Snohomish County
Grant No. G0400222

PROJECT TITLE: Northwest Straits Project: Picnic Point Restoration and MRC Support

Identify and Prioritize Restoration/Protection Projects

TASK 1.3

June 30, 2005

This report was funded in part through a cooperative agreement with the National Oceanic and Atmospheric Administration.

Snohomish County Nearshore Candidate Sites for Protection and Restoration

Prepared by:
Sean L. Edwards, Senior Planner
Ted Parker, Biological Technician
Snohomish County Public Works Department
Surface Water Management Division
3000 Rockefeller Ave.
Everett, WA 98201

Prepared for:
Snohomish County Marine Resources Advisory Committee (MRC)
c/o Snohomish County Surface Water Management
http://www.co.snohomish.wa.us/mrc.htm

Work funded by:
Northwest Straits Commission
10441 Bayview-Edison Rd
Mount Vernon, WA 98273
http://www.nwstraits.org

CZM310 Grant Agreement No. G0400222
Northwest Straits Project: Picnic Point Restoration and MRC Support
Project Task 1.3: Identify and prioritize restoration/protection projects

June 30, 2005

Table of Contents

List of Tables

List of Figures

Introduction and Background

This report presents the methodology and results of a local effort to identify candidate sites for protection and restoration of marine resources within the marine nearshore area of Snohomish County, Washington. The nearshore has been identified by the Snohomish County Marine Resources Advisory Committee (MRC) as a local priority for marine resource conservation because it provides critical habitat for marine life and it is vulnerable to degradation from human activities. For the purpose of this study, the nearshore is defined as the area extending from the upland and backshore areas that directly influence the marine shore to the lower extent of the photic zone of marine waters (Fresh *et al.* 2004).

The Snohomish County MRC was established in 1999 to advise Snohomish County on how to conserve the local marine environment (Snohomish County Code 2.800). The Snohomish County MRC is composed of eleven citizen members who represent a broad range of interests. The MRC participates in the Northwest Straits Marine Conservation Initiative, a non-partisan regional effort to protect and restore marine resources in northern Puget Sound and the Strait of Juan de Fuca. A 13-member Northwest Straits Commission coordinates the efforts of the seven participating counties, which include Snohomish, Skagit, Whatcom, San Juan, Island, Jefferson, and Clallam. Each MRC has one representative on the Northwest Straits Commission.

Since its first meeting in January 2000, the Snohomish County MRC has held monthly meetings to address local marine resource issues. In its first year, the MRC focused on educating itself on a wide range of locally relevant marine resource issues. In its second year, the MRC identified Dungeness crab stewardship, nearshore habitat restoration, and public involvement and education as its top priorities and began initiating local priority-driven projects. Staff support for the Snohomish County MRC is provided by the Surface Water Management Division of the Snohomish County Public Works Department. In addition to administrative and project management support, Surface Water Management (SWM) compiles existing marine resource data, collects new data, and conducts data analysis in support of MRC activities. In 2003 SWM staff began developing a methodology for analyzing existing marine resource data to help the MRC identify nearshore candidate sites for protection and restoration.

The methodology developed by SWM staff is presented in detail to allow for use or adaptation in other locations. The results are summarized for the whole county and at a landscape scale. The results include narrative descriptions of candidate sites and potential project options at each site. Conclusions and recommendations are also provided to highlight important findings from this study and to provide guidance for future work. A series of maps is included as Appendix A to provide a graphic representation of the county-wide extent of thirteen Nearshore Stewardship Areas as well as the locations of the candidate sites within each Nearshore Stewardship Area. Primary results of the candidate sites analysis are included as Appendix B.

Questions or comments about this study can be addressed to Sean Edwards at Snohomish County SWM as indicated on the title page.

Methodology

For the purpose of this analysis, candidate sites for protection and restoration are simply defined as geographically specific areas that should be considered for protection and/or restoration. Candidate sites for protection support existing high quality habitat and marine resource values that should be preserved. Candidate sites for restoration exhibit potential for improving habitat conditions where they have been degraded. For each candidate site there are generally more than one possible project options.

The methodology developed for this analysis uses existing Geographic Information System (GIS) data in a relatively simple three phase process to comprehensively screen the entire shoreline for potential nearshore protection and restoration values. The first phase is the definition of geographic units of analysis. The second phase is the compilation of existing data, definition of evaluation criteria, and analysis of the shoreline. The third phase is the development of detailed candidate site descriptions and project options.

An additional method of further prioritizing project options is also proposed, but it was not applied in this study. However, it is included for possible future use as a systematic technique for prioritizing the project options presented in this report. It could also be used to evaluate other project options that might be identified in the future.

Geographic Units of Analysis

The geographic units of analysis for this study are *Nearshore Stewardship Areas* and *Shore Units*. These are described below.

Nearshore Stewardship Areas are landscape scale marine shoreline segments in which the net shore drift is more or less uniform. These geographic units are approximately 1 – 10 miles in length. Nearshore Stewardship Areas were derived using the City of Bainbridge Island methodology for delineating Shoreline Management Areas (PSAT 2003). The drift cell information compiled by the Washington State Department of Ecology (2002) was used in this study. No adjustments or corrections were made to the DOE drift cell information.

Shore Units are marine shoreline segments that have more or less uniform geomorphology and substrate. Shore Units are generally less than one mile in length. The Washington State Department of Natural Resources has defined Shore Units for all of the marine shorelines of Washington State, including Puget Sound, Strait of Juan de Fuca, and the Pacific Coast. Shore Units and their associated attribute information are compiled in the Washington State ShoreZone Inventory (DNR 2001). This Geographic Information System (GIS) database is one of the most comprehensive sets of nearshore ecological information available for Puget Sound.

Shore Units can be nested within Nearshore Stewardship Areas. This allows for multiple scales of analysis. The nesting is not perfect, so it is necessary to keep this in mind when conducting any analysis that includes the Shore Units that are bisected by Nearshore Stewardship Areas.

Analysis of Shore Units

The first step in this analysis is to identify potential candidate sites for nearshore protection and/or restoration using explicit criteria and existing data. Shore Units within each Nearshore Stewardship Area are systematically screened using the criteria and data described below. The criteria defined for this analysis are focused on the Snohomish County MRC's priority marine resources, which include Dungeness crab and nearshore habitat. Other marine resources such as kelp, bivalves, birds, and salmon were considered but not included in this methodology in order to keep it as simple as possible and focused on the Snohomish County MRC's priorities.

Potential candidate sites for protection are identified using initial screening criteria that indicate positive existing nearshore habitat and/or marine resource values. Affirmative answers to the criteria questions indicate positive values. Each Shore Unit is scored according to the scoring and weights shown in Table 1. Any Shore Unit that receives a weighted score of *at least eight* qualifies as a potential candidate site for protection.

Table 1: Criteria for identifying protection candidate sites.

Criteria	Data Sources	Scoring	Weight
P1: Unmodified shoreline?	Snohomish County Marine Shore Inventory DNR ShoreZone Inventory DOE Oblique Shoreline Photos	Unmodified = 2 Slightly modified = 1 Modified = 0	2
P2: Unconfined stream outfall?	Snohomish County Marine Shore Inventory DNR Stream Hydrography DOE Oblique Shoreline Photos	Unconfined = 2 Confined = 1 None = 0	1
P3: Mature riparian vegetation?	Snohomish County Marine Shore Inventory DNR ShoreZone Inventory	Yes = 2 No = 0	1
P4: Mature upland vegetation?	DOE Oblique Shoreline Photos Snohomish County Orthophotos	Yes = 2 No = 0	1
P5: Forage fish?	WDFW Priority Habitats and Species Database	Yes = 2 No = 0	2
P6: Dungeness crab?	WDFW Priority Habitats and Species Database WDFW Recreational Crab Fishing Buoy Survey	Yes = 2 No = 0	1
P7: Eelgrass?	DNR ShoreZone Inventory Brightwater Marine Outfall Siting Study (MOSS) DOE Oblique Shoreline Photos	Continuous = 2 Patchy = 1 None = 0	1

A second set of screening criteria are used to identify *potential candidate sites for restoration*. Shore Units that could, if restored or enhanced, improve nearshore habitat and/or marine resource values. Affirmative answers to the criteria questions indicate potential restoration value. Each shore unit is scored according to the scoring and weights shown in Table 2 below. Any Shore Unit that receives a weighted score of *at least four* qualifies as a candidate site for restoration.

Table 2: Criteria for identifying restoration candidate sites.

Criteria	Data Sources	Scoring	Weight
R1: Non-essential shoreline modifications?	Snohomish County Marine Shore Inventory DNR ShoreZone Inventory DOE Oblique Shoreline Photos	Yes = 2 No = 0	2
R2: Confined stream outfall?	Snohomish County Marine Shore Inventory DNR Stream Hydrography DOE Oblique Shoreline Photos	Confined = 2 Unconfined = 1 None = 0	2
R3: Riparian area for vegetation enhancement?	Snohomish County Marine Shore Inventory DNR ShoreZone Inventory	Yes = 2 No = 0	1
R4: Potential forage fish spawning habitat?	Anchor Environmental Northwest Straits Nearshore Assessment	Yes = 2 No = 0	1

Description of Candidate Sites and Project Options

Once the Shore Unit Analysis is completed and potential candidate sites have been identified, each potential candidate site is reviewed and compared with any adjacent Shore Units to determine whether a final candidate site designation should include multiple Shore Units. In some locations it makes sense to combine multiple Shore Units into one large candidate site, especially where nearshore conditions and stewardship opportunities are similar. Final candidate sites are further described using supplemental documentation and anecdotal information. Supplemental documentation for the detailed narrative description of each candidate site should be referenced and should support the prioritization of project options.

Prioritization of Project Options

Further evaluation of the candidate sites should focus on prioritizing potential projects based on the explicit set of prioritization criteria presented in Table 3. In developing these criteria the MRC considered the Nearshore Science Team's Guidance for Protection and Restoration of the Nearshore Ecosystems of Puget Sound, which was prepared in support of the Puget Sound Nearshore Ecosystem Restoration Program (PSNERP) and distributed for public review on May 15, 2003. Prioritizing potential projects is essential for making recommendations for actions that will be taken in the future by the county and other public or private entities.

Table 3: Criteria for prioritizing potential projects.

Criteria Name	Definition	Scoring	Weight
F1: Learning potential	Contribution to our understanding of the ecosystem and/or how to restore it.	High = 2 Medium = 1 Low = 0	3
F2: Ecological benefits	Improvement and/or preservation of the condition of priority marine resources and the marine ecosystem.	High = 2 Medium = 1 Low = 0	3
F3: Community Support	Support from interest groups, local community, property owners, and public agencies.	Good = 2 Fair = 1 Poor = 0	3
F4: Threat	Imminence and magnitude of threat to the habitat or resource.	High = 2 Medium = 1 Low = 0	1

Criteria Name	Definition	Scoring	Weight
F5: Certainty	Likelihood of meeting stated goals.	High = 2 Medium = 1 Low = 0	1
F6: Risk	Potential for negative effects.	Low = 2 Medium = 1 High = 0	1
F7: Landscape context	Scale, connectivity, and complexity.	Good = 2 Fair = 1 Poor = 0	1
F8: Cost	Relative cost compared to other options.	Low = 2 Medium = 1 High = 0	1
F9: Sustainability	Not requiring significant long term maintenance or support.	Good = 2 Fair = 1 Poor = 0	1

Results

This study includes the following groups of results: 1) Nearshore Stewardship Area definitions and the nesting of Shore Units within these larger landscape units, 2) Shore Unit analysis results, and 3) narrative descriptions of candidate sites and project options. See Appendix A for maps showing the county-wide delineation of Nearshore Stewardship Areas and locations of candidate sites within each Nearshore Stewardship Area.

Nearshore Stewardship Areas

Based on the methodology used for this study, there are 189 Shore Units nested within thirteen Nearshore Stewardship Areas. The Nearshore Stewardship Areas are defined in Table 1 below. Eight of the Nearshore Stewardship Area boundaries cross individual Shore Units, so the total number of Shore Units indicated in the table is over-counted. The total length of the Shore Units presented in Table 4 is calculated correctly at 70.38 miles using GIS techniques to split Shore Units at Nearshore Stewardship Area boundaries.

Table 4: Snohomish County Nearshore Stewardship Areas.

Nearshore Stewardship Area	DOE Drift Cells	Description	Number of Shore Units	Length (mi.)
1. Woodway-Edmonds	SN-3	South Snohomish County border to Edmonds Marina	9	2.29
2. Edmonds	SN-2	Edmonds Marina to Picnic Point	23	7.97
3. Mukilteo	SN-2	Picnic Point to Mukilteo Lighthouse	11	4.64
4. Mukilteo-Everett	SN-1	Mukilteo Lighthouse to Snohomish River	48	17.49
5. Hat Island East	GED-4/GED-5, GED-4, GED-3, GED-2, GED-1/ GED-2	North Beach to Southeast Head	15	2.67
6. Hat Island West	GED-1/GED-2, GED-1, GED-4/GED-5	Southeast Head to North Beach	7	1.51
7. Priest Point	SNO-4	Snohomish River to Potlatch Beach	10	3.33
8. Tulalip Bay	SNO-2/SNO-3	Potlatch Beach to Hermosa Beach	26	5.38
9. Tulalip Shores	SNO-1	Hermosa Beach to Sunny Shores	13	4.82
10. Kayak Point	SNO-1	Sunny Shores to Warm Beach	14	4.61
11. Hat Slough	SK-?	Warm Beach to South Pass	5	4.36
12. Stanwood	SK-1/SNO-1	South Pass to Douglas Slough	14	7.75
13. Skagit Flats	SK-1/SNO-1	Douglas Slough to North Snohomish County border	2	3.57
Totals			**197**	**70.38**

Shore Unit Analysis

The number and total length of Shore Units that qualified for each type of candidate site are summarized by Nearshore Stewardship Area in Table 5.

Table 5: Summary of Shore Unit Analysis results by Nearshore Stewardship Area.

Nearshore Stewardship Area	Candidate Type[1]	Number of Shore Units	Length (ft.)	Length (mi.)
1. Woodway-Edmonds	R	4	4,721	0.89
	PR	2	2,320	0.44
	NA	3	5,064	0.96
2. Edmonds	P	1	504	0.10
	R	6	11,683	2.21
	PR	4	4,561	0.86
	NA	12	25,319	4.80
3. Mukilteo	R	6	18,693	3.54
	PR	1	948	0.18
	NA	4	4,882	0.92
4. Mukilteo-Everett	P	1	1,443	0.27
	R	9	14,065	2.66
	PR	8	18,528	3.51
	NA	30	58,286	11.04
5. Hat Island East	P	11	9,814	1.86
	R	1	1,112	0.21
	PR	1	1,107	0.21
	NA	2	2,048	0.39
6. Hat Island West	P	4	3,547	0.67
	PR	3	4,451	0.84
7. Priest Point	R	5	5,514	1.04
	PR	4	10,055	1.90
	NA	1	1,989	0.38
8. Tulalip Bay	P	6	5,682	1.08
	R	5	4,853	0.92
	PR	9	12,107	2.29
	NA	6	5,757	1.09
9. Tulalip Shores	P	6	6,661	1.26
	R	2	2,609	0.49
	PR	4	14,906	2.82
	NA	1	1,281	0.24
10. Kayak Point	P	2	4,100	0.78
	R	1	1,545	0.29
	PR	9	14,592	2.76
	NA	2	4,118	0.78
11. Hat Slough	P	1	4,071	0.77
	R	4	18,924	3.58
12. Stanwood	R	9	30,747	5.82
	NA	5	10,162	1.92
13. Skagit Flats	R	1	1,795	0.34
	NA	1	17,043	3.23
Totals		**197**	**371,607**	**70.38**

[1] Candidate Site Types: P = Protection, R = Restoration, PR = Protection and Restoration, NA = Not Applicable.

In the Woodway-Edmonds Nearshore Stewardship Area, for example, there are four Shore Units with a total length of 4,721 feet or 0.89 miles that qualified as potential restoration candidate sites. In several Nearshore Stewardship Areas, there were no Shore Units identified for one or more candidate site types. These Shore Unit Analysis results are graphically represented in Figure 1 below. The maps in Appendix A also show the locations of specific candidate sites. The primary results of the Shore Unit Analysis are presented in Appendix B.

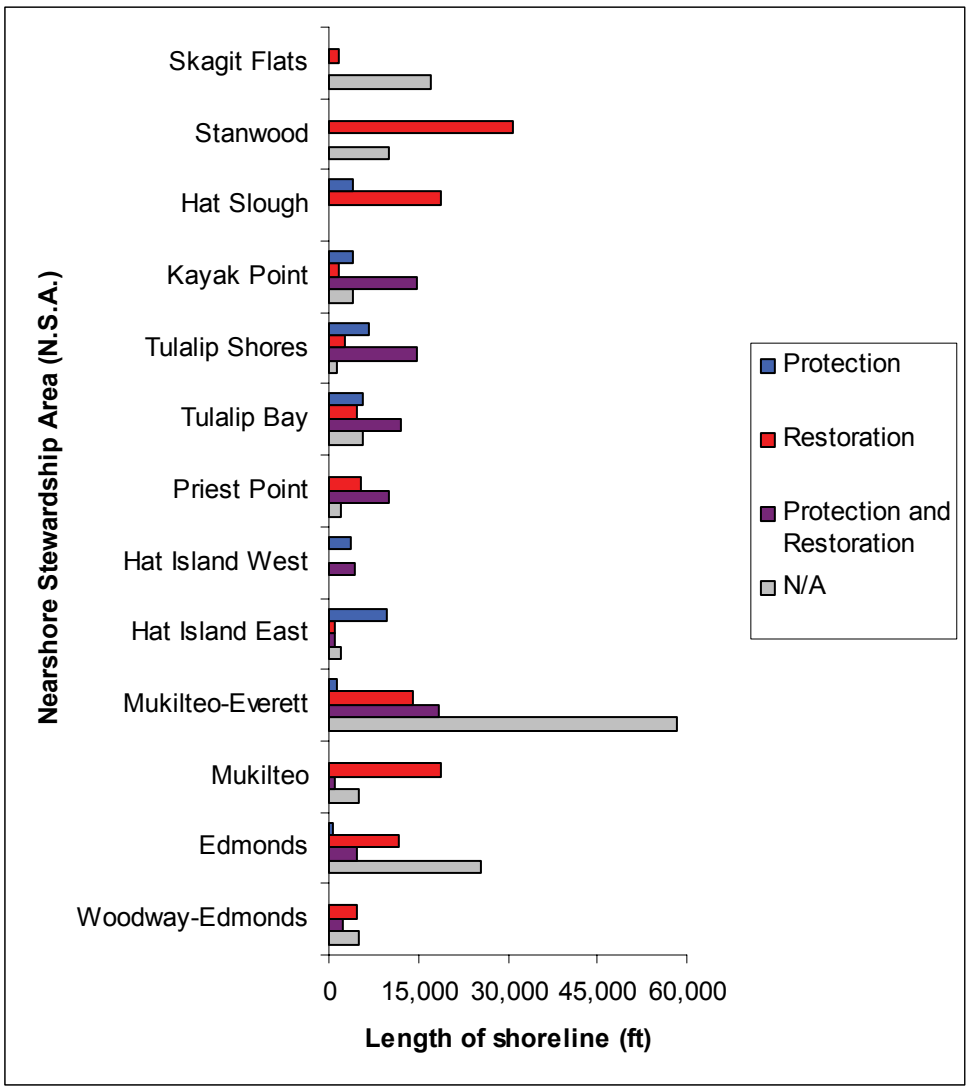

Figure 1: Total length of shoreline identified for protection and/or restoration in each Nearshore Stewardship Area.

The length of shoreline for the Mukilteo-Everett Nearshore Stewardship Area is exaggerated by the geometric complexity of the Port of Everett piers, docks, and other man-made shoreline facilities. The extensive shoreline length identified for restoration in the Hat Slough and Stanwood Nearshore Stewardship Areas is related to two major estuarine salt marsh restoration efforts that are underway in those areas.

Candidate Site Descriptions and Project Options

Narrative candidate site descriptions and possible project options are presented below for ten out of the thirteen Nearshore Stewardship Areas. Some candidate site descriptions and project options have not been completed for the Edmonds, Mukilteo, Mukilteo-Everett, and Tulalip Bay Nearshore Stewardship Areas. In the Mukilteo-Everett Nearshore Stewardship Area, the Merrill and Ring Creek Outfall candidate site has not yet been added to the map in Appendix A. Candidate site descriptions and project options have not yet been developed for the Hat Slough, Stanwood, and Skagit Flats Nearshore Stewardship Areas.

1. Woodway-Edmonds Nearshore Stewardship Area

Point Wells
Shore Units: 2511, 2512, 2513
Shoreline Length: 3,490 feet
Site type: Restoration

Site Description
Point Wells is a former petroleum distribution center owned and operated by the Chevron Corporation. The site was originally one of five sand spits with tidal lagoons between Seattle and Everett. It was filled in 1912 with sand and gravel for construction of the Chevron facility. The site is separated from the upland by the Burlington Northern Santa Fe (BNSF) railroad. Access to the site is provided by two vehicle overpasses. A riprap dike extends along the southeast shoreline (Shore Unit 2513). A vertical sea wall protects the west and northwest shorelines (Shore Units 2512 and 2511). A marine terminal facility covers part of the nearshore area along the west shoreline. Soil and groundwater in the area behind the west and north shorelines is known to be contaminated with petroleum products, but the area behind the south shoreline is reportedly not contaminated (Anchor Environmental, L.L.C. and Pacific International Engineering 2000). A 250 sq. ft. patch of Japanese knotweed is located at the north end of the south shoreline (Snohomish County Marine Shore Inventory 2002).

The south shoreline is approximately 800 feet long, has sandy substrate, supports some beach grass and other herbaceous vegetation, and includes a fair amount of large woody debris. Sand lance spawning has been documented at the south end of this site. A wide eelgrass bed covers the low-tide terrace along the south shoreline and extends further south into King County. Approximately 3 acres of the area behind the south shoreline has been cleared of most of the structures that were part of the original facility.

Point Wells is within Snohomish County jurisdiction and the current land use designation is "Rural Use." The future land use designation is "Urban Industrial." The site is proposed for annexation by the City of Shoreline or the City of Woodway and the City of Shoreline has shown interest in the site for commercial development (Sound Transit/Federal Transit Administration 1999, 2-20). The northern part of this site is the preferred alternative for siting the Shoreline commuter rail station. The south shoreline, with its proximity to nearby residential areas, has potential value for public access.

Project Options
Option 1: Enhance the south shoreline by removing riprap dike, eliminating invasive plants, and reestablishing native riparian and backshore vegetation.

Option 2: Re-create a tidal lagoon system behind the south shoreline as conceived by Sound Transit (Anchor Environmental, L.L.C. and Pacific International Engineering 2000). This option was part of Sound Transit's original mitigation plan, but Chevron pulled out of the negotiations for sale of the site. The "functional/ecological viability" of this option was rated high by Sound Transit's Mitigation Task Force (Anchor Environmental, L.L.C. and Pacific International Engineering 2002).

Option 3: Restore the entire site by completely removing the sea wall, riprap dike, and fill. Regrade the site and reconnect local freshwater sources to re-create a tidal lagoon system with an opening at the north end of the point, which was probably the original mouth of the tidal lagoon system. Reestablish native riparian and backshore vegetation.

Deer Creek
Shore Units: 2509, 2510
Shoreline Length: 2,320 feet
Site type: Protection and Restoration

Site Description
This site includes two shore units north of Point Wells. It is within the City of Woodway. The southern portion of this site (shore unit 2510) is a high quality remnant riparian area with several small freshwater outfalls that flow across the unmodified beach face. A wide eelgrass bed extends north from this beach and covers much of the adjacent low tide terrace. The northern portion of this site (shore unit 2509) includes the Deer Creek land slide, which covered the railroad in the mid-1990s, and the Deer Creek outfall, which runs under the tracks through two 48-inch concrete culverts. An estuarine wetland is located on the east side of the tracks and is connected to the Deer Creek outfall. Part of the Deer Creek landslide deposit extends along the seaward side of the tracks and is an actively eroding source of sediment for the beach to the north. Sound Transit is planning to reestablish the second railroad track along this segment up to Edmonds. This "corridor improvement" will include some additional filling of the estuarine wetland on the east side of the railroad and the Deer Creek culverts will be extended 15 – 25 feet on the upstream side (Anchor Environmental, L.L.C. and Pacific International Engineering 2000). Forest cover in the Deer Creek drainage basin is relatively intact and much of the riparian area along the stream is owned by the Olympic View Water District. Sound Transit's current mitigation plan includes enlarging the existing Deer Creek pool on the east side of the tracks and enhancing the riparian vegetation around the pool (Anchor Environmental, L.L.C. and Pacific International Engineering 2002).

Project Options
Option 1: Preserve the existing riparian vegetation, stream outfalls, and unmodified shoreline along the southern portion of this site.

Option 2: Enhance the connectivity of Deer Creek and the associated estuarine wetland with the nearshore by replacing the two concrete culverts with an oversized culvert or a trestle bridge. This option was considered by Sound Transit for its mitigation plan, but it was rejected for cost and logistical reasons (Parametrix, Inc. and Huckell/Weinman Associates, Inc. 1999).

Edmonds Marina Beach
Shore Units: 2507
Shoreline Length: 1,308 feet
Site type: Restoration

Site Description
This sandy beach is a popular public recreation site just south of the Edmonds Marina. The property was purchased by the City of Edmonds from UNOCAL in 2001. An oil pipeline runs across the site from the UNOCAL facility on the hill to a marine terminal facility located about 800 feet from the beach. The UNOCAL facility has been closed and on-site petroleum contamination is being cleaned up. The beach area on the south side of the pipeline is an off-leash dog park with some backshore vegetation. At the southern end of this area there appears to be a half-acre of non-essential fill on the seaward side of the railroad tracks in the upper intertidal zone. This feature may be owned by the Port of Edmonds. The area on the north side of the pipeline includes a groomed park lawn behind a broad sandy beach. An outfall pipe discharges in the lower intertidal portion of this area.

Northeast of this site is the 23-acre Edmonds Marsh, which is owned by the City of Edmonds and designated as a wildlife sanctuary. This freshwater wetland was created after the original 40-acre estuary was disconnected from tidal influence by a tide gate in the 1960s. The wetland drains directly into the Edmonds Marina through a long culvert. Upstream of the wetland is the Deer Creek hatchery, which produces coho salmon. Some of the hatchery stock is released into Willow Creek and a small run of about 200 to 300 coho salmon has been established. Planning is underway to relocate the Edmonds ferry terminal from the Edmonds waterfront to Edmonds Marina Beach along the south side of the marina.

Project Options
Option 1: Increase the area of the beach face by removing the non-essential fill on the south side of Edmonds Marina beach.

Option 2: Enhance the backshore of Edmonds Marina beach by removing non-native plants and establishing native marine riparian plants.

Option 3: Improve the longshore transport process and public use of the site by removing the UNOCAL oil pier, including the fill on the beach face that supports the pier.

Option 4: Reconnect Edmonds Marsh with Puget Sound by daylighting Willow Creek as conceived by Sound Transit (Parametrix, Inc. and Huckell/Weinman Associates, Inc. 1999).

2. Edmonds Nearshore Stewardship Area

Edmonds Waterfront and Shell Creek
Shore Units: 2497, 2498, 2499, 2500, 2501
Shoreline Length: 6,136 feet
Site type: Protection and Restoration

Site Description
This site includes five adjacent shore units along the Edmonds waterfront. The southern shore unit (2501), known as Olympic Beach, is a sandy pocket beach between the Edmonds Marina breakwater and the Edmonds ferry terminal. Brackett's Landing, on the north side of the ferry terminal, includes two shore units (2500, 2499). This area is a popular entry point to Edmonds Underwater Park for SCUBA divers. Two other shore units (2498, 2497) encompass the eroded shoreline between Brackett's landing and the small delta of Shell Creek.

One of Snohomish County's largest kelp beds extends north from Edmonds Underwater Park. Surf smelt and sand lance spawning has been documented along Olympic Beach and Brackett's Landing. The southwestern two-thirds of Olympic Beach is modified by a sea wall. The City of Edmonds owns all but 100 feet of the tidelands in this shore unit and about two-thirds of the adjoining upland property. The City of Edmonds has established small parks with public shoreline access on both sides of the ferry terminal. These park improvements include some native marine riparian vegetation. Another public access point is located at the south end of Olympic Beach next to the Edmonds Marina breakwater. The City of Edmonds also owns the two shore units at Brackett's Landing and part of the tidelands around the Shell Creek delta. The railroad runs along the upland side of Brackett's Landing and the shoreline up to and beyond Shell Creek. Planning is underway to relocate the Edmonds ferry terminal to Edmonds Marina Beach.

Project Options
Option 1: Further enhance the marine riparian vegetation by adding native plants to existing backshore areas and removing non-native invasive plants where appropriate and compatible with existing park uses.

Option 2: Enhance the shoreline north of Brackett's Landing by implementing the beach rehabilitation project option conceived for the Sound Transit mitigation strategy (Anchor Environmental, L.L.C. 2002). This would involve establishing a stable high tide beach and backshore by adding sediment along the existing shoreline from the end of Brackett's Landing to the Shell Creek delta. This option could also include replacing the existing undersized Shell Creek culvert with a trestle. Although Sound Transit is not pursuing this option as part of its nearshore mitigation for the Seattle-Everett Commuter Rail Project, this option received positive scores on all physical and biological evaluation criteria. This beach rehabilitation option could also expand the high tide beach area available for backshore vegetation enhancement and public use.

Meadowdale Marina
Shore Units: 2491
Shoreline Length: 6,486 feet
Site type: Restoration

Site Description
Meadowdale Marina is a dilapidated boat storage and launching facility with unregulated vehicle access across the railroad tracks. It is located within the City of Edmonds south of Meadowdale Park about a half-mile down the Browns Bay shoreline. The original facility was built in the 1920s and it was expanded in the 1970s. This overwater structure covers approximately 1.7 acres of the intertidal zone. Dense eelgrass beds are located north and south of the structure. A series of different owners have sought to redevelop the site, but redevelopment requests have been denied by the City of Edmonds based on local zoning restrictions and lack of parking space. The marine nearshore habitat impacts of this structure include shading within a productive eelgrass area and potential interference with juvenile salmon migration and foraging along the shoreline.

Project Options
Option 1: Eliminate the shading and fish migration impacts of the overwater structure by purchasing, demolishing, and removing the entire structure. This project was identified by the City of Edmonds. The estimated cost of this project is $500,000.

Lund's Gulch Creek
Shore Units: 2490
Shoreline Length: 1,054 feet
Site type: Restoration

Site Description
Lund's Gulch Creek is a DNR Type 3 stream that runs through Snohomish County's Meadowdale Regional County Park. The park provides public access to a small sandy beach. The drainage area is approximately 2.3 square miles (1,440 acres) and has good forest cover. The stream outfall is confined within an 80' long, 72" wide concrete box culvert, which also serves as a pedestrian underpass across the railroad. This stream is used by coho and chum salmon. Flooding in the park occurs frequently (approximately every other year). Excessive upstream erosion causes downstream sediment deposition, which contributes to the flooding problem and reduces instream habitat quality. The box culvert occasionally fills with sediment, which must be cleaned out to maintain fish passage. A quantitative analysis of erosion has been completed for Lund's Gulch Creek (Snohomish County 2002). Dense eelgrass exists north and south of the stream outfall.

Project Options
Option 1: Implement Snohomish County's project plan to replace the existing box culvert beneath the railroad with a wider box culvert as described in the Puget Sound Tributaries Drainage Needs Report (Snohomish County 2002). This project plan also includes riparian vegetation enhancement above and below the culvert, creation of an off-channel pond in the park, and placement of large woody debris in the pond. The off-channel pond would help reduce

stream flooding and provide high flow fish refuge. Snohomish County's cost estimate for this project is $433,000.

Option 2: Replace the existing box culvert with a trestle bridge. This option would provide even greater connectivity between the stream and the nearshore, thereby enhancing fish passage and sediment transport to the beach.

Norma Creek
Shore Units: 2488
Shoreline Length: 923 feet
Site type: Restoration

Site Description

Project Options
Option 1:

Picnic Point Creek
Shore Units: 2486
Shoreline Length: 1,204 feet
Site type: Protection and Restoration

Site Description
Picnic Point Creek is a DNR Type 3 stream with a drainage area of approximately 2.0 square miles (1,305 acres). Most of the drainage is within unincorporated Snohomish County and the lower reach and the outfall of the stream are within Picnic Point Regional County Park. Public access to the beach is provided by a pedestrian overpass that crosses the railroad. The stream outfall is confined under the railroad tracks by two 36" concrete culverts. The shoreline at this site is a sandy beach with a mid-sized intact backshore that supports the best remaining marine riparian vegetation in Snohomish County west of the railroad and south of Mukilteo. This marine riparian area is threatened by non-native invasive plants, including English ivy and Himalayan blackberry. Upland forest cover is relatively good, but streamside vegetation within the park is limited to small trees and shrubs. Residential and urban development in the drainage basin contribute to increased runoff and erosion, which cause flooding and excessive sedimentation in the lower reach upstream from the railroad culverts. The Alderwood sewage treatment plant is located in this watershed, the sewer effluent pipeline runs through the park, and the outfall extends offshore at Picnic Point. Two artificial fish passage barriers upstream from the park have been identified (Snohomish County 2002). Picnic Point has been used by fish biologists as a nearshore monitoring site for juvenile salmon in central Puget Sound. A large eelgrass bed extends south from the stream outfall. Snohomish County is implementing a nearshore restoration project at this site in 2004 on behalf of the Snohomish County MRC (Washington Department of Ecology 2004). This project includes marine riparian enhancement, creosote log removal, installation of nearshore interpretive signage, and feasibility and design of alternatives to address the flooding, erosion, and fish passage problems.

Project Options

Option 1: Replace the existing undersized railroad culverts with a trestle bridge. The Snohomish County MRC project at Picnic Point will shed some light on the flooding and sedimentation problem at the upstream end of the railroad culverts.

Option 2: Marine riparian enhancement…

3. Mukilteo Nearshore Stewardship Area

Hulk Creek
Shore Units: 2484
Shoreline Length: 948 feet
Site type: Protection and Restoration

Site Description
Hulk Creek is a small stream that flows under the railroad through a 30"-wide concrete culvert to the beach on the north side of Shipwreck Point. This sandy accretion beach has persisted due to the stabilizing effects of several old ship hulks that are now embedded in the shoreline. During the 1920s and 1930s this site was used for a ship salvaging operation. The site is privately owned and a small beach cabin continues to serve as a year-round residence. A mid-sized backshore area supports some marine riparian vegetation and there appears to be potential for enhancement with additional native planting. Eelgrass extends from this site to the north. This site is only two-thirds of a mile north of the public beach at Picnic Point. A wide low tide terrace extends from Picnic Point to Shipwreck Point.

Project Options
Option 1: Work with the property owners to enhance the marine riparian vegetation at the site. This would increase the amount of shade for potential forage fish spawning in the upper intertidal zone.

Option 2: Protect the site by purchasing the fee simple property rights or some form of conservation easement. A lifetime estate arrangement would allow the property owners to continue living on the site while ensuring its preservation and enhancement of marine riparian vegetation.

Chennault Beach Drainages
Shore Units: 2483
Shoreline Length: 3,695 feet
Site type: Restoration

Site Description

Project Options
Option 1:

Big Gulch Creek
Shore Units: 2481
Shoreline Length: 1,341 feet
Site type: Restoration

Site Description
Big Gulch Creek is a DNR Type 3 stream that drains a relatively large area within the City of Mukilteo. The drainage has good upland forest cover. The lower reaches of the stream are used by coho and chum salmon. The stream flows under the railroad to the beach through a 60"-wide corrugated metal culvert. The Olympus Terrace Sewer District operates a sewage treatment plant located on the south bank of the lowest reach of Big Gulch Creek. The City of Mukilteo owns most of the undeveloped open space within the drainage. The headwaters of Big Gulch Creek drain the western portion of Paine Field Airport. Chemical spills in the vicinity of Paine Field in 1993, 1996, and 2000 resulted in downstream fish kills. Eelgrass extends from the stream outfall to the north. Puget Sound Saltwater Anglers and local residents have demonstrated a stewardship commitment for Big Gulch Creek by conducting stream surveys and counting returning salmon.

Project Options
Option 1: Improve the connectivity of Big Gulch Creek with the nearshore by replacing the existing railroad culvert with a trestle bridge.

Option 2: Improve nearshore habitat around the Big Gulch Creek outfall by adding sediment along the seaward side of the railroad to recreate a beach profile that will support marine riparian vegetation.

Smugglers Gulch Creek
Shore Units: 2479
Shoreline Length: 2,710 feet
Site type: Restoration

Site Description

Project Options
Option 1:

Nakeeta Beach
Shore Units: 2478
Shoreline Length: 1,225 feet
Site type: Restoration

Site Description
Nakeeta Beach is a residential community built on top of approximately two acres of the upper intertidal zone of the south Mukilteo shoreline. The site includes ten houses that are protected by a nearly continuous concrete sea wall. Residential sewage is disposed of through on-site septic

systems. The southernmost parcel within the site is undeveloped. Approximately half of the houses are occupied year-round and the others are summer homes.

Project Options
Option 1: Restore the site by purchasing the fee simple property rights for all of the parcels and removing the houses, fill, and sea wall. A lifetime estate arrangement would allow the property owners to continue living on the site. Restoration work could not start until the residents vacated their properties according to the lifetime estate agreements.

Olympic View and Goat Trail Ravines
Shore Units: 2477
Shoreline Length: 7,610 feet
Site type: Restoration

Site Description

Project Options
Option 1:

Mukilteo Lighthouse Park
Shore Units: 2476
Shoreline Length: 1,298 feet
Site type: Restoration

Site Description
Mukilteo Lighthouse Park was transferred from the Washington State Parks Department to the City of Mukilteo in 2002. The park features more than 1,000 feet of sand and gravel beach. Marine riparian vegetation is limited to small patches of Nootka rose, dune rye grass, and gumweed. Existing park facilities along the shoreline include a fair weather public boat launch, scenic view parking spaces, restrooms, picnic tables, fire pits, and a paved walking path. A master plan to redevelop the park was approved in January 2004 and will include a beach restoration element.

Project Options
Option 1: Enhance the beach profile and marine riparian conditions by removing or setting back the existing park facilities along the shoreline and planting native marine riparian vegetation with only limited access points to the beach. This site has excellent potential for beach restoration and public education.

4. Mukilteo-Everett Nearshore Stewardship Area

Japanese Gulch Creek Outfall
Shore Units: 4700
Shoreline Length: 1,440 feet
Site type: Restoration

Site Description
This site is a sand and gravel accretional beach protected from wave action by the old US Air Force pier. Prior to industrial and military development at this site, the beach was one of the most productive clam beds in the region and people continue to harvest shellfish in this area despite potential contamination by sewage and stormwater. The shoreline is riprapped along the entire length of the old Tank Farm. Japanese Gulch Creek flows out onto the beach through culverts of unknown size and type under the Tank Farm and the BNSF railroad. Above the railroad the creek flows through a vertical pipe at 5th Street. Above 5th Street the Japanese Gulch watershed has good forest cover. The subtidal area along the outer edge of the US Air Force pier is heavily used as a by gravid female Dungeness crab. Several large scale redevelopment projects are planned to replace the Mukilteo Tank Farm. These include the Mukilteo multi-modal transportation center, the new Mukilteo ferry terminal, and the Port of Everett large container rail-barge facility that is being constructed for Boeing.

Project Options
Option 1: Daylight Japanese Gulch Creek where it flows under the Tank Farm. This option may conflict with plans to use the Tank Farm for the Mukilteo multimodal transportation center.

Option 2: Improve public health signage for recreational shellfish harvesting.

Option 3: Protect and enhance the remaining upland forest cover within the Japanese Gulch Creek drainage basin.

Edgewater Creek Outfall
Shore Units: 4699
Shoreline Length: 1,094 feet
Site type: Protection and Restoration

Site Description
This site is a sand and gravel accretional beach west of the Mukilteo Tank Farm. Rip rap for the railroad grade occupies the upland edge of this shoreline. Nonessential fill and riprap occupies part of the upper intertidal portion of the east end of this shore unit. Edgewater Creek flows onto the beach under the railroad tracks through a 24-inch concrete culvert. Just west of the creek outfall is a sewer pump station housing with an overflow pipe that discharges onto the beach. Existing vegetation on the upland side of the railroad tracks along the north facing bluff provides some shade to the upper intertidal beach. The Edgewater Creek drainage basin is steeply incised and is known for slope instability, but it also has good upland forest cover. Sandlance spawning

has been documented along most of this shore unit and continues to the east. The lower intertidal and offshore area is used for recreational crab fishing. This beach is also used for recreational hardshell clam harvesting despite health warnings issued for this area by the Washington Department of Health. Eelgrass covers much of the lower intertidal and subtidal portion of the low tide terrace at this site.

This site is a popular public beach owned by the Washington Department of Transportation. It is accessible from the gravel road that runs east along the Mukilteo Tank Farm. The City of Everett Parks and Recreation Department is responsible for locking the gate to this beach at nightfall.

Project Options
Option 1: Enhance the connectivity of Edgewater Creek with the nearshore by replacing the existing culvert with an oversized culvert or a trestle bridge.

Option 2: Improve public health signage for recreational shellfish harvesting.

Option 3: Enhance intertidal habitat and recreational beach use by removing nonessential fill at the east end of the tank farm.

Merrill and Ring Creek Outfall
Shore Units: 4693, 4694, 4695
Shoreline Length: 1,498 feet
Site type: Protection and Restoration

Site Description
This site is predominately gravel and sand substrate with sand flats extending east and west from the Merrill and Ring Creek outfall. Merrill and Ring Creek is a DNR Type 3 stream that flows under the railroad tracks through two perched 48-inch corrugated metal culverts. A relatively large delta fan supports one of the largest areas of remnant marine riparian vegetation in south Snohomish County. A large quantity of drift wood extends along the high water edge of the delta fan. This property is privately owned. Rip rap and rock revetment along the railroad grade separates this marine riparian area from the upstream corridor and uplands. Narbeck Creek, a DNR Type 4 stream, flows under the railroad tracks through a small culvert and onto the beach within a couple hundred feet west of Merrill and Ring Creek. Upland bluff vegetation is relatively mature and provides shade to some parts of the upper intertidal zone. The drainage basin has relatively good forest cover, but there is significant upstream development and impervious surface. The intertidal, subtidal, and offshore area along this site is popular for recreational Dungeness crab fishing. Eelgrass covers much of the intertidal and subtidal area.

Project Options
Option 1: Enhance the connectivity of Merrill and Ring Creek and Narbeck Creek with the nearshore by replacing the existing culverts with oversized culverts or trestle bridges.

Option 2: Work with the private property owner to maintain, preserve, and enhance the marine riparian vegetation along the Merrill and Ring Creek delta.

Howarth and Forest Park Beaches
Shore Units: 4686, 4687, 4688, 4689
Shoreline Length: 4,541 feet
Site type: Protection and Restoration

Site Description
This site is predominately gravel and sand substrate with sand flats at the Pigeon Creek #1 and #2 outfalls. Rip rap and rock revetment along the railroad grade occupies most of this shoreline. A pedestrian overpass and stairway is built on a fill platform protected with rip rap in the upper intertidal portion of the shoreline at Howarth Park. Glenwood Creek, an unclassified stream, flows under the railroad tracks through a small culvert and onto the beach at the west end of the fill platform. Pigeon Creek #2, a DNR Type 4 stream, flows under the railroad tracks through a 48-inch concrete culvert and onto the beach at the east end of the fill platform. Pigeon Creek #1, a DNR Type 3 stream, flows under the railroad tracks through a 60-inch concrete culvert and onto the beach near the Port of Everett's South Terminal. There is no significant riparian vegetation along this entire shoreline, however upland bluff vegetation provides limited shade to some parts of the upper intertidal zone. The drainage basins of all three creeks have relatively good forest cover. Surf smelt spawning has been documented along approximately 1,000 feet of the shoreline between Pigeon Creek #1 and #2. The intertidal, subtidal, and offshore area along this site is popular for recreational Dungeness crab fishing. Eelgrass covers much of the intertidal and subtidal area.

This site consists of two tideland parcels that are owned by the City of Everett and Port of Everett respectively. Howarth Park and Forest Park are large open space recreation areas that encompass significant portions of the Pigeon Creek #1 and #2 drainage basins. Howarth Park includes the only pedestrian railroad crossing facility for public shoreline access between Everett and Mukilteo. The City of Everett Parks and Recreation Department maintains a small system of nature trails in both parks and has conducted some native vegetation and stream enhancement projects involving volunteers. As part of the Port Gardner Outfall Replacement Project the Port of Everett will be creating a new shoreline public access facility near the mouth of Pigeon Creek #1. This project will also involve the rehabilitation of several pocket beaches at the end of the existing South Terminal of the Port of Everett (Kimberly-Clark and City of Everett 1999). A combined sewer overflow outfall is located alongside the Pigeon Creek #1 outfall.

Project Options
Option 1: Enhance the connectivity of Pigeon Creek #2 and/or Pigeon Creek #1 with the nearshore by replacing the existing culverts with oversized culverts or trestle bridges.

Option 2: Reestablish a stable high tide beach and backshore area between Pigeon Creek #2 and Pigeon Creek #1 by adding pea-sized gravel along the existing shoreline. This beach rehabilitation option would expand the high tide beach area available for backshore vegetation and public use. There is no known existing conceptual design work for this option, but it would likely be similar to the design for the Edmonds beach rehabilitation option.

5. Hat Island East Nearshore Stewardship Area

Hat Island East Sand Point
Shore Units: 4622
Shoreline Length: 1,113 feet
Site type: Restoration

Site Description
This is a low bank deposition area with substrate classified as sand and gravel flat or mixed coarse. The shoreline of this beach has been largely modified for single family residences with bulkheads along the backshore and numerous groins running perpendicular to the shoreline. There is little accumulated LWD along the backshore. There is almost no marine riparian vegetation, but much of the upland vegetation on the slopes behind the point is mature. The Washington Department of Fish and Wildlife has not identified this reach as a forage fish spawning habitat. It has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has approved this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage is described as patchy by DNR. The land use designation for this reach is rural residential. The parcels include the intertidal area along with the backshore and upland areas.

Project Options
Option 1: Work with property owners to remove and if necessary replace failing bulkheads with softer bank stabilization methods. Restore native riparian and upland vegetation.

Option 2: Work with property owners to remove the groins in order to restore the natural drift process.

Hat Island East Beach
Shore Units: 4623, 4624
Shoreline Length: 2,933 feet
Site type: Protection

Site Description
This stretch of beach is a moderate to steep banked reach with substrate classified as sand and gravel flat or mixed coarse. The shoreline of this beach has been partly modified with limited bulkheading in the southern section of the reach and in a portion of shore unit 4624. There exists 250 feet of failing wooden bulkheads in the southern section of the beach with two single family residences. There is a 500 ft section (with 210 ft failing) in shore unit 4624 which has been modified with bulkheading and single family residences. The marine riparian and upland vegetation areas are largely intact and mature. A majority of the reach contains active feeder bluffs. The Washington Department of Fish and Wildlife has identified this reach as sand lance (*Ammodytes hexapterus*) spawning habitat located on the upper half of the reach. It has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has not approved this reach as a shellfish growing area. Eelgrass

(*Zostera ssp.*) coverage is described as patchy by DNR. There is a 350 ft section along the shoreline which is owned by the Washington State Department of Natural Resources. The land use designation for this reach is rural residential. The parcels are located on top of the bluffs and do not extend down to the backshore area.

Project Options
Option 1: Work with property owners to remove and if necessary replace failing bulkheads with softer bank stabilization methods.

Opetion 2: Work with property owners to restore, maintain, and preserve marine riparian and upland vegetation.

Hat Island Northeast Beach
Shore Units: 4625, 4626, 4627
Shoreline Length: 2,480 feet
Site type: Protection

Site Description
This is a moderate to steep banked reach for a majority of the length. The substrate is classified as sand and gravel or mixed coarse. The shoreline of this beach has been slightly modified with approximately 150 feet of wood and concrete bulkheads. The easternmost end of this beach includes approximately 60 feet of failing wood bulkhead. The marine riparian vegetation is mature for 90 percent of the reach length. Upland vegetation is also mature. The Washington Department of Fish and Wildlife has identified this reach as sand lance (*Ammodytes hexapterus*) spawning habitat. It is classified as Dungeness crab (*Cancer magister*) habitat. The Washington State Department of Health has not classified this reach for shellfish harvest. Eelgrass (*Zostera ssp.*) coverage is patchy. The land use designation for this reach is rural residential. The parcels include the intertidal area along with the backshore and upland areas.

Project Options
Option 1: Work with property owners to remove and if necessary replace non-essential bulkheads with softer bank stabilization techniques to restore the connectivity between upland and marine riparian processes.

Option 2: Work with property owners to restore, maintain, and preserve riparian and upland vegetation.

Hat Island Marina Beach
Shore Units: 4628, 4629, 4630
Shoreline Length: 1,877 feet
Site type: Protection and Restoration

Site Description
This is a low to steep banked reach is primarily an open sandy beach with some bedrock and gravel substrate at the east end. There is accumulated LWD along some of the lower sections of this beach. The marine riparian vegetation is limited to shrub and ground cover for approximately have the length of this beach with the northern half none existent riparian nor upland vegetation. The upper section (4633) also contains around 280 feet of mature riparian and upland vegetation. The Washington Department of Fish and Wildlife has identified the lower and upper portions of this reach as this reach as sand lance (*Ammodytes hexapterus*) spawning habitat. All but 1400 feet of this reach has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has prohibited this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage has been describes as patchy for the lower reaches and absent for reaches 4631 and 4632 by DNR. The land use designation for this reach is rural residential and a marina. The marina and parking area are owned and operated by Hat Island Commercial Inc. and includes an area of 6.96 acres. The rural residence parcels include the intertidal and extend into the subtidal areas along with the backshore and upland areas.

Project Options
Options 1: Work with property owners to remove non-essential and failing bulkheading or replace hydromodifications with softer bank stabilization techniques to restore the connectivity between upland and marine riparian processes. Restore riparian and upland vegetation by planting native vegetation.

Hat Island Northwest Beach
Shore Units: 4633, 4634
Shoreline Length: 1,736 feet
Site type: Protection

Site Description
This is a steep banked reach with a classification of an open sandy beach. The shoreline of this beach is unmodified with accumulated LWD along the backshore. The marine riparian and mature vegetation has been classified as mature for the entire reach length. The Washington Department of Fish and Wildlife has identified this reach as sand lance (*Ammodytes hexapterus*) spawning habitat. The entire reach has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has approved this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage has been describes as patchy by DNR. The land use designation for this reach is rural residential. The rural residence parcels include the intertidal and extend into the subtidal areas along with the backshore and upland areas. The Tulalip Tribe owns three of the parcels along this reach. There is Tulalip Tribe tribal tidelands for the uppermost 57 feet of section 4633.

Project Options
Option 1: Work with land owners to restore native upland vegetation on top of bluffs.

6. Hat Island West Nearshore Stewardship Area

Hat Island West Sand Point
Shore Units: 4635
Shoreline Length: 2,081 feet
Site type: Protection and Restoration

Site Description
This is a low banked reach with substrate classified as sandy. The shoreline of this beach has been heavily modified. The modifications along these reaches includes wooden bulkheading and signal residential construction. There is an 80 foot section of failing rip rap in the southern portion of this reach which could be replaced with more natural types of bulkheading techniques. The marine riparian is not classified as mature along the backshore. The upland vegetation is considered mature for this reach. The Washington Department of Fish and Wildlife has identified this reach as this reach as sand lance (*Ammodytes hexapterus*) spawning habitat. In addition it has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has approved this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage has been describes as patchy by DNR. The land use designation for this reach is rural residential. The rural residence parcels include the intertidal and extend into the subtidal areas along with the backshore and upland areas. There is a 2.15 acre backshore wetland with a tremendous amount of LWD which could be reconnected to the nearshore ecosystem.

Project Options
Option 1: Reconnect salt marsh/mudflats to nearshore processes (tidal cycle), restore native shoreline vegetation.

Option 2. Replace non-essential or failing bulkheads with softer bank stabilization methods.

Hat Island Southwest Beaches
Shore Units: 4636, 4637, 4638
Shoreline Length: 2,827 feet
Site type: Protection and Restoration

Site Description
This is a steep banked reach with a classification of an open sandy beach. The shoreline of this beach is unmodified with accumulated LWD along the backshore. The marine riparian and mature vegetation has been classified as mature for the entire reach length. The Washington Department of Fish and Wildlife has identified this reach as sand lance (*Ammodytes hexapterus*) spawning habitat. The entire reach has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has approved this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage has been describes as patchy for almost half of the reach and absent from the lower half by DNR. The land use designation for this reach is rural residential. The rural residence parcels include the intertidal and extend into

the subtidal areas along with the backshore and upland areas. The Hat Island Commercial Corporation owns the lots which extend into the intertidal and upper subtidal zone.

Project Options
Option 1: Work with land owners to restore native upland vegetation on top of bluffs.

Hat Island South Beach
Shore Units: 4639, 4640
Shoreline Length: 3,633 feet
Site type: Protection and Restoration

Site Description
This is a steep, moderate to low banked reach with substrate classified as sandy. The shoreline of this beach has been heavily modified. Modifications include concrete bulkheading and rock (Rip Rap armoring) with single residential structures. The marine riparian is not classified as mature along the backshore. The upland vegetation is considered mature for this reach. The Washington Department of Fish and Wildlife has identified this reach as this reach as sand lance (*Ammodytes hexapterus*) spawning habitat. In addition it has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has approved this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage has been describes as patchy by DNR. The land use designation for this reach is rural residential. The rural residence parcels include the intertidal and extend into the subtidal areas along with the backshore and upland areas.

Project Options
Option 1: Work with property owners to remove non-essential bulkheading or replace hydromodifications with softer bank stabilization techniques to restore the connectivity between upland and marine riparian processes. Restore riparian and upland vegetation by planting native vegetation.

Hat Island Southeast Eroding Bluff
Shore Units: 4641
Shoreline Length: 1,356 feet
Site type: Protection

Site Description
This is a steep banked reach with a classification of an open sandy beach. The shoreline of this beach is unmodified with accumulated LWD along the backshore. The marine riparian is not considered mature resulting from the eroding processes of the active bluff. The upland vegetation has been classified as mature for the entire reach length. The Washington Department of Fish and Wildlife has identified this reach as sand lance (*Ammodytes hexapterus*) spawning habitat. The entire reach has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has approved this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage has been described as absent for the entire reach by DNR. The land use designation for this reach is rural residential. A portion of the rural

residence parcels include the intertidal and extend into the subtidal areas along with the backshore and upland areas.

Project Options
Option 1: Work with land owners to restore native upland vegetation on top of bluffs.

7. Priest Point Nearshore Stewardship Area

Priest Point Tidal Lagoon
Shore Units: 4646, 4647
Shoreline Length: 4,164 feet
Site type: Protection and Restoration

Site Description
Priest Point is a sand spit land form with a blocked backshore tidal lagoon. The original berm along the spit has been completely developed with residential dwellings and much of the shoreline is armored with wood and cement bulkheads. Many old pilings and a derelict barge are scattered around the mouth of the tidal lagoon and along the shoreline to the east. The shoreline east of the lagoon may be used occasionally for mooring log rafts. At the mouth of the tidal lagoon is a former mill site, which has been cleared for redevelopment. The inlet of the tidal lagoon is blocked by a tide gate. A freshwater wetland now exists in place of the original estuarine wetland. The substrate along shoreline of the inlet is predominately mud. A small unmapped stream flows from the upland into the north end of the tidal lagoon. Overhanging riparian vegetation extends along the north side of the site nearly all the way east to the Quilceda Creek estuary. Eelgrass is patchy along the shoreline at this site. The intertidal and subtidal area around this site is suitable Dungeness crab habitat.

This site is within the Tulalip Reservation, but all of the parcels within the site are privately owned. Much of the freshwater wetland area, the tide gate, and the former mill site are owned by a single non-tribal property owner. Redevelopment of the former mill site is currently delayed because it contains Native American cultural resources. Part of the shoreline east of the lagoon is owned by tribal property owners.

Project Options
Option 1: Explore the feasibility of protecting and restoring the tidal lagoon by acquiring the tide gate and freshwater wetlands and removing the tide gate and any associated fill. Restoring this site to estuarine wetland would provide a net increase in foraging and refuge habitat for juvenile salmon and Dungeness crab.

Option 2: Enhance the intertidal area of the lagoon inlet and the shoreline to the east by removing the old pilings and the derelict barge.

Priest Point West Beach
Shore Units: 4619, 4620, 4621, 4643
Shoreline Length: 4,589 feet
Site type: Restoration

Site Description
Approximately 411 ft of non-contiguous failing bulkhead.

Project Options
Option 1:

Potlatch Beach
Shore Units: 4618
Shoreline Length: 6,846 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

8. Tulalip Bay Nearshore Stewardship Area

Mission Beach Access Road
Shore Units: 4617
Shoreline Length: 1,354 feet
Site type: Restoration

Site Description

Project Options
Option 1:

Mission Beach Point
Shore Units: 4611, 4612, 4613
Shoreline Length: 1,275 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

Mission Beach Bayside
Shore Units: 4609, 4610
Shoreline Length: 3,176 feet
Site type: Protection

Site Description

Project Options
Option 1:

Tulalip Tribal Center Beach
Shore Units: 4607, 4608
Shoreline Length: 4,307 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

Mission Creek Outfall
Shore Units: 4606
Shoreline Length: 1,060 feet
Site type: Restoration

Site Description

Project Options
Option 1:

Mission Creek Beach
Shore Units: 4605
Shoreline Length: 470 feet
Site type: Protection

Site Description

Project Options
Option 1:

Tulalip Marina Beach South
Shore Units: 4603, 4604
Shoreline Length: 1,470 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

Totem Beach
Shore Units: 4601
Shoreline Length: 1365 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

Tulalip Creek Outfall
Shore Units: 4600
Shoreline Length: 448 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

Tulalip Creek Beach
Shore Units: 4599
Shoreline Length: 705 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

Hermosa Beach Bayside
Shore Units: 4596, 4597
Shoreline Length: 1,303 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

Hermosa Point Beach
Shore Units: 4593, 4594
Shoreline Length: 3,234 feet
Site type: Protection and Restoration

Site Description

Project Options
Option 1:

9. Tulalip Shores Nearshore Stewardship Area

Sunny Shores North Undeveloped
Shore Units: 4581
Shoreline Length: 3,821 feet
Site Type: Protection

Site Description
The substrate on this beach has been classified as sand and gravel. The entire length of this reach is unmodified. There are no bulkheads or modifications along the shoreline with reach riparian zone in the northern quarter is mature tree/shrub with the lower 3/4 was characterized as shrub/tree with the later resulting from private land use. Upland riparian is relatively intact. There are accumulated pieces of LWD or beach logs. Within the length of this reach there are sections of the feeder bluff which are actively feeding sediments to the nearshore ecosystem. There is a section of low bank area which is connected to upland hydric soils (wetlands). This section of the shoreline has an extended beach profile which could be a result of sedimentation processes from the hydric area. The entire length of this reaches shoreline has been documented as surf smelt (*Hypomesus pretiosus*) spawning habitat by the Washington Department Fish and Wildlife. The shoreline unit supports Dungeness crab (*Cancer magister*) and locally there are recreational crab buoys in the area. The Washington State Department of Health has approved this reach as a shellfish growing area. The Washington Department Natural Resources has described eelgrass (*Zostera ssp.*) coverage along this reach as patchy.

Project Options
Option 1: Further enhance riparian zone by planting native conifer vegetation.

Option 2: Further enhance native upland vegetation

Sunny Shores Developed
Shore Units: 4582
Shoreline Length: 2,335 feet
Site Type: Protection and Restoration

Site Description
This beach material on this beach is classified as sand and gravel or a mixed course. This section of the shoreline has been modified with non-essential bulkheads, which has resulted in a section of feeder bluff being cutoff from the nearshore by the wooden bulkheads. There are multiple private lots with multiple single residential structures along the backshore with wooden and concrete bulkheads. There appears that there are no areas where the backshore is connected with the nearshore area. The Snohomish County shoreline inventory conducted in 2001 documented a stream outlet in the northern section of the reach. A result of bulkheading and a reduction in potential LWD due to timber practices LWD is patchy along the entire length. The entire length of this unit has been identified by WDFW as surf smelt (*Hypomesus pretiosus*) spawning habitat. The reach also provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*).

There are fringing patchy beds of eelgrass (*Zostera ssp.*) along the reach. There are boat moorings in the subtidal zone. The Washington State Department of Health approved this reach as a shellfish growing area. This reach is within the Tulalip Indian reservation

Project Options
Option 1: Remove non-essential bulkheading and replacing with softer bank stabilization methods to restore the connectivity between upland and marine riparian processes. Restore riparian and upland vegetation by planting native vegetation.

Option 2: Enhance riparian and upland vegetation b planting native vegetation.

Sunny Shores South Undeveloped
Shore Units: 4583
Shoreline Length: 2,205 feet
Site Type: Protection and Restoration

Site Description
The beach substrate on the reach is classified as sand and gravel or mixed coarse. This reach is partially modified. The northern section of this reach is an accretion or deposition zone. In the upper portion of this reach bulkheads exist with 130 ft characterized as failing by the Marine Shore Inventory conducted by Snohomish County. The southern section contains a feeder bluff which is connected with the nearshore. There are 2 confined stream outfalls both are DNR type 5 streams. The marine riparian and upland vegetation areas are considered intact. There is LWD on the shore the entire length with more LWD in areas of no modifications and the riparian and upland vegetation is intact. Eelgrass (*Zostera ssp.*) beds are patchy throughout this reach. The entire length has been identified as surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) spawning habitat. The reach is considered to be important subtidal and intertidal Dungeness crab (*Cancer magister*) habitat. There is several existing recreational crab fishing buoys along this reach. The Washington State Department of Health has not classified this reach as a shellfish growing area. A majority of this reach is under the ownership or the Port Susan Camp Club located in Marysville. The entire reach is located on Tulalip Tribal Lands.

Project Options
Option 1: Explore the potential for daylighting the confined creek outfall so that it functions more like a natural nearshore tributary stream estuary. This would increase the existing nearshore habitat value for juvenile salmon.

Option 2: Work with land owners to remove or replace non-essential and failing bulkheads with softer bank stabilization methods to restore the connectivity between upland and marine riparian processes. Restore riparian and upland vegetation by planting native vegetation.

Option 3: Enhance riparian and upland vegetation by planting native vegetation.

Tulare Beach Developed
Shore Units: 4584
Shoreline Length: 2,131 feet
Site Type: Restoration

Site Description
The substrate of this reach is classified as mixed course or sand and gravel. This reach is a low bank deposition zone which is highly modified. Several sections the length of the backshore contains bulkheads with approximately 530 ft of the bulkheads failing. There are areas were the lot owners have adopted more natural ways of shoreline protection using vegetation and LWD. These sections along with areas were the bulkheads are setback contain higher amounts of accumulated LWD. There is little riparian and little upland vegetation other than ornamental plants or invasive vegetation. Forage fish have not been observed to spawn along this reach. It is considered Dungeness crab (*Cancer magister*) subtidal and intertidal habitat with several recreational crab buoys in the area. There are also several boat moored along the shoreline. The Washington State Department of Health has not classified this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) beds have been classified as patchy by the Washington State Department of Natural Resources ShoreZone survey. Land use is listed as rural residential with private owned parcels which extend into the intertidal and subtidal areas. The entire reach is located in the Tulalip Tribal Reservation.

Project Options
Option 1: Work with land owners to remove or replace non-essential and failing bulkheads with softer bank stabilization methods to restore the connectivity between upland and marine riparian processes. Restore riparian and upland vegetation by planting native vegetation.

Option 2: Enhance riparian and upland vegetation by planting native vegetation.

Tulare Beach South Undeveloped
Shore Units: 4585
Shoreline Length: 5,034 feet
Site Type: Protection and Restoration

Site Description
This beach has substrate classified as sand and gravel or mixed coarse. A majority of the length of the shoreline is unmodified, with high/steep active feeder bluff connected with the nearshore. A small section in the southern portion of the reach the backshore is cutoff by a wooden bulkhead. There are two unconfined DNR Type 5 streams and one confined DNR type 4 streams. The riparian and upland vegetation are both intact and mature. The Washington State Department of Natural Resources has classified eelgrass (*Zostera ssp.*) as patchy. WDFW has identified surf smelt (*Hypomesus pretiosus*) spawning habitat along this reach. The subtidal and intertidal areas along this reach are Dungeness crab (*Cancer magister*) habitat. There are recreational crab buoys in the area. The Washington State Department of Health has approved this area as a shellfish growing area. This beach has accumulated ample LWD along the

backshore. Portions of this reach are owned by a private company, a private land owner and Indian lands.

Project Options
Option 1: Explore the potential for daylighting the confined creek outfall so that it functions more like a natural nearshore tributary stream estuary. This would increase the existing nearshore habitat value for juvenile salmon.

Option 2: Work with Tribal agencies to protect land under Tribal ownership from development.

Option 3: Work with private land owner to set aside upland areas for protection.

Option 4: Secure grant or other resources to purchase and set aside riparian and upland areas for protection.

Spee-Bi-Dah Beach
Shore Units: 4586
Shoreline Length: 478 feet
Site Type: Restoration

Site Description
The substrate on this beach has been classified as classified as sand and gravel or mixed coarse. The entire reach is highly modified. Over half of backshore is cutoff by wooden bulkheads and an existing asphalt road with no riparian or upland vegetation. Approximately 400 ft of the existing bulkheading is failing. There is a boat ramp and moorings for boats. It appears that dredging has occurred in the intertidal and subtidal zones in the location of the existing boat ramp. There may be an opportunity to replace nonessential bulkheads with natural armoring techniques. WDFW has not identified this reach as being used as spawning habitat for forage fish. In the ShoreZone database eelgrass (*Zostera ssp.*) beds were characterized as patchy. This reach provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*). The Washington State Department of Health has not approved this reach as a shellfish growing area. This area is not included in the Tulalip Tribal lands. It is listed as rural residential.

Project Options
Option 1: Work with land owners and remove and/or replace with softer bank stabilization methods. Restore native riparian vegetation.

Option 2: Remove dredged materials from intertidal and subtidal habitats.

Spee-Bi-Dah South Developed
Shore Units: 4587
Shoreline Length: 1,779 feet
Site Type: Protection

Site Description
The substrate on this beach is classified as sand and gravel or mixed coarse. The shoreline of this reach is partially modified with some bulkheading and residential structures on top of the bluffs. The riparian and upland vegetation are mature. However, there are landscaped yards on top of the bluffs. The bluffs are actively feeding sediment to the beach. There appears to be an upland marsh or small stream with flows on the beach along this reach. There are accumulated amounts LWD along the backshore. The nearshore area provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*). The Washington State Department of Health has classified this reach as an approved shellfish growing area. The reach has not been identified as a forage fish spawning habitat site. It could potentially provide spawning area for forage fish spawning habitat. The eelgrass (*Zostera ssp.*) coverage along this reach has been determined by WDNR as patchy. The reach is located on Tulalip Tribal land.

Project Options
Option 1: Work with land owners or Tulalip tribe to replace hardened bulkheads with softer bank protection methods. Restore native riparian vegetation.

Spee-Bi-Dah South Undeveloped
Shore Units: 4588
Shoreline Length: 722 feet
Site Type: Protection

Site Description
This beach is a mixed course or sand and gravel beach. The shoreline of this reach is unmodified. In the southern section there are construction activities on top of the bluffs. Both riparian and upland vegetation are considered mature in a majority of the reach. There are cliffs and active feeder bluffs along the length of this reach. There are accumulated amounts of LWD along the backshore. Has been identified as forage fish spawning habitat surf smelt (*Hypomesus pretiosus*) and important Dungeness crab (*Cancer magister*) habitat. The eelgrass (*Zostera ssp.*) distribution along this reach has classified as patchy. Backshore contains LWD and feeder bluffs. The Washington State Department of Health has classified this reach as an approved shellfish growing area. The upland areas have been divided into parcels and have been zoned as rural residential.

Project Options
Option 1: Work with land owners to restore native upland vegetation on top of bluffs.

Tulalip Shores Developed
Shore Units: 4590
Shoreline Length: 1,281 feet
Site Type: Protection

Site Description
The low banked stretch of shoreline contains beach substrate classified as sand and gravel or mixed coarse. The shoreline has been modified with mature riparian but immature upland vegetation. A majority length of this reach has been bulkhead by both wooden and concrete material. These bulkheads isolate upland and riparian processes from the nearshore. The amount of stored LWD is much lower along the bulkhead section of this reach whereas along the unmodified section contains accumulated amounts of LWD along the backshore. There are active feeder bluffs along the unmodified section of this reach. This reach has not been identified by the State of Washington as forage fish spawning habitat. The reach provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*). The Department of health has not classified this reach as a shellfish growing area. The Washington Department of Natural Resources has classified eelgrass (*Zostera ssp.*) coverage along this reach as patchy. The land use of the upland areas of this reach have been classified as rural residential.

Project Options
Option 1: Work with land owners to remove or replace wooden bulkheads with softer bank stabilization methods. Restore native riparian vegetation.

Option 2: Work with land owners to restore native upland vegetation.

Tulalip Shores Undeveloped
Shore Units: 4591
Shoreline Length: 5,335 feet
Site Type: Protection and Restoration

Site Description
This moderate to steep bank beach has substrate classified as sand and gravel or mixed coarse. The unmodified shoreline contains a mature marine riparian zone with mature upland vegetation. There are two wetlands along this reach: one is a well developed freshwater wetland on top of the bluff with possible drainage area or ground water source, the Snohomish County shoreline inventory recorded a separate brackish supralittorial wetland along this reach. In southern section there is a DNR Type 5 stream. Along the backshore of the entire reach there is accumulated LWD storage. There are active feeder bluffs along this reach providing upland eroding processes to the nearshore ecosystem. This reach has been identified by Washington Department of Fish and Wildlife as surf smelt (*Hypomesus pretiosus*) spawning habitat. The reach also contains intertidal and subtidal habitat for Dungeness crab (*Cancer magister*). The Washington State Department of Health has classified this reach as an approved shellfish growing area. The distribution of eelgrass (*Zostera ssp.*) has been described as patchy. A major portion of this reach is Tulalip Tribal land with around 700 feet along the shoreline extending into the intertidal and subtidal areas the remaining length of the shoreline classified as rural residential.

Project Options
Options 1: Work with land owners to restore native upland vegetation.

Options 2: Explore the feasibility of a monitoring program to monitor and investigate supralittorial wetland health, functions and processes.

Shoemaker Beach
Shore Units: 4592, 4593
Shoreline Length: 2,529 feet
Site Type: Protection

Site Description
This moderate to steep banked shoreline contains substrate classified as sand and gravel or mixed coarse. The entire length of this reach is modified shoreline with large areas of rock and wooden bulkheading. Additional modifications such as boat ramps, single residence buildings are found along this shoreline. As a result of bulkheading and areas of large amounts of rip rap and rubble in the intertidal zone and backshore there is no significant amounts of LWD storage. There is a 65 ft section of bulkheads in shore unit 4593 which are failing and the bluff is actively contributing sediments to the nearshore. The marine riparian and upland vegetation is considered mature. However, the riparian vegetation is disconnected from the nearshore due to bulkheading and bank hardening. Washington State Department of Fish and Wildlife has not identified this reach as forage fish spawning habitat. The intertidal and subtidal habitats along this reach support Dungeness crabs (*Cancer magister*). The Washington State Department of Health has classified this reach as an approved shellfish growing area. The Washington Department of Natural Resources ShoreZone Inventory database characterizes eelgrass (*Zostera ssp.*) coverage along his reach as patchy. The A majority of the length of this shoreline has been classified for rural residential land use. The Tulalip Tribe owns around 650 feet along the shoreline.

Project Options
Option 1: Work with land owners to replace failing bulkheads with softer bank stabilization methods. Restore native riparian vegetation.

Option 2: Remove non-essential rock, bank armoring material, and debris from the intertidal and upper subtidal habitats.

Option 3: Work with land owners to restore native upland vegetation.

10. Kayak Point Nearshore Stewardship Area

Lake Martha Creek Outfall
Shore Units: 4568
Shoreline Length: 2,026 feet
Site type: Restoration

Site Description
This site is located near Warm Beach. The shoreline substrate is sand and mud. Shoreline armoring is limited to only about ten percent of the shore unit. Old pilings extend out into the mud flats. Lake Martha Creek, a DNR Type 3 stream, flows through a 150-foot long culvert onto the mud flats. There is very little riparian vegetation along this shore unit, but most of the adjoining residential properties have riparian areas that could potentially be re-vegetated. The Lake Martha Creek drainage basin has relatively good upland forest cover and includes Martha Lake.

There is no public property along this shoreline. It is divided into many small privately owned parcels. Water quality pollution from on-site septic systems is a known problem in Lake Martha Creek and the Warm Beach area. This area is within the Lower Stillaguamish Clean Water District and unincorporated Snohomish County. The Stillaguamish Tribe, Snohomish County, and the Washington Department of Ecology are involved in monitoring local water quality conditions. This site is part of the Snohomish County Noxious Weed Control Board's *Spartina* eradication and monitoring program.

Project Options
Option 1: Explore the potential for daylighting the Lake Martha Creek outfall so that it functions more like a natural nearshore tributary stream estuary. This would increase the existing nearshore habitat value for juvenile salmon.

Option 2: Work with local private property owners to plant appropriate types of trees, shrubs, and/or other native backshore vegetation that would provide increased marine riparian function while preserving views and other property values.

Warm Beach South Undeveloped
Shore Units: 4571
Shoreline Length: 5,443 feet
Site Type: Protection and Restoration

Site Description
This moderate to steep banked reach has a sand and gravel or mixed coarse beach. The reach has been partly modified with the upland area on top of the feeder bluffs containing residential lots. There are areas of wooden bulkheading (with approx. 550 feet classified as failing) and other types of construction where the backshore and upland areas have been disconnected from the nearshore. The marine riparian zone and upland vegetation are considered mature. The amount

of LWD along the backshore seems to be correlated negatively to bulkheading and bank hardening. Among parcels on top of the bluffs the native vegetation has been replaced by landscaped yards with invasive vegetation. This reach contains feeder bluffs with areas of active deposition adding sediments to the nearshore ecosystem. The Washington Department of Fish and Wildlife has identified this reach as surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) spawning habitat. This reach also provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*). The Washington State Department of Health has not classified this reach as a shellfish growing area. This reach does not have any eelgrass (*Zostera ssp.*) beds. The land use designation for this reach is rural residential. The parcels includethe intertidal area along with the backshore and upland areas.

Project Options:
Option 1: Work with landowners to replace non-essential and failing wooden bulkheads with softer bank stabilization techniques.

Option 2: Restore, maintain, and preserve riparian and upland native vegetation.

Kayak Cove Outfall North Beach
Shore Units: 4572
Shoreline Length: 1,609 feet
Site Type: Protection and Restoration

Site Description
This is a sandy, steep banked beach which has been partly modified with minor bulkheading. The marine riparian and upland vegetation is mature. The uplands are modified with private homes and landscaped yards. The backshore consists of feeder bluffs which are actively eroding in areas. There is accumulated LWD along the backshore. The Washington Department of Fish and Wildlife has identified this reach as surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) spawning habitat. This reach also provides Dungeness crab (*Cancer magister*) habitat. The Washington State Department of Health has not classified this reach as a shellfish harvest area. The Washington Department of Natural Resources ShoreZone Inventory classified the eelgrass (*Zostera ssp.*) beds as patchy. The Snohomish County Marine Shore Inventory recorded extensive groundwater seeps along the length of this reach. The land use designation for this reach is rural residential. The parcels includethe intertidal area along with the backshore and upland areas.

Project Options
Option 1: Work with private land owners to restore, maintain, and preserve native upland vegetation on top of the bluffs.

Option 2: Develop and implement protection and restoration plans for groundwater seep areas.

Kayak Cove Outfall
Shore Units: 4573
Shoreline Length: 334 feet
Site Type: Protection and Restoration

Site Description
This is a low to steep banked reach with sand and gravel flat or mixed coarse substrate. The shoreline of this beach has been partly modified. It is an accretion zone with the majority of sediment supplied from a DNR type 3 (WRIA ID-50457) tributary stream within the reach. The stream outlet is confined within a double culvert (24 and 53 inch diameters). The culvert is probably a barrier for salmonids to the upstream channel, which is relatively low gradient. There is currently a single family residence with a paved road with the backshore being hardened with rock rip rap. Along the hardened backshore there is little accumulated LWD. There is LWD in the southern half of the reach. The marine riparian vegetation is mature for approximately half the reach length. The majority of the upland vegetation is mature. The Washington Department of Fish and Wildlife has not identified this reach as a forage fish spawning habitat. It has been classified as Dungeness crab (*Cancer magister*) habitat for juvenile and adults. The Washington State Department of Health has not classified this reach as a shellfish growing area. Eelgrass (*Zostera ssp.*) coverage has been described as patchy by the DNR ShoreZone Inventory. The land use designation for this reach is rural residential. The parcels includethe intertidal area along with the backshore and upland areas.

Project Options
Option 1: Work with property owner to remove culverts and daylight the stream to provide fish passage to upstream freshwater habitat.

Option 2. Work with property owners to restore, maintain, and preserve native marine riparian and upland vegetation.

Option 3: Remove non-essential bulkheading and replace if necessary with softer bank stabilization techniques to restore the connectivity between upland and marine riparian processes.

Kayak Cove North Beach
Shore Units: 4574
Shoreline Length: 1,069 feet
Site Type: Protection and Restoration

Site Description
This steep banked reach is north of Kayak Point County Park. The beach substrate of this reach is classified as sand and gravel or mixed coarse. The shoreline has been partly modified. There is a 180-foot long wooden bulkhead which is failing as reported by the Snohomish County Marine Shore Inventory. The remaining length of backshore is connected with the nearshore and there is accumulated LWD along the length of the reach. There are also active feeder bluffs. The marine riparian zone and upland vegetation are mature. There are private residential parcels on top of the

bluffs. The Washington Department of Fish and Wildlife has identified this reach as surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) spawning habitat. The reach is also important juvenile salmonid habitat. This shoreline provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*). The Washington State Department of Health has not classified this reach as a shellfish growing area. There are patches of eelgrass (*Zostera ssp.*) along this reach. The land use designation for this reach is rural residential. The parcels includethe intertidal area along with the backshore and upland areas.

Project Options
Option 1: Work with land owners to remove failed bulkheads and replace if necessary with softer bank stabilization techniques.

Option 2: Work with land owners to restore, maintain, and preserve native vegetation on top of bluffs.

Option 3: Work with land owners to restore, maintain, and preserve native marine riparian vegetation.

Kayak Cove South Beach
Shore Units: 4575
Shoreline Length: 537 feet
Site Type: Protection and Restoration

Site Description
This low to moderate banked, sandy beach is adjacent to Kayak Point County Park. Partly modified residential parcels with dwellings located in backshore, upland and top of feeder bluff. There are areas of bulkheading in intertidal and backshore areas. As a result the marine riparian and upland vegetation has been modified and is not mature. There is a 135-foot section of wooden bulkhead that is failing. The amount of LWD storage varies with modification type. The Washington Department of Fish and Wildlife has identified this reach as surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) spawning habitat. This shoreline provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*). The Washington State Department of Health has not been classified this reach as a shellfish growing area. The Washington Department of Natural Resources ShoreZone Inventory has classified this reach as not currently supporting eelgrass (*Zostera ssp.*) beds. The land use designation for this reach is rural residential. The parcels includethe intertidal area along with the backshore and upland areas.

Project Options
Option 1: Work with land owners to remove and if necessary replace failed bulkheads with softer bank stabilization techniques.

Option 2: Work with land owners to restore, maintain, and preserve native vegetation on top of bluffs.

Option 3: Work with land owners to restore, maintain, and preserve native marine riparian vegetation.

Kayak Point North Beach
Shore Units: 4576, 4577, 4578
Shoreline Length: 2,353 feet
Site Type: Protection and Restoration

Site Description
This no bank, sandy beach is part of the highly used Kayak Point Regional County Park. Historically a tidal lagoon existed behind the accretion sand spit berm along Shore Unit 4577. The lagoon was filled in the early 1900s by sluicing soil from the adjacent slopes. A steel sheet pile bulkhead with a concrete cap was installed along most of this beach in the 1970s. A one-lane concrete road runs along the public beach. Immediately adjacent to the point, logs and other debris are occasionally thrown up onto the road during winter storm events and high tides. In the northern portion of Shore Unit 4576, there is approximately 110 feet of privately owned failing wooden bulkhead.

Marine riparian vegetation is limited to some shrubs and ground cover. The upland forest cover is relatively intact with some clearing for homes and views at the top of the bluff. There is accumulated LWD along this reach. The Washington Department of Fish and Wildlife has identified this reach as surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) spawning habitat. This shoreline provides subtidal and intertidal habitat for Dungeness crab (*Cancer magister*). The Washington State Department of Health has classified this reach as an approved commercial shellfish area. It has not been classified as a shellfish growing area. There is a documented market squid (*Loligo opalscenes*) spawning site located off the fishing pier. The eelgrass (*Zostera ssp.*) coverage along this reach is classified by the DNR ShoreZone Inventory as patchy. The land use designation for the upper portion of this reach is rural residential. The remaining southern length of the shoreline of his reach is owned by Snohomish County, Parks and Recreation. The Snohomish County Marine Resource Advisory Committee sponsored its first pilot project at the park in 2003. This project included experimental marine riparian enhancement planting between the fishing pier and the point and installation of interpretive signage on the fishing pier.

Project Options
Option 1: Work with private land owners to remove and if necessary replace failed bulkheads with softer bank stabilization techniques.

Option 2: Work with private land owners to restore, maintain, and preserve native marine riparian vegetation.

Option 3: Maintain and expand the marine riparian enhancement pilot project and continue conducting effectiveness monitoring.

Option 4: Work with Snohomish County Parks and Recreation to investigate feasibility of relocating the access road to increase beach profile and backshore habitat at the tip of the point.

Option 5: Work with Snohomish County Parks and Recreation to investigate feasibility of replacing all or part of the existing steel and cement bulkhead with a softer bank stabilization method. This could serve as a public demonstration and research project.

Option 6: Work with Snohomish County Parks and Recreation to investigate feasibility of recreating a tidal lagoon to provide refuge and rearing habitat for salmonids, marine fish and invertebrates.

Kayak Point South Beach
Shore Units: 4579
Shoreline Length: 2075 feet
Site Type: Protection

Site Description
This reach has a steep bank and the beach substrate along this reach has been classified as sand and gravel or mixed coarse. The entire length of this reach is unmodified. In the southern 155 feet of this reach there are several small 4-6 inch plastic drainage pipes associated with rural residential development. The marine riparian zone and upland vegetation is mature and intact. The marine riparian and upland areas both contribute LWD to the nearshore area. There is accumulated LWD along the backshore of this reach. There are active feeder bluffs with extensive areas of groundwater seepage from the bluff and the beach. The Washington Department of Fish and Wildlife has identified this reach as surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) spawning habitat. Eelgrass (*Marina ssp.*) beds are classified as continuous coverage making this area important subtidal and intertidal Dungeness crab (*Cancer magister*) and salmon habitat. The Washington State Department of Health has classified the northern portion of this reach as an approved shellfish growing area. Most of this shoreline reach is owned by Snohomish County Parks and Recreation.

Project Options
Option 1: Work with Snohomish County Parks and Recreation to protect and maintain this area.

Option 2: Increase park user and neighboring private land owner awareness of the habitat value of this site and ways they can help to protect it.

Option 3: Monitor the physical and biological conditions of this site to detect any degradation over time.

McKees Beach Outfall
Shore Units: 4580
Shoreline Length: 3,252 feet
Site type: Protection and Restoration

Site Description
This low bank sand and gravel depositional shore unit is located just south of Kayak Point cove. The shoreline along this unit is completely developed with small residential parcels. Several of these waterfront parcels do not have bulkheads; these parcels appear to support more large woody debris. A DNR Type 4 stream flows across the beach face through a 24-inch corrugated metal culvert at the bottom of the access road. Some parcels along the northern half of this shore unit include mature ornamental trees that provide shade to the upper intertidal zone. The drainage basin of the Type 4 stream supports mature forest cover. Surf smelt spawning occurs along the northern half of the unit and continues north along part of the undeveloped beach at Kayak Point cove. The intertidal and subtidal area along this shoreline is prime Dungeness crab habitat and is popular for recreational crab fishing. Eelgrass is dense and nearly continuous along the entire Shore Unit. This site is primarily within Snohomish County jurisdiction, but a small part of the southern end is within the Tulalip Reservation. The site is zoned rural residential, it is a private residential community, and most of the tidelands are owned by the McKee's Beach Association.

Project Options
Option 1: Work with the McKee's Beach Association and private property owners to replace existing wood and/or concrete bulkheads with softer shore protection alternatives.

Option 2: Explore the potential for daylighting the Type 4 stream outfall so that it functions more like a natural nearshore tributary stream estuary. This would increase the existing nearshore habitat value for forage fish and juvenile salmon.

Option 3: Work with the McKee's Beach Association and private property owners to plant appropriate types of trees, shrubs, and/or other native backshore vegetation that would provide increased marine riparian function while preserving views and other property values. This would increase the amount of shade for existing and potential forage fish spawning in the upper intertidal zone.

11. Hat Slough Nearshore Stewardship Area

Candidate site descriptions and project options have not been completed for the Hat Slough Nearshore Stewardship Area.

12. Stanwood Nearshore Stewardship Area

Candidate site descriptions and project options have not been completed for the Stanwood Nearshore Stewardship Area.

13. Skagit Flats Nearshore Stewardship Area

Candidate site descriptions and project options have not been completed for the Skagit Flats Nearshore Stewardship Area.

Discussion

The results of this study clearly demonstrate that most of the shoreline identified for protection is located in north Snohomish County and around Hat Island. These areas still have relatively good nearshore habitat conditions, with contiguous stretches of undeveloped shoreline, such as at Potlatch Beach on the Tulalip Reservation and at North Beach on Hat Island, or with key habitat elements that are still intact despite development. Most of the undeveloped sites are steep and not yet accessible by road.

Conversely, there is very little non-degraded nearshore habitat in south Snohomish County. This pattern largely reflects the impact of the Burlington Northern railroad from Everett south. The railroad has significantly degraded south Snohomish County nearshore habitat by disconnecting feeder bluffs from the marine shore, eliminating marine riparian vegetation, and confining the mouths of numerous Puget Sound tributary streams. Upland urban and residential development also contributes to the loss of marine riparian vegetation and upland forest cover. In north Snohomish County and on Hat Island most nearshore impacts are caused by residential development along the backshore and the bluff top.

In general, the types of nearshore impacts in Snohomish County include the following:

- Large scale industrial, maritime, and urban modifications of the nearshore, such as the railroad, Port of Everett, marinas, and ferry terminals.
- Historic loss of relatively large pocket estuaries at Edmonds Marsh, Lund's Gulch, Point Elliot, Priest Point, Tulalip Bay, and Kayak Point.
- Separation of feeder bluffs from the nearshore by the railroad and residential bulkheads.
- Interruption of longshore sediment transport by groins associated with residential properties.
- Confinement of Puget Sound tributary stream mouths where they enter the nearshore.
- Clearing of mature marine riparian vegetation.
- Industrial, urban, and residential development of low bank shorelines and backshore.
- Conversion of mature forest cover to urban and residential development in Puget Sound tributary stream drainages.
- Increased surface water peak flows and soil erosion due to conversion of forest cover to impervious surfaces from development.

To address these different types of nearshore impacts this study identifies the following general project options:

- Large scale restoration or enhancement efforts, such as reconstruction of tidal lagoons at historic pocket estuary locations, beach nourishment and backshore enhancement, replacement of undersized stream culverts with trestle bridges, and removal or set back of dikes.
- Large scale protection efforts, such as acquisition of fee simple property or conservation easements.
- Medium scale restoration or enhancement efforts, such as removal of residential bulkheads and groins, removal of creosote logs and pilings, and multi-parcel marine riparian planting.

- Medium scale protection efforts, such as nearshore stewardship technical assistance to home owner associations and owners of large properties.
- Small scale restoration or enhancement efforts, such as single parcel marine riparian planting.
- Small scale protection efforts, such as nearshore stewardship education and outreach to individual property owners.

Lessons learned:

- Although this methodology is relatively simple, it requires GIS capability and it can take a significant amount of time to complete.
- The basic approach used in this methodology could be easily adapted to fit other marine resource priorities, existing data, and evaluation criteria.
- The evaluation criteria can be constructed to fit existing data and local priorities.
- The detailed analysis of candidate sites and project options is time consuming, but it can be done with more or less detail.
- The application of this methodology can provide a useful and relatively simple framework for compiling, maintaining, and analyzing marine resource GIS data.

Conclusions and Recommendations

The results of this study will primarily be used by the Snohomish County MRC for improving public understanding of the condition of local marine resources and the needs and opportunities for nearshore protection and restoration. This report will also be available to the general public and other organizations that may be interested in working to protect and restore nearshore habitat and local marine resources.

It should be noted that this study is probably the first comprehensive attempt to identify candidate sites for protection and/or restoration in Snohomish County. As such it has great potential value, but it also has some limitations. Most importantly, the sites and project options identified in this report are purely speculative and, unless stated otherwise in this report, no commitments have been made by the owners of the properties where these sites are located. Nevertheless, this report provides a starting point for identifying site-specific priorities for protecting and restoring marine resources and nearshore habitat in Snohomish County.

Next steps:

- Complete the detailed candidate site descriptions and project options for the Edmonds, Mukilteo, Mukilteo-Everett, Tulalip Bay, Hat Slough, Stanwood, and Skagit Flats Nearshore Stewardship Areas.
- Add the Merrill and Ring Creek candidate site and any other new candidate sites to the maps in Appendix A.
- Facilitate a final Snohomish County MRC review of the completed report.
- Post the completed report on the Snohomish County MRC web site for dissemination to the general public and partner organizations.
- Provide the completed report to Snohomish County Planning and Development Services as a reference in the 2005 updates of the Snohomish County Comprehensive Growth Management Plan, Critical Area Regulations, and Shoreline Management Plan.
- Present major results and highlights of this study as part of the Snohomish County MRC 2005 Annual Report to the Snohomish County Council and Executive.

Recommendations:

- Continue to use this methodology as a framework for compiling, maintaining, and analyzing Snohomish County marine resource GIS data.
- Actively use this report to guide and promote the protection and restoration of Snohomish County marine nearshore habitat by public and private organizations as well as private property owners, home owner associations, and local community groups.
- Conduct a major update of this report by 2010 and use it as a baseline for documenting progress toward protecting and restoring Snohomish County marine resources.
- Offer this methodology as an alternative approach for other MRCs to use in identifying and prioritizing nearshore protection and restoration candidate sites and projects.

References

Anchor Environmental, L.L.C. 2002. Technical Memorandum regarding north commuter rail line mitigation – beach rehabilitation concept evaluation. January 2002.

Anchor Environmental, L.L.C. and Pacific International Engineering. 2002. Mitigation Plan: Everett-Seattle Commuter Rail Project. Prepared for the Central Puget Sound Regional Transportation Authority (Sound Transit). August 2002.

Anchor Environmental, L.L.C. and Pacific International Engineering. 2000. Conceptual Mitigation Plan: Everett-Seattle Commuter Rail Project. Prepared for the Central Puget Sound Regional Transportation Authority and Sound Transit. May 2000.

Fresh, K., C. Simenstad, J. Brennan, M. Dethier, G. Gelfenbaum, F. Goetz, M. Logsdon, D. Myers, T. Mumford, J. Newton, H. Shipman, C. Tanner. 2004. Guidance for protection and restoration of the nearshore ecosystems of Puget Sound. Puget Sound Nearshore Partnership Report No. 2004-02. Published by Washington Sea Grant Program, University of Washington. Seattle, WA.

Kimberly-Clark and City of Everett. 1999. Port Gardner Outfall Replacement Project: project analysis document. December 1999.

Parametrix, Inc. and Huckell/Weinman Associates, Inc. 1999. Mitigation Options Report, Everett to Seattle Commuter Rail Project, Appendix D-2 to the Final Environmental Impact Statement. Prepared for the Central Puget Sound Regional Transportation Authority and Sound Transit. November 1999.

Snohomish County. 2002. Puget Sound Tributaries Drainage Needs Report (DNR No. 11). December 2002. Public Works Department, Surface Water Management Division. Everett, WA.

Sound Transit/Federal Transit Administration. 1999. Everett to Seattle Commuter Rail Project Final Environmental Impact Statement (Volume I). December 1999. Seattle, WA.

Washington State Department of Ecology. 2004. Northwest Straits Project: Picnic Point Restoration and MRC Support. CZM310 Grant Agreement No. G0400222 between the State of Washington Department of Ecology and Snohomish County. Olympia, WA.

Washington State Department of Ecology. 2003. Northwest Straits Project: Nearshore Habitat Restoration and MRC Support. CZM310 Grant Agreement No. G0300112 between the State of Washington Department of Ecology and Snohomish County. Olympia, WA.

Washington State Department of Health. 2004. 2003 Annual Inventory: Commercial and recreational shellfish areas of Washington State. Office of Food Safety and Shellfish Programs. Olympia, WA.

GIS Data Sources

King County. 2000. Brightwater Marine Outfall Siting Study (MOSS). Seattle, WA. [web site]

Snohomish County. 2002. Marine Shore Inventory. Everett, WA. [web site]

Snohomish County. 2001. Orthophotos. Everett, WA. [web site]

Washington State Department of Natural Resources. 2001. ShoreZone Inventory. Nearshore Program. Olympia, WA. http://www2.wadnr.gov/nearshore/index.asp.

Washington State Department of Ecology. 2002. Drift Cells. Olympia, WA. http://www.ecy.wa.gov/services/gis/data/data.htm.

Washington State Department of Ecology (DOE). 2001. Oblique Shoreline Photos. Olympia, WA. http://apps.ecy.wa.gov/shorephotos/index.html.

Washington State Department of Natural Resources (DNR). [date]. Stream Hydrography. Olympia, WA. [web site]

Washington State Department of Fish and Wildlife (WDFW). [date]. Priority Habitats and Species Database. Olympia, WA. [web site]

Washington State Department of Fish and Wildlife (WDFW). 2002?. Recreational Crab Fishing Buoy Survey. Mill Creek, WA. [web site]

Appendix A: Maps of Nearshore Stewardship Areas and Candidate Sites

Appendix B: Shore Unit Analysis Results

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
615.020	2475	ELIOT PT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1298.099	2476	ELIOT PT	1	0	0	0	0	2	0	4	2	0	2	2	8	R	Mukilteo Lighthouse Park
7610.675	2477	NELSONS CORNER	0	1	0	2	0	2	1	6	0	2	0	2	6	R	Olympic View / Goat Trail Outfalls
1225.231	2478		0	1	0	2	0	2	1	6	0	2	0	0	4	R	Naketa Beach Outfall
2710.118	2479		0	1	0	2	0	2	1	6	0	2	0	0	4	R	Smugglers Gulch Outfall
1341.381	2480	BIG GULCH	0	0	0	2	0	2	1	5	0	0	0	0	0	NA	
2158.239	2481		0	1	0	2	0	2	1	6	0	2	0	0	4	R	Big Gulch Creek Outfall
1169.793	2482		0	0	0	2	0	2	1	5	0	0	0	0	0	NA	
3695.241	2483		0	1	0	2	0	2	1	6	0	2	0	0	4	R	Upper and Lower Chenault Creek Outfa
948.017	2484		1	1	2	2	0	2	1	9	2	2	2	2	8	PR	Hulk Creek Outfall
3666.583	2485		0	0	0	2	0	2	0	4	0	0	0	0	0	NA	
1204.959	2486	PICNIC PT	0	1	2	2	0	2	1	8	0	2	2	2	6	PR	Picnic Point Creek Outfall
5277.266	2487		0	0	0	2	0	2	2	6	0	0	0	0	0	NA	
923.530	2488	NORMA BEACH	0	1	0	2	0	2	1	6	0	2	0	0	4	R	Norma Creek Outfall
1007.479	2489		0	0	0	2	0	2	2	6	0	0	0	0	0	NA	
1054.446	2490		0	1	0	2	0	2	1	6	0	2	0	0	4	R	Lunds Gulch Outfall
6486.250	2491	BROWNS BAY	0	0	0	2	0	2	1	5	0	0	0	0	0	NA	
474.777	2492	BROWNS BAY	0	1	0	2	0	2	1	6	0	2	0	0	4	R	Browns Bay Outfall
1806.130	2493	BROWNS BAY	0	0	0	0	0	2	1	3	0	0	0	0	0	NA	
3531.161	2494	BROWNS BAY	0	0	0	2	0	2	2	6	0	0	0	0	0	NA	
1405.450	2495		0	0	0	2	0	2	2	6	0	0	0	0	0	NA	
2668.930	2496		0	1	0	0	0	2	1	4	0	2	0	0	4	R	North Stream Outfall
1105.672	2497		0	1	2	2	0	2	1	8	0	2	0	0	4	PR	Shell Creek Outfall
2286.686	2498	EDMONDS	0	0	0	0	0	2	1	3	0	0	0	0	0	NA	

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
732.888	2499	EDMONDS	1	0	0	0	2	2	1	9	0	0	2	2	4	PR	Edmonds Underwater Park
504.270	2500	EDMONDS	0	0	0	0	2	2	2	8	0	0	0	2	2	P	Bracketts Landing
1518.779	2501	EDMONDS	0	0	2	0	2	2	2	10	0	0	2	2	4	PR	Olympic Beach
1416.573	2502	EDMONDS MARINA	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1284.215	2503	EDMONDS MARINA	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
2673.727	2504	EDMONDS MARINA	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	
1908.381	2505	EDMONDS MARINA	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1313.149	2506	EDMONDS MARINA	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1308.836	2507	EDWARD POINT	0	1	2	0	0	2	1	6	2	2	2	0	10	R	Edmonds Marina Beach
4572.175	2508	EDWARDS PT	0	0	2	2	0	2	1	7	0	0	0	0	0	NA	
1463.823	2509	PT WELLS	0	1	2	2	0	2	1	8	0	2	2	2	8	PR	Deer Creek Outfall
856.765	2510	PT WELLS	2	2	2	2	0	2	2	14	0	1	2	2	6	PR	Point Wells North
1352.298	2511	PT WELLS	0	0	0	0	0	0	2	2	2	0	0	0	4	R	Point Wells B
1342.050	2512	PT WELLS	0	0	0	0	0	0	1	1	2	0	0	0	4	R	Point Wells A
796.257	2513	PT WELLS	0	0	0	0	0	0	1	1	2	0	2	2	8	R	Point Wells South
5514.274	4560	DAVIS SLOUGH	0	0	0	0	0	0	0	0	2	0	2	0	6	R	Leques Island Davis Slough
1306.943	4561		0	1	0	0	0	0	0	1	2	0	2	0	6	R	Leques Island Davis Slough South
2441.966	4562	SOUTH PASS	1	0	0	0	0	0	0	2	2	0	2	0	6	R	Leques Island South Pass
1561.876	4563	SOUTH PASS	0	1	0	0	0	0	0	1	0	0	0	0	0	NA	
14603.519	4564	HAT SLOUGH	0	1	2	0	0	0	0	3	2	2	2	0	8	R	Stillaguamish Estuary
2141.407	4565	HAT SLOUGH	0	1	2	0	0	0	0	3	2	2	2	0	8	R	Hatt Slough North
5469.684	4566	HAT SLOUGH	0	1	0	0	0	0	0	1	0	2	2	0	6	R	Hatt Slough South
4072.352	4567	WARM BEACH	1	0	2	2	0	2	0	8	0	0	0	0	0	P	Warm Beach

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
																	North
2026.341	4568	WARM BEACH	1	1	0	2	0	2	0	7	2	2	2	0	10	R	Martha Creek Outfall
3662.034	4569	WARM BEACH	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
457.259	4570		0	2	0	2	0	2	0	6	0	1	0	0	2	NA	
5443.313	4571		1	0	2	2	2	2	0	14	2	0	0	2	6	PR	Warm Beach South Undeveloped
1608.813	4572		1	0	2	2	2	2	1	15	2	0	0	2	6	PR	Kayak Cove Outfall North Beach
333.842	4573		1	1	2	2	0	2	1	10	0	2	0	2	6	PR	Kayak Cove Outfall
1069.591	4574		1	0	2	2	2	2	1	13	2	0	0	2	6	PR	Kayak Cove North Beach
536.601	4575		1	0	2	2	2	2	1	13	2	0	0	2	6	PR	Kayak Cove South Beach
1243.803	4576		1	0	0	2	2	2	1	11	2		2	2	8	PR	Kayak Point North Beach
572.115	4577		1	0	0	2	2	2	1	11	2	0	2	2	8	PR	Kayak Point Fishing Pier
536.646	4578	KAYAK POINT	1	0	0	2	2	2	1	11	2	0	2	2	8	PR	Kayak Point
2075.175	4579		2	0	2	2	2	2	2	16	0	0	0	2	2	P	Kayak Point South Beach
3252.179	4580	MCKEES BEACH	1	1	0	2	2	2	1	13	2	2	0	2	10	PR	McKees Beach Outfall
3820.089	4581	TULALIP INDIAN RES.	2	0	2	2	2	2	1	15	0	0	0	2	2	P	Sunny Shores North Undeveloped
2335.042	4582		0	0	2	2	2	2	1	11	2	0	0	2	6	PR	Sunny Shores Developed
2205.972	4583		1	2	2	2	2	2	1	15	0	1	0	2	4	PR	Sunny Shores South Undeveloped
2131.488	4584	TULARE BEACH	1	0	0	2	2	2	1	11	2	0	0	2	6	R	Tulare Beach Developed
5034.248	4585	TULARE BEACH	2	2	2	2	2	2	1	17	0	1	0	2	4	PR	Tulare Beach South Undeveloped
478.163	4586	SPEE-BI-DAH	1	0	0	0	0	2	1	5	2	0	2	2	8	R	Spee-Bi-Dah Beach
1779.105	4587		1	0	2	2	0	2	1	9	0	0	0	2	2	P	Spee-Bi-Dah South

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
																	Developed
721.682	4588		2	0	2	2	2	2	1	15	0	0	0	2	2	P	Spee-Bi-Dah South Undeveloped
1281.448	4589	TULALIP SHORES	0	0	0	0	2	2	0	6	0	0	0	2	2	NA	
978.257	4590	TULALIP SHORES	0	0	2	0	2	2	0	8	0	0	0	2	2	P	Tulalip Shores Developed
5335.494	4591	TULALIP SHORES	2	0	2	2	0	2	0	10	0	0	2	2	4	PR	Tulalip Shores Undeveloped
858.144	4592		0	0	2	2	2	2	1	11	0	0	0	2	2	P	Shoemaker Beach
1671.113	4593		0	0	2	2	2	2	1	11	0	0	0	2	2	P	Hermosa Point Beach North
1563.176	4594	HERMOSA POINT	1	0	2	0	2	2	1	11	2	0	2	2	8	PR	Hermosa Point Beach South
254.566	4595	HERMOSA POINT	0	0	0	0	2	2	0	6	0	0	0	2	2	NA	
921.460	4596	HERMOSA POINT	0	0	0	0	2	2	1	7	2	0	2	2	8	R	Hermosa Beach Residential
382.776	4597	TULALIP	1	0	0	0	2	2	1	8	2	0	2	2	8	PR	Hermosa Beach Access
724.925	4598	TULALIP	0	0	0	0	2	2	1	7	0	0	0	2	2	NA	
705.366	4599	TULALIP	1	0	0	0	2	2	1	9	0	0	2	2	4	PR	Tulalip Creek Beach
447.987	4600		1	1	0	2	2	2	1	12	0	2	2	2	8	PR	Tulalip Creek Outfall
1365.386	4601		2	0	0	0	2	2	1	11	0	0	2	2	4	PR	Totem Beach
484.649	4602		0	0	0	0	2	2	0	6	0	0	0	0	0	NA	
327.323	4603		1	0	0	0	2	2	1	9	0	0	2	2	4	PR	Tulalip Marina South Beach #2
1143.462	4604		0	0	0	0	2	2	1	7	0	0	2	2	4	R	Tulalip Marina South Beach #1
469.886	4605		1	0	0	0	2	2	1	9	0	0	0	2	2	P	Mission Creek Beach
1060.127	4606		1	2	2	2	0	2	0	10	0	1	2	0	4	R	Mission Creek Outfall
1061.811	4607		2	0	0	0	2	2	0	10	0	0	2	2	4	PR	Tulalip Tribal Center Beach #2
3245.749	4608	MISSION BEACH	1	0	0	0	2	2	0	8	0	0	2	2	4	PR	Tulalip Tribal

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
																	Center Beach #1
1705.926	4609		1	0	2	0	2	2	0	10	0	0	0	0	0	P	Mission Beach #2
1470.332	4610		1	0	2	0	2	2	0	10	0	0	0	0	0	P	Mission Beach #2
375.636	4611		1	0	0	0	2	2	1	7	0	0	2	2	4	R	Mission Beach Spit
231.581	4612		0	0	0	2	2	2	1	9	0	0	0	2	2	P	Mission Beach Point #2
666.883	4613		0	0	0	2	2	2	1	9	0	0	0	2	2	P	Mission Beach Point #1
741.185	4614		1	0	0	2	0	2	1	7	0	0	0	2	2	NA	
2251.385	4615		0	0	0	2	0	2	1	5	0	0	0	2	2	NA	
1301.498	4616	MISSION BEACH	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1353.902	4617	MISSION BEACH	0	0	0	0	0	2	1	3	2	0	2	0	6	R	Mission Beach Access Road
6846.034	4618		2	0	2	2	0	2	1	11	2	0	0	2	6	PR	Potlatch Beach
784.217	4619	TULALIP INDIAN RES.	0	0	0	0	0	2	2	4	2	0	2	2	8	R	Priest Point West Beach #3
1178.557	4620	TULALIP INDIAN RES.	0	0	0	0	0	2	2	4	2	0	2	2	8	R	Priest Point West Beach #2
894.433	4621	TULALIP INDIAN RES.	0	0	0	0	0	2	2	4	2	0	2	2	8	R	Priest Point West Beach #1
1112.583	4622	GEDNEY ISLAND	0	0	0	2	0	2	2	6	2	0	0	0	4	R	Hat Island East Sand Point
1725.372	4623	GEDNEY ISLAND	1	0	2	2	2	2	1	13	0	0	0	2	2	P	Hat Island East Beach
1207.706	4624	GEDNEY ISLAND	1	0	2	2	2	2	1	13	0	0	0	2	2	P	Hat Island Northeast Sand Point
373.952	4625	GEDNEY ISLAND	2	0	2	2	2	2	1	15	0	0	0	2	2	P	Hat Island Northeast Beach #3
386.799	4626	GEDNEY ISLAND	0	0	2	2	2	2	1	11	0	0	0	2	2	P	Hat Island Northeast Beach #2
1718.585	4627	GEDNEY ISLAND	1	0	2	2	2	2	1	13	0	0	0	2	2	P	Hat Island Northeast Beach #1
237.151	4628	GEDNEY ISLAND	1	0	2	2	2	2	1	13	0	0	0	2	2	P	Hat Island Marina Beach

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
																	#3
533.174	4629	GEDNEY ISLAND	1	0	2	2	2	2	1	13	0	0	0	2	2	P	Hat Island Marina Beach #2
1107.325	4630	GEDNEY ISLAND	1	0	0	0	2	2	1	9	2	0	2	2	6	PR	Hat Island Marina Beach #1
1425.332	4631	GEDNEY ISLAND	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	
622.951	4632	GEDNEY ISLAND	0	0	0	0	0	2	0	2	0	0	0	2	2	NA	
581.164	4633	GEDNEY ISLAND	1	0	2	2	2	2	2	14	0	0	0	2	2	P	Hat Island Northwest Beach #2
1155.074	4634	GEDNEY ISLAND	2	0	2	2	2	2	1	15	0	0	0	2	2	P	Hat Island Northwest Beach #1
2081.067	4635	GEDNEY ISLAND	1	0	0	2	2	2	1	11	0	0	2	2	4	PR	Hat Island West Sand Point
1150.861	4636	GEDNEY ISLAND	2	0	2	2	2	2	1	15	0	0	0	2	2	P	Hat Island Southwest #2
694.672	4637	GEDNEY ISLAND	2	0	2	2	2	2	0	14	0	0	0	2	2	P	Hat Island Southwest #1
981.621	4638	GEDNEY ISLAND	1	0	2	2	2	2	0	12	0	0	2	2	4	PR	Hat Island South Gravel Pit Road
1389.286	4639	GEDNEY ISLAND	2	0	0	2	2	2	0	12	2	0	2	2	8	PR	Hat Island South Beach Old Wharf
2243.553	4640	GEDNEY ISLAND	0	0	0	2	2	2	0	8	0	0	0	2	2	P	Hat Island South Beach Houses
1355.999	4641	GEDNEY ISLAND	2	0	0	2	2	2	0	12	0	0	0	2	2	P	Hat Island Southeast Eroding Bluff
1733.110	4643	TULALIP INDIAN RES.	0	0	0	0	0	2	2	4	0	0	2	2	4	R	Priest Point South
1989.663	4644	TULALIP INDIAN RES.	0	0	0	0	0	2	1	3	0	0	0	0	0	NA	
925.048	4645	TULALIP INDIAN RES.	0	0	0	0	0	2	0	2	2	0	2	0	6	R	Priest Point North
1246.832	4646		1	1	2	2	0	2	1	10	2	2	2	0	10	PR	Priest Point Tidal Inlet
2918.188	4647		1	0	2	2	0	2	1	9	2	0	0	0	4	PR	Quilceda

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
																	Nearshore #2
2057.266	4648		1	0	2	2	0	2	1	9	2	0	0	0	4	PR	Quilceda Nearshore #1
1449.510	4653	PORT EVERETT	1	0	2	0	0	2	0	5	2	0	2	0	6	R	Preston Point
814.090	4654	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
3536.630	4655	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
597.954	4656	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
6934.678	4657	PORT EVERETT	0	1	0	2	0	2	0	5	0	2	0	0	4	R	Maulsby Mudflats and Saltmarsh
5955.191	4658	PORT EVERETT	2	0	2	0	0	2	0	8	0	0	2	2	4	PR	Jetty Island North Beach
2508.834	4659	PORT EVERETT	2	0	2	0	0	2	0	8	0	0	2	2	4	PR	Jetty Island Tidal Lagoon
4377.918	4660	PORT EVERETT	2	0	0	0	0	2	2	8	0	0	2	2	4	PR	Jetty Island South Beach
3306.077	4661	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
3332.246	4662	PORT EVERETT	0	0	0	0	0	2	2	4	0	0	0	0	0	NA	
2472.551	4663	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	2	0	2	NA	
3587.157	4664	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	2	0	2	NA	
2961.837	4665	PORT EVERETT	1	0	0	0	0	2	0	2	0	0	2	0	2	NA	
326.115	4670		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
478.742	4671		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
2015.566	4672		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1211.981	4673		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
376.280	4674		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
561.580	4675		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
2995.876	4676		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
3223.080	4677		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1470.459	4678	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
2742.644	4679	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1136.914	4680	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
8583.229	4681	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
1160.958	4682	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
2474.893	4683	PORT EVERETT	0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
703.997	4684		0	0	0	2	0	2	0	4	0	0	0	0	0	NA	
781.186	4685		0	0	0	2	0	2	0	4	0	0	0	0	0	NA	
651.432	4686	PIGEON CREEK	0	1	0	2	0	2	1	6	0	2	0	0	4	R	Pigeon Creek #1 Outfall
2436.475	4687		0	1	0	2	2	2	1	10	0	2	0	2	6	PR	Viewridge Creek Outfall
631.026	4688		0	1	0	2	2	2	0	9	0	2	0	2	6	PR	Pigeon Creek

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
																	#2 Outfall
823.240	4689		0	1	0	2	2	2	1	10	2	2	0	2	10	PR	Howarth Park
1443.830	4690		0	0	0	2	2	2	1	9	0	0	0	2	2	P	Madrona Beach
582.768	4691		0	1	0	0	0	2	0	3	0	2	0	0	4	R	Glenwood Creek Outfall
2110.541	4692		0	1	0	2	0	2	1	6	0	2	0	0	4	R	Phillips Creek Outfall
706.702	4693	MERRILL & RING CREEK	2	1	2	2	0	2	1	13	0	2	2	0	6	PR	Merrill and Ring Creek Outfall
296.548	4694		0	0	0	2	0	2	1	5	0	0	0	0	0	NA	
496.474	4695		0	1	0	2	0	2	1	6	0	2	0	0	4	R	Narbeck Creek Outfall
2391.250	4696		0	0	0	2	0	2	1	5	0	0	0	0	0	NA	
421.756	4697	POWDER MILL GULCH	0	1	0	2	0	2	1	6	0	2	0	2	6	R	Powder Mill Gulch Creek Outfall
2658.260	4698		0	0	0	0	2	2	1	7	0	0	0	2	2	NA	
1093.988	4699		0	1	0	2	2	2	1	11	2	2	0	2	10	PR	Edgewater Creek Outfall
1440.825	4700		0	1	0	2	0	2	0	5	0	2	0	0	4	R	Japanese Gulch Creek Outfall
1361.852	4701		0	0	0	0	0	2	0	2	0	0	0	0	0	NA	
782.193	4702		0	0	0	0	2	2	0	6	2	0	0	2	6	R	NOAA Field Station
740.086	4703	ELIOT POINT	0	0	0	0	2	2	0	6	0	0	0	2	2	NA	
18438.006	4711	SKAGIT RIVER DELTA	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	
11107.911	4712	SKAGIT RIVER DELTA	0	1	0	0	0	0	0	1	0	2	0	0	4	R	Douglas Creek Outfall
3601.961	4713	CAMANO IS	0	0	0	0	0	0	0	0	2	0	2	0	6	R	Leques Island North
1628.622	4764	STILLAGUAMISH RIVER	0	0	0	0	0	0	0	0	2	0	2	0	6	R	Leques Island South Pass Middle
1305.939	4765	STILLAGUAMISH RIVER	0	0	0	0	0	0	0	0	2	0	2	0	6	R	Leques Island South Pass North
2122.690	4766	STILLAGUAMISH RIVER	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	
1211.686	4767	STILLAGUAMISH	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	

LENGTH	UNIT_ID	SHORENAME	P1	P2	P3	P4	P5	P6	P7	PROTECT_TOT	R1	R2	R3	R4	RESTOR_TOT	CANDIDATE	SITE_NAME
		RIVER															
1882.854	4773	STILLAGUAMISH RIVER	0	0	0	0	0	0	0	0	2	0	2	0	6	R	Leques Island West Pass
2909.899	4774	STILLAGUAMISH RIVER	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	
2359.631	4775	STILLAGUAMISH RIVER	0	0	0	0	0	0	0	0	0	0	0	0	0	NA	