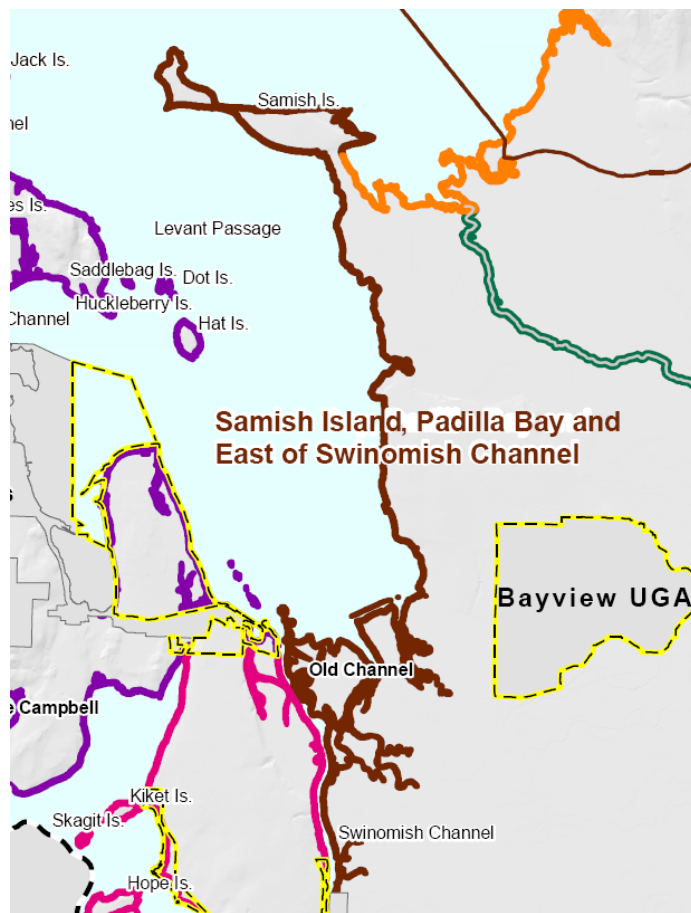


Figure 3. Map of Management Unit 2- Samish Island, Padilla Bay and East side of Swinomish Channel

Critical Habitat

In addition to priority habitat areas identified by WDFW, priority species identified within the shoreline area of Management Unit 2, include snowy owl and bald eagles. The majority of the shorelines of Samish Island provide potential forage fish spawning habitat, and another significant area of potential forage fish spawning occurs south of Bayview State Park. Herring spawning and holding areas occur primarily north of Samish Island. Coho salmon and coastal cutthroat spawn and rear in the coastal tributaries to Padilla Bay, and anadromous salmonids use the marine shoreline habitat. The extensive seagrass beds in Padilla Bay provide important rearing habitat for juvenile fish and marine invertebrates. According to the NWI information, as much as 30% of the total shoreline area may be wetlands. The majority of the shoreline falls within the coastal floodplain, and much of the shoreline area lies within the Channel Migration Zone of the Skagit River.

Current Land Use

Predominant land uses within the Samish Island, Padilla Bay, and East Side of Swinomish Channel Management Area are large undeveloped tracts, residential parcels, and two major clusters of resource production and extraction parcels. There are also a few cultural/recreation places in this Management Area.

On Samish Island, the uses are primarily residential. The main exception is on the west side of the island where Camp Kirby is located, which is cultural/recreation land. In addition, there are a couple of large parcels on the east end of the island that are also cultural/recreation land.

Further south, along the Padilla Bay shoreline, there are several large resource production and extraction parcels. Then, approaching the Bayview area, there are mostly residential parcels. There is also a cultural/recreation area, where Bayview State Park and the Breazeale Padilla Bay Interpretive Center are located. Between the area west of the Bayview UGA and the east side of the Swinomish Channel, there are several parcels in an existing service land use.

Continuing south along the eastern side of the Swinomish Channel, most parcels are farmed. There are a few scattered residential parcels, as well as one transportation, communications, and utilities parcel located adjacent to SR 20 near the Anacortes UGA boundary. This parcel is just south of the second area of resource production and extraction. Finally, there is one trade area, where a boat

and motor business is located (County assessor category – Trade – 55 Retail trade of automotive, marine craft, aircraft, and accessories).

Water-Oriented Uses

There is one primary area of water-dependent use, and that is the trade area near the Swinomish Channel where a boat and motor business and a boat-launching facility is located. Blau Oyster has an aquaculture operation on Samish Island, with shellfish beds in adjacent Samish Bay. There are a few areas of water-enjoyment use, located at the cultural/recreation areas such as Camp Kirby and Bayview State Park.

Future Land Use

Many of the existing land uses are similar to their land use designations: resource lands are designated Ag-NRL or Rural Reserve (RRv). The developed residential areas near Bayview are RVR or Rural Intermediate (RI). The designation for the Bayview State Park and Breazeale Padilla Bay Interpretive Center is OSRSI. The trade parcels near the Swinomish Channel are designated Rural Marine Industrial (RMI).

Existing Shoreline Designations

There are a wide variety of shoreline designations in this management unit: Aquatic, Rural, Rural Residential, Urban, and Conservancy. Starting in the north of the management unit, Samish Island has all four of these designations. The waters surrounding the island, as well as those throughout the management unit, are designated Aquatic. The entire western shoreline and part of the eastern shoreline are designated Conservancy. The north and south shorelines of the island are designated Rural Residential, with a small pocket of Rural on the northwest and southeast sides of the island.

Continuing south along the Padilla Bay shoreline, the shoreline is designated Rural until the Bayview area. This area is designated Rural Residential. The remainder of the Padilla Bay shoreline south of Bayview is also rural, including Telegraph Slough and Indian Slough.

The eastern shore of the Swinomish Channel is designated Rural, with the exception of the Residential area along Channel Drive north of Downey Road. This area is Rural Residential. Finally, at the southern edge of the management unit, next to the La Conner city limits, there is a small area designated Urban.

Additionally, Padilla Bay and Samish Island are Shorelines of Statewide Significance.

Existing and Potential Public Access

The Samish Island, Padilla Bay, and East Side of Swinomish Channel Management Area contains approximately 1,050 acres of shoreline jurisdiction including 89 acres of park and open space and more than 9,000 feet of trails.

Samish Island contains saltwater access and 1,500 feet of public tideland (DNR, undated). There are also two boat launches and 34 dock/marinas in this management unit. The following is a sample of the existing public access highlights in this management unit:

- Padilla Bay Shore Trail – This 2.2-mile interpretive trail extends along the dikes of Padilla Bay. It is ADA-accessible with portable toilets and parking.
- Swinomish Boat Launch – This 3-acre site is a popular boat launch for access to the Puget Sound and San Juan Islands. Amenities include restrooms, parking area, two boat ramps and picnic facilities.

Bay View State Park is a 25-acre site with over 1,200 feet of saltwater shoreline on Padilla Bay. Camping is allowed and an interpretive center is located within ½ mile of the park. According to the County's Parks and Recreation Plan, the Padilla Bay Trail is the most visited county site. Bay View State Park is an OSRSI. The Parks Plan identifies a general need to improve shoreline access, but no specific plan has been identified for these facilities. Washington State Parks is making improvements on storm water and wastewater treatment systems in 26 state parks, including Bay View State Park, as part of water quality improvement in Puget Sound and Hood Canal. Improvement work for Bay View is currently at the design phase (Washington State Parks 2011).

Samish Overlook is identified by the Washington State Department of Natural Resources as a recreational area with viewpoints, trail, hiking and boat launching facilities. DNR has been using a Washington Wildlife and Recreation Program (WWRP) grant to improve this area. Improvement work includes design and construction of improved parking and improved restroom access, signs, an observation terrace and links to trails (Washington Wildlife Recreation Coalition).

The UGA Open Space Concept Plan proposes a Swinomish Channel Trail which could “extend north from La Conner along the Swinomish Channel to the PNW Trail and provide access to the estuaries and wetlands in Padilla and Fidalgo Bays.” This Plan’s Scenic Resource Goal intends to protect and enhance overlooks or look-into places within the UGA open space network that includes the Swinomish Channel.

4.3.3 Management Unit 3- Swinomish Tribal Reservation

The Swinomish Tribal Reservation Management Unit includes 652 acres of shoreline, over a length of 28.1 miles of marine shoreline, including the western shoreline of the Swinomish Channel (Figure 4). The majority of the shoreline area occurs on Fidalgo Island; other island shorelines in the management unit include Goat Island, Hope Island, Kiket Island, and Skagit Island. A summary of shoreline characteristics is provided in Table 5.

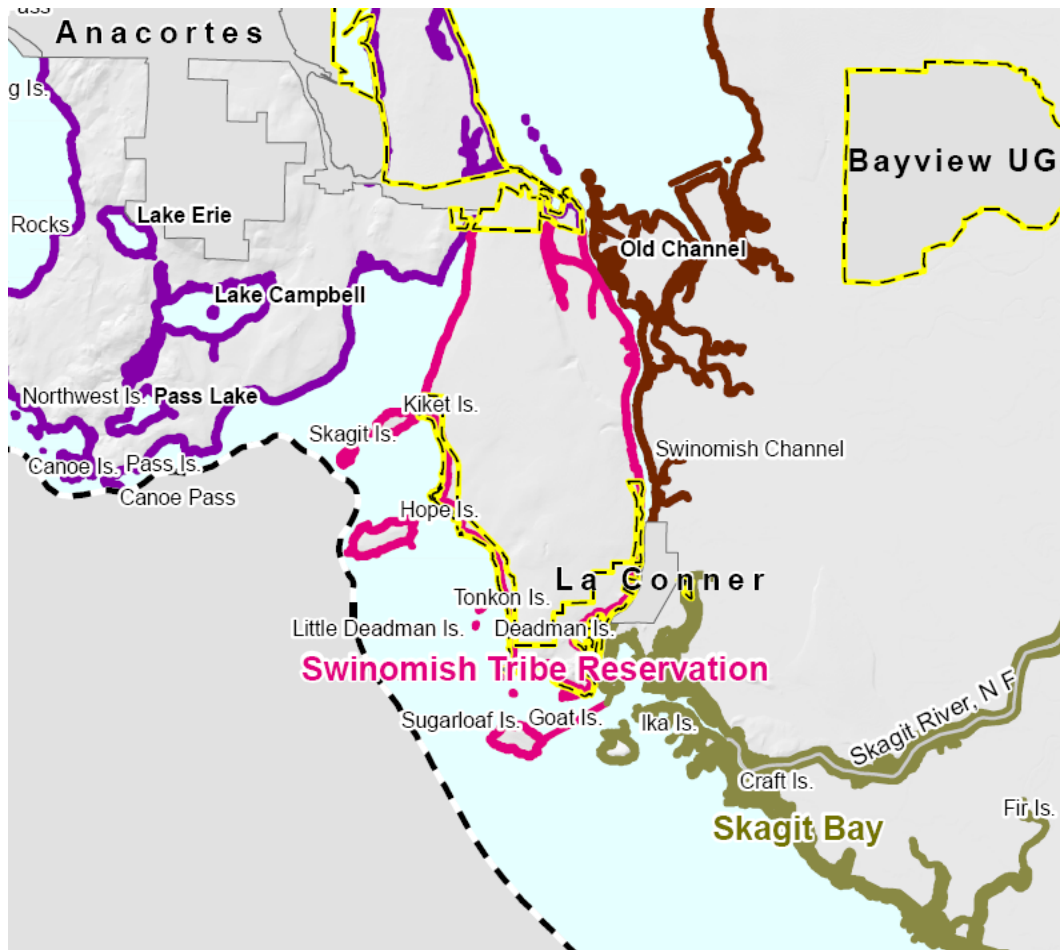


Figure 4. Map of Management Unit 3- Swinomish Tribal Reservation

Critical Areas

In addition to priority habitat areas described in Table 5, priority species identified within the shoreline area include: bald eagle, peregrine falcon, bald oystercatcher, and sea lions. Much of the western side of the management unit and selected areas along the Swinomish channel provide potential forage fish spawning beaches. Herring spawning habitat is found on the western side of the management unit. According to the NWI, as much as 14.9% of the total shoreline area may be wetlands. Approximately 36% of the shoreline falls within the floodplain, and 42% of the shoreline (the area along the Swinomish Channel) is within the Channel Migration Zone of the Skagit River.

Current Land Use

The Swinomish Tribal Reservation Management Area is characterized by residential land use, with a lesser amount of undeveloped land. The southern part of this management unit is part of the Swinomish UGA and it is predominantly residential, including the Shelter Bay Community. The only predominantly undeveloped areas in this management unit lie north of the Swinomish UGA and face the Swinomish Channel; on the northwestern side facing Similk Bay; Goat Island on the southern edge of the management unit; and Kiket Island on the western edge of the management unit. Transportation, communication, and utilities parcels are located just south of the Swinomish Channel resource lands; and cultural/recreation areas located on Skagit Island. Hope Island State Park is located in this management unit, but it is shown as an unclassified land use in the assessor database.

Water-Oriented Uses

Water-enjoyment uses exist in the Swinomish Tribal Reservation Management Area, but only in the southern part of the area, and mostly within the Swinomish UGA. The Shelter Bay Golf Course is a water-enjoyment use, as is the marina and the Thousand Trails RV Park (located across from Hope Island). Hope Island State Park is also a water-enjoyment use.

Future Land Use

The future land use as outlined by the County Comprehensive Plan follows closely with the current land use. The resource lands of the Swinomish Tribal Reservation Management Area are Ag-NRL, SF-NRL, and RRv. Part of the eastern side of the management unit is designated Rural Resource-Natural Resource Lands (RRc-NRL). The residential areas throughout the management unit are classified as Residential-Swinomish UGA (R), except for a small portion

on the northwest side of the management unit, which is part of RRC-NRL. Hope Island, Skagit Island, and Goat Island are designated OSRSI. The southeastern strip of land within the Swinomish UGA is classified as Commercial- Swinomish UGA (C).

Existing Shoreline Designations

It should be noted that the Swinomish Tribe have its own shoreline regulations and permits. In 1998, the Tribe and Skagit County entered into a Memorandum of Understanding (MOU), which represents the good faith effort that the Tribe and County use in administration of cooperative land use planning and regulation in this management unit. Property owners can choose whether to apply for permits through the Swinomish Tribe or the County, and the two agencies review permits accordingly.

In the County's current SMP, the Swinomish Tribal Reservation Management Unit is dominated by Rural and Rural Residential designations. The islands in the management unit are nearly all designated Natural, but Kiket Island is designated Conservancy. From Padilla Bay south along the Swinomish Channel up to the Swinomish UGA, the area is Rural. Between the UGA boundary and near Shoshone Drive, the designation is Rural Residential. There is a small section of Rural on the southeast part of the management unit, then the shoreline on the west side of the area is Rural Residential again (starting on Martha's Bay northward along to Kiket Island). From Kiket Island north to Turners Bay, the area is Rural. There is a small area near the Thousand Trails RV Park that is designated Conservancy.

Existing and Potential Public Access

The Swinomish Tribal Reservation Management Unit contains approximately 652 acres of shoreline jurisdiction, of which more than 190 acres are in parks and open space use. This shoreline area is mostly managed by the Swinomish Tribe.

The following water access facilities have been identified in this management unit:

- Boat launches (8)
- Dock/Marinas (93)- Docks and marinas are mostly private and located at the south end of the Reservation
- Floats (6)

Improved public recreational facilities include John K Bob Memorial Ball Park near the Swinomish Channel, the Tribal Community Center, and the Village Tennis Courts. Commercial recreation areas include the casino at the north end of the reservation and the Thousand Trails campground. This campground is a private facility.

The shoreline, especially Deadman and Little Deadman Islands, Martha's Bay, Hole in the Wall Beach, and Lone Tree Point, has high aesthetic values. Many recreational opportunities exist on the Reservation for public access. The tribal-owned beach area surrounding the Reservation is currently open to the public. Beaches with high recreational values include Turner Bay Spit, the Kiket Island Causeway, Martha's Bay, the Padilla Bay shoreline, the west bank of the Swinomish Channel, Tosi Point, Hole in the Wall, Sneeoosh, and Pull and Be Damned beaches. No beach area has solely been designated for recreation. Sport fishing is a main recreational pastime on the Reservation, which is enhanced by extensive shoreline access. Crabbing and clam digging are also favorite recreational activities. Traditional recreational activities related to shoreline also include canoe racing (The Swinomish Comprehensive Plan 1996).

Future opportunities for shoreline access include a proposed shoreline access area on Similk Bay. The area has access to an extensive tidal flat and the intertidal area is used for raising oysters. The 1996 Swinomish Tribe Comprehensive Plan calls for shoreline regulatory and management programs that identify and protect vital ecosystems and are conducive to implementing enhancement proposals. The programs should promote: compatible, shore dependent, economic development; access to coastal resources as limited by the inherent capability of the resource for such activity; passive recreational use of fragile areas; and active use in areas of greater tolerance. The programs also give emphasis to compatible historic uses over marginal new development and direct non-shore dependent road, utility, and circulation facilities upland from wetland, beach and offshore resources.

The UGA Open Space Concept Plan intends to designate hand-carry and other non-motorized watercraft routes that flow alongside and through countywide and UGA open spaces on Swinomish Channel.

4.3.4 Management Unit 4- Fidalgo Island and Other Islands

Management Unit 4 includes 16 islands and 3 lakes (Figure 5). The total shoreline area is 2,567 acres, with over 83.7 miles of marine shoreline primarily

divided among Fidalgo Island, Guemes Island, and Cypress Island; other smaller islands in the management unit include Allan, Burrows, Canoe, Cone, Dot, Hat, Huckleberry, Jack, Sinclair, and Vendovi Islands. Lake shorelines, stretching 7.7 miles, are divided among Lake Erie, Lake Campbell, and Pass Lake. A summary of shoreline characteristics in the management unit is provided in Table 5.

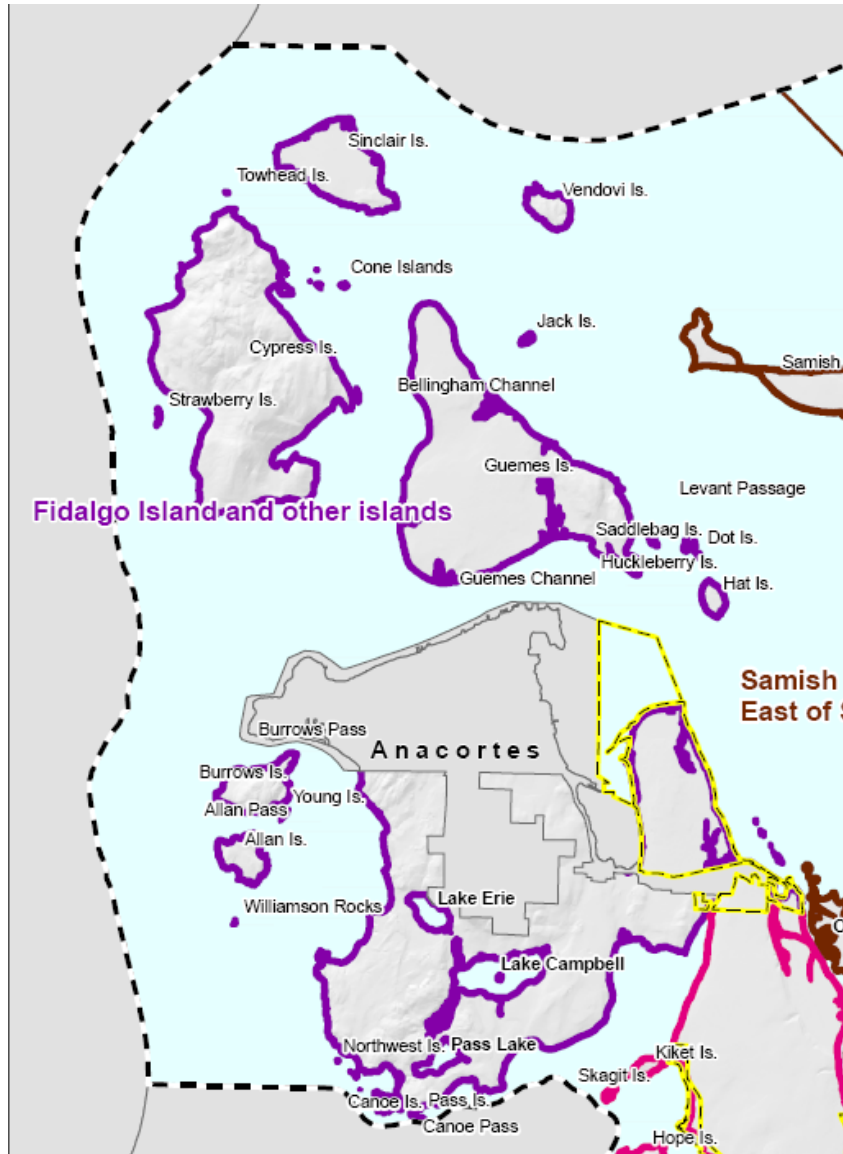


Figure 5. Map of Management Unit 4- Fidalgo Island and Other Islands

Critical Areas

Priority species identified in Management Unit 4 include bald eagle, peregrine falcon, black oystercatcher, sea lion, Townsend’s big-eared bat, osprey, common loon, and harbor seal. Anadromous salmonids also use the marine shorelines. Potential forage fish spawning beaches occur throughout the unit, particularly on

Guemes Island, the northwestern side of Sinclair and Cypress Islands, and March's Point. Herring spawn north of March's Point and in Similk Bay. Coho salmon and coastal cutthroat spawn and rear in the creeks on Fidalgo Island, and other anadromous salmonids use the marine shorelines. According to the NWI, approximately 26.3% of the shoreline area is composed of wetlands. Steep slopes cover over 100 acres of shoreline, comprising 4.2% of the total shoreline area. Thirty-four percent of the shoreline area is within the coastal floodplain.

Current Land Use

This management unit is comprised of several islands, only four of which have any significant development. The islands with development—nearly all residential—are Sinclair Island, Guemes Island, Fidalgo Island, and Cypress Island.

Residential land use exists primarily on Fidalgo Island, south of the City of Anacortes. These residential lands are distributed in relatively small rural lots across the island's portion of this management unit. This is also the case on Guemes Island, served by a County ferry, where residential development is spread across the island's shoreline jurisdiction. Cypress Island has a few areas of residential land use, clustered in about 6 locations in the management unit. On Sinclair Island, residential lands are located primarily on the north, east, and south parts of the island.

Non-residential land uses consist of:

- cultural/recreation use on the northern tip of Guemes Island, in three different locations on Cypress Island, on Burrows Island, and on the southern part of Fidalgo Island;
- one parcel of resource production and extraction on the southern edge of Guemes Island;
- a large cluster of manufacturing parcels within the Anacortes UGA on Fidalgo Island where the two refineries are located;
- several scattered parcels of "other land uses," representing uses not classified according to WAC 458-53-030, along the eastern edge of Fidalgo Island, facing Padilla Bay; and
- a few services parcels located on the southern part of Cypress Island (along Secret Harbor).
- The cultural/recreation uses all consist of parks. On Fidalgo Island, there is a significant amount of cultural/recreation land on the Pass Lake

shoreline and the nearby marine shorelines, which are part of Deception Pass State Park. There is also another area of cultural/recreation parcels on the southwestern edge of Fidalgo Island. On Guemes Island, there is Hunts Park. On Cypress Island, there is Strawberry Bay. Most of Burrows Island is part of Washington State Parks' marine parks system. The Cone Islands, Saddlebag Island, and Hat Islands are parks.

Water-Oriented Uses

Water-enjoyment uses, primarily parks described above, are the primary water-oriented uses. Additionally there are resorts and lodges, which are water-enjoyment uses, near Hunts Park on Guemes Island; on the southern end of Fidalgo Island; on the western side of Fidalgo Island, just west of Lake Erie; and on the western side of Fidalgo Island, just south of the City of Anacortes city limits.

Within this management unit on March's Point, there are also the two refineries, which are water-related uses. The Burrows Island lighthouse is a water-dependent use.

Future Land Use

The designated future land uses are in line with the current land uses. The residential lands on Cypress, Guemes, Sinclair, and Fidalgo Islands are designated as either RI or RRv. The undeveloped and cultural/recreation lands are OSRSI, with the exception of the Guemes Island Resort parcel. It is designated as Small-scale Recreation and Tourism (SRT). The islands that remain undeveloped, such as Vendovi Island and Allan Island, are designated RRv. The manufacturing area, where the refineries are located, is designated as Anacortes UGA Development District (A-UD).

Existing Shoreline Designations

The various islands in this management unit include the entire range of shoreline designations. The undeveloped or uninhabited islands are all designated either Conservancy or Natural; Vendovi, Burrows, Young and Allan Islands are all designated Conservancy. Huckleberry, Saddlebag, and Hat Islands are all designated Natural. Despite having some residential development, Cypress Island is nearly all Conservancy. There is one small area along the northwest tip of the island, facing the Rosario Strait, which is designated Natural. Sinclair Island is designated Rural. Guemes Island, with its amount of residential development, is primarily designated Rural Residential and Rural. The Rural Residential areas are on the west and east sides of the islands, with two smaller

Rural Residential areas along the southern shoreline facing Guemes Channel. The areas in between these are all designated Rural.

Fidalgo Island has several different designations. There appears to be discrepancies between the County's existing designations map and past SMP map amendments. Per available data, the Burrows Bay shoreline is split between Rural Residential in the north (near the Anacortes city limits), and Conservancy. Further south, near Sares Head, the shoreline is designated Rural. The Biz Point area is Rural Residential. On the southern tip of the island, just south of Pass Lake, the shoreline is Conservancy. Between this point and the north side of Similk Bay, the shoreline is designated Rural Residential. The final area along Similk Bay is Rural.

The inland lake areas of Fidalgo Island also have a variety of designations. Lake Erie is split between Rural (on the north side of the lake) and Rural Residential (on the south side of the lake). Lake Campbell is designated Rural. Pass Lake is designated Natural on the northwest side of the lake, and the remainder is designated Conservancy.

Finally, the manufacturing area on March's Point on the east side of Fidalgo Island is split between Urban and Rural. The eastern side of this area, facing Padilla Bay, is the Rural section. The northern and eastern edges (along Fidalgo Bay) are designated Urban.

Existing and Potential Public Access

The Fidalgo Island and Other Islands Management Area contains just over 2,567 acres of shoreline jurisdiction with nearly 990 acres in park and open space use and over 1,300 lineal feet of trails.

This management unit has many public access opportunities, including:

- Campbell Lake Boat Launch – This 2.5 acre site contains a boat launch, parking, temporary restrooms and fishing opportunities. It is maintained as a partnership between the Washington Department of Fish and Wildlife (WDFW) and Skagit County Parks (SCPR).
- Lake Erie Boat Launch – This site is less than 1 acre, but contains a boat launch, parking, temporary restrooms and fishing opportunities. It is maintained as a partnership between WDFW and SCPR.

- Young's Park (also known as Hunts Park) – This 13-acre day use park is located on the northern end of Guemes Island. It is ADA-accessible and has barbeque and picnic facilities, a kayak launch, seasonal restrooms and views of Mt. Baker and the San Juan Islands. The Parks Plan recommends developing a master plan for this park and maintaining the park as a water trail destination with a focus on boater-related camping.
- Guemes Island Playground – This site is ADA-accessible and contains a playground, picnic area, tennis court, baseball field, volleyball and basketball court, public art, and some undeveloped property to the south.
- Cypress Island – This island is a largely undeveloped natural preserve. Washington State Department of Natural Resources manages 4,800 acres of this 5,500-acre island (DNR, undated). The island's steep topography offers vistas of the San Juan Islands, the Strait of Juan de Fuca, mainland Washington and the Olympic and Cascade mountains. Cypress is a popular site for boaters offering primitive camping, lakes and miles of trails and abandoned roads. This has multiple hiking trails from north to the south side of the island. DNR recreation guide indicates trail access is available at Smugglers Cove, Pelican Beach, Eagle Harbor, Cypress Head and Reef Point.
- Pass Lake, Lake Erie, Bowman Bay and Lottie Bay – All on Fidalgo Island, these locations provide trail and shoreline public access. Bowman Bay and Lake Erie have boat launching facilities. Similk Beach area south of Fidalgo Island is accessed through Satteriee Road that runs parallel to the shoreline.

In addition to the sites and facilities described above, the Fidalgo Island and Other Island Management Area contains many islands that are identified as OSRSI on the Comprehensive Plan/Zoning Map, including: Burrows Island, Hope Island, Huckleberry Island, Saddlebag Island, and Skagit Island. In addition to the OSRSI designated islands, this management also contains two OSRSI designated parks:

- Deception Pass State Park – This over 4,100-acre marine park has 77,000 feet of saltwater shoreline and nearly 34,000 feet of freshwater shoreline. The rugged cliffs, turbulent waters, breath-taking views, old-growth forests and abundant wildlife make it a popular camping destination. The park crosses over to Island County and is connected through Deception Pass Bridge. Washington State Parks is making improvements on storm water and wastewater treatment systems in 26 state parks, including Deception Pass State Park, as part of water quality improvement in Puget Sound and Hood Canal. Improvement work for

Deception Pass has been completed (Washington State Parks, Clean Water Projects 2011).

- Montgomery-Duban Headlands Park – This 110-acre Skagit County Park has the largest remaining undeveloped waterfront on Fidalgo Island. Highlights include a freshwater beaver pond and the stunning views of Rosario Strait. The UGA Open Space Concept Plan describes a trail that extends through and eastward occasionally along the marine shorelines as follows: Anacortes-Burlington Trail extending “west from Burlington along SR-20 through the Bayview Ridge UGA to link with Swinomish Channel and PNW Trails to LaConner and Anacortes.” The Plan also intends to designate hand-carry and other non-motorized water craft routes that flow alongside and through countywide and UGA open spaces on Swinomish Channel and Fidalgo Bay.

4.3.5 Management Unit 5- Skagit Bay/Delta

The Skagit Bay/Delta Management Unit covers 3,743 acres of shoreline area. The 63.7 miles of marine shoreline include several small islands of barrier beaches and emergent vegetation. The delta includes 13.8 river miles and Carpenter Creek comprises another 3.9 stream miles within shoreline jurisdiction (Figure 6). Nearly the entire management unit was historically characterized by a shifting mosaic of emergent, scrub-shrub, and forested estuarine and freshwater transition zone marsh. Presently much of the shoreline is diked off for agricultural production, resulting in permanent delta channels and a substantially reduced wetland area.



Figure 6. Map of Management Unit 5- Skagit Bay/Delta

Critical Areas

The majority of this management unit is composed of wetlands (77.1% according to the NWI) and the unit is used extensively by wildlife. Priority species identified within the shoreline area include bald eagle, peregrine falcon, pileated woodpecker, snowy owl, and western toad. All anadromous salmonids in the Skagit River watershed use the delta as juveniles, leaving the river, and as adults, during their return migration. Nearly the entire management unit is within the coastal floodplain and channel migration zone (97% and 94%, respectively).

Current Land Use

Current land use in the Skagit Bay/Delta Management Area is largely agricultural, with small pockets of residential, cultural/recreation, services, resource production and extraction, and manufacturing.

All of the lands in the western edge of the management unit, near La Conner, are actively farmed. Following the Skagit Bay shoreline east, there are a few large parcels of cultural/recreation land, which are adjacent to several large parcels of resource production and extraction land. Continuing south toward the Skagit River Delta, there are several large parcels of services lands, in which the Skagit State Wildlife Recreation Area is located. This land is owned by Washington

Department of Fish and Wildlife. Following the Skagit River northward, there are several small residential parcels located in the Conway area, along with a few large manufacturing parcels. Continuing north toward Mount Vernon, most of the land is currently in agricultural production. There are a few scattered parcels used for resource production and extraction. Following the north fork of the Skagit west toward the La Conner area, these parcels are also largely agricultural with some residential areas scattered in the area.

Water-Oriented Uses

While there are no parks located in the Skagit Bay/Delta Management Area, there is the Skagit State Wildlife Recreation Area, considered a water-enjoyment use.

Future Land Use

Future land use designations are mostly consistent with current land uses. Where there are undeveloped parcels in this management unit, the future land use is categorized as RRv, OSRSI, or Ag-NRL. The entire Skagit River Delta, including the location of the Skagit State Wildlife Recreation Area, is designated OSRSI. The parcels currently designated as manufacturing near Conway are categorized as Natural Resource Industrial (NRI). The scattered residential parcels in this management unit are designated RRv or Ag-NRL (residences may be pre-existing on Ag-NRL, but residential development is not automatically allowed on Ag-NRL).

Existing Shoreline Designations

This management unit is split into two different shoreline designations: Rural and Conservancy. Starting south and east of La Conner, and continuing along the Skagit Bay shoreline, the area is designated Rural. Both forks of the Skagit River north to Mount Vernon are designated Rural. At the South Fork's end in the delta, the area is designated Conservancy.

Additionally, Skagit Bay and the adjacent area from the Skagit-Snohomish County line to Yokeko Point is a Shoreline of Statewide Significance, as is the Skagit River from Skagit Bay northeast to the Skagit-Whatcom County line.

Existing and Potential Public Access

The Skagit Bay/Delta Management Area contains approximately 3,743 acres of shoreline jurisdiction, and a majority of it is in parks and open space at nearly 2,200 acres. Because of the nature of the delta, most of this area has maintained a natural shoreline, with the exception of dikes, with limited trail access. Portion of the area is under Skagit Wildlife recreation area.

The following significant water access resources exist in this management unit:

- Conway Park – This site has 3 acres of ball fields, seasonal camping, fishing, picnic facilities, seasonal restrooms, and a maintained boat launch with parking on the South Fork of the Skagit River. The Parks Plan recommends developing a master plan for this site and seeking opportunities to connect the main portion of the site to the playfield on the south, formalizing parking, and considering additional camp sites and improvements to the boat launch area.
- Skagit Wildlife Area – The Skagit Wildlife Area totals roughly 16,700 acres, most of which are adjacent to Skagit Bay, between the mouths of the north and south forks of the Skagit River. The wildlife area includes tidelands, intertidal marsh areas, and tributaries. This resource is designated as OSRSI on the Skagit County Comprehensive Plan/Zoning Map.

The UGA Open Space Concept Plan proposes a trail extending south from Mount Vernon to the delta.

4.3.6 Management Unit 6- Lower Skagit Diking Districts

The Lower Skagit-Diking District Management Unit covers 2,794 acres of shoreline, over 30.8 river miles along the Skagit River (11.6 miles), Nookachamps Creek (21.3 miles), and Walker Creek (3.6 miles) within shoreline jurisdiction (Figure 7). Another 26 miles of lakeshore are divided among the following lakes (Table 9). Dikes separate the entire lower Skagit River from the surrounding uplands in this management unit.

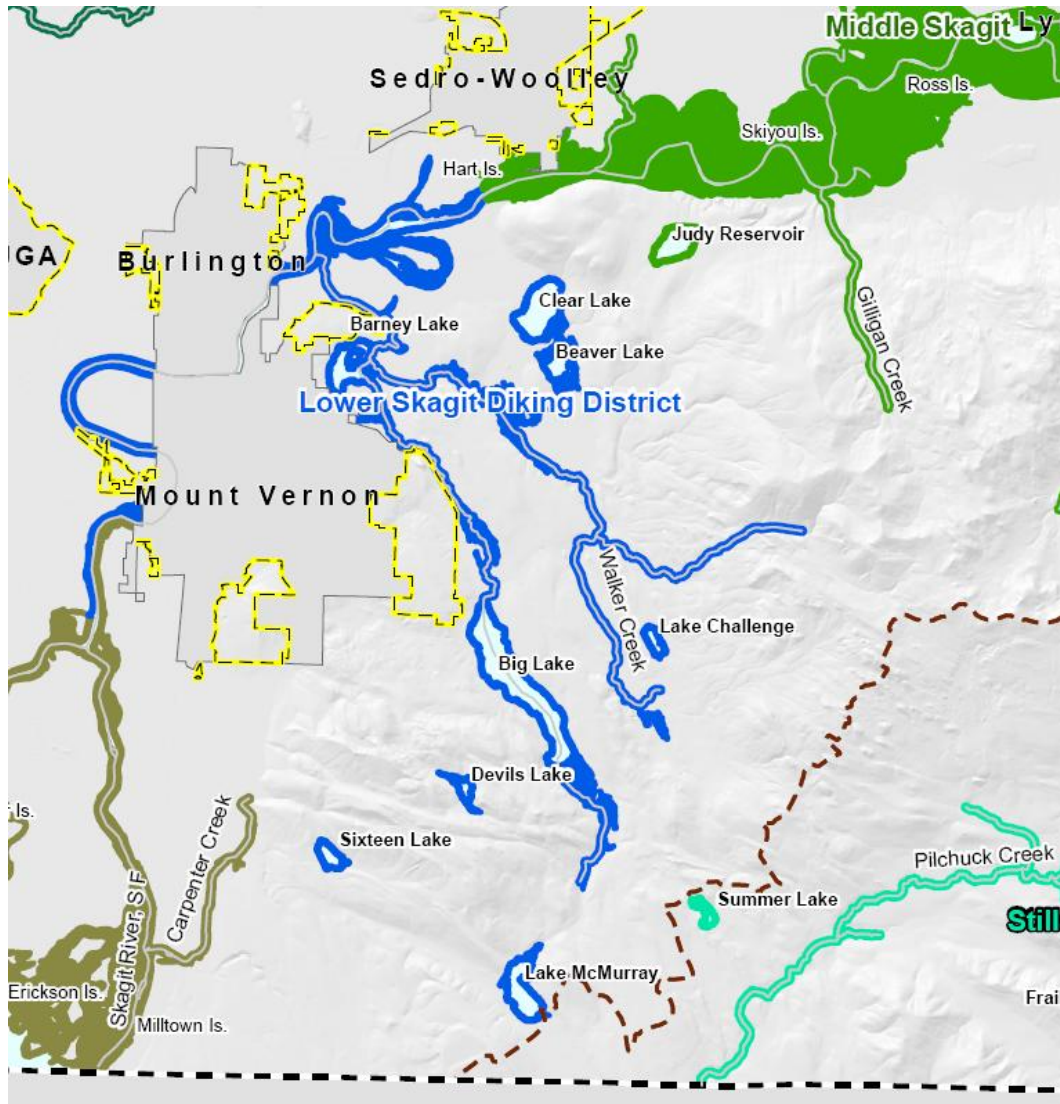


Figure 7. Map of Management Unit 6- Lower Skagit river- Diking Districts

Table 9. Lakes in Shoreline Jurisdiction in Management Unit 6- Lower Skagit Diking Districts

Lake Name	Lake Area (acres)	Shoreline Length (miles)
Barney Lake	146.7	4.3
Beaver Lake	72.3	1.5
Big Lake	535.8	6.4
Clear Lake	220.2	2.5
Devils Lake	25.4	1.0
Lake Challenge	32.2	1.1
McMurray Lake	155.3	2.8
LakeSixteen	43.3	1.1
Unnamed Lake	81.1	5.4

Critical Areas

Priority species identified include bald eagle, common loon, pacific lamprey, and Salish sucker. NWI maps indicate that wetlands cover 48.4% of the shoreline area in Management Unit 6. Seventy-five percent of the shoreline area falls within the coastal floodplain, and 34 percent of the area is within the channel migration zone of the Skagit River.

Current Land Use

The Lower Skagit-Diking Districts Management Area is composed of several developed areas west, east, and south of the Cities of Mount Vernon and Burlington. The two areas west of Mount Vernon are along the Skagit River, and are directly adjacent to the city limits; lands in this area are developed, and primarily residential. The section of the management unit east of the City of Burlington and west of SR 9 is quite different, with a few residential parcels, a few large resource production and extraction parcels, a few services parcels, and much agricultural land. Further south, toward Barney Lake, there is more farmland. The Barney Lake shoreline is mostly undeveloped on the south and east sides, with scattered residential parcels on the north and west sides.

Nookachamps Creek, the section of the management unit between the south side of Barney Lake and the north side of Big Lake, is characterized by several residential parcels near the Mount Vernon UGA boundary, but largely undeveloped just north of Big Lake. The shoreline around Big Lake is residential, with several parcels of agricultural land south of the lake. Devils Lake is west of Big Lake, and its shoreline is undeveloped. South of Devils Lake is Lake McMurray, which has residential lands on all sides of the lake. The lake southwest of Big Lake is Lake Sixteen. This section of the management unit has

residential parcels on the western half of the lake, but it is undeveloped on the eastern half.

There are a few residential parcels on the southwest side of Beaver Lake, and also around Clear Lake.

The remaining section of the Lower Skagit-Diking Districts Management Area is the eastern fork of Nookachamps Creek. This section ends in a two-way fork, with Lake Challenge in between, and Walker Creek as the south portion of the fork. Heading east away from Barney Lake, the land is mostly farmed with the exception of a few residential parcels near SR 9. Continuing southeast, as Walker Creek splits from Nookachamps Creek, each piece of the split includes mostly undeveloped land. Finally, in between the two splits, is Lake Challenge. Its section of the management unit is cultural/recreation, as the Fire Mountain Boy Scout Camp is located here.

Water-Oriented Uses

The water-oriented uses in the Lower Skagit-Diking Districts Management Area consist of water-enjoyment uses located on the lakes in the management unit. On Big Lake, there are three water-enjoyment uses: on the northeast side, a golf course; on the northwest side, a resort area; and on the southeast side, a ski school. On Lake Challenge, there is one water-enjoyment use, at the Fire Mountain Boy Scout Camp.

Future Land Use

The future land use designated in the Lower Skagit-Diking Districts Management Area consists of mostly of rural designations, which is consistent with the character of the current land use.

On the western side of Mount Vernon, the residentially developed areas here are designated Ag-NRL, RI, or Rural Business (RB). The land east of Burlington, some of which is currently categorized as resource production and extraction, is designated as Ag-NRL.

Continuing south toward Barney Lake, these parcels are primarily Ag-NRL. On the residential west side of Barney Lake, the lands are designated RRv. The land between Barney Lake and Big Lake is primarily Ag-NRL. Around the residential areas of Big Lake, the designation is mainly Rural Village Residential (RVR). On the south end of Big Lake, the lands are designated RRv and Ag-NRL. The very

southern tip of this area, just north of Lake McMurray, is designated Rural Resource-NRL (RRc-NRL).

Around Lake McMurray, the current residential areas are zoned RVR. The eastern side of the lake is RRv and RRc-NRL.

The two smaller, lakes west of Big Lake are designated Industrial Forest-Natural Resource Lands (IF-NRL; Devils Lake), and RRv (Lake Sixteen). In the Clear Lake area, the parcels are either RVR or RRv. Beaver Lake is mostly RRv, with a small pocket of RRc-NRL on the east side.

The section of the management unit that follows the eastern fork of the Nookachamps Creek is zoned RRv and RRc-NRL. The Walker Creek portion is RRc-NRL, with a large section of SF-NRL. The remainder of Nookachamps Creek, north of Lake Challenge, is SF-NRL and IF-NRL. Lake Challenge is entirely SF-NRL.

Existing Shoreline Designations

This management unit is primarily designated Rural. Along the Skagit River, the exception is located in the bend of the river west of Mount Vernon. This developed area is designated Rural Residential. Both the Nookachamps Creek and the East Fork of Nookachamps Creek are designated Rural. The area around Big Lake is Rural Residential, with the exception of where the undeveloped land is located at the south end of the lake; this area is designated Conservancy. Devils Lake and Beaver Lake are also designated Conservancy. Most of Lake Sixteen is Conservancy also, but there is a small area of Rural Residential on the west shore. Clear Lake is designated Rural Residential along the north side of the lake, and designated Rural on the south side. Finally, Lake McMurray is mostly designated Rural, with the exception of the Rural Residential area on the southwest side of the lake.

Lastly, the Skagit River from Skagit Bay northeast to the Skagit-Whatcom County line is a Shoreline of Statewide Significance.

Existing and Potential Public Access

The Lower Skagit Diking District Management Area contains 2,793 acres of shoreline jurisdiction of which about 355 acres are in parks and open space. The water bodies in this management unit include a mix of rivers, lakes and creeks.

Approximately 350 docks mostly private and 3 floats were identified in this management unit. Public access is available at a variety of lakes in this management unit. Key public access opportunities in this management unit include:

- Big Lake and Lake McMurray both have existing boat launching facilities.
- Pilchuck Forest is located south of Lake McMurray with 81 acres of land. This is owned by the County and connects with the Centennial trail.
- The Centennial Trail provides a potential future opportunity. The existing trail segment currently starts south of Lake McMurray and only extends a limited distance. However, it is intended to eventually connect Snohomish and Whatcom County past Big Lake, the Nookachamps, Skagit River
- Hoag Memorial Park along Nookachamps Creek is approximately 13-acres of rocky hilltop in the midst of surrounding lowlands. The park offers view from the top of the hill.
- Clear Lake Swim Beach – This 1-acre park provides supervised public swimming during the summer. Park includes boat rentals, concessions, playground, sports courts and facilities, restrooms, etc. Future opportunities for access improvements in this management unit include enhancing the parking and entry access at Clear Lake Park and installing a permanent concession building to better serve guests and increase the revenue potential for Skagit County Parks and Recreation.

Limited public access exists on Devils Lake and Sixteen Lake.

The UGA Open Space Concept Plan's Scenic Resource Goal intends to protect and enhance overlooks or look-into places within the UGA open space network that includes Nookachamps Creek.

4.3.7 Management Unit 7- Samish River

The shoreline area of the Samish River Management Unit covers 2,630 acres over 23.5 miles of the Samish River, 9 miles of Friday Creek, and 1.6 miles of lake shoreline along Butler Pit Lake (Figure 8). Nearly the entire lower, estuarine portion of the Samish River is lined with dikes, but the upper portion of the river is largely unrestricted by shoreline armoring.

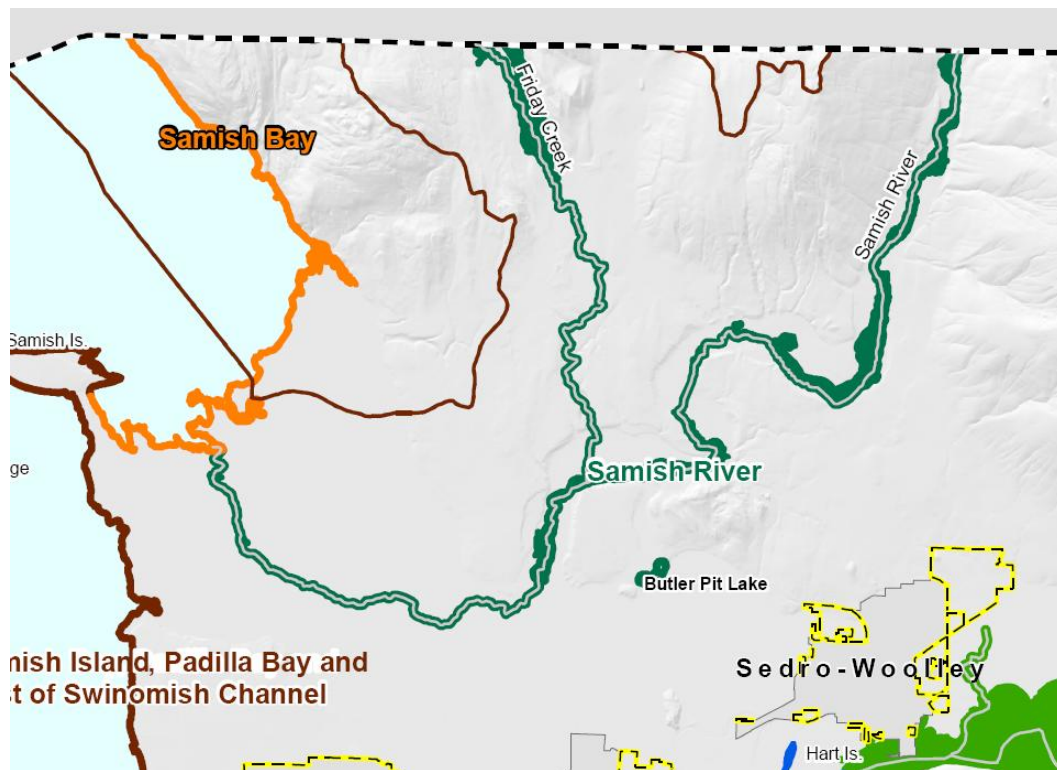


Figure 8. Map of Management Unit 7- Samish River

Critical Areas

Wetlands occupy 38% of the management unit, according to the NWI. Steep slopes are not mapped within shoreline jurisdiction in this management unit. Much of the shoreline area is within the 100 year floodplain (72%), and portions are also within the floodway and channel migration zone (27% and 14%, respectively).

Current Land Use

The Samish River Management Area is characterized by the Samish River, from the Whatcom County boundary to the southern edge of the Samish Bay Management Area (see Figure 8). Friday Creek is also part of this management unit, and it is located mostly parallel to and east of I-5. Large sections of this management unit are farmed, particularly in the western section of the Samish River. Friday Creek, however, goes through some residential areas. The exceptions are, starting from the north edge of the management unit:

- The area around the Samish Water District is transportation, communication, and utilities reflecting the utility use of that property;
- A large resource production and extraction parcel, located near Lake Samish Road;

- Two parcels designated as “other land uses” located just south of the resource production and extraction parcel; and
- Two cultural/recreation areas (one small parcel for Donovan Park, and several larger ones for the Thousand Trails RV Park).
- The Samish River east of Friday Creek, north to the Whatcom County boundary, is more residential than the western side of the river. There are concentrations of residential development just north of Sedro-Woolley, along Warner Road and Prairie Road. The only exception to residential and agricultural parcels in this section is the cluster of five resource production and extraction parcels located between SR 9 and the railroad track just north of Hathaway Road.

Water-Oriented Uses

This management unit includes the water-oriented uses of Donovan Park located along Friday Creek, Squires Lake Park which crosses the border with Whatcom County, and the Thousand Trails RV Park (for temporary lodging), all of which are categorized as water-enjoyment uses. Additional water-oriented uses include two fish hatcheries, one located near the confluence with Friday Creek and another located several miles upstream along Friday Creek.

Future Land Use

Future land use designations coincide with current land uses in the Samish River Management Area. The designation of the area along Samish River is nearly all Ag-NRL. A few slivers of RRc-NRL land coincide with the lands currently used as resource production and extraction.

The Friday Creek section of the management unit is mostly designated as RRv, with smaller Ag-NRL, RI, and Rural Village Commercial (RVC) sections.

Existing Shoreline Designations

The shoreline designation for much of this management unit, along both the Samish River and Friday Creek, is Rural. The only exception is a small area designated Rural Residential, which is located just south of the confluence of Friday Creek with the Samish River.

Existing and Potential Public Access

The Samish River Management Area contains 2,629 acres of shoreline area of which more than 267 are in parks and open space acreage. Trail connection exists in the area between the Friday Creek and Samish River. The management unit contains over 2,100 feet of trails, and the following water access opportunities:

- Donovan Park –This 3–acre park along Friday Creek provides a picnic area, barbeques, playground, and restrooms.
- Pomona Grange Park – A 15-acre site on Friday Creek and bordered by the state fish hatchery. Amenities include interpretive nature trail, portable toilets, picnic shelter, and barbeque facilities.

No future plan has been indicated for these parks. The UGA Open Space Concept Plan describes the Centennial Trail to eventually connect Snohomish and Whatcom County through this management unit. The UGA Open Space Concept Plan’s Transportation Water Trail Goal intends to designate hand-carry and other non-motorized water craft routes that flow alongside and through countywide and UGA open spaces including the Samish River.

4.3.8 Management Unit 8- Middle Skagit River

The Middle Skagit Management Area is located along the Skagit River between Sedro-Woolley and east of the town of Hamilton and covers 11,334 acres of shoreline, including the shorelines of Lyman and Hamilton (Figure 9). Rivers and lakes within shoreline jurisdiction are described in Tables 10 and 11. Unlike the lower Skagit, which is narrowly confined by dikes and levees, the mainstem middle Skagit River is characterized by broad floodplain with a high level of disturbance.

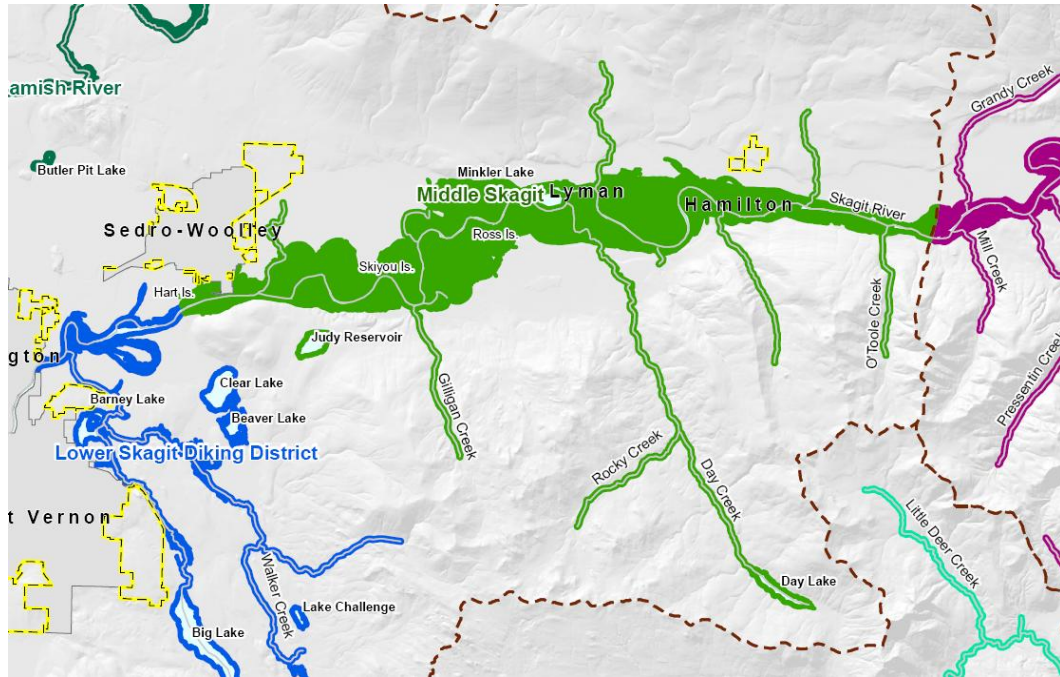


Figure 9. Map of Management Unit 8- Middle Skagit River

Table 10. Rivers and Streams in Shoreline Jurisdiction in Management Unit 8- Middle Skagit River

River/Stream Name	River/Stream Length (miles)
Alder Creek	2.3
Cumberland Creek	3.8
Day Creek	11.2
Gilligan Creek	3.6
Hansen Creek	2.7
Jones Creek	3.3
O'Toole Creek	2.9
Rocky Creek	7.1
Skagit River	22.0

Table 11. Lakes in Shoreline Jurisdiction in Management Unit 8- Middle Skagit River

Lake Name	Lake Area (acres)	Shoreline Length (miles)
Day Lake	121.8	3.1
Judy Reservoir	127.7	1.9
Minkler Lake	35.3	2.7

Critical Areas

Priority habitat regions and features in the Middle Skagit Management Unit are identified in Table 5. Priority species present include bald eagle, mountain quail, tailed frog, western toad, and pacific lamprey. The floodway and floodplain cover 77% and 87% of shoreline area, respectively. Additionally, 85 percent of the shoreline falls within the channel migration zone of the Skagit River.

Current Land Use

Much of the developed land in this management unit is located in the western portion, near Sedro-Woolley. Between Sedro-Woolley and the town of Lyman, most lands are farmlands or pasture. Those that are developed in this area are residential, except for two small trade parcels just south of the Sedro-Woolley boundary, and a few large services parcels midway between Sedro-Woolley and Lyman.

The Lyman and Hamilton areas are also developed. Most of Lyman's shoreline jurisdiction is undeveloped and residential. Clusters of residential development also exists further east between Lyman and Hamilton. Downtown Hamilton is located within the management unit, and its uses are mostly residential with some trade and services. Trade and service uses include restaurants and government facilities (e.g., post office, town offices).

Between Hamilton and the eastern edge of the management unit, there are some scattered residential parcels along the northern side of the Skagit River, as well as several large cultural/recreation parcels (Rasar State Park).

Judy Reservoir has some development; Day Lake area is completely undeveloped. Judy Reservoir is surrounded by transportation, communications, and utilities parcels.

The sections of the management unit that include the seven creeks are primarily rural, farm and pasture lands. Starting with Gilligan Creek, the westernmost creek, there are a few residential parcels on the northern edge of the creek where it meets the Skagit River. Jones Creek, which is near Lyman, is on the northern side of Skagit River. It is mostly undeveloped, with only two residential parcels crossing into this section. Day Creek and Rocky Creek are on the other side of the river from Jones Creek. Day Creek is directly connected to the Skagit River, while Rocky Creek is further south and is connected to Day Creek. Rocky Creek is primarily forest resource lands. Day Creek is also mostly forest resource land, with only a few residential parcels near its northern end. Cumberland Creek is

the next creek to the east, and is located south of Hamilton and the Skagit River. The parcels within this area are not developed. The next creek, just east of Hamilton and on the north side of the Skagit River, is Alder Creek. It is mostly forest resource land, with a few residential parcels and pastures located at its southern end. Finally, O'Toole Creek is the easternmost creek in this management unit. The lands located within this area are in pasture and forest.

Water-Oriented Uses

The dams at Judy Reservoir are water-dependent uses in this management unit. In addition, Rasar State Park on the north side of the Skagit River in the eastern part of this management unit provides water-enjoyment recreation.

Future Land Use

The future land use designations in this management unit are in line with current land use. The residential and undeveloped lands between the City of Sedro-Woolley and the City of Lyman are either Ag-NRL or RRc-NRL. The parcels surrounding Judy Reservoir are designated OSRSI.

Further east, most of the creeks as well as Day Lake are all within the IF-NRL or OSRSI designations. However, Gilligan Creek and Day Creek each have a small area designated RRc-NRL, which coincide with the residential areas near the Skagit River. Jones Creek, on the north side of Lyman, has a few parcels of residential land use, which are designated RRv. The remainder of land around Jones Creek is IF-NRL or SF-NRL. The Alder Creek area has a similar designation: the residentially developed lands (closer to Hamilton) are designated RRv, whereas the undeveloped lands further north are either SF-NRL or IF-NRL.

Both Lyman and Hamilton, as incorporated cities, provide their own land designations for land within their jurisdictions. Most of the portion of the Town of Lyman located within shoreline jurisdiction is designated Open Space (O-S). However, the eastern portion of the Town on the north side of the Skagit River is designated Residential (R-1), allowing single-family residential development. The entire developed portion of the Town of Hamilton is within the shoreline jurisdiction. Most of Hamilton is designated for residential development (R-V, R-A, R-1, and RM zones). The Town also applies open space (O-S), public (P), and commercial or industrial (B-C and M-C) land use designations within the shoreline jurisdiction.

Existing Shoreline Designations

The Middle Skagit Management Area includes several shoreline designations. The areas around the Skagit River—a Shoreline of Statewide Significance—are designated either Rural or Conservancy. Day Creek, Rocky Creek, and Day Lake all have the Conservancy designation, as does Judy Reservoir. The Gilligan, Cumberland, O'Toole, Jones, and Alder Creeks are also designated Conservancy. Both the Lyman and the Hamilton areas are designated Rural Residential.

Existing and Potential Public Access

The Middle Skagit Management Area contains 11,334 acres of shoreline jurisdiction with about 10% or 1,196 acres in parks and open space use.

The management unit contains nearly 37,000 feet of trails. Key public access opportunities in this management unit include:

- Cascade Trail – This 22.5-mile trail connects Sedro-Woolley and Concrete. It is a multi-use trail that allows hiking, biking and equestrian users but prohibits motorized vehicles. It provides views of the Skagit River as well as wildlife viewing opportunities.
- Hansen Creek Park – This 3-acre linear property is currently undeveloped but has Hansen Creek frontage.
- Northern State Recreation Area – This 726-acre property was acquired from the state in 1990. A Master Plan was developed in 2000, but has not been implemented yet. Portions of this property are designated as an OSRSI on the Skagit County Comprehensive Plan/Zoning Map.
- Rasar State Park – This 169-acre park has 4,000 feet of Skagit River shoreline and offers a campground and wildlife observation opportunities. It is an OSRSI designated area.
- No additional trail connection has been proposed in the UGA Open Space Concept Plan. This management unit lacks trail, boat launch and other shoreline public access facilities. The Cascade trail in most cases runs outside the shoreline jurisdiction.

4.3.9 Management Unit 9- Upper Skagit River

The Upper Skagit Management Unit is the largest management unit in the County, covering 26,513 acres of shoreline over 362 miles of river and stream (Table 12) and 63.2 miles of lakeshore (Table 13) within shoreline jurisdiction (Figure 10). The upper Skagit mainstem is the primary spawning site for the most abundant Chinook salmon stock in the Skagit Basin, the Upper Skagit Summer Chinook (WDFW et al. 1994). The lower portion of the mainstem in this

management unit has a relatively broad floodplain, and between the northern Skagit County border and Marblemount, the Skagit River flows through a narrow valley, with several steep, confined tributaries. Much of the upper Skagit management unit is in public ownership (44%).

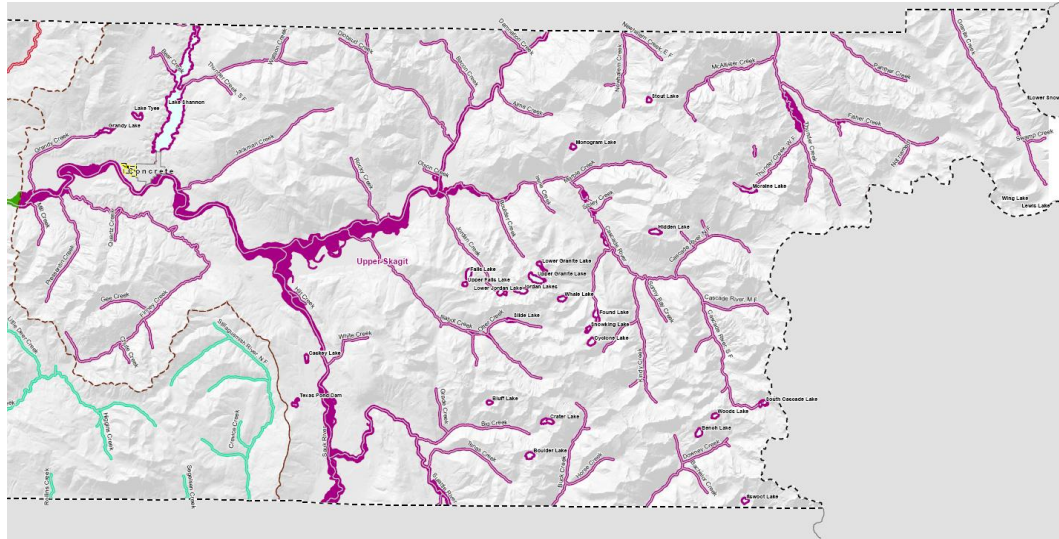


Figure 10. Map of Management Unit 9- Upper Skagit River

Table 12. Rivers and Streams in Shoreline Jurisdiction in Management Unit 9- Upper Skagit River

Stream/River Name	Stream/River Length (miles)
All Creek	0.7
Alma Creek	3.5
Arrow Creek	1.6
Bacon Creek	5.4
Bear Creek	3.8
Big Creek	6.4
Boulder Creek	3.3
Buck Creek	6.1
Cascade River	21.9
Cascade River - North Fork	5.2
Cascade River - South Fork	9.2
Damnation Creek	1.6
Diobsud Creek	9.0
Downey Creek	5.8
Finney Creek	22.6
Fisher Creek	9.6
Grade Creek	2.5
Grandy Creek	5.7
Granite Creek	10.8
Illabot Creek	14.9

Stream/River Name	Stream/River Length (miles)
Irene Creek	1.9
Jackman Creek	9.6
Jordan Creek	6.0
Marble Creek	5.5
McAllister Creek	6.9
Mill Creek	4.0
Newhalem Creek	6.5
Olson Creek	1.2
Otter Creek	3.2
Panther Creek	5.0
Presentin Creek	6.4
Quartz Creek	1.7
Rocky Creek	0.5
Sauk River	17.3
Skagit River	44.1
Suiattle River	12.5
Tenas Creek	5.6
Thunder Creek	24.6

Table 13. Lakes in Shoreline Jurisdiction in Management Unit 9- Upper Skagit River

Lake Name	Lake area (acres)	Shoreline Length (miles)
Barnaby Slough	33.2	2.5
Bench Lake	54.8	1.2
Bluff Lake	21.9	0.7
Boulder Lake	56.5	1.2
Caskey Lake	25.9	1.0
Crater Lake	62.5	1.9
Cyclone Lake	54.7	1.1
Falls Lake	59.7	1.3
Found Lake	62.9	1.8
Grandy Lake	56.4	1.8
Granite Lake # 3	41.8	1.7
Hidden Lake	61.2	1.5
Itswoot Lake	36.8	1.0
Jordan Lakes	66.4	1.5
Lake Tyee	48.7	1.6
Lower Jordan Lake	52.2	1.4
Monogram Lake	28.6	0.9
Moraine Lake	81.7	2.1
Shannon Lake/Baker Lake	2057.9	24.0
Slide Lake	30.6	1.1
Snowking Lake	25.6	1.3
South Cascade Lake	47.0	1.6
Stout Lake	24.0	0.8
Texas Pond Dam	30.0	1.4

Lake Name	Lake area (acres)	Shoreline Length (miles)
Upper Falls Lake	20.3	0.8
Upper Granite Lake	125.5	2.1
Whale Lake	45.1	1.3
Woods Lake	34.2	0.9

Critical Areas

The Upper Skagit shorelines support a diverse assemblage of priority species. Priority birds include marbled murrelet, osprey, bald eagle, spotted owl, black swift, common loon. Priority mammals include lynx, gray wolf, grizzly bear, western gray squirrel and the California, little brown, long-eared, and Yuma myotis (i.e. bats). The western toad and Salish sucker also occur in the Upper Skagit Management Unit. The NWI identifies approximately 15% of the area of shoreline jurisdiction as wetlands. Floodway and floodplain occupy 30 percent and 47 percent of shoreline jurisdiction, respectively, and another 34 percent of shoreline area falls within the channel migration zone.

Current Land Use

Land in the Upper Skagit Management Area is mostly undeveloped; the southern and eastern portions of this area are within the Mount Baker National Forest, Glacier Peak Wilderness, Ross Lake National Recreation Area, and the North Cascades National Park. The developed areas are all along the Skagit River, which crosses through the Towns of Concrete, Rockport, Van Horn and Marblemount. The Sauk River, which flows into the Skagit from the south, goes through the town of Darrington in Snohomish County, and has little development on the Skagit County side of the Darrington area. The Baker River flows from Lake Shannon into the Skagit River and most of it is within the jurisdiction of the Town of Concrete. Lake Shannon is located north of Concrete, and its shoreline is remote and undeveloped.

There are many separate parts of the Upper Skagit Management Area, clustered around numerous creeks and lakes. Most of these water bodies are part of the Mount Baker National Forest, Glacier Peak Wilderness, Ross Lake National Recreation Area, or the North Cascades National Park.

Because the developed lands in this management unit are along the Skagit and Sauk Rivers, their land uses will be described here. Starting east of Hamilton, in the Birdsvew area, there are many residential parcels along the river. As the Skagit passes through Concrete, the developed areas are also residential. Just

north of Concrete, Lake Tyee has many cultural/recreation parcels surrounding it. The Lake Tyee Recreational Community is located here. Continuing east from Concrete, there are a few scattered residential parcels, but many are undeveloped. At the location where the Sauk River meets the Skagit, there are several large cultural/recreation parcels; this is the location of Rockport State Park and Howard Miller Steelhead Park. East of Rockport, the management unit includes a few residential parcels along with services and cultural/recreation parcels. In the Marblemount area, there are some residential parcels and a few large cultural/recreation parcels. As the Skagit River turns north from this point, the land becomes even less developed. At the north end of the management unit, the river enters the Ross Lake National Recreational Area.

Near Marblemount, the Cascade River meets the Skagit River. Cascade River Park is a privately-owned recreational development on both sides of the Cascade River. There are also two resource production and extraction parcels in that area, located where the Marblemount Hatchery is located.

Along the Sauk River, upstream from Rockport, the management unit passes through a few scattered residential parcels. The Sauk River passes between two unconnected parts of the Mount Baker National Forest, and therefore most of the lands here are undeveloped. At the southern edge of the management unit, near the Skagit-Snohomish County boundary, there are a few residential parcels.

Water-Oriented Uses

There are several different water-oriented uses in the Upper Skagit Management Area. The cultural/recreation areas on Lake Tyee and on the Skagit River indicate water-enjoyment uses. The hatchery on the Cascade River is a water-dependent use. Cascade Park is a water-enjoyment use located on both sides of the Cascade River.

Future Land Use

Since much of this management unit is undeveloped and part of a national forest, national park or designated wilderness area, much of the land is designated OSRSI. The developed areas along the Skagit River, however, are designated a variety of categories.

The residentially developed areas between Hamilton and Concrete are RI or RRv. Lake Tyee is zoned IF-NRL. This section of the management unit passes through a couple of Ag-NRL areas. Between Concrete and Rockport, the residentially developed lands are designated RRv. The area of Rockport State

Park is designated OSRSI, as are the other cultural/recreation areas in the Rockport and Marblemount areas. The developed lands along the Cascade River are either RRv or RRC-NRL.

Existing Shoreline Designations

The Upper Skagit Management Area includes several different designations. The Skagit River has four different designations. Where this management unit begins in the west, between Hamilton and Concrete, the area around the river is designated Rural. Around the residentially developed area just west of Concrete, the area around the river is designated Rural Residential on the south bank and Conservancy on the north bank. In the Concrete area, most areas along the river are designated Rural. On the east side of Jackman Creek, Skagit River's shoreline designation is mostly Conservancy. In the area of the river near Rockport, it is entirely designated Conservancy. Between Rockport and Rocky Creek, the designation is mostly Conservancy with the exception of some small areas designated Natural. Between Rocky Creek and Marblemount, the south bank of the river is designated Conservancy, while the north bank is designated Rural. North of Marblemount, there is a small area designated Rural, but then the Conservancy designation covers the area north to Bacon Creek. After this point through to the Whatcom-Skagit County line, the northwestern bank of the river is designated Conservancy while the southeastern bank is designated Natural.

Most of the creeks on both sides of Rockport, including most of the Cascade River, are designated Conservancy. However, portions along the Cascade River (i.e. Cascade River Park) are designated Rural Residential. Most of Lake Shannon and Grandy Lake are also designated Conservancy. The area of Lake Shannon just north of Concrete is designated Rural. The Baker River, through Concrete, is designated Urban, but as it flows into the Skagit it is designated Rural

The Sauk River south from Rockport to the Darrington area is designated Conservancy, with a small portion upstream of White Creek designated Rural Residential. Between the convergence of the Suiattle River with the Sauk and the Skagit-Snohomish County line, the Sauk River area is designated Rural on the more developed, western side. The eastern side keeps the Conservancy designation. The entire length of the Suiattle River is designated Conservancy.

The inland lakes of this area are within the boundary of the Mount Baker National Forest.

The Skagit River from Skagit Bay northeast to the Skagit-Whatcom County line is a Shoreline of Statewide Significance, as is the Cascade River (between its confluence with Skagit River to the mouth of Boulder Creek) the Sauk River (between its confluence with the Skagit River to the Skagit-Snohomish County line), and the Suiattle River (from its confluence with the Sauk River to the Mount Baker National Forest boundary). Lake Shannon and the Baker River are also Shorelines of Statewide Significance.

Existing and Potential Public Access

The Upper Skagit Management Area contains over 26,500 acres of shoreline jurisdiction, much of which is considered forest, parks and open space. There are more than 9,580 feet of trails.

There are a wide range of public access opportunities in this management unit, including:

- Cascade Trail – This multi-use trail spans between two management units. It is discussed in detail under the Middle Skagit Management Area.
- Grandy Lake Park – This 22 acre site located off Baker Lake Road is popular with hunters and anglers and provides primitive seasonal camping. The Skagit County Comprehensive Parks Plan recommends developing a master plan that addresses the high demand during portions of the hunting and fishing seasons and the site’s role as an overflow to the Baker Lake recreational area.
- Howard Miller Steelhead Park – This 93-acre site has many amenities including: boat launch, fishing, natural area, picnic shelters, playground, trails, summer concerts, restroom with showers, etc. It is handicapped accessible. A range of camping options are available, including tent, RV and Adirondacks.
- Sauk Park – This 40-acre site provides seasonal primitive camping, portable restrooms, hiking and equestrian trails, and fishing opportunities along the Sauk River.
- Presentin Park – This 55-acre site has Skagit River frontage, a network of trails, a day use area and a picnic shelter. It is a popular destination for watching wildlife. The long-term plan is for this site to be developed as a

destination park with day-use area, 40 RV campsites, and up to 20 tent camping sites.

- North Cascades National Park – This OSRSI has a stunning mix of peaks, valleys, waterfalls and glaciers.
- Noisy Diobsud Wilderness – Noisy Creek flows north and Diobsud Creek flows south through this OSRSI designated wilderness, which shares a border with the southwest corner of North Cascades National Park. The USFS manages 14,133 acres of this land.
- Glacier Peak Wilderness – This OSRSI designated wilderness area has approximately 572,000 acres and shares its northern border with North Cascades National Park.
- Ross Lake National Recreation Area – This OSRSI designated area is the most accessible part of the North Cascades National Park complex. The Ross Lake National Recreation Area includes three reservoirs (Ross Lake, Diablo Lake, and Gorge Lake) and offers outdoor recreation opportunities along the upper reaches of the Skagit River.
- Seattle City Light Wildlife Mitigation Lands – These OSRSI designated open spaces are the result of the settlement agreement put forth by Seattle City Light to mitigate for its hydroelectric relicensing project impacts.
- Rockport State Park – This 670-acre park contains old-growth forest that has never been logged at the foot of Sauk Mountain.

Additional opportunities for improving public access in the Upper Skagit Management Area include:

- Developing access opportunities on Lake Shannon, including permanent access to Lake Shannon and developing day use facilities and overnight camping.

4.3.10 Management Unit 10- Nooksack Watershed

The portion of the Nooksack watershed within Skagit County covers 1,293 acres over 23.8 river/stream miles within shoreline jurisdiction (Figure 11). The Nooksack Management Area includes the South Fork of the Nooksack River, along with two major creeks (Cavanaugh and Howard). It is located in the north-central part of Skagit County, and north of the towns of Lyman and Hamilton. Rivers and streams in shoreline jurisdiction include Cavanaugh Creek, Howard Creek and the South Fork Nooksack River. The high elevation and rugged

terrain have limited development in this management unit. The area is well vegetated with a mix of evergreen, mixed, and deciduous forests.



Figure 11. Map of Management Unit 10- Nooksack Watershed (WRIA 1)

Critical Areas

Priority species occurrences have been documented for marbled murrelet and osprey. Based on the NWI, wetlands comprise 27.8 percent of the shoreline area. The floodplain covers 44% of shoreline area, and the channel migration zone is not mapped for this management unit.

Current Land Use

Most of this area is completely undeveloped, and the northeast edge of the management unit ends in the Mount Baker National Forest. The only partially developed areas are two large transportation, communication, and utilities parcels located separately along the river. One of these parcels is located west of Howard Creek, and one is located east of it (near the National Forest boundary).

Water-Oriented Uses

As there is little to no development in this management unit, the only water-oriented uses are those associated with recreational use such as hiking trails and outdoor recreation, considered water-enjoyment uses.

Future Land Use

This management unit is split between the IF-NRL and the OSRSI designations. The portion of the South Fork that is part of the Mount Baker National Forest and an additional stretch of the river (which coincides with the transportation, communication, and utilities parcel west of Howard Creek) is designated OSRSI.

The remainder of the South Fork, along with the area around Cavanaugh Creek, is designated IF-NRL.

Existing Shoreline Designations

The South Fork of the Nooksack, as well as Cavanaugh and Howard Creeks, are designated Conservancy.

Existing and Potential Public Access

The Nooksack Management Area (WRIA1) contains 1,293 acres of shoreline jurisdiction with 21 acres of National Forest land along the south fork of the Nooksack River; nearly the entire shoreline jurisdiction is considered forest, parks and open space. The area is undeveloped and not populated and both trail and vehicular access is limited in this management unit. No additional existing or planned public access opportunities have been identified.

4.3.11 Management Unit 11- Stillaguamish Watershed

The Stillaguamish River Management Unit is located in the south-central part of Skagit County and covers 3,627 acres of shoreline over 69.5 miles of river and stream within shoreline jurisdiction (Table 14) and 9.2 miles of lake shoreline (Table 15) (Figure 12). The area of the North Fork Stillaguamish is primarily undeveloped, and the majority of the shorelines are covered by evergreen forest. Forty-four percent of the management unit is in public ownership. The three branches of the North Fork Stillaguamish and a majority of the North Fork are located in the Mount Baker National Forest. The eastern part of Deer Creek, as well as Higgins Creek and a portion of Little Deer Creek, are also located in the Mount Baker National Forest. A general description of the features of the Stillaguamish Management Unit is presented in Table 5.

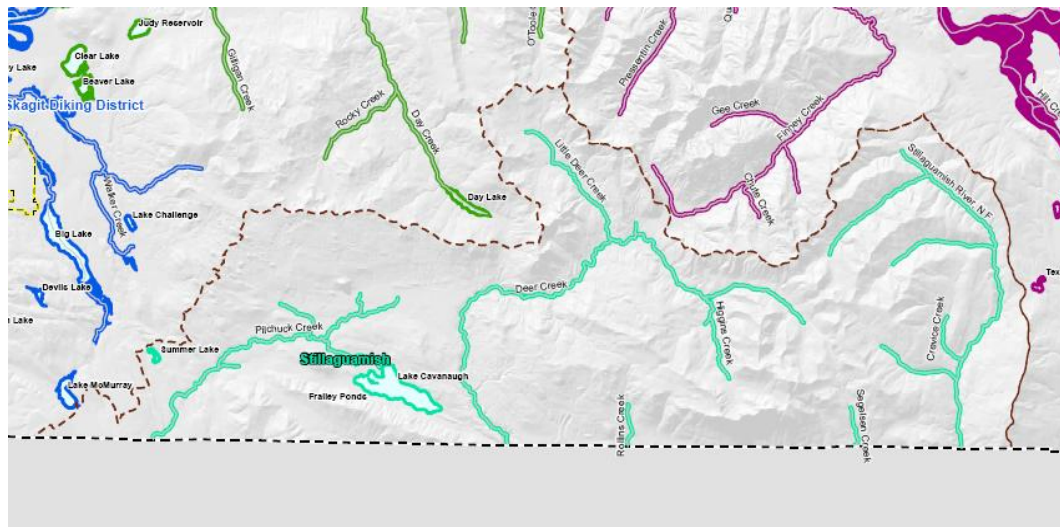


Figure 12. Map of Management Unit 11- Stillaguamish Watershed (WRIA 11)

Table 14. Rivers and Streams in Shoreline Jurisdiction in Management Unit 11- Stillaguamish Watershed

Stream/River Name	Stream/River length (miles)
Bear Creek	3.8
Crane Creek	0.7
Crevice Creek	1.7
Deer Creek	19.4
Lake Creek	2.4
Little Deer Creek	4.8
Pilchuck Creek	11.5
Rollins Creek	1.4
Segelsen Creek	1.3
Stillaguamish River - North Fork	21.2

Table 15. Lakes in Shoreline Jurisdiction in Management Unit 11- Stillaguamish Watershed

Lake Name	Lake Area (acres)	Shoreline Length (miles)
Lake Cavanaugh	832.6	7.9
Sumner Lake	21.7	1.3

Critical Areas

Several priority species occur in the shorelines of the Stillaguamish management unit, including marbled murrelet, northern goshawk, bald eagle, spotted owl, and tailed frog. The NWI identifies 4.1% of the shoreline area as wetlands. Steep slopes cover another 3.6% of the shoreline. Only 2 percent of the shoreline area is within the mapped floodplain.

Current Land Use

Nearly all of the areas of these creeks, lakes, and rivers are undeveloped, with the exception of Pilchuck Creek and Lake Cavanaugh. Residential development surrounds Lake Cavanaugh. Although the majority of Pilchuck Creek is undeveloped, there are small pockets of residential and resource production uses within the shoreline jurisdiction of this creek.

Water-Oriented Uses

As there is little development in this management unit, the only water-oriented uses are those associated with recreational use such as hiking trails and outdoor recreation. These uses would be considered water-enjoyment uses.

Future Land Use

Since there is little developed land in the Stillaguamish Management Area, most of the land here is designated OSRSI (the land located inside the Mount Baker National Forest) or IF-NRL. However, the residentially developed lands around Lake Cavanaugh are designated RVR and RRv.

Existing Shoreline Designations

The existing shoreline areas in this management unit which are federally owned (Mount Baker National Forest) are designated as Natural. Areas outside of federal ownership, located near the Skagit-Snohomish County line, is designated as Conservancy. This same pattern applies to Deer Creek and Little Deer Creek; the designation for the portion of Deer Creek outside of the park is Conservancy. Finally, Pilchuck and Lake Creeks are also designated Conservancy. Lake Cavanaugh, however, has a shoreline that is designated Rural Residential.

Existing and Potential Public Access

The Stillaguamish Management Area (WRIA 5) contains 3,627 acres of shoreline jurisdiction with 423 acres of National Forest land along Deer Creek and 80 acres along Crevice Creek; most of the shoreline jurisdiction is considered forest, parks and open space. The primary water access features in this management unit are mostly private docks – over 420 were identified. There is one public boat launch on Lake Cavanaugh. Limited public access opportunity exists along Lake Cavanaugh as most of this shoreline is developed with residential use and privately owned. No planned public shoreline access projects were identified in this management unit.

5 REACH-SCALE FUNCTIONS AND PROCESSES

A GIS-based quantitative method was developed to characterize the relative performance of relevant watershed ecological processes and functions by shoreline reach (delineated based on function and land use), as outlined in WAC 173-26-201(3)(d)(i). The assessment used the available information gathered as part of the Shoreline Inventory and applied a standardized ranking criterion for each independent shoreline reach to provide a consistent methodological treatment among reaches for comparison purposes. These numerical results will ensure consistent and well-documented treatment of all reaches when assigning existing ecological function and reduce observer bias associated with the subjective assignment of ecological value. The numerical results are intended to complement the inventory information in Chapters 3 and 4 and the brief narrative discussions developed using the available data. Functional scores should not be viewed as an absolute measure of existing ecological function.

5.1 Functional Evaluation Approach, Rationale and Limitations

5.1.1 Reach Delineation

In order to assess shoreline functions at a local scale, the eleven management units within the county were broken into discrete reaches based on a review of maps and aerial photography. The following criteria were used to determine reach break locations for marine, riverine/estuarine, and lacustrine shorelines. Land use (e.g., adjacent land use patterns, shoreline uses, vegetation coverage, and shoreline modifications) was weighted heavily in determining reach break locations in recognition that the intensity and type of land use will affect shoreline ecological conditions. Furthermore, functional analysis outcomes will be more relevant for future determination of appropriate shoreline environment designations if the reach breaks occur at likely transition points in environment designations. In addition to land use, physical drivers of shoreline processes were used to establish an overall framework for determining reach break locations. In the marine environment, marine shoreform and drift cell boundaries were used to help assess the scale of landscape processes and designate reach boundaries. In the freshwater environment, tributary confluences and geomorphological changes were used.

Table 16. Criteria for Determining Reach Breaks

Factors weighed in determining reach break location	Marine ⁴	Riverine/Estuarine ⁵	Lacustrine ⁶
1	Changes in land use ¹ (consideration to overwater structures)	Changes in land use ¹	Changes in land use ¹
2	Changes in armoring	Changes in vegetation (coverage and type)	Stream/River confluences
3	Changes in shoreform	Changes in channel confinement and upland topography	Significant wetland areas ²
4	Drift cell breaks	Tributary confluences ³	Changes in topography
5	Changes in vegetation	Artificial barriers (levees, dikes)	Changes in vegetation (coverage and type)
6	Significant wetland areas ²	Changes in slope	

1. Reach breaks were generally identified at the nearest parcel boundary, except with large parcels, where physical or ecological factors changed notably within a single parcel.
2. In general, reach breaks were positioned to avoid dividing large wetlands.
3. Reach breaks typically occurred at tributary confluences. The position of the reach break depended on the size of the tributary and its effect on physical processes in the receiving water. For example, a tributary mouth was designated as its own reach for a large tributary with a significant effect on the receiving channel's properties (Figure 13). In the case of a small tributary with lesser physical influences on the receiving water, the tributary mouth was not considered as a reach.
4. Small (~100 acres or less), uninhabited islands, under similar land use, and within 3 km of each other were grouped together into a single reach.
5. Islands and landforms with predominantly emergent vegetation coverage in the Skagit River delta were grouped into a single reach because these landforms are expected to be somewhat transient, shifting over time.
6. Undeveloped lakes, under the same ownership and management (i.e. Forest Service or National Parks Service), and not adjacent to a shoreline stream, were grouped into a single reach.

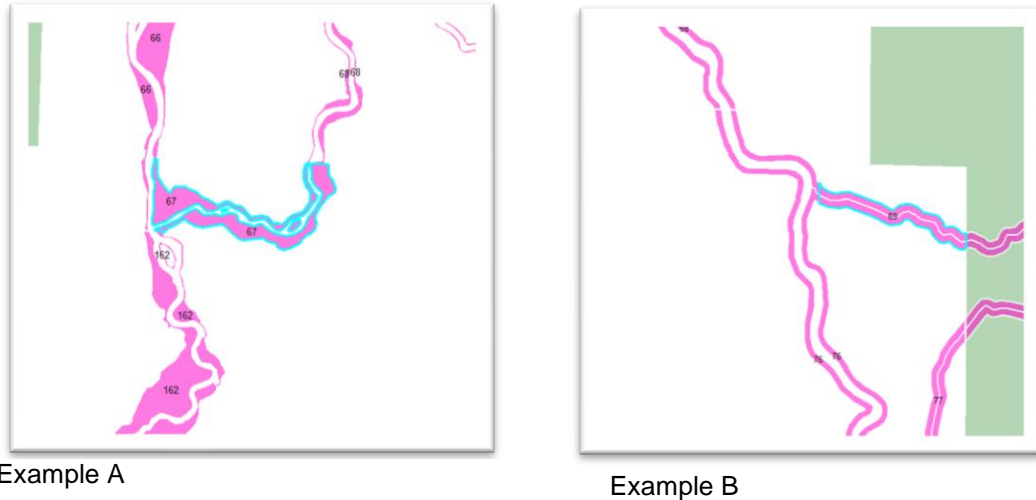


Figure 13. Example tributary mouth reach determinations. Example A shows a large tributary confluence, where the creek mouth formed a reach of its own. Example B is a smaller tributary where creek mouth was not a distinct reach within the receiving water.

The total number of reach breaks by management unit is described in Table 17. Maps of reach breaks throughout the county are provided in Appendix D.

Table 17. Summary of Reaches per Management Unit

Management Unit	Number of Reaches
1- Samish Bay	8
2- Samish Island, Padilla Bay, and East Side Swinomish Channel	21
3- Swinomish Tribal Reservation	22
4- Fidalgo Island and Other Islands	55
5- Skagit Bay/Delta	39
6- Lower Skagit Diking Districts	48
7- Samish River	32
8- Middle Skagit River	46
9- Upper Skagit River	157
10- Nooksack Watershed	6
11- Stillaguamish Watershed	24

5.1.2 Functions and Impairments

The analysis of reach functions was based on the four major function categories identified in the Department of Ecology’s guidelines: hydrologic, hyporheic, shoreline vegetation, and habitat. The four primary functional categories were

further broken down into relevant functions which were used to evaluate reach performance:

Ecological Functions
<p>1. Hydrologic Functions</p> <ul style="list-style-type: none"> • Erosion processes • Transport of water and sediment • Attenuating flow/wave energy <li style="padding-left: 20px;">Riverine only: • Developing pools, riffles, and gravel bars
<p>2. Hyporheic Functions</p> <ul style="list-style-type: none"> • Removing excess nutrients and toxic compounds • Water storage and maintenance of base flows • Support of vegetation • Sediment storage and maintenance of base flows
<p>3. Vegetative Functions</p> <ul style="list-style-type: none"> • Temperature regulation • Provision of LWD and other organic matter • Filtering excess nutrients, fine sediment, and toxic substances • Slowing riverbank erosion; bank stabilization • Attenuating flow/wave energy
<p>4. Habitat Functions</p> <ul style="list-style-type: none"> • Wetland and riparian habitat • Physical space and conditions for life history <ul style="list-style-type: none"> • Priority habitat regions and species • Food production and delivery <ul style="list-style-type: none"> • Shoreline vegetation • Terrestrial subsidies to the aquatic environment

Hyporheic functions are generally dependent on directional flow, and therefore, hyporheic functions are less meaningful in lake and marine environments. For these reasons, hyporheic functions were not evaluated for lake or marine environments. Estuarine channels were evaluated with riverine processes because of their shared directional flow characteristics (unidirectional for riverine, bidirectional for estuarine).

The available information gathered County-wide in the Shoreline Inventory was used to determine the performance and relative rank score of these functions. Assessment of each function using this approach is based upon quantitative data results derived from the GIS inventory information described in Chapter 3.

For each of the parameters used in the function assessment, the quantitative data was sorted into five categories, with 1 representing “low” function and 5 representing “high” function (e.g., vegetation coverage 0-5% = 1, >5-25% = 2, >25-50% = 3, >50-75=4, and >75% = 5). The sorting of quantitative data into scoring categories was based on best professional judgment related to known impacts of different parameters. Tables 18 and 19 provide a description of the metrics and how each data layer contributed to each functional score; a full list of scores for each function is provided in Appendix E.

Once scores were assigned to each function, they were averaged for each of the four major functional categories. The mean of each major function was calculated to provide a simple standardized tool useful for inter-reach functional comparison. The functional score is derived from a standardized numerical process that formalizes and enables a basis for comparison of ecological functions among reaches.

Table 18. Summary of Functional Scoring Approach

Category	Data	Hydrologic			Hyporheic (Riverine Only)					Habitat					Vegetative				
		Production of sediment	Transport of sediment and water	Wave and/or flow attenuation	Development of pools, riffles, gravel bars (riverine only)	Remove excess nutrients and toxic compounds	Water storage	Support of vegetation	Sediment storage and maintenance of base flows	Estuary/wetland/riparian habitat	Shoreline vegetation	Direct shoreline alterations	Alteration to shoreline inputs	Priority habitats/species (Physical Space and conditions for Life History)	Shade (temperature regulation)	Large wood and organic debris	Remove excess nutrients and toxic compounds	Shoreline soil stabilization	Wave attenuation
Method to summarize metrics into a functional score		If armoring=1, then 1, otherwise use average of all applicable scores			If conifer=1, then 1, otherwise average	Average of metrics				Max value	Value	Average of scores			Value	Average of scores			If armoring=1, then 1, otherwise average
Floodplain	% Area			X (riverine)		X	X	X	X						X		x		
Area of wetlands	% Area									X									
Priority habitat - regions	% Area														X				
Priority species- Terrestrial	#/reach														X				
Priority species- Aquatic, Marine	# of spp. (within 500ft)/reach														X				
Priority species- Aquatic, Riverine/Lake	# (within 500ft)/reach														X				
Forage fish spawning beach (marine)	% Length																		
Length of armoring - marine, riverine (extent of data coverage only)	% Length	X	X (marine)	X	X				X			X	X				x		x
Overwater structures- Riverine	Y/N											X							
Overwater structures - lake	#/shoreline length (mile)											X							
Overwater structures - marine	#/shoreline length (mile)											X							
Vegetation - total vegetation not including developed, cultivated, or bare	% Area			% within floodplain (riverine)		% within floodplain					X		X		X		x		% within floodplain (riverine)
Marine vegetation - seagrass/kelp/dune grass/salt marsh	% continuous														X				
Marine vegetation - wave attenuation	Presence/absence within 500'			X															x

Category	Data	Hydrologic			Hyporheic (Riverine Only)					Habitat					Vegetative				
		Production of sediment	Transport of sediment and water	Wave and/or flow attenuation	Development of pools, riffles, gravel bars (riverine only)	Remove excess nutrients and toxic compounds	Water storage	Support of vegetation	Sediment storage and maintenance of base flows	Estuary/wetland/riparian habitat	Shoreline vegetation	Direct shoreline alterations	Alteration to shoreline inputs	Priority habitats/species (Physical Space and conditions for Life History)	Shade (temperature regulation)	Large wood and organic debris	Remove excess nutrients and toxic compounds	Shoreline soil stabilization	Wave attenuation
Method to summarize metrics into a functional score		If armoring=1, then 1, otherwise use average of all applicable scores			If conifer=1, then 1, otherwise average	Average of metrics				Max value	Value	Average of scores			Value	Average of scores			If armoring=1, then 1, otherwise average
Tide gate	#/shoreline length (mile)		X (marine)																
Floodway	% Area																		
303d listings - by Category 5,4,2,1	Highest category in reach					X													
Feeder bluffs (marine)	% Length	X																	
Vegetation -%conifer	% Area				X														
Soils - Highly Erodible	% Area				X (reverse scoring)	X													
Soils- Slightly Erodible	% Area					X													
Soils - Available Water Supply	Average AWS							X											
Soils - Forest Productivity Index	Cubic ft/Acre/Yr								X										
Geology- Quaternary alluvium and Quaternary younger alluvium	% Area																		
Vegetation - upland (tree/forest cover)	% Area																		X
Slope <15%	% Area		X (Reverse scoring-riverine)																X
Soils - severe erodability	% Area	X (riverine/lake)			X (reverse scoring)														X
Soils-slight erodibility	% Area																		
Vegetation - % tree/shrub	% Area	X								X									X
Slope >40%	% Area	X (riverine/lake)																	

Table 19. Functional Score Ranking by Indicator Metric

Indicator Metric	Unit of Measure	Ranking score				
		1	2	3	4	5
Floodplain	% Area	0-5	5-25	25-50	50-75	75-100
Area of wetlands	% Area	0-5	5-25	25-50	50-75	75-100
Priority habitat - regions	% Area	0-5	5-25	25-50	50-75	75-100
Priority species- Terrestrial	#/reach	0	NA	0-1	1-3	3-4
Priority species- Aquatic, Marine	# of spp. (within 500ft)/reach	0	0-1	1-2	2-4	4+
Priority species- Aquatic, Riverine/Lake	# (within 500ft)/reach	0-1	2-3	4-5	6-7	8+
Forage fish spawning beach (marine)	% Length	0-5	5-25	25-50	50-75	75-100
Length of armoring - marine, riverine (extent of data coverage only)	% Length	70-100	40-70	10-40	5-10	0-5
Overwater structures- Riverine	Y/N	Present	NA	Absent	NA	NA
Overwater structures - lake	#/shoreline length (mile)	50	10-50	5-10	0-5	0
Overwater structures - marine	#/shoreline length (mile)	3+	2-3	1-2	0-1	0
Vegetation - total not including developed, cultivated, or bare	% Area	0-10	10-25	25-50	50-75	75-100
Marine vegetation- seagrass/kelp/dune grass/salt marsh	% Continuous	0-5	5-25	25-50	50-75	75-100
Marine vegetation- wave attenuation	Presence/absence within 500'	None		Eelgrass only		Kelp Present
Tide gate	#/shoreline length (mile)	3+	2-3	0-1	NA	0
Floodway	% Area	0-5	5-25	26-50	50-75	76-100
303d listings - by Category 5,4,2,1	Highest category in reach	5	4	NA	2	1
Feeder bluffs (marine)	% Length	0-20	21-40	41-60	61-80	81-100
Vegetation -%conifer	% Area	0-10	10-25	25-50	50-75	75-100
Soils - Highly Erodible	% Area	80-100	60-80	40-60	20-40	0-20
Soils- Slightly Erodible	% Area	0-20	20-40	40-60	60-80	80-100
Soils - Available Water Supply (AWS)	Average AWS	0-9.38	9.38-14.6	14.6-22.6	22.6-39.3	39.3+
Soils - Forest Productivity Index	Cubic ft/Acre/Yr	0-43	43-100	100-129	129-157	157-187
Geology- Quaternary alluvium and Quaternary younger alluvium	% Area	0-20	21-40	41-60	61-80	81-100
Vegetation - upland	% Area	0-5	5-25	25-50	50-75	75-100

Indicator Metric	Unit of Measure	Ranking score				
		1	2	3	4	5
(tree/forest cover)						
Slope <15%	% Area	0-20	20-40	40-60	60-80	80-100
Soils - sever erodibility	% Area	80-100	60-80	40-60	20-40	0-20
Soils-slight erodibility	% Area	0-20	20-40	40-60	60-80	80-100
Vegetation - % tree/shrub	% Area	0-10	10-25	25-50	50-75	75-100
Slope >40%	% Area	30+	20-30	10-20	5-10	0-5

5.1.3 Limitations

This evaluation was limited by the quality and availability of inventory data. Therefore, limitations presented in Section 4.2 also apply to this evaluation.

The evaluation approach did not take into account that some areas naturally may function “lower” than others, not because of any anthropogenic alteration or natural disturbance, but simply because of the combined effects of a particular locale’s geology, aspect, or topography. For example, this evaluation approach considers forest to be the ideal condition, but some areas are naturally not suited for forest. Many functions operate “better” in this evaluation approach when there is a floodplain to capture sediments or store water, but there are a number of drainages in steep areas that do not have floodplains. Therefore, because of the inherent differences in functions and processes among different management units, the functional assessment scores should not be used to compare functions at a management unit scale. Rather, for comparison of individual reaches within management units, average scores for functional categories generally correspond with the intuitive hypothesis that the more highly developed areas score lower than areas that are generally less altered or protected under public ownership and established management plans. In evaluating shoreline functions, the area of shoreline impacts and conditions assessed was generally limited to the area of shoreline jurisdiction. In many cases, shoreline impacts may occur at a site due to ecological and geomorphological processes that are disturbed at a remote site upstream, further inland, or up-current. This evaluation approach may not identify all of the functional responses occurring as a result of impacts to nearby or remote areas.

The approach was limited to an evaluation of shoreline ecological potential, and it did not integrate this potential with the opportunity to perform a given function based on site-specific conditions. For example, the analysis assessed the

ability of a shoreline to store water, but it did not consider the frequency of flooding downstream and the corresponding significance of such a function.

The ordinary high water mark used in the analysis is not an accurate, surveyed line; therefore, it occasionally is located waterward of the actual ordinary high water mark. Accordingly, vegetation mapping occasionally notes that the vegetation type is “Water.” For those segments that have a significant portion of water as a vegetation type, the segment score was skewed downward.

5.2 Management Unit Functional Evaluation

5.2.1 Samish Bay

Functional Analysis

The functional analysis of Samish Bay shoreline was evaluated based on eight distinct reaches (Table 20, see map in Appendix D). Functional scores tended to be higher toward the northern end of the management unit, and these higher scores were primarily driven by higher forest cover and lower levels of armoring. Observed differences were also a reflection of differences in land use, since the northern shoreline is dominated by forestry uses, whereas the southern portion of the management unit is predominantly in agricultural use. Water quality is impaired by fecal coliform bacteria in the southern reaches of the management unit. A TMDL was prepared to address fecal coliform levels in Samish Bay in 2009 (Ecology 2009). Additionally, dissolved oxygen and pH are impaired along several unnamed tributaries and Edison Slough (Ecology, Electronic source).

Table 20. Reach Functional Analysis Scores for Management Unit 1- Samish Bay

Waterbody	Reach Number	Hydrologic	Vegetation	Habitat
Puget Sound- Samish Bay	1	3.7	3.5	3.8
	2	3.1	2.7	3.3
	3	3.8	3.6	3.7
	4	2.7	2.6	2.6
	5	2.3	2.3	2.1
	6	2.7	2.8	3.6
	7	2.3	2.5	2.2
	8	2.3	2.3	2.1

Potential Restoration Opportunities

The evaluation results suggest that the ecological function of the southern Samish Bay shoreline would benefit from efforts to restore marine riparian

vegetation and reduce shoreline armoring impacts. Diking along the shorelines may limit the extent and quality of shoreline habitat available, particularly during flood tides. The Puget Sound Action Team identified dike removal as a significant action for restoring habitat in the Samish River and Samish Bay (PSAT 2005). Riparian restoration would improve shoreline habitat functions, and vegetation along the shoreline could help filter bacterial contaminants before reaching the sound. If fecal coliform bacteria originate from agricultural sources, agricultural best management practices to control runoff could improve water quality. Shoreline protection efforts would be most effective where riparian vegetation exists with little armoring, particularly in the northern reaches. A shoreline assessment of northern Skagit County bays and shoreline habitats also identified the northern shoreline of Samish Bay ranked highly as a conservation priority (People for Puget Sound 2006). A summary of restoration opportunities identified throughout the management unit is provided in Table 21.

Table 21. Restoration Opportunities in Management Unit 1- Samish Bay

SMP ID # Water Name	Identified From/ Source ID #	Project Name/Description	Project Status
SB-1 Samish Bay	PSAT 2005	Remove agricultural dikes where feasible: Remove agricultural dikes, where feasible to support rearing and foraging opportunities for juvenile Chinook salmon	Conceptual
SB-2 Samish Bay	People for Puget Sound 2006	Protect habitat from north County line to outlet of Harrison Creek (McElroy Slough): Conserve area, which ranked highly for forage fish, juvenile salmon, and marine bird habitat.	Conceptual

5.2.2 Samish Island, Padilla Bay, and East Side of Swinomish Channel

Functional Analysis

Management unit 2 was divided into 21 distinct reaches for functional analysis (Table 22, see map in Appendix D). Shoreline vegetation and armoring were the two primary factors differentiating shoreline functions within the management unit. Overall, shorelines in the management unit have minimal forested vegetation, with the notable exception of the western shorelines of Samish Island.

Water quality in Indian Slough is impaired by dissolved oxygen and fecal coliform bacteria, and water quality impairment is likely associated with surrounding land uses. The majority of the shorelines in the management unit are also armored with either dikes or bulkheads, except some areas on Samish Island (reaches 10, 14, 15, 17) and select shorelines on the eastern side of Padilla Bay just north of Bayview State Park (reaches 20 and 21).

Table 22. Reach Functional Analysis Scores for Management Unit 2- Samish Island, Padilla Bay, and East Side of Swinomish Channel

Waterbody	Reach Number	Hydrologic	Vegetation	Habitat
Puget Sound- Samish Island	9	1.0	1.9	1.8
	10	3.8	3.3	3.6
	11	3.2	2.5	2.7
	12	2.8	2.9	3.4
	13	1.0	2.2	2.4
	14	3.3	3.4	3.5
	15	4.4	3.9	3.9
	16	3.3	2.7	2.8
	17	4.4	3.4	3.5
Puget Sound- Padilla Bay	18	3.2	2.6	2.7
	19	2.3	2.4	2.5
	20	4.3	3.6	3.8
	21	3.7	2.6	2.8
	24	3.1	2.8	3.2
	25	2.8	3.2	3.3
Puget Sound- Indian Slough	22	1.9	2.3	1.9
	23	1.0	2.0	2.2
Swinomish Channel	26	2.8	2.9	2.7
	28	1.0	1.9	1.9
	29	1.0	2.0	2.7
Telegraph Slough	27	2.8	3.2	3.2

Assessments from Other Studies

The Skagit River Council Strategic Application ranked Padilla Bay as 77% degraded. The low score was caused by degraded riparian buffer widths (77% of WAU with impaired riparian buffers) and a high proportion of isolated and blocked fish habitats (Beamer et al. 2000). The Strategic Application document identifies a network of channels that once provided fish habitat connectivity between the Skagit River Delta and Padilla Bay and the Swinomish Channel. These connections are now isolated from anadromous fish use by tide gates, dikes, and other barriers (Beamer et al. 2000).

Potential Restoration Opportunities

Based on the analysis, opportunities for restoration in the management unit include improving riparian vegetation and removing or reducing the impacts of shoreline armoring. Reducing shoreline armoring would allow for increased habitat and hydrologic connectivity, particularly at the southern end of Padilla Bay and Telegraph Slough, where dikes now isolate Padilla Bay from the Skagit River delta. Historically, tidal channels connecting the Skagit delta to Padilla Bay allowed delta rearing Chinook salmon from the Skagit River to access and utilize habitat in Padilla Bay. Today, those connections have been lost due to diking and development. The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) emphasizes process based restoration in order to restore functions to the Skagit nearshore. Actions to restore connectivity between Padilla Bay and the Skagit River and to reduce diking impacts along the southern shoreline of Padilla Bay would restore fundamental processes that improve juvenile salmonid rearing opportunities (PSAT 2005).

The west end of Samish Island and the area north of Bayview State Park provide opportunities for conservation of shoreline processes and functions. A rapid inventory assessment of Samish Island was completed to assess conditions and identify conservation and restoration priorities (People for Puget Sound 2002). Based on the analysis, the areas highlighted for conservation were Scott’s Point, points northwest of Wharf Road, points north and east of Samish Point, and several areas along Samish Island Road. The areas prioritized for restoration were Scott Road, west Samish Beach, points north and east of Samish Point, and a few areas along Samish Island Road. Three general areas of focus for combined conservation and restoration consideration were recommended based on these scores and local knowledge of Samish Island and the surrounding areas. These areas were: 1) The Samish Point area; 2) The Wharf Road area, and; 3) The Scott Road area (People for Puget Sound 2002). A broader survey of Northern Skagit County bays and shorelines identified similar priorities along Samish Island, as well as conservation and restoration opportunities near Bayview State Park (People for Puget Sound 2006).

A summary of restoration opportunities in Management Unit 2 is provided in Table 23.

Table 23. Restoration Opportunities in Management Unit 2- Samish Island, Padilla Bay, and east side Swinomish Channel

SMP ID	Source	Project Description	Project Status
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PB-1 Telegraph Slough	SRSC and WDFW 2005; PSAT 2005; WRIA3/4 3- year work plan, 2010	Telegraph-Phase 2 (11.04.02): Following restoration actions described in Telegraph Slough Phase 1 to restore approximately 90 hectares of marsh, this Phase 2 project will re-establish connectivity and estuarine marsh habitat through the historic footprint of the former Telegraph Slough corridor. This project will necessitate concurrence from the WSDOT and local landowners.	Concept, Feasibility Pending
PB-2 Padilla Bay	PSAT 2005	Remove agricultural dikes in Southern Padilla Bay: Remove agricultural dikes, where feasible to support rearing and foraging opportunities for juvenile Chinook salmon. This would require concurrence from the diking district(s) and affected landowners.	Conceptual
PB-3 Padilla Bay	PSAT 2005	Continue to remove Spartina colonies: Remove spartina to improve native vegetation cover and habitat	Ongoing
PB-4 Padilla Bay	People for Puget Sound 2006	Conservation and restoration around Bayview State Park shoreline: Conserve area north of Bayview State Park for marine bird and juvenile salmon habitat. Restore the Bayview shoreline for forage fish and marine bird habitat.	Conceptual
SI-1 Samish Island	People for Puget Sound 2006	Conservation on Samish Island: Work with landowners to conserve Freestad Lake on the northeast side of Samish Island. Conserve northwest point of Samish Island and Camp Kirby on the southwest end of Samish Island.	Conceptual
SI-2 Samish Island	People for Puget Sound 2006	Restore Samish Island shoreline: Restore aquatic vegetation, forage fish, salmon, and marine bird habitat at the northeast point and north shore of Samish Island, and Alice Bay, on the southeast end of Samish Island. This would require concurrence from affected landowners.	Conceptual

5.2.3 Swinomish Tribal Reservation

Functional Analysis

The Swinomish Tribal Reservation Management Unit was divided into 22 shoreline reaches (Table 24, see map in Appendix D). Shoreline functions on the western side of the Swinomish Tribal Reservation (Reaches 31-42), including the

islands, were generally high to moderate due to low levels of armoring and well vegetated shorelines. High proportions of armoring along the Swinomish Channel (reaches 43-48) resulted in lower hydrologic functions and lower scores overall. In particular, Shelter Bay (reach 43), characterized by armoring and extensive overwater structures, and reach 46 along the west side of the Swinomish Channel, which has extensively armored banks and minimal forested vegetation, had low hydrologic, habitat, and vegetative scores. Among the Swinomish Channel reaches, overall vegetation coverage is moderate; however, forested vegetation is limited, reducing the potential for shoreline shading and the recruitment of organic debris.

Table 24. Reach Functional Analysis Scores for Management Unit 3- Swinomish Tribal Reservation

Waterbody	Reach Number	Hydrologic	Vegetation	Habitat
Puget Sound- Turners Bay	30	4.1	3.1	2.6
	31	4.8	4.4	4.4
Puget Sound- Fidalgo Island	32	4.6	4.7	4.3
	33	3.6	3.6	3.3
	36	3.3	3.1	2.5
	37	4.3	4.0	3.3
	39	2.9	2.5	2.5
	40	4.7	3.9	3.8
	41	4.2	2.9	3.3
	42	4.4	3.5	3.7
Puget Sound- Kiket Island	34	4.4	4.0	4.0
Puget Sound- Skagit Island	35	4.2	4.3	4.3
Puget Sound- Hope Island	38	4.4	4.3	4.7
Swinomish Channel- Fidalgo Island	43	1.0	1.9	1.8
	44	3.2	2.5	2.0
	45	3.7	2.9	2.9
	46	1.0	2.1	2.5
	47	3.4	3.5	3.6
	48	1.0	2.7	2.9
Puget Sound - Small Islands	49	4.1	3.5	3.8
	51	2.6	2.4	3.1
Puget Sound- Goat Island	50	4.3	3.7	3.9

Assessments from Other Studies

The Skagit Watershed Council Strategic Application identified several barriers to fish passage, creating tidal channels that are isolated from anadromous fish access on the west side of the Swinomish Channel (Beamer et al. 2000).

Potential Restoration Opportunities

Overall, opportunities for shoreline enhancement, particularly along the Swinomish channel, include the removal of shoreline armoring and planting of native tree species. Conservation of shoreline functions along the western side of the management unit will allow for continued shoreline functions there.

The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) emphasizes an approach to nearshore restoration that is based on restoring processes, including longshore sediment erosion, transport, and deposition; tidal erosion; tidal range, volume, and bathymetry; fluvial deposition; freshwater inflow and estuarine mixing; and water and sediment quality. The restoration of pocket estuaries, particularly those with a high level of connectivity with the Skagit River delta, is also prioritized in the Plan (SRSC and WDFW 2005). Proposed restoration projects from the Skagit Chinook Recovery Plans, as well as projects proposed more recently, are described below in Table 25.

Table 25. Restoration Opportunities in Management Unit 3- Swinomish Tribal Reservation

SMP ID	Source	Project Description	Project Status
ST-1 Skagit Bay/ Similk Bay	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Kiket Island Conservation Acquisition (07.056.01): This acquisition protects important Skagit River delta marine riparian habitat for endangered salmon and provide public shoreline access for passive recreation and environmental education. Protecting Kiket from development will benefit diverse nearshore habitat including feeder bluffs, forage fish spawning habitat, and kelp & eelgrass that support salmon, steelhead, and bull trout. A high functioning pocket estuary fed by freshwater seeps through a scrub-shrub wetland offers important habitat to juvenile salmonids and numerous waterfowl and shorebirds. Marine riparian forested uplands with old growth trees shade the Kiket beaches. Seattle City Light owned the property in the 1970's with plans to build a nuclear power plant.	Acquired. Co-managed by State Parks and the Swinomish Tribe.
ST- 2 Swinomish Channel	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Swinomish Channel Fill Removal (11.03.11): This project is intended to restore approximately 0.85 acres of tidal marsh adjacent to the Swinomish Channel on the Swinomish Indian Tribal Community reservation and 1.6 acres of tidal marsh on	Feasibility Completed

SMP ID	Source	Project Description	Project Status
		<p>Tribal property on the McGlenn Island causeway by removing fill material from past Swinomish Channel dredging activities to allow tidal inundation. One tidal channel on each site will be excavated for a total of approximately 580 feet of tidal channel, each with a width of 3-6 feet and depth of 3-4 feet. Restored tidal channel sites will be planted with native tidal marsh plant species currently found to be dominating small marsh remnants fringing the Swinomish Channel. A baseline study of elevation distributions of native marsh vegetation along the Swinomish Channel was used to determine the design elevation of the restoration sites.</p>	
<p>ST-3 Turner's Bay (Skagit Bay)</p>	<p>SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010</p>	<p>Turner Bay Lagoon (12.03.03): The objective of the Turner Bay Lagoon project are to: 1) Restore connectivity for the upper marsh area by removing road fill. 2) Address water quality and ditching in the headwater wetlands. 3) Protect existing sediment source beaches in the adjacent drift cell. The project would require the concurrence of the affected landowners.</p>	<p>Design Completed</p>
<p>ST-4 SneeOosh Lagoon (Skagit Bay)</p>	<p>SRSC and WDFW 2005</p>	<p>SneeOosh Lagoon (12.03.06): The objectives of the SneeOosh Lagoon project are to:</p> <ul style="list-style-type: none"> • Restore intertidal pocket estuary habitat by removing fill and creating a new outlet channel. • Protect and restore sediment source beaches in the adjacent drift cell that historically maintained the lagoon spit. • Address water quality issues related to the sewer pump station in the isolated marsh. 	<p>Concept – Feasibility Pending</p>
<p>ST-5 Kiket Lagoon</p>	<p>SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010</p>	<p>Kiket Lagoon (12.03.07): The objectives of the Kiket Lagoon project are to:</p> <ul style="list-style-type: none"> • Restore intertidal pocket estuary habitat by removing fill and bank armoring. • Protect and restore sediment source beaches in the adjacent drift cells that historically maintained the lagoon spit and tombolo (a deposition landform in which an island is attached to the mainland by a narrow piece of land such as a spit or bar). 	<p>Concept</p>

SMP ID	Source	Project Description	Project Status
ST-6 Swinomish Channel and floodplain channels	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Smokehouse- Phase 2 (11.04.03): Phase 1 of this project opened the Smokehouse Floodplain to fish access. This project will set back levees through key areas of the Smokehouse Floodplain, expanding emergent marsh communities and associated blind channel networks.	Feasibility/ Design/Permitting

5.2.4 Fidalgo Island and Other Islands

Functional Analysis

This management unit was divided into 55 reaches for functional analysis (Table 26, see map in Appendix D). Island shorelines with minimal development (reaches 52-79) scored highly for hydrologic, habitat, and vegetative functions. Steep slopes and erosive soils along many of the island shorelines limit vegetative capacity to filter out nutrients and contaminants and to stabilize shorelines; however, these same characteristics allow feeder bluff processes to recruit fine sediment to the nearshore.

The lowest scores in the management unit occur at March's Point (reaches 80-84). Hydrologic scores are lowered by shoreline modifications, including armoring and overwater structures. Overall vegetation coverage is moderate to high on the eastern side of March's Point, but forested vegetation is largely lacking along the shoreline. The extent of industrial development on March's Point, and the lack of vegetation along much of the shoreline are likely related to water quality impairments for polycyclic aromatic hydrocarbons (PAHs) in the vicinity. Well-vegetated wetlands on the eastern shoreline of March's Point (reaches 81 and 83) provide habitat functions; however, connectivity between the wetland and the nearshore is severely limited by armoring at the cusp of March's Point.

Among the remainder of reaches along Fidalgo Island (reaches 87-97), the reaches along the northern shoreline (reaches 87-92) scored highly for each of the functional categories. These shorelines are characterized by a lack of shoreline modifications and abundant forested vegetation. On the other hand, reaches to the south (reaches 93-96), scored somewhat lower, primarily because of armoring and patchy vegetation coverage.

Lake Erie, Lake Campbell, and Pass Lake (reaches 98-104) had relatively high functional scores across the functional categories; lower vegetative scores,

particularly for functions dependent on forested vegetation, occurred on the eastern, developed portion of Lake Campbell (reaches 101-103). Overwater structures in developed areas of Lakes Campbell and Erie also affect habitat functions (reaches 98, 101-103). Lakes Campbell and Erie are impaired (Category 4C) by the presence of invasive exotic species.

The small islands that comprise reaches 105 and 106, although unaltered by human disturbance, are so small that they do not naturally support significant vegetation, resulting in low vegetative and habitat scores.

Table 26. Reach Functional Analysis Scores for Management Unit 4- Fidalgo Island and Other Islands

Waterbody	Reach Number	Hydrologic	Vegetation	Habitat
Puget Sound- Sinclair Island	52	4.4	3.9	4.2
	53	4.4	4.2	4.3
	54	4.6	4.3	4.4
	55	4.3	4.0	4.4
Puget Sound- Vendovi Island	56	4.4	4.1	4.5
Puget Sound - Small Islands	57	4.2	3.8	4.2
	58	4.1	3.6	4.0
	59	4.4	4.5	4.5
Puget Sound- Cypress Island	60	4.2	4.2	4.3
	61	4.6	4.2	4.4
	62	4.6	4.3	4.2
	63	4.4	3.9	3.7
	64	3.9	3.9	4.0
	65	4.5	4.4	4.3
	66	4.8	4.1	4.1
67	4.2	4.2	4.3	
Puget Sound - Small Islands	68	4.2	4.1	4.3
Puget Sound- Guemes Island	69	4.2	4.1	4.1
	70	3.9	3.9	4.3
	71	4.4	4.2	4.7
	72	4.7	3.9	4.2
	73	3.8	3.5	3.7
	74	4.3	4.2	4.4
	75	4.9	4.2	4.4
	76	3.9	3.5	2.9
77	4.6	3.8	3.7	
Puget Sound- Hat Island	78	4.4	4.0	4.3
Puget Sound - Small Islands	79	3.8	2.5	3.1
Puget Sound- March's Point	80	2.8	2.7	2.9
	81	2.2	2.6	3.6

Waterbody	Reach Number	Hydrologic	Vegetation	Habitat
	82	3.9	3.2	3.5
	83	3.3	2.8	3.4
	84	3.8	2.7	2.6
Puget Sound- Burrows Island	85	4.2	3.9	4.3
Puget Sound- Allan Island	86	4.4	4.1	4.6
Puget Sound- Fidalgo Island	87	4.8	4.2	4.2
	88	4.6	4.1	3.9
	89	4.4	4.1	4.2
	90	4.3	3.3	3.1
	93	3.6	3.1	3.3
	94	3.4	3.2	3.6
	95	3.7	3.5	3.3
	96	3.1	2.9	3.0
Puget Sound - Islands	97	4.3	3.5	3.4
	91	4.4	3.8	4.1
Lake Erie	92	4.1	3.6	3.2
	98	3.8	3.8	3.5
Lake Campbell	99	3.7	4.3	4.7
	100	4.8	4.4	4.7
	101	4.0	3.5	3.5
	102	2.8	3.0	3.3
Pass Lake	103	3.3	3.2	3.0
Puget Sound - Islands	104	4.0	4.1	4.1
	105	3.4	2.2	3.1
	106	3.8	2.5	2.7

Assessments from Other Studies

Several assessments have been completed for Fidalgo Island for the purpose of identifying conservation and restoration priorities (Antrim et al. 2003, Johannessen and MacLennan 2007, McBride et al. 2006, People for Puget Sound 2001, 2006). A rapid shoreline inventory of March Point on Fidalgo Island identified both protection and restoration needs based on existing conditions (People for Puget Sound 2001). The inventory identified several beach sections containing eelgrass beds and/or potential forage fish spawning habitat that would benefit from protection. The project also identified several opportunities for ecological improvement. These opportunities were based on the following site conditions:

- a substantial length of shoreline (approximately 27%) previously identified as forage fish spawning habitats no longer met spawning habitat criteria;

- nearly half of the existing upland shoreline covered in invasive species;
- the invasive marsh grass, *Spartina*, identified in several sections (14%) of the shoreline;
- failing intertidal structures; and
- outfalls with potential for pollutant discharge.

A geomorphic assessment of March's Point identified the primary sediment sources for the March's Point cusp as eroding low and moderate elevation bluffs southeast of the cusp (Johannessen and MacLennan 2007). Approximately 44% of the length of the sediment source drift cell is modified with short bulkheads (Johannessen and MacLennan 2007). If these sediment sources were restored, the beach at March's Point cusp would likely rebuild slightly, and become more fine-grained. However, development along the shoreline precludes true restoration of the feeder bluff process. Beach nourishment could provide a medium-term approach for habitat enhancement (Johannessen and MacLennan 2007).

A rapid shoreline inventory of Guemes Island (People for Puget Sound 2005) found the Guemes Island shorelines to be relatively intact. Of the surveyed length of shoreline (6.45 miles, with a tendency to oversample public lands), the inventory found a high potential for forage fish spawning habitat (71%) and a relatively low density of shoreline modifications (19%). Guemes Island has a rich diversity of habitat types. Substrates vary from the sandy mud flats of North Beach to the rocky cliffs of Holiday Hideaway. The shoreline supports rich eelgrass beds and kelp forests, which in turn supports a variety of bird and invertebrate life. Based on the analysis, five sites were identified on which to focus conservation efforts. These included:

- Starfish Rock, with 900 ft of high scoring shoreline;
- North Beach, where high bluff areas scored high for conservation, and lowland areas with greater residential development offer restoration potential;
- West Beach, where high bluff areas scored high for conservation;
- Young's Park, which scored high for restoration; and
- Seaway Hollow, which scored high for restoration.

Potential Restoration Opportunities

Results from the functional analysis are largely in accord with past assessments of Fidalgo Island and Guemes Island (Antrim et al. 2003, Johannessen and MacLennan 2007, McBride et al. 2006, People for Puget Sound 2001) (Table 26). Investigation into possible approaches to rehabilitate sediment recruitment and

transport processes on March’s Point through the removal, reconfiguration, or enhancement of armoring is recommended. Studies more specific to March’s Point identified several specific restoration priorities to improve conditions there (Antrim et al. 2003, Johannessen and MacLennan 2007, McBride et al. 2006), and these are included in Table 27, below.

Since shoreline functions are generally strong on Guemes Island, conservation efforts, and accompanying localized restoration where needed, would be worthwhile.

The above referenced studies are generally consistent with the Skagit Chinook Recovery Plan’s focus on process based restoration (e.g., sediment erosion and sediment and water transport processes) in the nearshore ecosystem. The Skagit Chinook Recovery Plan also identified the significance of habitat provided by pocket estuaries to juvenile Chinook salmon during their migration to the ocean (Skagit Watershed Council). A report on habitat and fish use within pocket estuaries identified the Bowman Bay pocket estuary as having significant restoration potential (Beamer et al. 2006).

Table 27. Restoration Opportunities in Management Unit 4- Fidalgo Island and Other Islands

SMP ID	Source	Project Description	Project Status
FI-1 Fidalgo Island	SRSC and WDFW 2005	12.03.11 Similk Beach (12.03.11): The objectives of the Similk Beach project are to: <ul style="list-style-type: none"> • Characterize the restoration potential for this site. • Restore intertidal pocket estuary habitat by removing fill to open up the outlet channel to the marsh, replacing the road fill with a bridge, and constructing channels in the existing golf course wet areas. • Protect and restore sediment source beaches in adjacent drift cell that historically maintained the lagoon spit. 	Feasibility Pending
FI-2 Fidalgo Island	SRSC and WDFW 2005; Beamer et al. 2006	Bowman Bay Pocket Estuary: Wetland creation to expand the existing pocket estuary. The wetland outlet to Bowman Bay, which appears to be fish passable during high tides, could be reconstructed for better fish passage. Some of the mowed lawn area adjacent to the estuary could be	Conceptual

SMP ID	Source	Project Description	Project Status
		excavated to expand the wetland.	
MP-1 March's Point	McBride et al. 2006; People for Puget Sound 2006; Johannessen and MacLennan 2007	East shore of March's Point: In follow-up to the restoration of tidal influence and freshwater sources at Whitmarsh marsh, investigate relocating or removing portions of March's Point Rd landward so that there is a greater setback between the road and the bluff crest.	Conceptual
MP-2 March's Point	McBride et al. 2006; People for Puget Sound 2006; Johannessen and MacLennan 2007	March's Point cusp: Relocate structures and reopen channel at Longshore Lagoon. Plant overhanging vegetation. Beach nourishment to enhance beach habitats on both sides of the March's Point cusp. Bluff restoration actions to enhance coastal processes and habitat conditions along the shores surrounding the cusp and restore sediment processes over the long term.	Conceptual
MP-3 March's Point	McBride et al. 2006; People for Puget Sound 2006	North shore of March's Point: Remove intertidal structures, remove or reconfigure boat ramps. Plant overhanging vegetation to shade upper beach.	Conceptual
MP-4 March's Point	Antrim et al. 2003; McBride et al. 2006; People for Puget Sound 2006; Johannessen and MacLennan 2007	Crandall Spit: Restore sediment sources. Consider removing or replacing dike road with bridge or culvert to restore water circulation in tidal channel and increasing marsh area. Replace the numerous creosoted piles that support the Shell pipeline inside the Crandall Spit salt marsh and adjacent to the tidal channel.	Conceptual
MP-5 March's Point	Antrim et al. 2003; Johannessen and MacLennan 2007	Remove derelict barge dock west of the Tesoro Pier: Remove the structure, which has been out of use for many years and has rock and concrete debris covering the backshore and upper intertidal beach. This action would restore between 70-90 ft of beach and documented surf smelt spawning habitat.	Conceptual
GI-1 Guemes Island	People for Puget Sound 2003	Guemes Island Restoration and Conservation: Focus conservation on the Starfish Rock, North Beach, and West Beach areas. Focus restoration actions on North Beach, Young's Park, Seaway Hollow, and West Beach areas. Continue Spartina surveys; conserve and restore	

SMP ID	Source	Project Description	Project Status
		south shore feeder bluffs; restore Cooks Cove Marsh; and remove derelict creosote pilings in Peach Preserve and Kelly's Point. Would require concurrence of affected landowners.	

5.2.5 Skagit Bay/Delta

Functional Analysis

Management Unit 5 was divided into 39 reaches including reaches along Skagit Bay and the Skagit River Delta (Table 28, see map in Appendix D). Dikes along the Skagit River delta limit hydrologic connectivity and functions of the shorelines, and agricultural development associated with and adjacent to the dikes limits natural shoreline vegetative functions. Reaches on both sides of the channel where the South Fork and North Fork diverge are notable exceptions, with extensive scrub-shrub wetland vegetation and no armoring. Similarly, a reach at the mouth of the Swinomish Channel (reach 108) and a reach on the right bank of the North Fork Skagit River (Reach 112) are unarmored and dominated by scrub-shrub vegetation. Despite low hydrologic scores, several reaches provide substantial habitat value, including reach 110, which runs along the outer edge of the dikes. This reach is composed of a mixture of tidal channels and emergent vegetation that shift and reform over time as a result of natural disturbances associated with deltaic processes. This environment provides substantial nursery habitat for aquatic life; however, the extent and diversity of channel habitats is limited by dikes. Several portions of reach 110 have been identified as impaired for dissolved oxygen and fecal coliform, and these impairments are likely related to surrounding and upstream land uses.

The shorelines of Carpenter Creek received moderate hydrologic, hyporheic, habitat, and vegetative scores. Although much of the surrounding area is altered by either agricultural or residential uses, moderate vegetation coverage within the shoreline area and the floodplain provides an intermediate level of function.

Table 28. Reach Functional Analysis Scores for Management Unit 5- Skagit Bay/Delta

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Skagit Bay	107	2.8		3.1	2.4
	108	4.3		3.8	4.0
	109	1.0		2.7	3.3

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
	110	3.0		3.2	4.0
	111	4.1		3.6	4.2
	119	1.0		2.3	2.5
	120	1.0		2.2	2.4
	121	1.0		2.2	2.1
	122	3.4		2.6	2.4
	123	1.0		3.0	3.8
	124	1.0		3.0	3.1
Skagit Delta	125	1.0	2.8	3.1	3.3
	126	1.0	2.9	2.6	2.6
	135	1.0	2.7	2.9	3.3
	141	1.0	3.3	2.8	3.8
	142	2.9	3.4	4.2	4.5
	143	2.6	3.5	3.5	3.4
	144	3.0	3.3	4.2	4.5
	145	2.4	3.0	3.4	3.5
Skagit Delta - North Fork	112	3.4	2.9	3.6	4.0
	113	1.0	3.5	2.7	3.8
	114	2.7	3.4	3.5	3.7
	115	1.0	3.1	2.5	2.8
	116	3.0	4.5	4.6	4.5
	117	2.2	3.2	2.8	3.0
	118	2.2	3.1	3.0	3.1
Skagit Delta - South Fork	127	2.4	3.2	3.3	3.4
	128	1.0	3.4	2.7	3.3
	129	2.4	3.5	3.3	3.5
	130	2.5	3.6	3.5	3.7
	131	2.9	3.6	4.4	4.5
	132	2.1	2.8	2.8	3.1
	133	2.4	3.8	3.1	3.4
	134	2.9	3.2	3.8	4.1
Carpenter Creek	136	2.5	3.5	3.0	3.0
	137	2.5	3.3	3.0	2.8
	138	3.0	3.3	4.1	3.7
	139	2.4	3.3	3.2	3.0
	140	3.3	2.8	4.2	3.9

Assessments from Other Studies

The Skagit Watershed Council Strategic Application ranked Skagit delta overall as 21% key habitat; while mainstem and non-mainstem habitats within the delta were degraded (67% and 98% respectively), the estuary was ranked as 27% key habitat (Beamer et al. 2000). The Skagit River delta has lost approximately 72% of historic tidal marsh habitat, including a loss of 68% of estuarine emergent

habitat, 66% of transitional estuarine forested habitat, 94% of tidal scrub shrub habitat and 84% of riverine tidal habitat (Collins and Montgomery 2001; Beamer et al. 2002 cited in Smith 2003).

Studies of Chinook salmon use of the Skagit River delta have found that the growth rate of juvenile Chinook salmon in Skagit Bay is higher if they spend more time rearing in the delta (Beamer and Larsen 2004). Further studies have found that as the density of juvenile Chinook salmon increases in the delta, the average length decreases; this indicates that density dependent factors are likely present, and suggests that the availability of delta habitat is a limiting factor for Chinook salmon in the Skagit River watershed (Beamer and Larsen 2004).

Further supporting the theory that habitat is limited within the delta, the number of juvenile Chinook passing through the delta without spending time rearing there increases when the number of outmigrating Chinook salmon surpasses 2,500,000 (Beamer and Larsen 2004). The present role of density dependent factors in the timing and growth rate of juvenile Chinook salmon in the Skagit River estuary suggests that if fish access to delta habitat were restored, more Chinook salmon would rear in the delta, where they would tend to experience higher growth rates. Past studies of estuarine rearing suggest that Chinook salmon that spend more time rearing in estuaries have higher adult return rates compared to Chinook salmon that rear in streams and spend little time rearing in estuaries (Reimers 1971).

In addition to the loss of delta habitat, an analysis of fish passage priorities identified several high and medium priority fish passage barriers in Carpenter Creek (Smith and Waldo 2003). Carpenter Creek is also included in Ecology's Surface Water Source Limited (SWSL) list.

Potential Restoration Opportunities

Restoration opportunities in the Skagit River delta primarily focus on restoring tidal influence to restore landscape ecological processes, expand connectivity between the Skagit River and nearshore marsh, and increase Chinook rearing habitat. The restoration of delta processes is significant for salmon because the delta provides a transitional zone between freshwater rearing in the Skagit River and the marine environment of Puget Sound.

Project recommendations identified in the Skagit Chinook Recovery Plan, and more recently by project sponsors, are described below in Table 29.

Table 29. Restoration Opportunities in Management Unit 5- Skagit Bay/Delta

SMP ID	Source	Project Description	Project Status
SB-3 Skagit Delta	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	<p>Deepwater Slough-Phase 2 (11.04.06): Phase 1 of the Deepwater Slough project was constructed in 1999 and 2000. The project restored tidal and riverine influence to 235 acres of previously isolated habitat. Funding for the project was obtained through the US Army Corps of Engineers Section 1135 program. Currently the Deepwater Slough Phase 1 project is being monitored for effectiveness of the restoration and fish use.</p> <p>If recovery goals are still not being achieved after the ten-year time horizon the remaining habitat at the Deepwater Slough site may be considered for restoration. This potential Phase 2 work would likely involve the complete removal of levees left after the first Deepwater project.</p>	Phase 1 - Complete Phase 2 - Concept
SB-4 South Fork Skagit River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	<p>South Fork Off Channel (11.03.10): This project will restore forest vegetation and enhance salmonid access to a ~40 acre riverine tidal wetland. The project area includes one of the largest and last remaining tracts of intact riverine tidal forest or riparian habitat left in the Skagit delta between Burlington and Conway, providing critical food resources, LWD, rearing and refuge habitat in the most modified section of the Skagit. Portions of the project area have been used in the recent past as pasture and for off-road motorcycle racing. Sediment deposition has impaired connectivity to an off-channel wetland. The project is in the highest priority target area for the Skagit Watershed Council.</p>	Design/ Permitting
SB-5 Skagit Delta	SRSC and WDFW 2005	<p>Fir Island Farms Estuary Restoration (Davis/Dry Slough) (11.03.07): The Washington Department of Fish and Wildlife (WDFW) owns 264 acres of upland (Fir Island Farm) in the vicinity of Brown Slough, Dry Slough and Claude Davis Slough that is currently managed as a snow goose reserve. The purpose of this feasibility study is to evaluate different alternatives to restore tidal processes, tidal marsh habitat and tidal</p>	Design/ Permitting

SMP ID	Source	Project Description	Project Status
		channel habitat at the Fir Island Farm site. The different restoration alternatives evaluated by the feasibility study will range from replacing existing tide gates with self regulating tide gates to varying degrees of relocating the existing tide gates and flood dikes to more landward configurations. The primary objective of the feasibility and design project is to maximize the juvenile Chinook salmon rearing habitat area.	
SB-6 Skagit Delta	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Fisher Slough (11.03.06): This project included ~50-80 acres of farmland within the riverine tidal zone and restored agricultural land to channel, scrub-shrub, forested wetland, and tributary junction habitats. In addition, this project assesses ecosystem functions supplied by the Fisher Slough sub-basin, including hydrology and geomorphology, and provides conceptual alternatives for addressing high priority problems.	Permitting complete, construction in progress
SB-7 Skagit North Fork	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	McGlenn Island Causeway (11.03.04): The objective of this project is to improve the hydraulic connection between the North Fork of the Skagit River and the Swinomish Channel north of McGlenn Island. This action is expected to improve access by juvenile Chinook to estuarine rearing habitat in Padilla Bay. The current access, through a small opening in the rock jetty (known as the "Fish Hole") is limited because river flow is directed away from Swinomish Channel, and the opening is inaccessible at low tides.	Feasibility
SB-8 Skagit North Fork	SRSC and WDFW 2005	Blake's Bottleneck (11.04.01), Thein Farm (11.04.08), Rawlins Road Dike Setback: These projects encompass several alternative actions that can be implemented in the vicinity of the terminus of Rawlins Road and Blake's marina complex. Each action seeks to setback levees in such a way as to create additional emergent marsh and riverine wetlands. There is potential synergy between this project and the concept of a North Fork Levee setback. The projects footprint would vary substantially	Feasibility Pending

SMP ID	Source	Project Description	Project Status
		based on the willingness of private landowners to engage and the institutional incentives provided for their consideration. The alternatives evaluated include: Thein Farm, Rawlins Road Dike Setback, and Blake's Bottleneck.	
SB-8 Skagit North Fork	SRSC and WDFW 2005	Rawlins Road (11.03.09): The objective of the Rawlins Road project is to restore the estuary at the mouth of the North Fork Skagit River. A study has been completed to show the conceptual relative benefit of several restoration scenarios.	Design/Per mitting.
SB-9 Skagit North Fork	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Cross Island Connector (11.04.04): The objective of this project is to re-establish connectivity between the North Fork of the Skagit and the central bay front along Fir Island. Achieved most likely through the development of a connecting corridor that follows one of two historic pathways (Browns Slough and/or Dry Slough) or through low-lying farmland.	Feasibility Pending
SB-10 Skagit North Fork	SRSC and WDFW 2005	Sullivan's Hacienda (11.04.05): The objective of this project is to setback levees to a pre 1956 footprint, allowing for the reestablishment of emergent marsh and blind channel networks in the vicinity of Sullivan's Slough.	Feasibility Pending
SB-11 Skagit North Fork	SRSC and WDFW 2005	North Fork Levee Setback (11.04.07): The objective of this project is to setback levees along the North Fork of the Skagit from the former inlet of Dry Slough to the western terminus of the levee system near Rawlins Road. The proposed project could be phased in four distinct phases depending on its merit as a flood control project.	Concept
SB-12 Skagit South Fork	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	South Fork Pole yard (11.03.13): This project will address the limiting factor of lack of rearing habitat for Skagit Chinook fry as described in section 5.3.10 (Loss of Delta Habitat) of the Skagit Chapter of the Puget Sound Chinook Recovery Plan. The objective of this project is to restore tidal and riverine processes that will	Concept

SMP ID	Source	Project Description	Project Status
		scour and maintain on-site tidal channels providing rearing habitat for juvenile Chinook and other salmonids. Similar projects described in the Skagit Chapter include Fisher Slough and South Fork Dike Setback.	
SB-13 Skagit South Fork	SRSC and WDFW 2005	South Fork Dike Setback: 2500' of existing levee would be removed and regraded down to the existing "bank top level" at the top end and the lower end will be graded for offchannel connectivity. The main river levee will be relocated and constructed approximately 700' (maximum) from the riverbank at the mid-point of the project. 1800' of new levee will be built adjacent to the County road with the keyway located along the riverward toe slope of the levee.	Concept

5.2.6 Lower Skagit- Diking Districts

Functional Analysis

The Lower Skagit Management Unit was divided into 48 reaches for functional analysis (Table 30, see map in Appendix D). The mainstem river reaches just west of the City of Burlington (reaches 148-152) scored consistently low in hydrologic, habitat, and vegetative functions. The majority of these reaches are armored by levees and shoreline vegetation is patchy. Surrounding land uses are a mix of residential, commercial, and agricultural production. In contrast, the Skagit River mainstem reaches just east of the City of Burlington (reaches 155, 159-161) had the highest functional scores. These reaches lack shoreline armoring and support vegetated floodplains with side channels, wetlands, and off-channel habitats.

The lower reaches of Nookachamps Creek (reaches 163-166 and 172-176) scored highly for hyporheic functions. The majority of Big Lake (reach 177) and its outlet into Nookachamps Creek scored low for hydrologic, habitat, and vegetative functions because of minimal vegetation coverage along the shoreline, and numerous overwater structures. A TMDL has been prepared for fecal coliform bacteria in Nookachamps Creek, and several reaches are also impaired for temperature and dissolved oxygen levels. Beaver Lake, Big Lake, and Clear Lake are also impaired (Category 4C) by invasive exotic species. On the other

hand, extensive vegetation coverage resulted in high habitat and vegetation scores in the southern reaches of Big Lake and upstream in Nookachamps Creek (reaches 178-181). Similarly, Devil’s Lake (182), which is primarily surrounded by forested vegetation, had high functions for each of the functional categories, and less developed portions of Lake Sixteen (Reach 183) and Lake McMurray (187-188) also scored highly.

Table 30. Reach Functional Analysis Scores for Management Unit 6- Lower Skagit- Diking Districts

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Skagit River	146	2.4	3.7	3.3	3.3
	147	2.0	2.6	2.6	2.8
	148	1.0	3.2	2.2	2.1
	149	1.0	3.3	2.4	2.5
	150	1.0	3.4	2.7	1.9
	151	1.0	2.9	2.6	2.1
	152	1.0	3.2	2.6	2.7
	153	2.4	3.6	3.2	3.3
	154	2.4	3.4	3.1	3.6
	155	2.9	3.9	4.0	4.3
	156	2.4	2.9	3.3	3.5
	157	1.0	3.8	2.6	2.6
	158	1.0	4.0	2.3	2.4
	159	3.6	3.8	4.1	4.5
	161	3.9	4.1	4.4	4.4
162	2.5	4.2	3.3	3.2	
Unnamed Lake	160	4.5		3.6	4.3
Nookachamps Creek	163	3.1	4.2	3.5	3.9
	173	2.8	3.5	3.6	3.9
	174	3.1	3.3	4.1	3.8
	175	2.8	3.8	3.6	3.9
	176	2.5	3.7	3.0	2.5
	180	2.7	2.8	4.0	3.9
	181	2.7	2.4	4.4	3.8
Nookachamps Creek - East Fork	164	2.8	3.9	3.8	3.9
	165	2.8	3.6	3.8	4.3
	166	2.7	3.6	3.4	3.1
	167	3.7	2.6	4.0	3.9
Walker Creek	168	3.3	2.9	4.1	3.9
	169	3.6	3.7	4.3	4.0
	170	3.2	3.3	4.5	4.1
Lake Challenge	171	3.7		3.9	3.8
Barney Lake	172	4.2		3.9	4.2
Big Lake	177	2.0		2.2	1.9
	178	4.5		4.2	4.1

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
	179	4.6		4.1	4.2
Devil's Lake	182	4.2		4.5	4.5
Lake Sixteen	183	3.2		3.7	4.4
	184	3.0		3.4	3.5
Lake McMurray	185	3.3		3.2	3.6
	186	3.8		3.5	2.5
	187	3.5		4.0	3.8
	188	3.8		4.2	4.3
Clear Lake	265	5.0		4.4	4.4
	266	4.2		4.1	3.8
	267	4.2		3.6	4.3
	268	4.7		3.8	2.8
Beaver Lake	269	4.3		3.8	4.5

Assessments from Other Studies

The Skagit Watershed Council Strategic Application ranked the Skagit River flats as 69% degraded (Beamer et al. 2000). Only 10% of the river from Sedro-Woolley (RM 24.3) to the Forks (8.1) has split channels or island habitat (Smith 2002). This reach consists mostly of deep glides with riprap on one or both sides of the river (Duke Engineering 1999 in Smith 2002).

In an analysis of fish passage priorities, Smith and Waldo (2003) identified several high and medium priority fish passage barriers in Nookachamps Creek, and they ranked the creek as “poor” for fish access. Nookachamps Creek is also included in Ecology’s Surface Water Source Limited (SWSL) list.

Potential Restoration Opportunities

Restoration priorities in the lower Skagit management unit focus on reconnecting habitats that have become hydrologically isolated because of historic and ongoing land uses. The Skagit Chinook Recovery Plan (2005) supports this type of restoration and reconnection, which could expand rearing opportunities for juvenile Chinook salmon. Such expanded rearing opportunities could allow for the redevelopment of more diverse life history strategies for juvenile Chinook that are not presently possible because of the simplification of habitat opportunities within the lower Skagit River. An increase in juvenile life history diversity could increase the resilience of Chinook salmon populations to local disturbances. Potential projects in the lower Skagit that were identified in the Skagit Chinook Recovery Plan (2005) are described in Table 31.

Table 31. Restoration Opportunities in Management Unit 6- Lower Skagit Diking District

SMP ID	Source	Project Description	Project Status
LS-1 Skagit River	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Cottonwood Island (10.03.08): The objective of this project is to increase the hydraulic connectivity to the historic Cottonwood channel located at the North and South Forks of the Skagit River. A feasibility report and preliminary project design have been completed.	Design/ Permitting
LS-2 Skagit River	SRSC and WDFW 2005	10.03.07 Britt Slough (10.03.07): Located on site is the outlet of the relic Britt Slough channel. Because this channel has been disconnected from the mainstem river near Eagle Nest bar it no longer functions as an ephemeral distributary. The channel now acts as the drainage system for the watershed area around the old channel. This project seeks to re-establish a historic riverine wetland near the southern portion of the site and examine to potential for a distributary connection to the mainstem using the remaining portion of the historic Britt Slough channel.	Feasibility Complete
LS-3 Skagit River	SRSC and WDFW 2005	Nookachamps Confluence (10.03.06): This project would split mainstem flow by excavating a channel through the oxbow at the Nookachamps confluence.	Concept
LS-4 Skagit River	SRSC and WDFW 2005	10.03.05 Sterling Reach Restoration (10.03.05): This project would reestablish hydraulic connections to the mainstem river throughout the historic oxbows in the vicinity of Sterling. These oxbows, now known as Debay's and Hart's sloughs would be reconnected such that mainstem flows could re-establish historic channel networks. This would require partial removal of a training levee established by the Army Corps of Engineers south of Highway 9 and the excavation of historic channels in the present day floodplain. Feasibility studies have reviewed potential site reconnections. In addition, land acquisition programs have purchased significant easements and title in the area for fish and wildlife values.	Feasibility Pending
LS-5 Skagit River	SRSC and WDFW 2005	River Bend (10.03.04): Conceptual restoration actions at this site focus on actions that take advantage of the low topographic depressions, classic oxbow shape and position in the river	Concept

SMP ID	Source	Project Description	Project Status
		continuum. River Bend is an area that is extremely prone to flooding and regionally recognized as a high hazard area during large-scale flood events. This high hazard exposure to river forces generally deters development in the area, and impacts agricultural productivity in low lying areas, thereby making this location uniquely situated to offer substantial opportunity for fish, wildlife, open space, or recreational uses.	
LS-6 Skagit River	SRSC and WDFW 2005	Debays Slough Reconnection (10.03.09): This project would evaluate the feasibility of reestablishing hydraulic, sediment and fish access connections to the mainstem river throughout the historic oxbow now called Debay's Slough in the vicinity of Sterling. This oxbow could be reconnected such that mainstem flows would re-establish or reoccupy historic channel networks. This would require partial removal of dikes established by the Army Corps of Engineers south of Highway 9 and the excavation of historic channels in the present day floodplain. Impacts to adjacent land uses would need to be considered. Debays slough is publicly owned but currently managed as a Swan reserve.	Concept

5.2.7 Samish River

Functional Analysis

Among the 32 reaches in the Samish River Management Unit (Table 32, see map in Appendix D), the highest functioning reaches occurred in the Samish River upstream from Friday Creek (reaches 207-218). Well vegetated floodplain wetlands in these reaches provide for effective flow attenuation, water and sediment storage, habitat opportunities, and various vegetative functions. Despite these qualities, water quality in many of the upper reaches of the Samish River is impaired by fecal coliform bacteria and low dissolved oxygen levels. At the other end of the spectrum, the lowermost reach of the Samish River (reach 189) is entirely lined with levees, and as such, hydrologic scores were very low. A portion of reach 189 is also impaired by turbidity, temperature, and fecal coliform bacteria. Just upstream of the levees but downstream from the confluence with Friday Creek (reaches 190-197), minimal forested vegetation resulted in low-moderate functions, although hyporheic functions are higher in

the reaches at and just downstream of the confluence with Friday Creek. Habitat and vegetative functions were high throughout Friday Creek (reaches 199-206) due to extensive forested shoreline vegetation (reaches 199-204) and well-vegetated floodplain wetlands (reaches 205-206). Similar to the upper Samish River, despite seemingly high levels of ecological function and relatively low shoreline disturbance, select reaches (reaches 199, 202, and 203) in Friday Creek are impaired by fecal coliform, low dissolved oxygen, and pH.

Butler Pit Lake, the only lake in the Samish River management unit, scored low in each of the functional categories as a result of little to no shoreline vegetation along either of the two reaches (reaches 219-220). The northern reach is denuded of vegetation from an active mining operation, and the southern edge is closely bordered by a trail and a road, which separate the lake from agricultural uses. An overwater structure is visible in aerial photography; however, it was not captured in the inventory data.

Table 32. Reach Functional Analysis Scores for Management Unit 7- Samish River

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Samish River	189	1.0	4.0	2.4	2.4
	190	2.5	2.7	3.3	3.2
	191	2.5	3.6	3.2	2.6
	192	2.2	2.9	2.9	2.5
	193	3.0	2.9	4.0	3.8
	194	2.8	4.0	3.8	3.5
	195	2.6	3.9	3.2	3.1
	196	2.4	4.3	2.9	2.5
	197	2.6	3.6	3.2	3.1
	198	3.0	3.6	4.1	3.7
	207	3.6	3.9	4.4	4.1
	208	3.0	4.3	4.2	4.0
	209	2.8	4.0	4.0	3.7
	210	3.7	3.8	4.5	4.1
	211	3.1	3.7	4.2	3.8
	212	3.5	3.1	4.5	4.0
	213	2.8	3.9	4.0	3.7
	214	3.3	3.1	4.3	4.1
	215	3.1	3.3	4.4	4.3
	216	2.9	4.2	4.2	4.0
217	2.7	4.8	4.2	3.9	
218	2.9	4.1	4.2	4.0	
Friday Creek	199	2.8	4.3	3.9	3.6
	200	3.8	2.9	4.4	4.1
	201	3.4	2.9	4.6	4.0
	202	3.3	2.8	4.2	3.7
	203	3.5	3.6	4.6	4.1
	204	3.1	3.1	4.7	4.1
	205	2.6	2.7	3.8	4.1
	206	2.8	2.4	3.9	3.8
Butler Pit Lake	219	2.3		2.1	1.8
	220	3.0		2.1	2.3

Assessments from Other Studies

The Skagit Watershed Council Strategic Application ranked the Samish River as 58% degraded (Beamer et al. 2000). The Samish River is included in Ecology’s Surface Water Source Limited (SWSL) list. Several high priority fish passage barriers were identified in Friday Creek; Thomas, Swede, and Skarrup Creeks also had high priority fish barriers (Smith and Waldo 2003).

The Samish River is well known for its coho production, and coho are found throughout the lower 27.5 miles of mainstem, the entire length of Friday Creek, and in most tributaries (Cutler 2001). Chinook and chum salmon and steelhead also use the mainstem Samish River, as well as lower Ennis Creek, most of Friday Creek, and lower Silver Creek. Pink and sockeye salmon have been recorded in the lower Samish River (Cutler 2001).

Edison Slough, just north of the Samish River mouth, was once the North Fork Samish River, but dikes have disconnected it (Phinney and Williams 1975 cited in Cutler 2001). It is now used for irrigation water with a tide gate controlling saltwater intrusion.

Potential Restoration Opportunities

Based on the functional analysis, the lower portion of the Samish River would benefit from a reduction in armoring coverage. Enhancement of existing riparian vegetation with conifers and shade trees could help reduce temperatures in Friday Creek and the upper portion of the Samish River. Furthermore, an examination of contaminant sources and land use practices associated with water quality issues being conducted through the Clean Samish Initiative would allow targeted actions to improve water quality throughout the management unit. The Skagit Chinook Recovery Plan (SRSC and WDFW 2005) does not identify projects in the Samish River because Chinook salmon populations in the Samish River are genetically influenced by hatchery production, rather than wild origin Skagit River Chinook populations; however, a focus on restoring hydrologic connectivity and fish passage would contribute to the diversity of in-stream habitat available to all anadromous salmonid species in the Samish River.

A summary of restoration opportunities for the near future in Management Unit 7 is provided below.

Table 33. Restoration Opportunities in Management Unit 7- Samish River

SMP ID	Project Description	Project Status
SR-1	Clean Samish Initiative - Samish Pollution Identification and Correction Program: The purpose of the PIC program is to identify and correct sources of bacterial contamination in the watershed. The program provides a multifaceted approach to address fecal coliform pollution problems, including intensive monitoring, incentives, compliance and enforcement, and a comprehensive education program.	Funded by EPA grant in July, 2010

5.2.8 Middle Skagit

Functional Analysis

The Middle Skagit Management Unit was divided into 46 reaches for functional analysis (Table 34, see Appendix D for a map of reaches). The management unit consists of mainstem river reaches with broad floodplains with varying levels of human impacts, as well as numerous tributaries and lakes. Shoreline armoring is less common in the Middle Skagit Management Unit compared to the lower portions of the Skagit River. That said, in the lowermost reaches in the management unit (reaches 221-225 and 227), long stretches of riprap armoring constrain channel migration and the development of diverse channel structure. As a result, hydrologic scores are generally low in these reaches. Furthermore, since the armoring is associated with agricultural uses and structures, natural vegetation along these reaches is limited, resulting in low habitat and vegetative scores.

Further upstream in the middle Skagit mainstem (reaches 228, 231-238, 241, and 248-262), armoring is present in places, but it is more limited and occurs on the outskirts of the floodplain, limiting its impact on floodplain processes and functions. This area is characterized by broad forested and scrub-shrub floodplain wetlands with several side channels and off-channel habitats created by channel migration. The towns of Lyman and Hamilton are situated along this portion of the river (reaches 236-237: Lyman and reach 253: Hamilton). Hyporheic functions are particularly high throughout all of the Skagit River mainstem reaches in this management unit, including reaches in Lyman and Hamilton. Hydrologic, habitat, and vegetative functions are generally moderate, although a few reaches scored particularly high (reaches 232, 241, 256-257, and 261). Higher scores can be attributed to higher proportions of coniferous and otherwise forested vegetation and a lack of shoreline armoring. Contrary to what one might anticipate, the reach on the northern bank of the Skagit River in Lyman (reach 236) scored slightly higher for vegetative and habitat scores than the southern bank (reach 237), even though the southern reach is composed of floodplain forest, whereas residential development is included in the northern reach. These scores are likely a result of water being considered in the landcover analysis, reducing the calculated percent vegetation cover and resulting functional scores for reach 237.

In general, the primary differences between various reaches along most of the tributaries in the Middle Skagit Management Unit are in riparian canopy cover

(i.e. density of cover, tree/vegetation types). Agriculture and residential development along the valley floor may also affect tributaries near their confluence with the mainstem Skagit River. Hyporheic functions in tributaries are naturally lower than in the mainstem river because the channels tend to be more confined and steeper, resulting in sediment transport rather than deposition. Correspondingly, hyporheic scores are low for the tributaries in this management unit, except at the tributary mouths (reaches 226 and 238), which tend to have high hyporheic functions. Habitat and vegetative functions were moderate to high in the tributary reaches, and variation among scores was largely dependent on the extent of forested vegetation.

Most of the five lakes in the Middle Skagit Management Unit had moderate to high functional scores. Judy Reservoir was the exception, with moderate hydrologic scores and very low scores for habitat and vegetation. The reservoir is operated as an off-stream water storage reservoir and it is formed by two earthfill dams without vegetation. Because of the unique purpose and structure of the reservoir, habitat and vegetative goals are likely distinct from other lakes in the watershed. The other lakes in the management unit are relatively undisturbed.

Table 34. Reach Functional Analysis Scores for Management Unit 8- Middle Skagit River

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Skagit River	221	1.0	4.3	2.6	2.8
	222	1.0	3.6	2.3	2.7
	223	2.1	4.3	2.8	2.4
	224	2.6	3.1	3.5	3.1
	225	1.0	4.5	2.5	2.9
	227	1.6	2.9	3.1	3.0
	228	2.6	4.2	3.9	3.8
	231	2.5	4.6	3.7	3.6
	232	2.7	4.3	4.0	4.0
	233	2.4	4.5	3.5	3.5
	234	2.5	4.4	3.5	3.9
	241	3.0	4.4	4.4	4.5
	248	2.6	4.0	3.6	3.1
	249	2.7	4.5	3.9	3.9
	250	2.1	4.2	3.2	3.4
	251	2.9	4.3	4.3	4.4
	254	2.1	4.6	3.0	3.1
	255	2.6	3.4	3.4	3.4
256	2.8	4.2	4.0	3.9	
257	2.6	4.6	3.8	3.9	

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
	260	2.8	3.7	3.7	3.2
	261	2.9	4.5	4.3	4.1
	262	2.8	4.3	3.8	3.9
Skagit River - Town of Lyman	236	2.7	4.0	4.1	3.9
	237	2.8	4.2	3.7	3.5
Skagit River - Town of Hamilton	253	2.7	4.7	3.8	3.4
Hansen Creek	226	2.7	4.3	3.5	3.3
Gilligan Creek	229	3.2	2.9	3.8	3.9
	230	3.3	2.0	3.6	3.7
Minkler Lake	235	4.3		4.2	4.7
Jones Creek	238	2.7	4.1	3.9	4.1
	239	2.8	2.1	3.6	4.1
	240	3.2	2.3	4.0	3.9
Day Creek	242	2.8	3.1	4.3	4.1
	243	2.8	2.3	4.2	3.8
	244	3.5	1.7	4.0	3.9
	246	3.0	2.1	3.8	4.1
Rocky Creek	245	3.2	1.6	3.9	3.7
Day Lake	247	2.8		4.1	4.2
Cumberland Creek	252	3.7	2.0	3.6	4.0
Alder Creek	258	2.2	3.0	3.3	3.5
	259	3.1	1.7	4.0	4.0
O'Toole Creek	263	3.5	1.8	3.2	4.1
	264	3.1	1.9	3.9	3.7
Judy Reservoir	270	3.0		2.2	1.8
	271	3.3		2.9	2.7

Assessments from Other Studies

The overall percent of modified mainstem Skagit River channel length ranges from only 1 to 2 percent from Sedro-Woolley to the Sauk River (Smith 2002). A study of salmonid habitat in the Middle Skagit River (Baker River mouth to Sedro-Woolley) found that salmon spawned throughout the study area, and that heavy Chinook and chum salmon spawning occurred between the Towns of Lyman and Hamilton, and just upstream of Hamilton (R2 2003).

In an analysis of fish passage priorities, Smith and Waldo (2003) identified several high and medium priority fish passage barriers in Hansen Creek, and they ranked the creek as “poor” for fish access. Jones, Mannser, Red Cabin, Gilligan, Morgan, Careys, Alder, and Grandy Creek watersheds also had many

high and medium priority fish passage barriers (Smith and Waldo 2003). No fish passage barriers were documented in Sorenson, Loretta, Cumberland, Presentin, and Jackman Creeks. Jones Creek is included in Ecology’s Surface Water Source Limited (SWSL) list.

Potential Restoration Opportunities

For the mainstem Skagit River, the Skagit Chinook Recovery plan prioritizes the removal of riprap armoring and the restoration of floodplain connectivity wherever feasible. The Recovery Plan strategy is to extend bridge crossings where they cross the floodplain, remove shoreline modifications where they interfere with floodplain functions, and soften shoreline armoring by incorporating wood and complex structures along the edge of the floodplain. Within the Middle Skagit Management Unit, there are several opportunities to improve floodplain function with little impact to infrastructure (SRSC and WDFW 2005). By increasing floodplain area and function and enhancing channel shorelines, the Chinook Recovery Plan recommendations are meant to improve flood refuge habitat and Chinook productivity (SRSC and WDFW 2005). A summary of proposed restoration opportunities in Management Unit 8 is provided in Table 35.

Table 35. Restoration Opportunities in Management Unit 8- Middle Skagit River

SMP ID	Source	Project Description	Project Status
MS-1 Day Creek	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Day Creek Habitat Restoration (10.04.08): This project proposes to enhance 10 acres of riparian area, install 30 LWD log jams into one mile of Lower Day Creek as an interim solution while the riparian area is reestablished and enhanced. These changes are expected to result in a net decrease in water temperature.	Design Complete
MS-2 Skagit River	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Gilligan Floodplain Restoration (10.04.03): The objective of this project is to restore side channel and floodplain habitat in the Skagit River downstream of Gilligan Creek by removing 170 linear meters of flood control dike and associated riprap bank protection, which will restore function to approximately 69 hectares (170 acres) of floodplain. Floodplain vegetation will be improved by removing non-native vegetation and planting native trees. Would require concurrence of	Feasibility Pending

SMP ID	Source	Project Description	Project Status
		affected landowners.	
MS-3 Skagit River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Skagit Floodplain Habitat Acquisition Phase 2 (07.55.01): Skagit Land Trust (SLT), The Nature Conservancy and Seattle City Light (SCL), in partnership with the Sauk-Suiattle Tribe, will continue to protect high quality Chinook habitat in the Skagit River system. The project area includes the floodplain of the Skagit and its major tributaries upstream of Sedro-Woolley.	Active
MS-4 Hansen Creek	Habitat Work Schedule	Hansen Creek Reach 5 Acquisition and Restoration (10.04.16): The Hansen Creek Management Plan was completed in 2001 and has been serving as a template for improving habitat conditions and finding more effective and sustainable solutions to flooding concerns. This project is a continuation of implementing proposals from the Hansen Creek Management Plan.	Concept
MS-5 Skagit River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Davis Slough/Iron Mountain Ranch Hydrologic Connectivity (10.04.14): The Skagit Fisheries Enhancement Group proposes to work with Seattle City Light (SCL) and the Skagit County Department of Public Works to develop a project that would ultimately result in the restoration of natural hydrologic flow paths across SCL's Iron Mountain Ranch Property, and reestablish unrestricted fish passage to and from Davis Slough. This section of the river provides some of the most important spawning areas for Fall Chinook, chum, and steelhead in the middle Skagit.	Concept
MS-6 Skagit River	Habitat Work Schedule	07.053.01 Middle Skagit Acquisitions (07.053.01): This project will result in systematic and permanent protection of the highest quality Chinook and coho rearing and spawning habitat remaining in this portion of	Implementation

SMP ID	Source	Project Description	Project Status
		the Skagit River.	
MS-7 Skagit River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Cascade Trail Relocation (10.04.07): This project involves relocating a portion of the Cascade Trail on the right bank (north side) of the Skagit River just downstream from Lyman Slough. It would include relocating approximately one mile of trail to the edge of the adjacent floodplain. This will involve the removal of approximately 2500' of rip-rap currently degrading the mainstem Skagit River and restoring 30 acres of floodplain to natural river processes. The existing riprap structure has had some existing threat of erosion from the river, and Skagit County Parks has indicated that they see trail relocation as the best long-term solution at the site.	Concept, Feasibility Pending
MS-8 Skagit River	SRSC and WDFW 2005	10.04.05 Cockreham Island (10.04.05): The objective of the project is to evaluate and implement habitat restoration for Etach Slough and Cockreham Island on the right bank (north side) of the Skagit River just downstream from the town of Hamilton. Approximately 2,470 linear meters of bank armoring on the right bank limits connectivity between the river and floodplain on the north side. The floodplain between Lyman-Hamilton Highway and the river in this location is 1,334 acres and there are over five kilometers of sloughs and channels that would benefit from increased connectivity with the river. Restoration actions could include removing or setting back bank protection structures, relocating homes, removing or relocating roads, and planting native vegetation in the floodplain.	Feasibility
MS-9 Skagit River	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Skiyou Slough (10.04.04): Skiyou Island was recently acquired by the USFS as a part of the Wild and Scenic River Corridor. Over 600 acres in size, the island was intensively farmed and managed for agricultural purposes. Surrounded by a relic slough, the site has been the focus of considerable	Feasibility

SMP ID	Source	Project Description	Project Status
		restoration activity aimed at re-establishing the riparian functions of the floodplain and channel corridor. However, little attention has been focused on removing hydraulic restrictions near the upstream inlet to the slough channel. If the levee at Gilligan can be removed, then hydraulic controls at the inlet of Skiyou should be considered for removal.	

5.2.9 Upper Skagit (WRIA 4)

Functional Analysis

The Upper Skagit Management Unit was divided into 157 reaches (Tables 36 and 37, see map in Appendix D). Functions along the mainstem Skagit River were generally moderate to high for each of the functional categories. Shoreline armoring, accompanied by reduced shoreline vegetation and higher levels of development, were the primary factors differentiating high scoring reaches from reaches with moderate scores within the mainstem Skagit River. The highest scoring reaches were often situated at tributary mouths and river confluences with broad floodplain wetlands and high hyporheic functions. Reaches of the mainstem under federal ownership and without shoreline armoring also tended to score highly because of the high proportion of forested shorelines in those reaches.

Table 36. Reach Functional Analysis Scores for Skagit River mainstem within Management Unit 9

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Skagit River	272	3.2	4.8	4.3	4.2
	278	2.7	4.4	3.9	3.6
	280	3.4	3.6	4.4	4.1
	281	3.1	4.5	4.2	4.1
	285	3.0	4.2	4.1	3.9
	286	3.0	4.2	3.5	2.8
	291	4.1	3.4	4.4	4.1
	292	2.9	4.0	4.1	3.9
	293	3.1	4.8	4.8	4.6
	294	3.7	4.3	4.4	3.6
	295	3.1	4.3	4.3	3.9
	296	3.0	4.5	4.4	4.4
	297	3.1	4.1	3.8	3.4
	298	3.2	3.9	4.1	3.9

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
	299	3.2	3.9	3.9	3.3
	300	3.0	3.7	4.1	4.2
	301	3.3	2.3	3.9	3.7
	314	3.8	4.4	4.3	3.9
	315	3.1	4.3	4.0	3.8
	316	3.1	4.1	3.2	3.3
	317	3.0	4.1	4.0	3.7
	320	2.4	4.3	3.4	3.6
	321	2.6	4.5	3.9	3.6
	322	2.8	4.6	3.9	3.9
	323	2.9	4.4	4.1	4.0
	324	3.4	3.6	4.0	3.6
	325	2.9	3.6	3.8	3.2
	326	2.8	4.0	3.6	3.6
	327	2.7	3.4	3.8	3.3
	328	2.7	3.4	3.9	4.1
	329	3.4	3.6	3.7	3.7
	330	2.7	4.3	3.7	3.9
	331	2.6	4.0	3.6	4.3
	332	3.0	3.3	3.1	3.0
	335	3.1	4.1	4.0	4.3
	354	3.3	3.9	4.1	3.6
	355	2.4	4.0	3.6	3.7
	356	3.1	4.5	4.4	4.6
	357	2.2	3.3	3.1	2.8
	358	2.9	4.1	3.8	3.8
	359	2.7	4.3	4.1	4.6
	361	2.4	3.9	3.6	3.3
	362	3.0	4.2	4.2	4.7
	368	3.2	4.5	4.6	4.6
	369	3.1	4.0	4.1	4.0
	372	3.4	4.3	4.4	4.2
	373	2.5	4.3	3.3	2.9
	374	3.3	4.0	4.5	4.2
	375	2.6	4.0	3.3	2.5
	377	3.1	4.5	4.5	3.9
	378	3.4	3.9	4.3	3.8
	382	2.9	3.2	3.7	3.1
	383	3.5	4.5	4.5	4.4
	386	2.8	2.6	3.3	3.4
	387	4.0	4.4	4.4	4.4
	391	4.3	4.5	4.6	4.4
	392	2.8	2.5	3.3	3.3

Within the mainstem Sauk, Suiattle, and Cascade Rivers, functional scores ranged from moderate to high for all functions (Table 37). Hyporheic, habitat, and vegetative functions were particularly high in several reaches. Lower vegetative scores along the Sauk River are due to data interpretation constraints rather than actual vegetative condition since water coverage was incorporated into the total shoreline area in several reaches along the Sauk. This issue is discussed in the data limitations in Section 4.2.

As described for the Middle Skagit Management Unit, hyporheic functions in tributaries are naturally lower than in larger river reaches because channels tend to be steeper and more confined. Hyporheic scores were consistently low for tributaries except at the tributary mouths, where the channel slope decreases and sediment tends to deposit. Vegetative and habitat functions ranged from moderate to high in the Upper Skagit tributaries.

The functional scoring of tributaries and lakes in the Upper Skagit Management Unit was affected by elevation and topography, as high elevation glacial lakes and creeks, which tend to have little shoreline vegetation and more highly erodible lands, tended to score lower across functional categories compared to lower elevation lakes and creeks (Table 37). These differences in functional scoring reflect the vulnerability of headwaters to human alteration that removes vegetation and destabilizes hillsides. In an unaltered state, high elevation creeks transport moderate sediment loads, whereas when riparian vegetation is removed and soils are destabilized, sediment loads rapidly increase, affecting in-stream habitat throughout the watershed.

Table 37. Reach Functional Analysis Scores for Rivers, Creeks, and Lakes other than the Skagit River mainstem within Management Unit 9

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Grandy Creek	273	3.0	4.1	4.3	4.3
	274	3.4	2.4	4.2	4.0
Grandy Lake	275	3.2		4.1	4.4
Lake Tyee	276	3.7		3.4	3.6
	277	4.2		3.8	3.3
Mill Creek	279	3.6	1.8	3.9	3.9
Pressentin Creek	282	3.3	3.8	4.6	4.0
	283	3.3	1.7	3.5	4.0
	284	3.0	1.8	3.7	3.8
Finney Creek	287	3.2	2.9	4.2	4.2
	289	4.4	2.1	4.4	3.8

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
	290	3.8	1.5	4.1	3.8
Quartz Creek	288	3.6	1.8	3.9	3.8
Lake Shannon	302	2.9		3.9	4.4
	313	3.2		3.7	3.8
Bear Creek	303	3.1	2.6	3.7	4.1
Baker Lake	304	2.8		3.8	4.5
	306	4.5		4.0	3.7
	307	3.2		3.7	4.4
Rocky Creek	305	3.1	2.3	3.6	3.7
Thunder Creek	308	3.6	2.4	4.1	4.1
	309	3.3	2.0	3.9	3.7
	310	4.4	1.4	4.0	3.7
	311	4.0	1.0	4.0	3.7
	312	3.7	2.0	3.6	3.7
Jackman Creek	318	3.0	1.7	3.6	3.8
	319	4.0	1.3	3.9	3.7
Sauk River	333	2.6	4.1	3.7	3.8
	334	2.8	3.6	4.0	4.1
	336	2.7	4.3	3.4	3.3
	337	3.4	4.4	4.5	4.4
	338	3.0	4.4	4.2	4.1
	339	2.8	3.5	3.4	3.0
	342	2.8	4.1	3.8	3.7
	426	3.0	3.8	4.0	4.2
White Creek	340	3.7	2.1	3.6	4.0
	341	4.5	1.5	4.2	3.7
Suiattle River	343	3.3	3.9	4.3	4.1
	344	3.6	3.5	4.5	4.3
	345	3.4	3.0	4.2	4.1
	351	3.2	3.3	4.6	4.0
	353	3.0	2.9	4.4	3.8
Big Creek	346	3.0	1.4	3.4	3.8
	348	2.5	1.5	3.8	3.7
Grade Creek	347	2.6	1.6	3.1	3.7
Tenas Creek	349	3.0	1.7	3.9	3.8
	350	3.1	1.6	3.7	3.9
All Creek	352	3.4	1.9	4.4	4.0
Barnaby Slough	360	5.0		4.6	4.8
Illabot Creek	363	3.4	3.1	4.3	4.3
	364	3.8	1.5	4.5	3.9
	366	3.8	2.0	4.1	3.9
Arrow Creek	365	3.9	1.1	3.7	3.7
Otter Creek	367	4.1	2.1	4.5	4.3
Rocky Creek	370	3.8	2.3	3.8	3.8
	371	3.3	2.3	3.8	3.7
Olson Creek	376	3.2	3.3	4.2	3.5

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Diobsud Creek	379	3.5	3.7	4.5	3.9
	380	3.0	2.4	3.6	3.8
	381	3.5	1.3	3.9	3.7
Bacon Creek	384	3.5	3.2	4.1	3.6
	385	3.8	2.1	4.0	4.0
Alma Creek	388	4.5	1.5	4.2	3.7
	389	4.5	1.5	4.2	3.7
	390	4.4	1.4	4.0	3.7
Damnation Creek	393	4.3	1.3	3.8	3.7
Cascade River	394	3.0	4.1	4.1	3.6
	397	3.6	3.4	4.4	3.8
	403	3.6	4.1	4.4	4.3
Jordon Creek	395	3.3	1.8	4.0	3.8
	396	2.3	1.6	3.8	3.7
Boulder Creek	398	3.6	1.8	3.9	3.8
Irene Creek	399	3.8	2.0	3.8	3.8
	400	4.5	1.5	4.2	3.8
Marble Creek	401	3.8	2.3	4.4	3.9
	402	3.0	1.5	4.1	3.7
Sibley Creek	404	3.8	2.3	4.3	3.8
Found Creek	405	3.8	1.0	4.1	4.2
Found Lake	406	4.5		4.0	3.8
Kindy Creek	407	3.5	1.0	4.3	3.8
Sonny Bay Creek	408	3.8	1.0	4.1	3.7
Cascade River - North Fork	409	4.4	2.1	4.4	3.9
	410	3.9	2.1	4.3	3.8
Cascade River - South Fork	411	3.8	1.0	4.1	4.3
South Cascade Lake	412	1.0		1.5	2.8
Caskey Lake	413	4.7		4.4	4.3
Texas Pond	414	5.0		4.8	4.5
Small Lakes	415	3.5		3.6	3.7
Buck Creek	416	4.0	1.5	4.4	3.7
Downey Creek	417	4.0	1.5	4.4	3.7
Newhalem Creek	418	4.1	1.4	4.1	3.7
Small Lakes	419	4.5		3.6	3.5
McAllister Creek	420	3.5	2.3	4.0	3.4
Thunder Creek	421	4.0	1.5	4.4	3.9
	422	4.5	2.8	4.2	4.5
Fisher Creek	423	4.0	1.5	4.4	4.0
Panther Creek	424	3.5	1.0	3.6	3.9
Granite Creek	425	4.0	1.5	4.4	4.1
Lower Granite	427	2.5		3.2	3.5

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Lake					
Hidden Lake	428	2.0		1.6	2.3

Assessments from Other Studies

The Skagit Watershed Council Strategy Application document ranked several upper Skagit WAUs as 80-100% key habitat (Beamer et al. 2000, Table 38); within Skagit County, these include: Illabot, Cascade Pass, and Buck-Downey-Sulfur WAUs. Sub-basins in Skagit County with 60-80% key habitat include: Bacon, Newhalem, Cascade-Middle, and Presentin. Most other WAUs within the upper Skagit were rated as <20% key habitat. These low ranking WAUs were generally impaired by sediment, peak flows, or both.

Table 38. Degraded Watershed Administrative Units in Upper Skagit watershed within Skagit County (data from Beamer et al. 2000)

Watershed Administrative Unit	Sediment Impaired?	Peak Flow impaired?	% Functioning Riparian Habitat
Grandy	Yes	Yes	34%
Shannon West	Yes	Yes	45%
Jackman	Yes	Likely	28%
Corkindale	Yes	No	40%
Diobsud	Yes	No	59%
Damfino	Yes	No	57%
Jordan-Boulder	Yes	No	85%
Finney	Yes	Yes	50%
Miller	No	Likely	43%
Hilt	Yes	Likely	94%
Rinker	Yes	Likely	62%
Tenas	Yes	No	91%
Sauk Prairie	Yes	Likely	27%

The National Forest Service conducted a watershed analysis of the Suiattle watershed, including the lower Suiattle/Tenas Creek, Big Creek, Downey Creek, and Buck Creek Sub-basins within Skagit County, as well as other sub-basins that fall within Snohomish County (USFS 2004). The analysis found a low level of vegetation disturbance within the publicly owned watershed lands. The highest disturbance levels within the watershed were caused by large, stand replacing fires. Rain-on-snow effects from timber harvest and roads were greatest in the 1970s and 1980s in Grade, Tenas, Conrad, and All Creeks, and the

mainstem below Downey Creek. The Suiattle watershed includes over 138 miles of road. Road failures have the potential to deliver significant quantities of sediment to streams, and roads have not been maintained to standard because of funding issues.

Of the six Skagit River Chinook salmon populations, the Suiattle population is the only population that is not considered depressed. The Suiattle population was upgraded from depressed to healthy in 2003. The Suiattle watershed also provides important habitat for coho salmon (10-15% of the total Skagit River production) and for native char. The report identified high bedload, a mobile streambed, and limited LWD recruitment as limiting factors for salmonids, despite overall good conditions. Because of the high turbidity in the watershed, refuge provided by off-channel areas is particularly important.

The Suiattle watershed provides significant habitat area for birds and wildlife. It is likely that the relatively low bird and wildlife survey efforts in the watershed compared to other more accessible areas has resulted in an underestimate of rare wildlife using the watershed. Wildlife known to occur includes spotted owl, pine marten, pileated woodpeckers, and mountain goats.

Some of the recommended actions based on the watershed analysis results include the following:

- Continue upgrading, storm-proofing, and maintaining roads (stabilized under the MOA with Ecology) to eliminate elevated levels of sediment from entering the stream network. Decommission roads no longer needed. Where possible, relocate roads, parking areas, and recreation facilities out of floodplains.
- Develop a close partnership between fisheries and recreation to implement a public education and awareness program concerning overuse impacts in the wilderness and at dispersed camping sites along the river. Work through public awareness and outreach programs to reduce poaching and encourage self-policing by the public. Explore opportunities to combine education with increased enforcement.
- Explore opportunities to restore and/or enhance side channel habitats. First protect these areas from road sediment impacts. Allow for unimpeded floodplain processes as much as possible to promote side channel development.

- Collect water temperature samples in streams that may be used by bull trout to determine if management activities are influencing this habitat attribute.
- Complete a fire management plan, which would include allowing fire as a natural disturbance.
- Complete an inventory of noxious weed sites. Prioritize and treat infestations.
- Develop management actions to promote desired habitat conditions for species of concern.
- Evaluate the lower portion of the drainage for pre-commercial and commercial thinning opportunities in LSR stands for spotted owl and marbled murrelet. Consider stands less than 80 years old to promote late-successional and old-growth forest habitat structure and diversity, and dispersal habitat to neighboring LSRs to the west.
- Use information from goat studies scheduled from 2002 to 2006 to update Forest Plan management areas or standards and guidelines for activities in goat habitat. Continue coordination with cooperating agencies and tribes on goat management in the Suiattle, especially in relation to the Gamma goat herd.
- Continue to coordinate with land managers along the Skagit River to provide bald eagle night roosts, staging areas, and foraging opportunities for wintering bald eagles.
- Develop relations with cooperating agencies and tribes for management of sensitive species and other management indicator species. This includes review of management opportunities for deer and elk, of interest to the Sauk-Suiattle Tribe and WDFW.
- Encourage riparian management that provides for increasing beaver populations, and diversity in the riparian areas of songbirds, bats, and waterfowl such as the harlequin duck. Consider riparian management for encouraging development of large diameter trees of desired species such as western red cedar.
- Find and develop new boat launches.

The Baker River drains about 10% of the entire Skagit Basin (U.S. Forest Service 2002), making it the second largest tributary to the Skagit River. Shoreline habitat within the Baker River sub-basin has been substantially altered by two dams. The Lower Baker Dam is separated from the Upper Baker Dam by the 8-mile long Lake Shannon. Baker Lake extends for 10 miles behind the Upper dam.

The Cascade River, the third major tributary to the Skagit River, meets the Skagit River near Marblemout. While the upper reaches of the Cascade River are steep, there are considerable stretches of low gradient, unconfined channels in the mainstem river.

Overall, the upper Skagit watershed has relatively few fish passage barriers. Smith and Waldo (2003) identified several high and medium priority barriers in the lower Cascade River; other sub-basins with high priority barriers include the Sauk sub-basin, particularly in the Prairie Creek watershed and several unnamed tributaries to the Suiattle River, South Fork Sauk, and lower Sauk River. Upper Skagit watersheds within Skagit County that did not have any barriers include: the middle Cascade, upper Cascade, Shannon West, Shannon East, and Newhalem watersheds.

Potential Restoration Opportunities

The Skagit Watershed Council Strategic Application Report identified several priorities for restoration in the Skagit watershed that are particularly applicable to the upper Skagit. Along the mainstem Skagit River, restoration recommendations include extending bridges where they cross the floodplain and removing or reconfiguring shoreline modifications to minimize impacts on floodplain functions.

Additionally, Beamer et al. (2000) identified several overall priorities for the upper watershed that generally fall into the following three categories: sediment reduction, riparian restoration, and fish passage barrier restoration. Prioritized lists of projects throughout the entire Skagit River watershed may be found in the Strategic Application document (Beamer et al. 2000).

Project recommendations identified in the Skagit Chinook Recovery Plan (SRSC and WDFW 2005) are identified below in Table 39.

Table 39. Restoration Opportunities in Management Unit 9- Upper Skagit River

SMP ID	Source	Project Description	Project Status
US-1 Sauk River Basin	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Sauk Roads (09.03.01): Approximately 50 miles of Forest Service roads were identified in the Sauk Prairie and Dan Creek watersheds in the Sauk River Basin that are poorly designed or maintained and have the potential to increase sediment to fish-bearing streams. Treatments have already been completed on approximately 25 miles of road with a previous SRF Board grant, so this project will treat the remaining road segments.	Feasibility Complete
US-2 Suiattle River Basin	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Suiattle Roads (09.03.02): This project will stabilize or decommission forest roads in the Suiattle River Basin. Surface erosion and mass wasting associated with poorly designed or maintained roads are problematic for spawning conditions in the Suiattle River Basin, where the majority of Chinook spawning occurs in the lower reaches of a few larger tributary streams because the main stem has such a very large fine sediment load as a result of extensive glaciers upstream.	Concept
US-3 Sauk River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Upper Sauk Erosion Control (09.03.03): Replace worn out and undersized culverts for 7 miles of road; replace Chockwich Fish Passage; and under separate effort replace Bedal Bridge, an undersized structure.	Concept
US-4 Cascade River Basin	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Lower Cascade Roads (09.03.04): This sediment reduction project would result in the removal of a 1.1 mile section of forest road, revegetation of the obliterated road surface, and the treatment of approximately 10 water bars (abandoned culvert crossings) that pose a mass wasting hazard in Cascade River sub-basin.	Concept
US-5 Illabot Creek	Habitat Work Schedule; WRIA 3/4	Skagit Conservation District is partnering with the USFS on a design and permit project for erosion reduction to reduce the risk of road failure and its negative effects to	Proposed

SMP ID	Source	Project Description	Project Status
	3-year work plan 2010	fish habitat in the upper Illabot Creek basin. The project is a design only and permitting proposal to decommission Illabot Road #16 from MP 9.5-24. Design work includes culvert removal and replacement with rocked rolling dips, ditching and fill stabilization, and providing alternative public access up West Jordan Road, a DNR system.	
US-6 Skagit River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	The Skagit Fisheries Enhancement Group (SFEG) proposes to work with Skagit County Parks Department and the Skagit County Department of Public Works to develop a project that would route a small channelized tributary stream in Howard Miller Steelhead Park (HMSP) back into its natural course along the base of the slope in a former side channel of the Skagit River.	Concept
US-7 Cascade River Tributary	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	A fish passage barrier occurs on a left bank tributary to the Cascade River at Cascade River Mile 1.25. This drainage supports Chinook salmon as indicated by the Limiting factors fish distribution. The crossing consists of an overgrown road crossing to the south side Cascade River Road at mile post 1. The land is privately owned and has no improvements.	Feasibility Pending
US-8	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	<p>This proposal includes acquisition and near-term restoration of approximately 212 acres along the Skagit River in the Savage Slough area including 3,461 linear feet of Skagit River edge habitat, the lower portion of Savage creek, Savage Slough, and associated off-channel habitats. Acquisition of the Savage Slough properties will create opportunities for both near and long-term habitat restoration.</p> <p>Proposed near-term restoration includes removal or demolition of several houses/structures, removal of an access road and culvert and 400 feet of Savage road, restoring 12-15 acres of pasture to</p>	Acquisition ongoing, future restoration

SMP ID	Source	Project Description	Project Status
		native vegetation, and underplanting 8-10 acres of existing riparian forest with conifers.	
US-9 Skagit River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	<p>The Barnaby reach includes the Skagit River from the mouth of Illabot Creek downstream to the Rockport bridge. Historically, the river has migrated over a very broad area in this reach which has created an extensive network of sloughs, wetlands, ponds, side channels, and other off-channel habitats that provide important spawning and rearing for a variety of salmon species.</p> <p>The purpose of this feasibility study is to evaluate the effect developments in the Barnaby reach have on fish use and habitat conditions over time, and to evaluate alternatives for improving habitat conditions, restoring natural processes, and reducing maintenance costs.</p>	Feasibility
US-10 Sauk River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	<p>Sauk River Riparian Restoration (10.09.04): The purpose of this project is to improve habitat conditions in the Sauk River by restoring native riparian and floodplain vegetation at three different sites totaling approximately 31 acres. Restoring native vegetation will improve future large woody debris contributions, nutrients, shade, and edge habitat complexity for Chinook salmon and other species that use the Sauk River.</p>	Construction
US-11 Skagit River, Major tributaries	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	<p>Skagit Watershed Tier 1 and Tier 2 Floodplain Acquisition Grant (07.054.01): The project area includes Tier 1 floodplains of the mainstem Skagit and Sauk rivers, and Tier 2 floodplains of major tributaries located upstream of Sedro-Woolley as identified in the Skagit Watershed Council's Year 2010 Strategic Approach. The acquisition process involves the identification and evaluation ('ranking') of individual properties as needed (SWC); landowner outreach; site inspection;</p>	Concept

SMP ID	Source	Project Description	Project Status
		<p>appraisals and typical due diligence associated with land acquisition. Restoration needs will be evaluated on a per property basis, as project sponsors are identified and new funding secured as necessary.</p>	
<p>US-12 Downey Creek, Suiattle River</p>	<p>SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010</p>	<p>Downey Creek Crossing (10.11.05): This project involves closing the Suiattle River Road at the Downey Creek Crossing, or expanding the bridge crossing over Downey Creek to a length that would minimize impacts to approximately 1.2 hectares (3 ac) of the alluvial fan associated with Downey Creek near the confluence with the Suiattle River.</p>	<p>Feasibility Pending</p>
<p>US-13 Suiattle River</p>	<p>SRSC and WDFW 2005</p>	<p>Boundary Bridge (10.11.04): The objective of this project is to restore floodplain connectivity by removing road and fill material associated with Boundary Bridge on the south side of the Suiattle River. Approximately 260 linear meters of road crosses the floodplain in this location. This road blocks several historic channels and isolates approximately 17 hectares (43 ac) of floodplain. The bridge currently does not provide access because the river eroded approximately 25 meters of the approach on the south side in October 2003. Habitat restoration options include removing the bridge and all of the associated road fill in the floodplain or extending a new bridge span across a portion of the floodplain and replacing fill material with large culverts in historic channel crossings.</p>	<p>Concept</p>
<p>US-15 Sauk River</p>	<p>SRSC and WDFW 2005</p>	<p>Government Bridge (10.08.03): The habitat gap analysis shows that the Sauk River downstream of the Suiattle River between RM 16.6-19.0 is lacking in off-channel and backwater habitat. The primary floodplain modification in this area is the Government Bridge and associated bank protection projects. The road fill associated with this bridge blocks connection to a</p>	<p>Feasibility Pending</p>

SMP ID	Source	Project Description	Project Status
		<p>historic floodplain channel and function for approximately 22 hectares (54 ac) of floodplain. A project in this location would involve constructing a bridge to span at least a portion of the floodplain, which extends approximately 215 meters on the left bank side of the Sauk River. The purpose of this project is to restore mainstem channel complexity and the development of off-channel habitat through the natural process of channel migration on the Sauk River.</p>	
<p>US-16 Bacon Creek, Cub Creek, Skagit River</p>	<p>SRSC and WDFW 2005</p>	<p>Bacon Creek (10.06.03): The purpose of this project is to restore complete fish passage to Cub Creek and restore the development of off-channel habitat on 11 hectares (27 ac) in the floodplain and alluvial fan of Bacon Creek. The SR 20 road fill spans the alluvial fan and floodplain along the lower mile of Bacon Creek, which is a large tributary on the right bank of the Skagit River. The road fill crosses a small but productive groundwater tributary (Cub Creek) with a culvert that creates a barrier to juvenile fish during higher flows. In addition, the road fill reduces channel complexity in the main Bacon Creek channel and limits the development of off-channel habitat by constraining lateral channel migration. Constructing a full-spanning bridge at the Cub Creek crossing will restore fish passage and provide substantially more opportunity for channel migration and habitat development. A project was recently completed shortly upstream of SR 20 to restore lateral channel migration by relocating approximately one mile of a Forest Service road outside of the floodplain and alluvial fan of Bacon Creek, so improving the SR 20 road crossing would add value to this existing project by removing the largest remaining impact in this area.</p>	<p>Feasibility Pending</p>
<p>US-17</p>	<p>Habitat Work</p>	<p>10.05.08 Upper Skagit Floodplain Restoration (10.05.08): Upper Skagit land</p>	<p>Feasibility</p>

SMP ID	Source	Project Description	Project Status
Upper Skagit, Sauk, Suiattle, Cascade	Schedule; WRIA 3/4 3-year work plan 2010	acquisition is focused on protecting and restoring diverse floodplain functions and habitats important for Chinook salmon. This project proposes to conduct small scale restoration work on lands purchased for conservation purposes in the floodplains of the Upper Skagit, Sauk, Suiattle and Cascade Rivers. Restoration work is anticipated to occur mostly within the floodplains of protected lands, but could also include tributary streams, alluvial fans and upland riparian areas	Completed
US-18 Skagit River	SRSC and WDFW 2005	Marblemount Bridge (10.05.05): The habitat gap analysis indicates that there is very little natural off-channel or backwater habitat in the two kilometer reach of the Skagit River just upstream from the bridge in Marblemount, and that almost 200 ac of the floodplain is isolated or shadowed by roads and riprap bank protection. No specific project has been identified for this area, but the analysis indicates that reconnecting channels or floodplain in this area to the river should be a high priority. This could be accomplished through acquisitions, setting back dikes, and relocating roads.	Feasibility Pending
US-19 Skagit River	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	10.05.04 Car Body Hole (10.05.04): The objective of this project is to remove approximately 550 linear meters of riprap bank armoring (and associated car bodies) at Car Body Hole, which is located on the right bank of the Skagit River across from Illabot Creek. This section of the Skagit River was identified in the floodplain analysis as having a gap in off-channel habitat and there are a number of historic channels that would likely become wetted if the bank armoring were removed. Additionally approximately 20 hectares (50 acres) of native riparian and floodplain vegetation will be restored.	Feasibility Pending
US-20	Habitat	Finney Riparian (10.04.10): The purpose	Feasibility

SMP ID	Source	Project Description	Project Status
	Work Schedule; WRIA 3/4 3-year work plan 2010	of this project is to restore the conifer species such as Western Red Cedar and Western Hemlock to the Finney Creek riparian forest. An extensive field inventory has documented that the Finney Creek riparian forest is currently dominated by young stands of hardwoods. While hardwood species are generally well represented in natural floodplain forests, regular observations of cut conifer stumps, the presence of conifer stands on historic aerial photographs, and other historic information indicates that conifers have been greatly reduced in the Finney Creek riparian forest.	Completed
US-21 Skagit River	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	07.052.01 Upper Skagit Acquisitions (07.052.01): Land acquisition work, led by The Nature Conservancy (TNC), Skagit Land Trust (SLT) and others, will focus on the purchase of parcels to protect and restore diverse floodplain functions and habitats important for Chinook salmon. Initial acquisitions will focus on parcels identified in previous Skagit Watershed Council-endorsed assessment work. In addition, Skagit River System Cooperative (SRSC), TNC, SLT and the Skagit Watershed Council Restoration and Protection Committee will apply the scientific principles developed in the Chinook Recovery Plan to revise and refine previous assessment work (conducted in the Middle and Upper Skagit as well as in the Sauk basin) to identify additional parcels important to Chinook recovery.	Concept
US-22 Illabot Creek	SRSC and WDFW 2005; WRIA 3/4 3-year work plan 2010	Illabot Creek (10.05.03): The Illabot Creek Habitat Restoration Feasibility Study, completed in 2005 examined the effects of human modifications on the alluvial fan and floodplain of Illabot Creek. Restoration alternatives include: 1) relocating the road and bridge to the historic crossing further upstream on Illabot Creek and removing all riprap bank armoring in the floodplain reach, 2) constructing an additional bridge span at	Construction

SMP ID	Source	Project Description	Project Status
		its present location to accommodate an historic secondary channel and removing most of the riprap upstream and downstream of the bridge, or 3) removing some of the excess riprap (270 m in length) downstream of the current bridge crossing.	
US-23 Illabot Creek	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Illabot Creek Design Study (10.05.03.02) (See #10.05.03, above): The purpose of this design study is to evaluate and address flood and erosion risks for existing infrastructure on an approximately half-mile reach of Illabot Creek that is heavily degraded. A feasibility study identified a preferred alternative to address these habitat impacts- to remove the dikes, relocate Illabot Creek to its historic channel, and allow for natural channel migration.	Design/ Permitting
US-24 Bacon and Diobsud Creeks	Habitat Work Schedule; WRIA 3/4 3-year work plan 2010	Diobsud Roads Erosion Control (09.3.05): Skagit Conservation District is partnering with USFS on an erosion reduction project to reduce the risk of road failure, erosion, and its negative effects on Bacon Creek and Diobsud Creek, and their floodplains. This project is designed to reduce the risk of road failure and resultant sediment production that occur from water collection and concentration and its negative effects on fish habitat. The project consists of culvert replacement and/or removal and replacement with rocked rolling dips, ditching and fill stabilization. This proposal will address 30 miles of high risk road segments in Bacon or Diobsud Creek Drainage.	Construction

5.2.10 Nooksack (WRIA 1)

Functional Analysis

Only six reaches were evaluated in the Nooksack Watershed Management Unit (Table 40, see map in Appendix D). As expected since this management unit focuses on the upper portion of the watershed, with steeper and more confined channels, hyporheic functions were low throughout the reaches in the Nooksack Management Unit. Habitat functions are particularly high throughout the

management unit, and forested vegetation is largely intact. Forested vegetation was present in high proportions throughout the management unit, and vegetative functions were especially high in the South Fork Nooksack because of greater bank stability and filtration capacity compared to the tributaries. Despite forested vegetation, temperature and fine sediment are impaired in several portions of the South Fork Nooksack River (Reaches 430 and 434) and several tributaries (reaches 429 and 432).

Table 40. Reach Functional Analysis Scores for Management Unit 10- Nooksack Watershed (WRIA 1)

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Cavanaugh Creek	429	3.1	1.8	3.6	4.0
Nooksack River - South Fork	430	3.3	2.8	4.4	4.2
	431	3.0	2.3	3.8	4.0
	434	3.3	3.4	4.7	4.3
Howard Creek	432	2.8	1.5	3.1	4.0
	433	3.1	1.8	3.6	3.8

Assessments from Other Studies

A geographic prioritization of restoration and protection priorities for Chinook salmon in the Nooksack watershed identified the upper South Fork Nooksack as the second highest priority for both habitat restoration and protection (WRIA 1 2005). The upper South Fork represents 44% of the spawning distribution for South Fork Nooksack early Chinook. High temperatures and lack of habitat diversity are the most significant limiting factors, followed by high fine sediment load and lack of key habitats. The recovery plan notes a reduction in the amount of in-stream wood and associated habitat diversity in the upper South Fork relative to historic conditions. Degraded riparian conditions and sediment delivery from forest management and forest roads are the primary human impacts in the upper South Fork sub-basin. These impacts have resulted in habitat simplification through a reduction in woody debris and bank stability. Furthermore, the reduction of woody debris may be associated with channel incision and reduced connectivity between the river and its floodplain (WRIA 1 2005). Sediment loads from mass wasting related to forest management may also contribute to the infill of pools and reduced habitat complexity (WRIA 1 2005).

In 2006, the National Forest Service conducted a Watershed Analysis of the Middle Fork and South Fork Nooksack Rivers. The Watershed Analysis recognized the significance of forest road impacts and the upper South Fork

Nooksack and its tributaries. The analysis noted that decreased timber harvest in the watershed has reduced the need for forest road construction, and by 2006, over half of the original road mileage in the upper middle and south fork basins had been closed (USFS 2006).

Potential Restoration Opportunities

The Nooksack Watershed (WRIA 1) identifies the recovery of the South Fork Nooksack early Chinook salmon population as one of its near-term priorities. In addition to the captive broodstock program to increase population numbers, habitat restoration in the lower South Fork (Whatcom County) is a primary concern and focus of near-term actions. In the upper South Fork, which includes lands in Skagit County, the retention and recovery of riparian zones are identified as priority actions (WRIA 1 2010). The development of a strategic plan to sequence and prioritize actions in the South Fork Nooksack is also underway (WRIA 1 2010). A summary of restoration opportunities that have been identified in the Nooksack Watershed Management Unit is provided in Table 41.

A watershed analysis of the upper middle and south forks of the Nooksack River identified several areas of concern and corresponding opportunities for shoreline restoration (USFS 2006). Restoration opportunities primarily focus on sediment load control through forest road improvements and decommissioning and habitat enhancement through the addition of key pieces of large woody debris.

Table 41. Restoration Opportunities in Management Unit 10- Nooksack Watershed (WRIA 1)

SMP ID	Source	Project Description	Project Status
Nook-1 South Fork Nooksack, Cavanaugh Creek	Habitat Work Schedule; Nooksack 3-year work plan 2010	South Fork Nooksack: Cavanaugh Island Restoration (10-LT-RCO1806): The Cavanaugh Creek reach (RM 16.6-17.0) includes the greatest length of side channel habitat in the South Fork watershed and is a known cool water tributary. The project objectives include increasing habitat quantity, improving conditions for spawning, and increasing thermal refugia availability. The design may consider using logjams at the head of the island to maintain year-round flow in the side channel, constructing engineered logjams in the channel to provide cover and thermal refuge for	Design and Permitting

SMP ID	Source	Project Description	Project Status
		endangered species, and increasing the stability of the island through riparian restoration.	
Nook-2 South Fork Nooksack	Nooksack 3-year work plan 2010	Larson’s Floodplain Refuge Project: Improve connectivity with cool water side-channel. This site is a series of groundwater-fed floodplain channels located just above the Larson’s Bridge at RM 20.9. A relic South Fork channel, dating from the 1940s, runs through the forested floodplain and mixes with the main channel. This is the sixth highest ranked project in the Upper South Fork Nooksack River Habitat Assessment and the third highest ranked project not currently funded.	Concept
Nook-3 South Fork Nooksack	Nooksack 3-year work plan 2010	Fobes Creek Reach Restoration: Stabilize existing wood debris in the active channel of the South Fork Nooksack to increase habitat functions and improve floodplain connectivity, provide high quality habitat in a known thermal refuge area, increase wood recruitment potential and shading through riparian enhancement. The Fobes Reach project area and scope has been expanded to include the reach between Larson’s Bridge (RM 20.5) and the top of Dye’s Canyon (RM 18). The project will be constructed in several phases and likely use a variety of stabilization techniques to improve the function of wood in the channel. The design will build on the Larson’s Bridge Project that lies in the reach.	Permitting

5.2.11 Stillaguamish (WRIA 5)

Functional Analysis

The Stillaguamish Watershed Management Unit was divided into 24 reaches for functional analysis (Table 42, see map in Appendix D). Similar to the Nooksack Management Unit, since the Stillaguamish management unit is located in the upper portion of the watershed, where channels are steeper and more confined, hyporheic functions were low throughout the Stillaguamish Management Unit.

Furthermore, despite relatively low hydrologic impacts in the watershed, hydrologic functions were moderate for most reaches, primarily as a result of relatively little floodplain area. Similarly, habitat and vegetative scores were moderate to high throughout the river and tributary reaches; and scores were buoyed by high vegetation coverage, but lowered for functions that incorporate floodplain area.

The abundance of overwater structures and associated shoreline development reduced the habitat functions for most of the Lake Cavanaugh shoreline reaches (reaches 442, 444, and 445). In contrast, the undeveloped, forested reach on Lake Cavanaugh (reach 443) scored highly for each of the functional categories. Summer Lake (reach 435) also scored highly for each of the functions; however, roads running along the eastern and southern shoreline are expected to reduce vegetative, habitat, and water quality functions to some extent.

Table 42. Reach Functional Analysis Scores for Management Unit 11- Stillaguamish Watershed (WRIA 5)

Waterbody	Reach Number	Hydrologic	Hyporheic *Riverine Only	Vegetation	Habitat
Summer Lake	435	3.7		4.4	4.3
Pilchuck Creek	436	2.9	2.0	3.9	3.9
	438	3.3	2.1	3.9	3.7
	441	2.6	1.6	3.3	3.7
Crane Creek	437	2.8	1.9	4.0	3.7
Bear Creek	439	2.9	1.8	4.1	3.7
Lake Creek	440	2.8	1.7	3.9	3.8
Lake Cavanaugh	442	2.3		3.6	2.9
	443	3.8		3.9	3.8
	444	3.7		3.5	2.5
	445	3.7		3.4	2.7
Deer Creek	446	2.9	1.8	4.0	3.9
	449	3.3	1.7	4.1	3.9
Little Deer Creek	447	2.8	2.1	4.1	3.9
	448	3.3	2.0	4.0	3.9
Rollins Creek	450	3.1	1.8	3.6	3.7
Segelsen Creek	451	4.0	1.0	4.0	3.8
Stillaguamish River - North Fork	452	3.3	2.2	3.5	3.8
	453	3.8	2.2	3.8	3.7
	455	3.3	2.3	3.5	3.7
	456	4.3	1.5	4.3	3.7
	457	3.2	2.0	3.3	3.8
	458	3.9	1.1	3.7	3.7
Crevice Creek	454	4.0	1.0	4.0	3.7

Assessments from Other Studies

A reduction in large wood debris combined with increased sediment supply has resulted in the loss of pool area in the Stillaguamish watershed. The North Fork Stillaguamish has 28% pool area, representing a 38% loss since 1950 (Pess et al. 1999). Landslides have occurred in the North Fork drainage basin (Washington State Conservation Commission 1999). Forested areas with over two miles of road per square mile may not have properly functioning sediment and water delivery to lower watersheds (NMFS 1996). The density of roads in the Upper North Fork Stillaguamish, Deer Creek, and Upper Pilchuck Creek exceeds this threshold, with average road densities of 3.2, 2.6, and 4.08 mi/mi², respectively (SIRC 2005). Furthermore, 28% of existing roads in the upper North Fork Stillaguamish sub-basin, as well as 9% in Deer Creek, and 1% in Upper Pilchuck Creek, are underlain by unstable geology and built on slopes steeper than 30% (SIRC 2005).

The extent and frequency of peak flows in the North Fork Stillaguamish have increased over time. It is unclear of the extent to which land use changes in the upper North Fork Stillaguamish basin have contributed to increases in peak flows downstream; however, industrial forestry is a possible factor contributing to increased peak flows (SIRC 2005). Forest cover is relatively high in the North Fork Stillaguamish and Deer Creek (70% and 75%, respectively); although the proportion of mature forest is much lower in comparison (27% and 28%, respectively). Forest cover is lower in Upper Pilchuck Creek at 60%, where only 14% of landcover is mature forest.

Potential Restoration Opportunities

Although forest cover is relatively high in the Stillaguamish Management Unit, riparian forest cover is below the 80% cover threshold identified by the Stillaguamish Technical Advisory Group as properly functioning conditions. Riparian restoration could improve large wood recruitment potential, reduce sediment inputs, and reduce elevated stream temperatures. The installation of large woody debris would help accelerate the development of in-stream habitat cover, pool development, and side channel connectivity. Forestry management practices that protect existing mature forests and allow immature forests to mature would also improve overall shoreline function in this management unit. A summary of restoration opportunities in the Stillaguamish Watershed Management Unit is provided in Table 43.

Table 43. Restoration Opportunities in Management Unit 11- Stillaguamish Watershed (WRIA 5)

SMP ID	Source	Project Description	Project Status
Stilly-1	SRFB Round 7 (2006) letter of intent for grant applications	Upper North Fork Stilly Temperature Reduction: The project would relocate 0.5 to 1.0 mile of Forest Service Road 28 where it impinges on the upper North Fork Stillaguamish and also place 15-20 large wood complexes along a 1.5-mile, low gradient braided reach between RM 39 and 40.5. High summer temperatures and degradation of downstream spawning and rearing habitat for Chinook will be addressed. Riparian vegetation will re-establish as width to depth ratio decreases. Wood complexes will form deep pools for rearing and adult holding.	Concept
Stilly-2		“Big Trees” planting plans to include Pilchuck Creek and upper North Fork, parts of which are in Skagit County	Concept

6 LAND USE ANALYSIS AND IMPLICATIONS

This section presents an analysis, identifying current and projected shoreline use patterns, as well as estimating future demand for shoreline space, consistent with SMP guidelines.

Land use patterns are an important consideration in SMP analysis because such analysis can identify opportunities for “preferred uses,” especially water-dependent, water-related and water-enjoyment uses. Land uses are also a determinant in assigning environment designations to specific sections of the shoreline. Additionally, an analysis of land use conditions is necessary to determine potential land use changes and their effect on shorelines with respect to SMA objectives. Finally, the existing land uses and proposed environment designation boundaries and provisions must be mutually consistent with the County’s Comprehensive Plan.

As part of SMP development, the shoreline is to be classified into specific shoreline environment designations based upon existing land use patterns, baseline inventory and analysis results, goals stipulated in the Comprehensive Plans and Ecology criteria. Additionally, while use environments vary in the variety of land uses and level of development they may allow, all use environments will be subject to vegetation conservation standards, critical area regulations, and other requirements that are intended to balance preferred uses and ecological protection and achieve no-net-loss of ecological function. See Section 8.1 for additional discussion of potential environment designation strategies.

6.1 Shoreline Land Capacity Analysis

6.1.1 Land Capacity Analysis

The purpose of the shoreline land capacity analysis is to gauge the potential level of development that may occur in the future along shorelines given adopted Comprehensive Plan land use designations. The analysis was not based upon existing County shoreline regulations, which have minimal density/intensity controls when compared to the Comprehensive Plan and its implementing zoning land use designations. The information is intended to provide an

understanding of the future level of intensity that may occur given current plans and regulations and to help identify potential use conflicts.

Because Skagit County is in the process of developing a long-range land capacity as part of the Envision Skagit County 2060 planning effort, data available from this effort, and assumptions consistent with this effort were used to the extent possible.

In general, two analyses were conducted for land capacity, one for the rural lands, and one for land within urban growth areas. The method to determine shoreline land capacity for rural and urban land is summarized below. A more detailed matrix of assumptions is included in Appendix F.

Both Rural and Urban Land

Determine shoreline boundaries. The analysis includes parcels within or intersecting shoreline jurisdiction. The parcel was included whether the entire parcel was within the shoreline jurisdiction, or just a part of the parcel was included in the shoreline jurisdiction.

- Because Skagit County land use data aggregates separate areas of land under a common parcel number, in some cases, lot areas are included within the data used for this land capacity analysis that is not within the shoreline jurisdiction. Therefore, the land capacity output indicates a larger amount of potential development within the County's shorelines than would actually occur.

Rural Land

Determine Development Potential. The analysis estimates developable acres by Skagit County zoning designation category, using outputs from the Envision Skagit County 2060 model for developable acres in the vacant and redevelopable (partially used/developed) categories. The Envision Skagit County 2060 model applies policy and other factors to assess alternative future scenarios for Skagit County. The gross developable acres data that was used for the shoreline land capacity analysis was derived from raw data in the model that does not include the application of policy or other factors influencing future development.

- Because Skagit County calculates land development potential on a gross acreage basis, most environmentally critical areas or development infrastructure factors were not removed from the rural land calculations. However, land within the floodway was removed from the calculation in

recognition of the development constraints of that environmentally sensitive area. It is still acknowledged that some of those properties would still be allowed to potentially transfer development rights out of the floodway, or if a portion of the property is out of the floodway it would still have development rights from the portion in the floodway to that area.

- A 25% market factor was applied in the Industrial Forest zone only. A market factor accounts for those property owners with vacant or redevelopable property that choose not to develop during the planning timeframe being considered. The 25% figure is similar to that applied for the urban areas method and in the range of market factor percentages applied in other counties for buildable lands assumptions. The market factor was applied in this zone because maximum densities are applied, and this zone allows a wide range of densities, and generally applies to large land holdings.
- The maximum zoning density for each zone was applied to result in the estimated number of dwelling units for each parcel considered vacant or redevelopable. Existing dwelling units were deducted from development in partially used parcel calculations to arrive at a net increase.
- For commercial and industrial lands in the rural area, an estimated number of employees per acre ratio used in the Envision Skagit County 2060 land use model was applied to parcels depending upon whether or not they had commercial, light industrial, or heavy industrial zoning. The results were expressed in employees per acre to provide a sense for where potential non-residential development would occur.
- Skagit County does not have existing building square footages in the data provided. Therefore, a measurement of commercial square footage that deducted existing building square footage could not be made. In addition, available data does not include any record of existing employees. Therefore, for commercial statistics, both employees generated on vacant and employees generated on partially-used (redevelopment) parcels is indicated. Due to data limitations, the employees in redevelopment include some existing employment as well as the new employees.

Urban Land

Determine Development Potential. The analysis estimates developable acres by Skagit County zoning designation category for urban growth areas that are not

associated with a city (i.e., Swinomish), or the City's planned land use designations when an urban growth area associated with a city (i.e., Anacortes, Burlington, and Mount Vernon UGAs), or in the towns of Lyman and Hamilton. Envision Skagit County 2060 model data for gross developable acres in the vacant and redevelopable (partially used/developed) categories were used as a basis for this analysis, similar to the rural lands assumptions, above.

- Similar to rural areas above, because environmentally sensitive areas are not deducted from development areas, only areas of land in floodways were deducted under that category. In addition, a 10% deduction was taken for infrastructure such as roads and other infrastructure needed for development, particularly in an urban area. This deduction allows for a more realistic assessment of area of land available for development.
- Market factor reductions, which account for land that may not be available (e.g., owner does not wish to develop), are also included for urban land.
- A maximum density was applied to the net buildable acres for residential development in urban areas to be consistent with the approach taken with rural residential land capacity and the Envision Skagit County 2060 model effort in estimating total future dwellings.
- The Envision Skagit 2060 employee/acre ratios for commercial, light industrial and heavy industrial zones were applied to the net acres for non-residential development.

In all rural or urban cases, the statistical results exclude the following lands:

- Lands designated for conservation whether publicly or privately owned are excluded from the statistics since the likelihood is that these conservation easements or ownership (e.g., Nature Conservancy) mean that future development or redevelopment on these lands is unlikely.
-
- It is important to note that this analysis is intended to give an overall picture of the potential for development along shorelines, but is not an exact predictor of which parcels may develop or redevelop. In addition, the analysis does not provide a "rate" of development.

Table 44 below, summarizes the residential development capacity broken down by management unit and rural vs. urban areas. A summary discussion of the land capacity results by management unit follows Table 44.

Table 44. Estimated Land Capacity in Skagit County Shoreline Jurisdiction

Management Area	Rural Dwelling Units	Urban Dwelling Units	Total Dwelling Units	Total Employees (Commercial/Industrial)
Samish Bay	53	0	53	230
Samish Island, Padilla Bay, and East Side of Swinomish Channel	320	0	320	152
Swinomish Tribal Reservation	68	1,415	1,483	1,470
Fidalgo Island and Other Islands	752	0	752	6,775
Skagit Bay/Delta	146	0	146	51
Lower Skagit – Diking Districts	467	364	832	402
Samish River	308	0	308	0
Middle Skagit	574	0	574	198
Town of Lyman	0	TBD	TBD	
Town of Hamilton	0	0	0	0
Upper Skagit (WRIA 4)	1,768	0	1,768	357
Nooksack (WRIA 1)	0	0	0	0
Stillaguamish (WRIA 5)	81	0	81	0
TOTAL	4,537	1,780	6,317	18,873

A review of Table 44 shows that approximately 28% of the residential development capacity exists in the Upper Skagit (WRIA 4) Management Unit. This can be attributed to the larger amount of large lots with vacant and redevelopable land available in this management unit, as well as to the higher intensity development potential available through the large amount of Industrial Forest parcels that are found in this management unit. Due to the larger parcel sizes found in the Upper Skagit Management Unit, it is also more likely that a larger number of potential residential units found in this management unit would be located outside of the shoreline jurisdiction. The second largest amount of residential land capacity (approximately 23%) can be found in the Swinomish Tribal Reservation, where a large portion of the shoreline jurisdiction is made up of the Swinomish UGA. Residential development capacity is more likely to be found in the shoreline jurisdiction in the Swinomish Tribal Reservation due to generally smaller lot sizes.

The majority of commercial development capacity in and near the County’s shoreline jurisdiction (approximately 70%) exists on Fidalgo Island and Other Islands’ Management Area, and particularly in the City of Anacortes’ UGA,

where a large amount of industrial property is available for potential future redevelopment. Other management units with sizable commercial and industrial redevelopment potential include:

- The Swinomish Tribal Reservation Management Area, which as mentioned above, has a large portion of the shoreline jurisdiction in UGA, where a wider variety and higher intensity of development could occur, and
- The Lower Skagit – Diking Districts Management Area which has small areas of UGA associated with the City of Mount Vernon.
- Due to the amount of land in public or conservation ownership and/or residential zoning designations, several management units have little or no commercial or industrial development capacity. These include the Samish River, Nooksack (WRIA 1), and Stillaguamish (WRIA 5) Management Units.

6.1.2 Potential Use Conflicts

Although there is potential for future use conflict, particularly in land use zones that provide a wide variety of land uses, the existing Skagit County SMP provides guidance and a regulatory framework that helps minimize or avoid future use conflicts in the shoreline jurisdiction. Similarly, the existing Skagit County SMP helps provide a framework for allowing and/or encouraging shoreline preferred uses in the shoreline jurisdiction.

6.1.3 Samish Bay

The Samish Bay Management Area has land capacity for approximately 53 dwelling units, mostly found through redevelopment on partially used and vacant rural lots in zones such as the Rural Village Residential (RvR), which in this management unit are found in and around the unincorporated town of Edison. A smaller amount of residential capacity is found in the Secondary Forest – Natural Resource Lands (SF-NRL) and Agricultural – Natural Resource Lands (Ag-NRL) zones that are predominant along the shoreline jurisdiction in this management zone. Overall, residential development capacity in this management unit is a small fraction of the overall residential development capacity in shorelines of the County as found on Table 44.

In terms of commercial and industrial land capacity, this management unit is estimated to have capacity for approximately 230 employees, most of which would be found on vacant and partially developed lots in zones such as the

Small Scale Business (SSB) and Rural Business (RB), which are located in and around the town of Edison and in small pockets in other parts of the management unit near SR 11. These zones allow for water-enjoyment uses, such as hotel/lodging and restaurants.

Large-scale residential and/or commercial development within this management unit poses a potential use conflict for existing and future shellfish harvesting operations on the tidelands and shores of Samish Bay in this management unit. Shellfish harvesting is a water-dependent use. Although the residential and employment land capacity in this management unit is not large, it along with that of the neighboring land capacity on Samish Island (Management Area 2), may pose a more significant use conflict. Larrabee State Park and restaurants in Edison present water-enjoyment uses within the management unit.

6.1.4 Samish Island, Padilla Bay, and East Side of Swinomish Channel

This management unit has an estimated land capacity for approximately 320 dwelling units, most of which is found in vacant and redevelopable rural lots in the Rural Intermediate (RI) and RVR (Rural Village Residential) found on Samish Island or west of the Bayview UGA. A much smaller amount of this residential development potential is found in the Ag-NRL and Rural Reserve (RRv) zones found in most of the shoreline jurisdiction in this management unit.

Non-residential development capacity in and near the shoreline jurisdiction in this management unit consists of approximately 152 employees. This development capacity is found entirely in the form of redevelopment on partially used, and a few vacant Rural Marine Industrial (RMI) zoned parcels found within the management unit on the east side of the Swinomish Channel near SR 20. Potential water-oriented uses that could make use of this non-residential capacity include boat works or repair/maintenance type of facilities, and other marine transportation types of uses.

Large scale residential and/or commercial development on the shoreline may pose a potential use conflict for existing and future shellfish harvesting operations on Samish Bay and Padilla Bay. In particular, more intense development in the RI, RVR, and RMI zones could have a cumulative impact on future health of shellfish harvests in these areas. Shellfish harvesting is a water-dependent use. A boatworks located south of Bayview State Park is also a water-dependent use which is zoned RMI, and there is no conflict with existing and planned shoreline uses in this instance. Additional RMI-zoned land near the

Swinomish Channel at the south end of this management unit provides additional area for similar water-dependent uses. Bayview State Park and the Padilla Bay Trail provide water enjoyment uses in this management unit.

6.1.5 Swinomish Tribal Reservation

The Swinomish Tribal Reservation has one of the highest residential land capacities for parcels within and near the shoreline jurisdiction of all the management units. This is largely because a large percentage of the management unit's shoreline area is made up of the Swinomish UGA, an urban growth area that is not associated with an incorporated town or city. This management unit has residential capacity for an estimated 1,483 dwelling units, most of which comes from development in the Residential (R) zone found in the Swinomish UGA. Most of the lots that make up this residential land capacity have an estimated capacity for one additional dwelling unit, indicating a larger amount of small scale redevelopment opportunity on the smaller more urban lots located along this shoreline, with a few larger lots available for development mixed in this management unit.

The Swinomish Tribal Reservation Management Area has the second-highest employment capacity of the management units in Skagit County. This is largely because of the extent of this shoreline found in the Swinomish UGA. Although there are few commercial parcels that are vacant or redevelopable, there are a few large redevelopable lots that are zoned Commercial and provide for the most commercial redevelopment opportunity in this management unit. Since the Commercial zoning designation allows a wide variety of land uses, this needs to be reviewed carefully during future development of the shoreline jurisdiction in this management unit.

The wide variety of land uses allowed in the Commercial land use district located on the west side of the Swinomish Channel provides a greater opportunity for future land use conflict than in other areas. In addition, the mix of Swinomish Tribal shoreline regulations with the Skagit County shoreline regulations in this management unit also poses a potential for future use conflicts, particularly if future shoreline designations are inconsistent between Swinomish and Skagit County use environments. Coordination between County and Swinomish planning officials to designate the shoreline area appropriately is important. This management unit provides some of the greatest land use capacity for the shoreline preferred use of residential development – particularly

in the Residential land use district. Hope Island, Goat Island, and other nearby small islands' OSRSI land use designations allow them to provide water enjoyment use in this management unit. In addition, marinas and piers associated with existing residential development in this management unit also provide additional water-dependent uses.

6.1.6 Fidalgo Island and Other Islands

The Fidalgo Island and Other Islands Management Area has a residential land capacity for approximately 752 dwelling units (approximately 12% of the overall residential development capacity), most of which come from development and redevelopment of Rural Intermediate (RI) and Rural Reserve (RRv) zones found on the rural part of Fidalgo Island located south of Anacortes, or on Guemes Island, served by the Skagit County Ferry.

This management unit provides the largest potential non-residential development capacity in the County's shoreline jurisdiction. The majority of this development capacity is found in the Anacortes UGA, which provides capacity for approximately 6,077 employees of the overall 6,775 employee development capacity in this management unit. Anacortes UGA development is largely in heavy industrial zoned areas east of the Anacortes city limits. Outside of the Anacortes UGA, commercial development capacity is found in Rural Commercial (RC) zoned properties on Guemes Island, and on Lake Erie and Lake Campbell. A small amount of industrial land capacity also exists on the shores of Similk Bay on Puget Sound. Similar to the previous management unit, the wider range of uses allowed under the RB and RMI zones has the potential to create future land use conflicts in development of the shoreline. However, it also provides an opportunity to develop future industrial and commercial shoreline uses that meet the SMA's definition of water-oriented uses.

Because of land use zoning and shoreline use environments applied in this management unit, use conflicts are not an issue in this management unit. The portion of the management unit in the Anacortes UGA provides for shoreline priority port facilities and water-related industrial facilities. Because of the complementary comprehensive plan and zoning designations provided between the City of Anacortes and Skagit County, there does not appear to be a future use conflict in this area, and it appears as if it will continue in this use into the future. Cypress Island, Burrows Island, and Deception Pass State Park all provide for water-enjoyment uses which will continue into the future with the OSPI land use

designation. Residential shoreline priority uses are also allowed and will to continue to be within this management unit.

6.1.7 Skagit Bay/Delta

The Skagit Bay/Delta Management Area has a small amount of residential land capacity of approximately 51 dwelling units, most of which come from development on two vacant RRv zoned parcels located on the north fork of the Skagit Delta. The remainder of the residential capacity is in the form of 1 to 5 dwelling units occurring on smaller vacant lots or as redevelopment on partially used lots within the shoreline jurisdiction.

The Skagit Bay Management Area also has a small amount of commercial development capacity derived from development of a RB-zoned lot on the Carpenter Creek shoreline jurisdiction.

The Skagit Bay Management Area has large areas of shoreline dedicated to water enjoyment use through the OSPSI land use designation and much of the shoreline jurisdictions' ownership by the Washington State Department of Natural Resources or the Washington Department of Fish and Wildlife. Some potential for use conflict exists, particularly in some limited instances where existing land uses and land use designations are not consistent, such as on the south fork of the Skagit River near the Town of Conway, where existing residential uses are found in areas designated OSPSI on the Skagit County zoning map. Some additional potential for land use conflicts exist in places with NRI and RVR land use designations applied (in Town of Conway). These land use designations allow a wider variety of land uses at higher intensities than other rural land use designations, and therefore, potential use conflicts could occur in these areas.

6.1.8 Lower Skagit Diking District

The Lower Skagit Diking District provides residential development capacity for approximately 832 dwelling units, a little less than half of which are found in the portion of the Mount Vernon UGA which are found within this management unit. Parcels within the Mount Vernon UGA are currently zoned a variety of Ag-NRL, RRv, and URR, but once annexed would be zoned within the zoning allowed under Mount Vernon's Medium Density Residential Comprehensive Plan designation. There are a wide variety of zoning designations that allow residential in areas of this management unit outside of the Mount Vernon UGA. Most of the residential development capacity comes from development or

redevelopment on smaller lots. However there are areas with larger vacant lots located on Nookachamps and Walker Creeks which provide for larger amounts of residential development capacity within this management unit.

The presence of the Mount Vernon UGA within this management unit provides for approximately 402 of the 453 estimated employees in this area. Most of this commercial development capacity is driven by existing County zoning designations located within the City of Mount Vernon's Commercial/Limited Industrial Comprehensive Plan designation (which extends west from the City). The small portion of non-residential development capacity in this management unit outside of the UGA is found on an underutilized RB-zoned parcel on Nookachamps Creek, east of the City of Mount Vernon.

Although there do not appear to be existing use conflicts in this management unit, portions of the management unit in and near the UGAs of Mount Vernon and Burlington are expected to attract a wider variety of potential land uses, and this could result in potential future use conflicts. The residential shoreline preferred use is accommodated in land capacity estimates for this area. In addition, other water enjoyment uses, such as restaurants could be accommodated in appropriate zones allowing this use, such as the RB zone.

6.1.9 Samish River

The Samish River Management Area has an estimated residential land capacity of approximately 308 dwelling units. Although a variety of zoning designations in this management unit allow for residential development and contribute to the residential capacity in this management unit, most of the potential residential development is found from development of vacant parcels in the RRv zoning designation.

There is little or no commercial and industrial land capacity in this management unit.

The Samish River Management Area accommodates the residential preferred shoreline use, as can be seen in the residential land capacity noted above. Although little commercial or industrial land capacity exists in this management unit, potential for use conflict exists in the small number of areas where existing land uses are inconsistent with planned land uses identified in land use designations.

6.1.10 Middle Skagit

The Middle Skagit Management Area includes unincorporated areas of the County, as well as the towns of Lyman and Hamilton. These towns are treated separately below. The unincorporated rural portion of this management unit has residential development capacity for approximately 574 dwelling units, approximately 9% of the total residential development capacity in the County. Similar to other management units above, the Middle Skagit has a wide variety of zoning designations that allow residential development. Most of the residential development capacity in this management unit is found in areas of the shoreline jurisdiction along the Skagit River.

The unincorporated rural portion of this management unit has non-residential capacity for approximately 198 employees which are divided between two RB-zoned areas.

Potential use conflicts in the Middle Skagit Management Area could occur in the areas near the Towns of Sedro-Woolley, Lyman, and Hamilton where market forces could attract incompatible land uses in the future. However, zoning designations and the shoreline use environments would minimize future use conflicts. As noted above, this management unit primarily accommodates the preferred residential shoreline use (note: residential uses are not a top preferred use for shorelines of statewide significance).

Town of Lyman

The Town of Lyman's shoreline jurisdiction is mostly in Open Space (O-S) land use designation. However, a portion of the Town's shoreline jurisdiction is within the residential land use designation. This area is mostly developed with existing residences. However, a small amount of residential development capacity can be expected in this area resulting from redevelopment on existing underutilized larger lots, or development of the small number of vacant residential lots within this area.

Town of Hamilton

The Town of Hamilton is located completely within the Skagit River floodway. As such, although the town has zoning that allows residential and some non-residential (commercial) development, it is considered to have no land capacity within the existing incorporated boundaries. The Town's UGA, which is located outside of the shoreline jurisdiction and north of SR 20, has residential (approximately 200 residential dwelling units) and commercial/industrial

capacity (approximately 10 acres zones for commercial and industrial use) for future growth (Personal Communication, Mark Personius, April 11, 2011).

Although uses within the Town of Hamilton are allowed per the Town's existing regulations, the presence of the existing town within the floodway presents a use conflict. The Town of Hamilton is addressing this use conflict by development of a UGA outside of the floodway and the shoreline jurisdiction (located north of SR 20) that will allow for future relocation of residences and businesses as well as future town growth.

6.1.11 Upper Skagit (WRIA 4)

The Upper Skagit (WRIA 4) Management Area is largely in OSRSI zoning designation. As such it provides no residential development capacity. However, areas of the shoreline jurisdiction closest to SR 20 and SR 530 include significant amounts of Rural Reserve, Rural Resource – Natural Resource Lands, and Industrial Forest lands. Land in these zoning designations within this management unit tend to be held in large private holdings (in some cases, hundreds of acres), and as vacant land with residential zoning potential provide for the largest residential land capacity of any of the management units within the County. However, it should be noted that due to the size of the parcels, the variability of the zoning densities, and the lack of infrastructure availability in this part of the County, the residential land capacity of approximately 1,768 dwelling units is higher than what would likely occur over a 20-year planning period, and in particular, only a fraction of this land capacity would actually occur within the portion of these large lots found within the shoreline jurisdiction. However the large amount of residential development capacity in this management unit could provide a future conflict to shoreline uses in the management unit.

The Upper Skagit Management Area has a commercial land capacity of approximately 357 employees mostly found in Rural Village Commercial and Rural Business zoning designations along the Skagit River and Grandy Creek in the western part of the management unit, west of the Town of Concrete. Although these zoning designations provide an opportunity to provide water-oriented uses, such as water-enjoyment (e.g., eating establishments and lodging), the wide variety of uses allowed in these zoning designations also provides an opportunity for potential future land use conflict in this management unit.

Potential use conflicts in the Upper Skagit Management Area may occur in areas of the management unit where existing uses are incompatible with the planned land uses allowed in the zoning land use designations. This is particularly true in portions of the management unit near SR 20 between the western edge of the management unit and the confluence of the Skagit and Cascade Rivers. In addition, although the management unit accommodates preferred residential shoreline uses (note: residential uses are not a top preferred use for shorelines of statewide significance), the large amount of potential residential allowed in the land capacity analysis may present a use conflict in terms of location of the residential uses, particularly in the IF, RRv and RR-NRL zoning designations. There are areas of water enjoyment uses also preserved in this management unit in the OSRSI land use designation.

6.1.12 Nooksack (WRIA 1)

The shoreline jurisdiction of the Nooksack Management Area is largely within the OSRSI zoning designation, allowing for open space and recreation uses. As such, this management unit has no measurable land capacity (residential or commercial/industrial).

There are no potential use conflicts in this management unit. The water enjoyment uses of recreation (hiking trails and primitive camping) are protected in this management unit through implementation of the OSRSI land use designation.

6.1.13 Stillaguamish (WRIA 5)

The Stillaguamish (WRIA 5) Management Area has a potential residential land capacity of approximately 81 dwelling units. The majority of this management unit is in OSRI or Industrial Forest (IF-NRL) zoning designations. However, the vast majority of the residential land capacity in this management unit is found on the shores of Lake Cavanaugh in the western portion of the management unit, where the Rural Village Residential (RVR) zoning designation is common.

This management unit allows for the shoreline priority use of residential, particularly in and around Lake Cavanaugh and Pilchuck Creek. There are no known use conflicts in this management unit.

7 PUBLIC ACCESS ANALYSIS AND IMPLICATIONS

Public access means, “the ability of the general public to reach, touch, and enjoy the water’s edge, to travel on the waters of the state, and to view the water and the shoreline from adjacent locations” (WAC 173-26-221(4)(a)). Public access may be provided on public properties or along with development that creates a demand for public access. Providing public access helps fulfill the public trust doctrine which holds “that the waters of the state are a public resource owned by and available to all citizens equally for the purposes of navigation, conducting commerce, fishing, recreation and similar uses.” At the same time the public trust doctrine “does not allow the public to trespass over privately owned uplands to access the tidelands.” This section addresses existing public access opportunities as well as future public access opportunities.

WAC 173-26-221(4) (c) states that:

“Local governments should plan for an integrated shoreline area public access system that identifies specific public needs and opportunities to provide public access. This planning should be integrated with other relevant comprehensive plan elements, especially transportation and recreation.”

To support this planning, WAC 173-26-201(3)(c)(vi) calls for local governments to inventory existing and potential shoreline public access sites, including public rights-of-way and utility corridors. Because shoreline access includes visual access, important views of the water from shoreline areas were also identified.

Information about public access sites in the County and Towns was drawn from site visits; aerial photographs; the County and Towns’ Comprehensive Plans; Parks, Recreation and Open Space Plan; parks and recreation staff and/or websites; and the County and Towns’ land use and parks maps.

7.1 Goals and Policies

Several documents, including the Skagit County Comprehensive Plan and the Skagit County Comprehensive Parks and Recreation Plan, include goals, objectives and policies to guide future development of open space, recreation and public access opportunities, such as:

Comprehensive Plan Goal A-2: *Adequate urban public facilities and services shall be provided concurrently with urban development, as appropriate for each type of designated land use in the Urban Growth Area.*

Note: Skagit County considers park and recreation facilities an urban public facility and includes recreation and environmental protection in the list of urban public services.

Comprehensive Plan Goal B: *Recognize the important functions served by private and public open space, designate and map public open space of regional importance, and designate open space corridors within and around urban growth areas.*

Note: The policies for implementing Goal B include islands, lakes, reservoirs, creeks, streams, river corridors, and shorelines in the list of lands that should be reserved for public use or enjoyment because of their special natural resource-based and recreational opportunities.

Skagit County's Parks and Recreation Comprehensive Plan contains the following goals and objectives related to acquisition and development of water access:

Goal: *Provide opportunities for water access and activities throughout the County.*

Objectives:

- *Identify future sites and partnerships to acquire additional salt water access sites along Puget Sound.*
- *Identify future opportunities for appropriate lakefront water activities at new park sites.*
- *Evaluate opportunities to develop new sites, or redevelop existing parks to expand water dependent activities at appropriate locations.*
- *Designate, maintain and promote aquatic trail opportunities and recreational experiences for users of kayaks, canoes, inflatable boats, pleasure boats, and small non-motorized watercraft.*
- *Develop a plan to assess river access needs on the Skagit River.*

Goal: *Acquire and develop parks and recreation facilities and open space areas to meet the needs of the public within available resources.*

Objectives:

- *Make acquisition and development of water property for parks, trails, and open space a high priority.*
- *Acquire and develop regional parks and secure open space in rural areas s opportunities to meet the other goals set forth in this plan occur.*

The Skagit Countywide Urban Growth Area (UGA) Open Space Concept Plan is a plan prepared by the Skagit Council of Governments on behalf of Skagit County and local cities and towns intended to define and separate UGAs with open space, as well as to provide connectivity for 10 communities through recreation and habitat conservation. Much the open space is focused along shorelines of the state, including the Skagit River and marine shoreline. Countywide UGA open space corridors “focus on the Skagit River from Concrete through Hamilton, Sedro-Woolley, Burlington, and Mount Vernon; on the Swinomish Channel to LaConner; and on the Community Forests and State Park through Anacortes.” This document includes public access goals as follows:

Scenic Resource Goal: *Protect and enhance scenic viewpoints that look into and onto visual landscapes including prominent high points such as Cap Sante Point, Mount Erie, Little Mountain, and Burlington Hill, as well as strategic overlooks or look-into places alongside and within the UGA open space network at the Baker and Skagit Rivers, Gages Slough, Nookachamps Creek, and Swinomish Channel.*

Recreation Water Trail Linkage Goal: *Where possible, connect on/off road trails with water trails on the Guemes and San Juan Island Ferries and private excursion boat routes on the Skagit River, Swinomish Channel, Padilla, Similk, and Skagit Bays to increase public access and interpretive opportunities.*

Transportation Water Trail Goal: *Designate hand-carry and other non-motorized water craft routes that flow alongside and through countywide and UGA open spaces on the Baker River, Skagit River including the North and South Forks, Samish River, Swinomish Channel, and Samish, Padilla, Fidalgo, Burrows, Similk, and Skagit Bays.*

7.2 **Opportunities for Future Public Access**

In a 2003 survey for the need analysis for the Skagit County Parks and Recreation Plan, Skagit County residents indicated a higher need for regional parks over community and neighborhood parks. Surveys also show a strong demand for additional boat ramps. There are only 35 public boat launches including river, lake, and saltwater ramps in the County's 50 miles of public shoreline. Access is limited on many of the County lakes. Saltwater launching opportunities have improved since Skagit County renovated the Swinomish Site. River access is declining as many sites have become inoperable. The sites that do exist are distributed sporadically. There is a clear deficiency in the amount of public shoreline access, especially in regards to lakes and rivers.

The survey for the Parks Plan also showed high usage of water access and trails, with over 78% of respondents spending time at public seashores, lakes or rivers during the preceding year and 64% of respondents using trails during the same period. With such high use of existing public access points and trails, it is imperative that those facilities be maintained. Expanding public access opportunities or acquiring new shoreline sites should be a priority. Funding shortages may result in a gap between supply of and demand for facilities. The County should explore adequate funding sources to accomplish recreation priorities while maintaining shoreline resources. The UGA Open Space Plan implementation strategy establishes a funding source and competitive process for funding projects with a priority to award and fund proposals that preserve through acquisition of development rights or property title, restore environmental character and wildlife habitat, enhance rural agricultural, forest, or other open space features and activities within, adjacent, or between the UGAs and countywide.

The County should seek a balance of development and preservation of its shorelines. Seeking opportunities for acquisition of shoreline access parcels should be a priority, especially since such parcels will become more expensive and harder to find over time. Skagit County should pursue opportunities for expanding public access to those lakes which lack access opportunities. Since most of the future growth is targeted toward the UGAs, expanding public access opportunities near the UGAs would provide the greatest benefit to the largest number of people.

The following shoreline public access needs are identified based on the existing condition review:

Table 45. Public Access/Trail Improvement Opportunities in Shoreline

Management Unit	Improvement Opportunities
Samish Bay	<ul style="list-style-type: none"> • Add trail extension. Add PNW/Interurban Trail extending south from the Interurban Trail in Whatcom County through Bayview to the Swinomish Channel. • Access improvement to cross-over the railroad. • Road end improvements at the southern end of the management unit.
Samish Island, Padilla Bay and East Side of Swinomish Channel	<ul style="list-style-type: none"> • Samish Overlook improvement to include design and construction of improved parking and improved restroom access, signs, an observation terrace and links to trails. Extend Swinomish Channel Trail north from La Conner along the Swinomish Channel to the PNW Trail and provide access to the estuaries and wetlands in Padilla and Fidalgo Bays. • Improve and enhance Padilla Bay Trail. • Protect and enhance overlooks or look-into places within the UGA open space network. • Introduce hand-carry and other nonmotorized water craft routes that flow alongside and through countywide and UGA open spaces on Swinomish Channel.
Swinomish Tribal Reservation	<ul style="list-style-type: none"> • Opportunities for shoreline access on Similk Bay. • Work with the Tribe to enhance public access with shoreline recreational activities.
Fidalgo Island and Other Islands	<ul style="list-style-type: none"> • Trail extension along the marine shorelines as follows: Anacortes-Burlington Trail extending “west from Burlington along SR20 through the Bayview Ridge UGA to link with Swinomish Channel and PNW Trails to LaConner and Anacortes.” • Developing a master plan for Hunts Park and maintain the park as a water trail destination with a focus on boater-related camping. • Introduce hand-carry and other nonmotorized water craft routes that flow alongside and through countywide and UGA open spaces on Swinomish Channel and Fidalgo Bay.
Skagit Bay/ Delta	<ul style="list-style-type: none"> • Trail extension south from Mount Vernon to the delta. • Expand the estuary and wildlife habitat preserves.
Lower Skagit Diking District	<ul style="list-style-type: none"> • Extension of the Centennial Trail to connect Snohomish and Whatcom County past Big Lake, the Nookachamps, Skagit River. • Improve public lake access where feasible. • Protect and enhance overlooks or look-into places within the UGA open space network at Nookachamps Creek.
Samish River	<ul style="list-style-type: none"> • The Centennial Trail extension to connect Snohomish and Whatcom County. • Designate hand-carry and other nonmotorized water craft routes that flow alongside and through countywide and UGA open spaces network at the North and South Forks of Samish River.

Management Unit	Improvement Opportunities
Middle Skagit	<ul style="list-style-type: none"> • Improve trail, boat launch and other shoreline public access facilities. • Improve trail connection with the Cascade Trail that is outside the shoreline jurisdiction.
Upper Skagit	<ul style="list-style-type: none"> • Develop public access to Cascade River • Improve public access opportunities for Lake Shannon such as permanent access to Lake Shannon and day use facilities, overnight camping and an improved boat ramp. • Develop Pressentin Park as a destination park with day-use area, RV campsites, and limited tent camping sites. • Extend trail from Concrete to the west.
Nooksack	<ul style="list-style-type: none"> • Improve public access opportunities • Improve nature hiking and trails access opportunities with viewpoints.
Stillaguamish	<ul style="list-style-type: none"> • Improve public access opportunities through easements where feasible especially along Lake Cavanaugh.

7.2.1 Roads/Street Ends

Road or street ends consist of street segments that are not required for vehicular access and that can potentially provide the public with visual or physical access to a body of water and its shoreline. No specific road end data was available from the County GIS. Review of the existing condition reveals multiple road ends mostly for private use. Samish Bay Management Unit has multiple road end shoreline access points at the southern end of the management unit, but these are mostly private for existing water-oriented uses. Fidalgo Islands Management Unit has multiple roads ending near the shoreline on the south side of the island. Most of the shoreline areas have opportunities to explore road ends for public access.

7.2.2 Vacant and "No owner" Parcels

Opportunities for public access and recreation properties may be found by reviewing the location of vacant parcels and parcels with "no owner" according to the Assessor records. Vacant lands have been "no owner" parcels are identified as properties for which the Assessor has not identified an owner. Some parcels may be associated with a condominium development (e.g. common open space) and are "under review," but others appear to be separate full parcels unassociated with other properties. Table 46, below, summarizes the number of "no owner" parcels along all shorelines management units. Although the table indicates very few "no owner" parcels in Skagit County, still a review for potential public access in such parcels can offer important public access

potential. The full set of identified parcels requires review and confirmation by the county, cities, and citizens.

Table 46. Number of No Owner Parcels in Shoreline

Management Area	No "Owner" Parcel
Samish Bay	1
Samish Island, Padilla Bay and East Side of Swinomish Channel	2
Swinomish Tribe Reservation	1
Fidalgo Island and Other Islands	8
Skagit Bay/ Delta	1
Lower Skagit Diking District	5
Samish River	0
Middle Skagit	3
Upper Skagit	6
Nooksack	0
Stillaguamish	0

7.2.3 Land Trusts and Conservation Groups

Skagit Land Trust, Skagitonians to Preserve Farmland, Ducks Unlimited, Trust for Public Land, American Farmland Trust, the Nature Conservancy, and the Skagit County Farmland Legacy Program.

Skagit County Land Trust

Skagit Land Trust is particularly active in Skagit County. Skagit Land Trust was founded in March 1992 to help protect the natural lands, open space and wildlife habitat of Skagit County. It focuses on permanently protecting all types of natural and resource lands with exceptional conservation value throughout Skagit County. It accepts conservation easements on diverse private lands. In addition to work with private landowners, Skagit Land Trust works in collaboration with over twenty local and regional organizations preferring to leverage limited resources to achieve common goals.

Skagit Land Trust acquires land for protection through purchase or gifts of land and by assisting landowners and other conservation groups and agencies to protect land. The conservation easement is a popular choice as it allows the land to remain in private ownership while restricting certain future uses to protect the land’s wildlife and conservation values. Other choices include land donation or land sales (Skagit Land Trust 2011).

Skagitonians to Preserve Farmland

Skagitonians to Preserve Farmland (SPF) is a land conservation group working to preserve farmland in Skagit Valley. SPF's vision is to permanently secure the critical mass of farmland in the Valley. It works to preserve Skagit Valley as a working agricultural region and landscape by protecting farmland through acquisition of permanent property restrictions and by promoting and supporting farming as an economically viable way of life. It helps educate farmers about important estate and tax-law changes. It creates partnerships for land protection with other conservation organizations, such as Skagit Land Trust, Trust for Public Land, American Farmland Trust, and The Nature Conservancy. SPF is also a key participant in the Skagit Watershed Council (Skagitorians 2010).

Ducks Unlimited

Ducks Unlimited (DU) conserves, restores, and manages wetlands and associated habitats for North America's waterfowl. In 1996, DU launched its Pacific Northwest Program to protect and restore critical wetland and wildlife habitat in Washington and Oregon. Its work area includes the western edge of Skagit County.

Land protection is one of the critical tools by which Ducks Unlimited conserves waterfowl habitat throughout North America. DU protects land through several means including acquisitions, conservation easements and revolving lands strategy. Biologists and engineers of DU work with private landowners, state and federal agencies, private foundations and corporations to protect and preserve the wetlands (Ducks Unlimited, undated).

The Trust for Public Land

The Trust for Public Land (TPL) is a national non-profit organization, with a mission to conserve “land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for generations to come.”

In 2010, TPL was able to help the Swinomish tribe and the state of Washington craft a conservation solution for Kiket Island that shared ownership and operating costs, managed the land jointly and regulated visitation. Today Kiket Island is both part of an Indian Reservation and a state park—a national first. As Kukutali Nature Preserve, it is the first state park to be jointly owned and managed by a sovereign Indian nation, the Swinomish, and the Washington State Parks Department (The Trust for Public Land 2011).

The Nature Conservancy

The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

The Nature Conservancy has been working to preserve the Skagit River for more than 30 years. It works with many partners on restoration of migrating birds, bald eagles, legendary Skagit salmon and many other species. In 1976, the Conservancy and the Washington Department of Fish and Wildlife created the Skagit River Bald Eagle Natural Area. In the Skagit Delta, the Conservancy is leading an effort to restore highly productive tidal marshes—critical habitat for threatened salmon—while enhancing flood control and farmland preservation. In the pioneering Farming for Wildlife program, the Conservancy is partnering with Skagit Delta farmers to incorporate flooding into their crop rotations to create important wetland habitat for shorebirds as well as maintain family farms (The Nature Conservancy 2011).

Skagit County Farmland Legacy Program

The Skagit County Farmland Legacy Program is a county initiative that purchases agricultural easements on Skagit farmland, and works to support policies, programs, and plans that enhance the protection of farmland. Funding comes from the conservation tax and is often leveraged with federal and state grants and private donations. The Skagit County Conservation Futures Advisory Board is responsible for administering the Farmland Legacy Program, which purchases development rights and places perpetual conservation easements on agricultural lands. Purchase of Development Right (PDR) programs have been established in many localities across the country as a means of protecting farmland for long-term agricultural use. PDR is a voluntary program which enables property owners to sell their development rights to the County while holding fee simple title to their land and continuing to farm. The easement places permanent restrictions on future use and development of the land in order to protect its agricultural character and productivity. Easements are held by the County in perpetuity. The property owner continues to own the land and may sell or lease the farm if he or she chooses but the development restrictions run with the land. The intention is to maintain the farmland in a productive manner allowing uses that support that goal.

7.2.4 Parks and Recreation Easements

This section describes lands and easements that are dedicated for public use. Multiple land conservation groups are active in Skagit County which have been described in the following section. Most of them preserve land through conservation easements. Skagit Land Trust acquires land through purchase or gifts of land and by assisting landowners and other conservation groups and agencies to protect land. The Nature Conservancy worked with the Washington Department of Fish and Wildlife to create the Skagit River Bald Eagle Natural Area. In most cases, working with private property owners is the key to acquiring easements for shoreline public access. Easements likely need to be reviewed and surveyed prior to determining appropriate actions. Actions may include improving access on unused sites, consolidating access points for maintenance purposes, or land surplus, exchanges or purchases, etc. Scattered, small access points with low levels of alteration may be preferred for certain passive recreational uses (e.g., fishing). But for other uses such as RV camping, swim beaches, picnicking and event facilities, land acquisition may be a better option.

The total Parks and Open Space in shoreline shown in Section 4.2.11 includes easements, land preserve or conservancy, national forest, parks and recreation land, State parks and County designated OSRSI. The following table indicates only County Parks, County OSRSI designated areas and easement/conservation areas by each management unit.

Table 47. OSRSI and Easements is Shoreline

Management Area	County Parks	County OSRSI Designation Acres	SCDC (Easement/Reserve/Conservancy) Acres
Samish Bay	0	17.75	44.88
Samish Island, Padilla Bay and East Swinomish Channel	2	13.19	69.31
Swinomish Tribe Reservation	0	121.55	121.55
Fidalgo Island and Other Islands	2	635.69	4.56
Skagit Bay	0	2132.48	63.74
Lower Skagit Diking District	0	0	354.91
Samish River	2	0	267.27

DRAFT Skagit County Shoreline Analysis Report

Middle Skagit	1	183.26	875.21
Upper Skagit	2	12870.38	141.83
Nooksack	0	549.52	465.37
Stillaguamish	0	1664.29	0

8 SHORELINE MANAGEMENT RECOMMENDATIONS

The following are recommended actions for translating inventory and characterization findings into the draft SMP policies, regulations, environment designations, and restoration strategies for areas within shoreline jurisdiction. In addition to the following analysis-specific recommendations, the updated SMP will incorporate all other requirements of the Shoreline Management Act (RCW 90.58) and the Shoreline Master Program Guidelines (WAC 173-26).

8.1 Environment Designations

8.1.1 Background

As outlined in WAC 173-26-191(1)(d), “Shoreline management must address a wide range of physical conditions and development settings along shoreline areas. Effective shoreline management requires that the shoreline master program prescribe different sets of environmental protection measures, allowable use provisions, and development standards for each of these shoreline segments.” In WAC 173-26-211(2)(a), the Guidelines further direct development and assignment of environment designations based on “existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through comprehensive plans...” (note: The methodology discussion in Section 8.1.2 below describes how the function analysis scores presented in the *Shoreline Analysis Report* may be considered in assigning preliminary designations.)

The current SMP (Chapter 14.26 of the Skagit County Code) utilizes a system of six environment designations: Natural, Conservancy, Rural, Rural Residential, Urban and Aquatic. Definitions and designation criteria for each are provided in Table 48 below. The shoreline environment designation map has been modified only a few times since it was originally developed in 1976, and thus the environment designation assignments may no longer provide the best fit with the existing biological and land use character or the community’s vision as expressed in the latest Comprehensive Plan.

The Guidelines recommend use of six unique environments: Aquatic, Natural, Urban Conservancy, Rural Conservancy, Shoreline Residential, and High-

Intensity. However, each jurisdiction may use alternate environment designations, as appropriate, as long as they provide equal or better protection than the standard. Table 48, below summarizes Ecology's suggested criteria for each of their designations, and shows the approximate correlation between the County's existing system and Ecology's system.

Table 48. Comparison of Existing and Ecology Shoreline Environment Designations

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology’s Designation Purpose and Criteria (WAC 173-26-211)	Comparison
Urban	<p>Objective: “...ensure optimum utilization of shorelines within urbanized or potentially urbanized areas, to identify areas suitable for intensive uses, both public and private, and to manage development and maintain urban shorelines for a variety of uses...”</p> <p>Criteria: “(1) Areas of high intensity land use including recreation, residential, public facility, commercial, industrial development, and port activities. (2) Areas officially designated for expansion of urban uses that are in conformance with the Act and this Master Program. (3) Areas possessing few or no natural limitations for urban intensive areas. (4) Areas which can provide adequate public services, utilities, and access consistent with this program. (5) Areas currently zoned to permit compatible uses under applicable Skagit County ordinances.”</p>	High Intensity	<p>Purpose: “to provide for high-intensity water-oriented commercial, transportation, and industrial uses...”</p> <p>Criteria: “shoreline areas within incorporated municipalities, urban growth areas, and industrial or commercial ‘rural areas of more intense development’ ...if they currently support high-intensity uses related to commerce, transportation or navigation; or are suitable and planned for high-intensity water-oriented uses.”</p>	<p>Compared to Ecology’s High Intensity designation, the County’s Urban designation includes a broader scope of uses (e.g. residential and recreational).</p> <p>Residential areas within UGA’s and LAMIRDs could be designated as Shoreline Residential under Ecology’s criteria. Similarly, recreational areas within similarly developed areas could be designated as Urban Conservancy.</p>
Rural	<p>Objective: “...protect agricultural land from urban density expansion, regulate intensive development along undeveloped shorelines, function as a buffer area between Urban and Conservancy Shoreline Areas and maintain open spaces and opportunities for recreational activities and a variety of uses compatible with agriculture and the shoreline environment.”</p>	Rural Conservancy Urban Conservancy	<p>Rural Conservancy Purpose: “...to protect ecological functions, conserve existing natural resources and valuable historic and cultural areas in order to provide for sustained resource use...and provide recreational opportunities. Examples of uses that are appropriate...include low-impact outdoor recreation uses, timber</p>	<p>For the most part, Ecology’s Rural Conservancy designation is very similar to the County’s Rural designation.</p> <p>However, areas within UGA’s and LAMIRDs could be designated as Urban Conservancy under</p>

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology’s Designation Purpose and Criteria (WAC 173-26-211)	Comparison
	<p>Criteria: “(1) Areas characterized or having the capability to support active agricultural practices and/or a variety of recreational development. (2) Areas where residential, utility, and transportation development is at a low density and of limited extent and, at this level, is compatible with the primary uses of agriculture and recreation. (3) Areas which provide a buffer between other shoreline areas of greater or lesser density of uses. (4) Areas modified from their natural vegetative cover and, in some cases, surface drainage patterns. (5) Areas designated in officially adopted park and recreation plans for recreational use. (6) Areas having valuable sand, gravel, and mineral deposits. (7) Areas zoned to permit compatible uses under applicable Skagit County ordinances.”</p>		<p>harvesting on a sustained-yield basis, agricultural uses, aquaculture, low-intensity residential development and other natural resource-based low-intensity uses.”</p> <p>Rural Conservancy Criteria: “if any of the following characteristics apply: ...currently supporting lesser-intensity resource-based uses, such as agriculture, forestry, or recreational uses, or is designated agricultural or forest lands...; ...currently accommodating residential uses outside urban growth areas and incorporated cities or towns; ...shoreline is supporting human uses but subject to environmental limitations, such as properties that include or are adjacent to steep banks, feeder bluffs, or flood plains or other flood-prone areas; ...high recreational value or with unique historic or cultural resources; ...shoreline has low-intensity water-dependent uses.”</p> <p>Urban Conservancy Purpose: “...protect and restore ecological functions of open space, floodplain and other sensitive lands where they exist in urban and developed</p>	<p>Ecology’s criteria.</p>

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology's Designation Purpose and Criteria (WAC 173-26-211)	Comparison
			<p>settings, while allowing a variety of compatible uses.”</p> <p>Urban Conservancy Criteria: “appropriate and planned for development that is compatible with maintaining or restoring of the ecological functions of the area, that are not generally suitable for water-dependent uses and that lie in incorporated municipalities, urban growth areas, or commercial or industrial "rural areas of more intense development" if any of the following characteristics apply: ... suitable for water-related or water-enjoyment uses; ...open space, flood plain or other sensitive areas that should not be more intensively developed; ... potential for ecological restoration; ... retain important ecological functions, even though partially developed; or ... potential for development that is compatible with ecological restoration.”</p>	
Rural Residential	Objective: “...provide for a transition area between the more intensive Urban Shoreline Area uses and those low intensity uses of the Rural Shoreline Area. It also intends to identify those shoreline areas that presently exhibit the low to medium, level of uses and have the environmental	Rural Conservancy Urban Conservancy Shoreline	<p>Elements similar to Rural and Urban Conservancy and High Intensity as outlined above, as well as Shoreline Residential.</p> <p>Shoreline Residential Purpose: “...accommodate residential</p>	In most instances, Ecology's Rural Conservancy designation would be an appropriate alternative to the County's Rural Residential designation.

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology’s Designation Purpose and Criteria (WAC 173-26-211)	Comparison
	<p>capabilities to support such uses for future development.”</p> <p>Criteria: (1) Areas presently developed or platted for residential uses. (2) Areas zoned for residential development with lot sizes ranging from one-fourth (1/4) acre (with public sewer and water) to five (5) acres. Also included are existing extensive small, single lot shoreline developments. (3) Areas which could support and serve the needs of planned unit developments (PUD). (4) Areas which could serve as transition zones between urban and rural, conservancy, or natural shoreline areas. (5) Areas having the physical ability to support low to medium density residential uses and associated commercial, recreational, and public service facilities. (6) Areas which are appropriate for low to medium intensity recreational uses compatible with residential and/or light agricultural activities (grazing, small-scale crop, or gardens). (7) Areas which are capable of supporting small-scale agricultural activities such as livestock grazing, small scale crop, gardens, or woodlots. (8) Areas which can provide and have the capabilities to support the necessary infrastructure of public services, utilities, and access to accommodate low to medium density development. Sewage</p>	Residential	<p>development and appurtenant structures that are consistent with this chapter... provide appropriate public access and recreational uses.”</p> <p>Shoreline Residential Criteria: “inside urban growth areas, as defined in RCW 36.70A.110, incorporated municipalities, "rural areas of more intense development," or "master planned resorts," as described in RCW 36.70A.360, if they are predominantly single-family or multifamily residential development or are planned and platted for residential development.”</p>	For areas of more intense residential development or planned development Shoreline Residential may be an appropriate alternative.

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology's Designation Purpose and Criteria (WAC 173-26-211)	Comparison
	<p>disposal and water supply facilities are provided on an individual or community basis or could possibly be provided via future regional networks of these facilities.</p> <p>(9) Areas officially designated on county comprehensive plans for future expansion of residential use in the Rural Open Space or Residential classifications.</p>			
Conservancy	<p>Objective: "...intended to ensure long term wise use, enhancement, and protection of natural resources and processes and valuable historic and cultural areas. Activities in this shoreline area should be conducted in a manner to ensure recreational benefits to the public and/or achieve sustained resource utilization without significant adverse impacts"</p> <p>Criteria: "(1) Areas which may provide for present and future recreation needs for the county and region and where inappropriate modification or use would adversely affect such qualities.</p> <p>(2) Areas which contain resources manageable on a sustained yield, multi-purpose basis and are more valuable to the region than through any form of more intensive or single purpose development.</p> <p>(3) Areas possessing the following biophysical limitations to development, modification or unrestricted use:</p> <p>i. Steep slopes and slide hazard areas.</p>	Rural Conservancy	Most similar to Rural Conservancy as outlined above.	The County's Conservancy and Ecology's Rural Conservancy designations are extremely similar.

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology’s Designation Purpose and Criteria (WAC 173-26-211)	Comparison
	ii. Floodways or marine tidal surge or storm areas. iii. Rivers and streams subject to frequent changes in alignment or direction. iv. Unstable, erosive streambanks, bluffs, and other landforms. v. Recognized accretion shoreforms. (4) Areas of critical natural and cultural features requiring a low overall density of people, structures and livestock with minimal changes in topography. Such areas may include forests, pastures, outdoor recreation areas, fish and wildlife habitats, historical and archaeological sites, and shorelines prone to limitations listed above. (5) Areas free of extensive development and whose existing character and features provide optimal, long term use and enjoyment by the public. (6) Areas zoned to permit compatible uses under applicable Skagit County ordinances.”			
Natural	Definition: “...preserve those dynamic natural features and systems in a manner relatively free of human influence and to encourage or permit those activities that best preserve the natural characteristics which make these shoreline areas unique and valuable. The designation seeks to ensure long-term preservation of these resources that yield optimum,	Natural	Purpose: “...to protect those shoreline areas that are relatively free of human influence or that include intact or minimally degraded shoreline functions intolerant of human use. These systems require that only very low intensity uses be allowed...”	The County and Ecology’s Natural designations are extremely similar.

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology's Designation Purpose and Criteria (WAC 173-26-211)	Comparison
	<p>unquantifiable benefits to the region in their natural condition"</p> <p>Criteria: "(1) General</p> <ul style="list-style-type: none"> i. Areas where human influence and development are minimal. ii. Areas recognized as unique and reasonably capable of being restored to a natural condition or that have been restored by a natural process. iii. Areas having a high scenic value and a high value for low intensity recreational use. iv. Unique areas not compatible for or with development, modification, extraction, or unrestricted use such as but not limited to: floodways, marshes, swamps, steeply sloping shores, erosion and accretion shores, and major seasonal havens or migratory routes for wildlife. <p>(2) Wildlife Habitats</p> <ul style="list-style-type: none"> i. An area utilized by rare, diminishing, or endangered species for food, water, cover, or protection. ii. A major seasonal haven or migratory route for fisheries and wildlife. iii. Original or unique wildlife habitats with developed areas. <p>(3) Scientific and Educational Value</p> <ul style="list-style-type: none"> i. Areas considered to represent basic ecosystems and geologic types or derivations thereof that are of particular scientific and educational interest. 		<p>Criteria: "...if any of the following characteristics apply: ...shoreline is ecologically intact and therefore currently performing an important, irreplaceable function or ecosystem-wide process that would be damaged by human activity; ...considered to represent ecosystems and geologic types that are of particular scientific and educational interest; ...unable to support new development or uses without significant adverse impacts to ecological functions or risk to human safety."</p>	

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology's Designation Purpose and Criteria (WAC 173-26-211)	Comparison
	<p>ii. Unique areas as described in this section which are close to population centers and/or educational facilities close to population centers and/or educational facilities.</p> <p>iii. Established natural science research areas or areas having a history of such use.</p> <p>(4) Areas may fall within any land use zones where a Natural designation would be of benefit to the community, citizens, and shoreline environment. Areas should be under public ownership or management or should be capable of such an arrangement in order to fulfill the intent of a Natural designation.</p>			
Aquatic	<p>Definition: "...encourage and protect appropriate multiple uses of the water or, in some cases, single purpose, dominant uses in limited areas; to manage and protect the limited water surfaces and foreshores from inappropriate activities or encroachment; and, to preserve and wisely use the area's natural features and resources which are substantially different and diverse in character from those of the adjoining uplands and backshores."</p> <p>Criteria: " (1) All marine water areas seaward of the ordinary high water mark including estuarine channels, sloughs, and associated wetlands. (2) All lakes subject to this program below the ordinary high</p>	Aquatic	<p>Purpose: "...to protect, restore, and manage the unique characteristics and resources of the areas waterward of the ordinary high-water mark."</p> <p>Criteria: "...lands waterward of the ordinary high-water mark...may assign...to wetlands."</p>	The County and Ecology's Aquatic designations are extremely similar.

Existing County Designation	Summary of County Designation Purpose and Criteria	Ecology Designation	Summary of Ecology's Designation Purpose and Criteria (WAC 173-26-211)	Comparison
	water mark. (3) All streamways of rivers designated shorelines of the State. (4) All natural swamps, marshes, and wetlands adjoining the above three categories of water bodies and all those which are not designated a Natural Shoreline Area.			

8.1.2 Methodology

It is difficult to describe a methodology for environment designation recommendations as there are very few firm rules. In general, the environment designation purpose and criteria will be utilized and further informed by the findings of this *Shoreline Analysis Report*, including the following GIS data:

- Current land use
- Planned land use
- Ownership
- Wetlands
- Floodplains
- Vegetation
- Impervious surface
- Ecological function scores (provided in Chapter 5 of this *Shoreline Analysis Report*)

While current and future land use provide basic context for a given segment of land, recommended environment designations will not always correlate strongly with those parameters, particularly on currently undeveloped shoreline areas and shoreline areas with extensive critical areas (e.g., wetlands, floodways, channel migration zones, other geologically hazardous areas). Parcels are often quite large, and extend well beyond shoreline jurisdiction. For example, while the current land use code may indicate a single-family residential use, the actual development may not be in shoreline jurisdiction and would therefore not necessarily result in adverse impacts to shoreline condition.

Vegetation (including identification of wetlands) and impervious surface data provide better gauges of existing alteration level in shoreline jurisdiction, as well as the ecological function scores. For this reason, parcels that have a current or planned land use of residential (or other designation allowing alteration) may ultimately have a Conservancy, or even Natural environment shoreline designation if the function score is high and examination of aerial photos and specific data layers provides additional support. The parcel can still accommodate the use, perhaps even in shoreline jurisdiction, and satisfy the WAC requirements for consistency between the environment designations and the Comprehensive Plans (see WAC 173-26-211(3) for additional detail about consistency requirements).

In the Towns of Lyman and Hamilton, current land use will be more strongly correlated with level of alteration and the resulting environment designation because more often the entire parcel or a large portion of the parcel is in shoreline jurisdiction and the allowed level of development may already have occurred.

8.1.3 Recommendations

Based on the Background and Methodology outlined above, the following specific recommendations are provided for development and assignment of environment designations in the County and the Towns of Hamilton and Lyman:

- The County updated its critical areas regulations in 2009, and included shoreline-specific buffers based on the current environment designation system for marine and lake waters and based only on water type (Type S) for rivers and streams. For this reason, it is anticipated that the County will seriously consider maintaining its six-level environment designation system, at least by name. The existing environments should be updated with clear statements of purpose, designation criteria, and regulations and policies that incorporate any relevant elements of Ecology's system and eliminate any confusing criteria overlap, such as those related to objective intensities of recreational and residential land use.
- It is recommended that the Towns of Hamilton and Lyman utilize the appropriate elements of Ecology's basic six-category environment designation scheme in the SMP Guidelines, primarily anticipated to be Shoreline Residential and Urban Conservancy.
- Consider pre-existing adjacent city or town environment designations within UGAs in anticipation of any future annexations.
- Consider whether additional environment designations would be appropriate to further delineate unique areas that might warrant designation-specific use or modification regulations, such as levee corridors or waterfront parks.
- Substantively utilize inventory and characterization findings, such as GIS information and/or function scores, in this report to inform assignment of environment designations, as outlined in Methodology.

8.2 General Policies and Regulations

Archaeological and Historic Resources

- The findings of this Shoreline Analysis Report do not suggest a need for additional regulations beyond those mandated by the SMP Guidelines.

Critical Areas

- Consider whether the County's and Towns' critical areas regulations should be incorporated into the SMP by reference or through direct inclusion. Either method of inclusion will likely require modification of the County's critical areas regulations to meet SMA criteria. For example, any exceptions, such as reasonable use, will need to be removed as the appropriate SMA process for such action is through the Shoreline Variance. The critical areas regulations, including any incorporated shoreline buffers, will also need to be revisited to assess if changes are needed to recognize existing shoreline conditions and to accommodate water-oriented and other preferred uses consistent with no net loss of ecological functions. In particular, the County's existing stream buffers are not environment-designation based, which indicates that they may need to be further customized to accomplish these objectives.

Flood Hazard Reduction

- Dike and levee systems are prevalent in the Lower Skagit Management Unit, and are critical protection elements for existing development and agriculture uses. Consistent with the WAC provisions in the Guidelines, provide maximum flexibility for developing and maintaining flood hazard reduction measures as needed to continue protection of existing uses.

Public Access

- Provide policies and regulations that recognize and facilitate implementation of existing County and Town parks, recreation, and open space plans.

Shoreline Vegetation Conservation

- Build on the existing protections provided in the County's and Towns' critical areas regulations and current SMP, paying special attention to measures that will promote retention of shoreline vegetation and development of a well-functioning shoreline which provides both physical and habitat processes.

- Ensure that vegetation provisions allow for appropriate modifications to accommodate preferred uses, particularly water-oriented uses and public access.

Water Quality, Stormwater, and Nonpoint Pollution

- Consider incorporating regulations to facilitate maximum implementation of TMDL plans and controlling introduction of 303(d)-listed pollutants for which TMDLs have not yet been prepared.
- Ensure that regulations allow for placement of water quality related structures or facilities in shoreline jurisdiction.
- Consider adding clarifying statements noting that the policies of the SMP are also policies of the County's comprehensive plan and that the policies also apply to activities outside shoreline jurisdiction that affect water quality within shoreline jurisdiction. However, the regulations apply only within shoreline jurisdiction.

8.3 Shoreline Modification Provisions

Shoreline Stabilization

- Ensure "replacement" and "repair" definitions and standards are consistent with WAC 173-26-231(3)(a). Repair activities should be defined to include a replacement threshold so that applicants and staff will know when "replacement" requirements need to be met.
- Otherwise, fully implement the intent and principles of the WAC Guidelines. Reference appropriate exemptions found in the WAC related to "normal maintenance and repair" and "construction of the normal bulkhead common to single-family residences." These are not exemptions from the regulations, however; they are exemptions only from a Shoreline Substantial Development Permit.
- Give preference to those types of shoreline modifications that have a lesser impact on ecological functions. Policies and regulations should promote "soft" over "hard" shoreline modification measures. Consider requiring a Conditional Use Permit for any new hard shoreline stabilization.
- Incentives should be included in the SMP that would encourage modification of existing armoring, where feasible, to improve habitat while still maintaining any necessary site use and protection.

Piers and Docks

- Develop detailed dimensional and material standards for new piers and replacement/modified piers, customized for marine, river and lake environments.
- Be consistent, to the extent practicable based on local conditions and requirements for no net loss, with Washington Department of Fish and Wildlife and U.S. Army Corps of Engineers design standards, and recognize special local issues or circumstances.

Fill

- Restoration fills should be encouraged, including improvements to shoreline habitats, material to anchor LWD placements, and as needed to implement shoreline restoration.
- Fills waterward of the OHWM to create developable land should be prohibited, and should only be allowed landward of OHWM if not inconsistent with the requirement to protect shoreline ecological functions and ecosystem-wide processes.

Breakwaters, Jetties, Groins and Weirs

- Consider prohibiting new breakwaters, jetties, groins, or weirs in the SMP except where they are essential to restoration or maintenance of existing water-dependent uses.

Beach and Dunes Management

- The findings of this Shoreline Analysis Report do not suggest a need for additional regulations beyond those mandated by the SMP Guidelines.

Dredging and Dredge Material Disposal

- Except for purposes of shoreline restoration, flood hazard reduction, and maintenance of existing legal moorage and navigation, consider prohibiting these modifications.

Shoreline Habitat and Natural Systems Enhancement Projects

- Consider incentives to encourage restoration projects, particularly in areas identified as having lower function. For example, allow modification of impervious surface coverage, density, height, or setback requirements when paired with significant restoration. Emphasize that certain fills, such as streambed or nearshore gravels or material to anchor logs, can be an important component of some restoration projects.

8.4 Shoreline Uses

Agriculture

- Maintenance of existing agriculture is commercially and culturally important to Skagit County. This should be recognized in shoreline policies. The findings of this Shoreline Analysis Report do not suggest a need for additional regulations beyond those mandated by the SMP Guidelines.

Aquaculture

- Maintenance of existing aquaculture is commercially important to Skagit County. This should be recognized in shoreline policies. The regulations should appropriately differentiate between commercial aquaculture and species restoration aquaculture, and include special provisions for aquaculture activities that are temporary in nature.

Boating Facilities

- Skagit County includes a variety of commercial, public and private boating facilities, including marinas, port uses, ferry terminals, and community and park boat moorage and launching facilities. Regulations for the over-water components should be developed to provide applicants with as much predictability as possible, while still allowing for an appropriate amount of flexibility based on site-specific conditions and use-specific needs.

Commercial Development

- Recognize commercial uses and consider incentives to attract water-oriented uses in appropriate locations along the shoreline.

Forest Practices

- Provide general policies and regulations for forest practices according to the SMP Guidelines.

Industry

- Recognize industrial uses and consider incentives to attract water-oriented uses in appropriate locations along the shoreline.

In-stream Structural Uses

- Small and large-scale in-stream structures intended to produce energy and/or moderate flooding are found in Skagit County. Given the prevalence of small hydropower projects proposed in Skagit County, special regulations adopted in 1995 should be reviewed and revised, if necessary, in consultation with WDFW and WDNR.

Mining

- Provide general policies and regulations for mining according to the SMP Guidelines. Clearly differentiate between upland and aquatic mining, and address recreational mining.

Recreational Development

- Policies and regulations related to parks management should provide clear preferences for shoreline restoration consistent with public access needs and uses. Existing natural parks should be protected and enhanced.
- Include provisions for existing and potential recreational uses, including boating, scuba diving, kayaking, swimming, and fishing.
- Work with local and state parks officials to ensure consistency between shoreline policies and regulations and long term parks management plans.

Residential Development

- Recognize current and planned shoreline residential uses with adequate provision of services and utilities as appropriate to allow for shoreline recreation and ecological protection.

Transportation and Parking

- Allow for maintenance and improvements to existing roads and parking areas and for necessary new roads and parking areas where other locations outside of shoreline jurisdiction are not feasible.

Utilities

- Allow for new, expanded, and maintained utilities with criteria for location and vegetation restoration as appropriate.

8.5 Restoration Plan

A Restoration Plan document will be prepared at a later phase of the Shoreline Master Program update process, consistent with WAC 173-26-201(2)(f). The Shoreline Restoration Plan must address the following six subjects (WAC 173-26-201(2) (f) (i-vi)) and incorporated findings from this analysis report:

- (i) *Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;*
- (ii) *Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;*

- (iii) *Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;*
- (iv) *Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;*
- (v) *Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals; and*
- (vi) *Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals.*

The Restoration Plan will “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.” The Restoration Plan will mesh potential projects identified in this report with additional projects, regional or local efforts, and programs of each jurisdiction, watershed groups, and environmental organizations that contribute or could potentially contribute to improved ecological functions of the shoreline.

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10 LIST OF ACRONYMS AND ABBREVIATIONS

ADA.....	Americans with Disabilities Act
AWS.....	Available Water Supply
BLM	Bureau of Land Management
CAO.....	Critical Areas Ordinance
C-CAP	Coastal Change Analysis Program
CFS.....	Cubic Feet per Second
Corps	U.S. Army Corps of Engineers
CPP	County-wide Planning Policies
DFIRM.....	Draft Flood Insurance Rate Map
DU.....	Ducks Unlimited
Ecology.....	Washington Department of Ecology
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
Ft	Feet
GIS	Geographic information systems
GMA	Growth Management Act
HPA	Hydraulic Project Approval
LWD	Large Woody Debris
OHWM.....	Ordinary High Water Mark
MOU	Memorandum of Understanding
MUGA.....	Municipal Urban Growth Area
NF	North Fork
NOAA	National Oceanographic and Atmospheric Administration
NPS	National Parks Service
NPDES.....	National Pollutant Discharge Elimination System
NRCS.....	Natural Resources Conservation Service
NRL.....	Natural Resources Lands
NWI	National Wetlands Inventory
PAH.....	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PHS.....	Priority Habitats and Species
PNW	Pacific Northwest

PSAT.....	Puget Sound Action Team
PSE.....	Puget Sound Energy
PSNERP.....	Puget Sound Nearshore Ecosystem Project
PUD.....	Public Utility District
RCW.....	Revised Code of Washington
ROW.....	Right of Way
RGP.....	Regional General Permit
RM.....	River Mile
RV.....	Recreational Vehicle
SCL.....	Seattle City Light
SCPR.....	Skagit County Parks and Recreation
SEPA.....	State Environmental Policy Act
SF.....	South Fork
SIRC.....	Stillaguamish Implementation Review Committee
SMA.....	Shoreline Management Act
SMP.....	Shoreline Master Program
SPF.....	Skagitonians to Preserve Farmland
Spp.....	Species
SR.....	State Route
SRSC.....	Skagit River System Cooperative
SSURGO.....	Soil Survey Geographic Database
STAG.....	Stillaguamish Technical Advisory Group
SWSL.....	Surface Water Source Limited
TMDL.....	Total Maximum Daily Load
TPL.....	Trust for Public Land
UGA.....	Urban Growth Area
USDA.....	U.S. Department of Agriculture
USFS.....	United States Forest Service
USFWS.....	U.S. Fish and Wildlife Service
USGS.....	U.S. Geological Service
WAC.....	Washington Administrative Code
WDFW.....	Washington Department of Fish and Wildlife
WDNR.....	Washington Department of Natural Resources
WRIA.....	Water Resource Inventory Area
WSR.....	Wild and Scenic Rivers
WWRP.....	Washington Wildlife and Recreation Coalition
Yr.....	Year

Zoning Abbreviations:

A-UD	Anacortes UGA Development District
AEO	Airport Environs Overlay
Ag-NRL.....	Agricultural – Natural Resources Lands
AVR	Aviation Related
C	Commercial – Swinomish
IF-NRL.....	Industrial Forest – Natural Resource Lands
MRO	Mineral Resource Overlay
OSRSI.....	Public Open Space of Regional/Statewide Importance
NRI.....	Natural Resource Industries
RB.....	Rural Business
R	Residential
RC	Rural Center
RFS.....	Rural Freeway Services
RI.....	Rural Intermediate
RMI	Rural Marine Industrial
RRc-NRL	Rural Resource – Natural Resource Lands
RRv	Rural Reserve
RVC.....	Rural Village Commercial
RVR.....	Rural Village Residential
SF-NRL.....	Secondary Forest – Natural Resource Lands
SRT.....	Small Scale Recreation and Tourism
SSB	Small Scale Business
URC-I.....	Urban Reserve Commercial-Industrial
URP-OS.....	Urban Reserve Public – Open Space
URR	Urban Reserve Residential

APPENDIX A

**Skagit County Assessment of
Shoreline Jurisdiction**

APPENDIX B

Shoreline Inventory Map Folio

APPENDIX C

List of Historic and Cultural Resources

APPENDIX D

Maps of Reaches Used in Functional Analysis

APPENDIX E

Functional Analysis Scoring Results by Reach

APPENDIX F

**Methodology for Land Use Capacity
Analysis**