CITY OF SHORELINE
SHORELINE MASTER PROGRAM UPDATE

Restoration Plan

Prepared for:
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Planning and Development Services
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1.0 INTRODUCTION

This report supports the development of a restoration element as part of the City's Shoreline Master Program (SMP) update. The City of Shoreline's 1995 SMP (King County Code Title 25 adopted by reference upon City's incorporation) is being updated to comply with the Shoreline Management Act requirements (RCW 90.58) and the state's SMP guidelines (Washington Administrative Code [WAC] 173-26, Part III), which went into effect in 2003. To support this effort, the City applied for and received a grant issued by the Washington State Department of Ecology (Ecology) (G0800171).

The SMP guidelines require that local governments develop SMP policies that promote "restoration" of impaired shoreline ecological functions and a "real and meaningful" strategy to implement restoration objectives. The City's *Shoreline Inventory and Characterization Report* (ESA Adolfson, 2008) identifies which shoreline ecological functions and ecosystem processes have been impaired. In updating its SMP, the City of Shoreline (City) is required to identify and plan for ways to restore or enhance those functions and processes that have been impaired. In the context of the SMP, planning for shoreline restoration includes establishing goals and policies, working cooperatively with other regional entities, and supporting restoration through other regulatory and non-regulatory programs.

1.1 Regulatory Background

The restoration plan is an important component of the SMP process under the state's new SMP guidelines. Local governments must develop provisions "to achieve overall improvements in shoreline ecological functions over time when compared to the status upon adoption of the master program" (WAC 173-26-201[2][f]).

It is important to note that the restoration planning component of the SMP is voluntary, not regulatory. Restoration planning is focused on incentives, available funding sources, volunteer programs, and other programs that can contribute to a no net loss strategy.

To date, restoration, rehabilitation, enhancement or other improvements to shoreline ecological functions have either been voluntary or in the form of mitigation for impacts resulting from development. Conservation or preservation of existing conditions has been, and continues to be, the primary regulatory approach to protecting ecosystem functions:

> *Through numerous references to and emphasis on the maintenance, protection, restoration, and preservation of "fragile" shoreline "natural resources," "public health," "the land and its vegetation and wildlife," "the waters and their aquatic life," "ecology," and "environment," the act makes protection of the shoreline environment an essential statewide policy goal consistent with the other policy goals of the act* (WAC 173-26-186[8]).

Current guidelines for updating local shoreline master programs require policy language to include the improvement of ecosystem functioning. The guidance augments the typically

reactionary approach (i.e., mitigation for environmental impacts) to a proactive approach wherein:

> *For counties and cities containing any shorelines with impaired ecological functions, master programs shall include goals and policies that provide for restoration of such impaired ecological functions* (WAC 173-26-186[8][c]).

The guidelines to prepare or amend shoreline master programs further state:

> *The goal of this effort is master programs which include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area of each city and county* (WAC 173-26-201[2][c]).

1.2 Defining Restoration

There are numerous definitions for "restoration" in scientific and regulatory publications. Specific elements of these definitions often differ, but the core element of repairing damage to an existing, degraded ecosystem remains consistent. In the SMP context, the WAC defines "restoration" or "ecological restoration" as:

> *The reestablishment or upgrading of impaired ecological shoreline processes or functions. This may be accomplished through measures including, but not limited to, revegetation, removal of intrusive shoreline structures and removal or treatment of toxic materials. Restoration does not imply a requirement for returning the shoreline area to aboriginal or pre-European settlement conditions* (WAC 173-26-020[27]).

Using the WAC definition of restoration in regard to state shorelines, it is clear the effort should be focused on specific shoreline areas where natural ecological functions have been impaired or degraded. The emphasis in the WAC is to achieve overall improvement in existing shoreline processes or functions, if these functions are impaired. Therefore, the goal is not to restore historically natural conditions, but rather to improve on existing, degraded conditions. The guidelines require that restoration goals, policies and actions "be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program" (WAC 173-26-201[2][f]).

Restoration can be broadly implemented through a combination of programmatic measures (such as surface water management, water quality improvement, or public education) and site-specific projects (such as soft shore armoring or riparian plantings). It is important to note that the guidelines do not state that local programs should or could require individual permittees to restore past damages to an ecosystem as a condition of a permit for new development (Ecology, 2004). The required restoration planning element therefore focuses on the city as a whole rather than parcel by parcel, or permit by permit.

1.2.1 Difference between Restoration and Protection

Restoration is different from protection. For state shorelines, the latter is achieved primarily through the SMP policies and regulations (as well as other county, state, and federal regulations) that safeguard resources from damage caused by use and development. Protection requires that development be prohibited in some areas and that, when allowed, development occur in a way that mitigates adverse effects on the natural environment. The net result of the development activity should be no worse than the pre-development condition, thereby ensuring no net loss of shoreline ecological functions. Protection also requires that deliberate measures be taken to ensure that natural ecosystem processes (such as net shore-drift) continue with minimal impairment.

Restoration, on the other hand, involves more than simply following and enforcing existing rules or maintaining existing conditions. It requires taking active steps to improve the condition of existing shoreline functions and processes and replace those that have been lost. Restoration measures are intended to supplement shoreline protection efforts such that environmental conditions improve over time.

Table 1-1 identifies and differentiates typical shoreline protection and restoration actions. The protection measures are addressed in the SMP (and/or required by other regulatory programs such as critical areas regulations and stormwater regulations). The restoration actions reflect a range of activities that are applicable to the City of Shoreline. This plan is built around the following list of common restoration actions as indicated in the subsequent chapters.

Table 1-1. Examples of Typical Protection and Restoration Actions

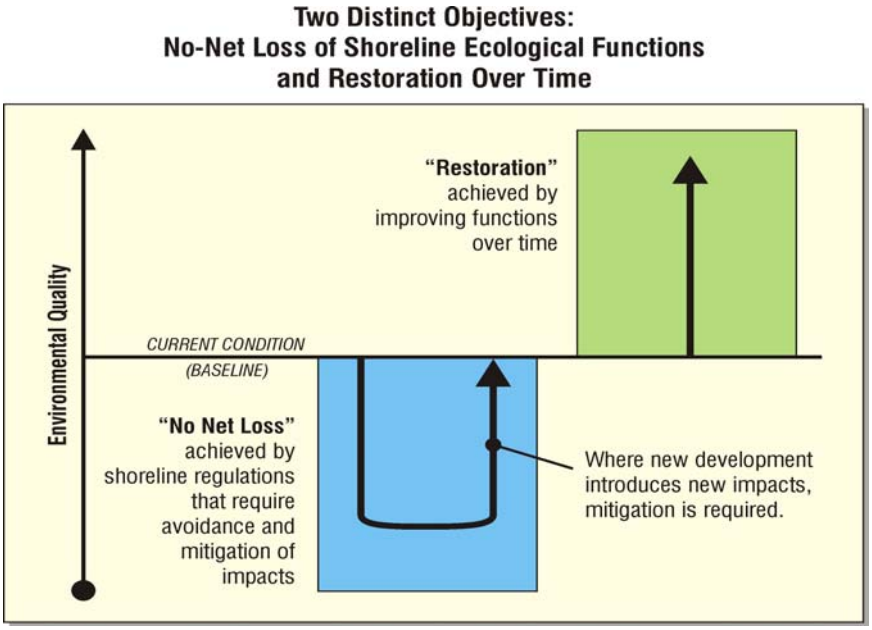
Examples of Protection Actions	Examples of Restoration Actions[1]
• Treating stormwater runoff using best management or low impact development practices • Maintaining existing wetlands • Observing buffer and setback requirements • Protecting/preserving existing trees/vegetation • Protecting water quality by limiting pesticide/fertilizer use • Limiting construction of new docks and hard armoring • Preserving property through protective easements	• Removing bulkheads to reestablish sediment delivery, where feasible • Replacing bulkheads with soft shore stabilization, where feasible • Encourage alternative wave deflecting devices where bulkheads exist • Replanting nearshore vegetation • Planting eelgrass, kelp and other aquatic macrophytes • Replacing or enlarging undersized culverts • Removing fill from wetlands, intertidal habitats and floodplains • Removing invasive plant species • Removing abandoned in-water structures including docks • Removing creosote pilings and other in-water apparatus • Retrofitting existing impervious surfaces to include stormwater treatment and flow control • Replacing pavement with pervious pavement

Examples of Protection Actions	Examples of Restoration Actions[1]
[1] In some circumstances, these actions may be required by law.	

1.2.2 No Net Loss and Restoration

The concept of no net loss of shoreline ecological functions is rooted in the Shoreline Management Act and in the goals, policies, and governing principles of the state's shoreline guidelines. The Act states that "permitted uses in the shoreline shall be designed and conducted in a manner that minimizes in so far as practical, any resultant damage to the ecology and environment of the shoreline area…" (WAC 173-26-176[2]). The guidelines suggest that no net loss is achieved primarily through regulatory mechanisms including mitigation requirements but that restoration incentives and voluntary actions are also critical to achieving no net loss.

The SMP requires that proponents of shoreline development fully mitigate impacts caused by their proposed development and although they are not required to improve conditions over and above the impacts of their development action, they may elect to implement elements of this plan as mitigation for shoreline development if appropriate. Citizens, agencies, and other groups may also elect to implement portions of this plan irrespective of any proposed development activity or requirement to mitigate impacts. Components of this plan can also be implemented as part of future capital improvement plans. As an example, a park improvement project could be designed to include restoration of nearshore habitat. These actions would have the effect of improving conditions over time, which is necessary for achieving no net loss. This distinction is illustrated in Figure 1-1 below.



Source: Department of Ecology

Figure 1-1. Mitigation versus Restoration in Shoreline Master Programs

1.3 Restoration Planning

1.3.1 Key Elements of Restoration Planning in the SMP Update Process

The state guidelines provide six key elements for shoreline restoration planning as part of a local jurisdiction's master program, as outlined in WAC 173-26-201(2)(f). These elements are summarized below:

1. Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration.

2. Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions.

3. Identify existing and ongoing projects and programs that are currently being implemented that are designed to contribute to local restoration goals (such as capital improvement programs [CIPs] and watershed planning efforts [WRIA habitat/recovery plans]).

4. Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs.

5. Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals.

6. Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals (e.g., monitoring of restoration project sites).

These key elements provide the organization and content for this report. The assessment of existing degraded areas and/or functions relies on the *Shoreline Inventory and Characterization Report* (ESA Adolfson, 2008).

1.3.2 Phases After Restoration Planning

There are multiple phases involved after completing the first phase of restoration planning (see Table 1-3). The progression from planning to the final phase of reporting can take weeks, months, or even years depending on the complexity and scope of the restoration effort. In general, the phases and tasks build on and inform one another. Yet in some cases, the progression of phases and actions is not linear but iterative, meaning that it may be necessary to go back and revisit goals or priorities during the implementation phase or do more construction in response to performance monitoring information. This is an adaptive management approach.

This plan addresses and accomplishes most of the actions required in the restoration planning phase. Additional effort will be required to implement, monitor, manage, and report on the outcomes of this planning effort.

Table 1-2. Typical Restoration Phases and Actions

Phase	Actions	Timeline Beginning → → → Completion
Planning	Visioning Collecting background data Setting goals Defining objectives Identifying priority areas Identifying potential restoration measures in priority areas Identifying partners and collaborators Identifying funding sources Integrating plans with other efforts	
Implementation	Selecting projects/sites Developing conceptual designs/ plans Preparing detailed design plans Constructing project/site	
Performance Assessment / Monitoring	Defining success criteria Comparing to reference sites Designing monitoring program Collecting performance monitoring data	
Adaptive Management	Adjusting design Correcting problems (barriers to success) Implementing contingency measures	
Reporting	Publishing reports documenting project effectiveness	

2.0 ASSESSMENT OF SHORELINE FUNCTIONS

Shoreline restoration planning begins with the identification of "degraded areas" or areas with "impaired ecological functions." The assessment of existing degraded areas and/or functions relies on the *Shoreline Inventory and Characterization Report* (ESA Adolfson, 2008). The City's inventory and characterization examined nearshore ecosystem processes that maintain shoreline ecological functions and identified impaired ecological functions. Key findings of the inventory and characterization are summarized below.

2.1 Regional Setting

The City of Shoreline is generally bounded by the City of Lake Forest Park to the east, the City of Seattle to the south, the Puget Sound shoreline to the west, and Snohomish County to the north, which includes the Cities of Edmonds and Mountlake Terrace, and the Town of Woodway. The City of Shoreline is located within the Lake Washington/Cedar/Sammamish Watershed (Water Resource Inventory Area [WRIA] 8).

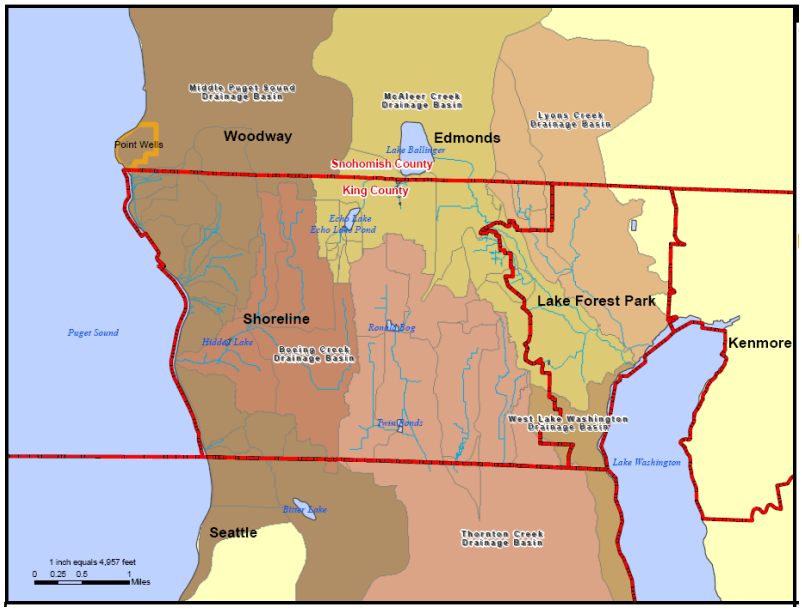


Figure 2-1. Regional Context for City of Shoreline, Washington

2.2 Shoreline Jurisdiction

The City's shoreline jurisdiction includes the Puget Sound shore within both the city limits and its potential annexation area (PAA). The portion of Puget Sound seaward from the line of extreme low tide is considered a "shoreline of statewide significance." The remainder of the Puget Sound landward of the extreme low tide is considered a "shoreline of the state." The city

therefore includes approximately four miles of Puget Sound coastline. There are no rivers, streams, or lakes in the city meeting the definition of shorelines of the state.

The City's shoreline jurisdiction is composed of a variety of natural and man-made characteristics that include natural beaches, wooded slopes, single-family homes, the Burlington Northern Santa-Fe (BNSF) Railway, and an industrial port in the annexation area of Point Wells. Point Wells, a 100-acre industrial site located directly north of the City along Puget Sound, is currently under Snohomish County jurisdiction and is the potential annexation area for the City of Shoreline (City of Shoreline, 2005a).

For the purposes of the inventory study, the City's shoreline jurisdiction was organized into five segments (A through E) based broadly on the physical distinction along the shoreline, the level of ecological functions provided by each segment, as well as existing land uses and zoning designations. Shoreline Planning Segments are described in Table 2-1. See Map 1 for segment locations.

Table 2-1. Shoreline Planning Segments

Shoreline Segment	Approximate Length (feet)	Approximate Segment Acreage	General Boundaries
A	3,411	15.6	Potential Annexation Area / Point Wells: located directly north of the city limits in unincorporated Snohomish County.
B	4,724	21.7	Richmond Beach residential area: the Snohomish County line south to Richmond Beach Saltwater Park.
C	2,801	11.0	Richmond Beach Saltwater Park, south to Storm Creek culvert.
D	1,295	5.7	Innis Arden residential area: south of Richmond Beach Saltwater Park to Innis Arden Reserve Park.
E	9,424	41.6	Innis Arden Reserve / Highlands: Innis Arden Reserve Park south to city limits.

Source: City of Shoreline, 2002

Insert Map 1.

2.3 Physical and Coastal Processes

The City of Shoreline beaches are typical of Puget Sound and can be characterized by two types of foreshore components: a high-tide beach and a low-tide terrace (Downing, 1983). The high-tide beach consists of a relatively steep beachface with coarse sediment and an abrupt break in slope at its waterward extent. Considerable amounts of sand in a mixed sand and gravel beach are typically winnowed from the high-tide beach by waves and deposited on the low-tide terrace (Chu, 1985).

Puget Sound beach morphology and composition is dependent upon three main influences: wave energy, sediment sources, and relative position of the beach within a littoral cell. Wave energy is controlled by fetch, the open water over which winds blow without any interference from land. Wind-generated wave action gradually erodes beaches and the toe of coastal bluffs, leading to landslides. These coastal bluffs are the primary source of sediment for most Puget Sound beaches. In the city, coastal bluffs are separated from the shoreline by the BNSF Railway, thus completely removing bluff sediment sources. Although riparian vegetation is located along portions of the shoreline, the shore modifications associated with the BNSF Railway and BNSF maintenance activities prevent recruitment of large woody debris to the shoreline. These shore modifications also preclude net shore-drift along the Puget Sound. A small amount of sediment is delivered by fluvial sources (streams) in the city, although this process is also impaired by culvert systems and the BNSF Railway.

The City's shoreline is homogeneous in terms of the sediment stability and source because of the BNSF railroad. The railroad results in a stable sediment characterization throughout the shoreline, with the exception of the shoreline adjacent to Innis Arden Reserve. Construction of the railroad buried much of upper foreshore beach, thereby locking up coarse sand and gravel in the littoral system. This limits or precludes longshore transport of sediment.

The Washington Coastal Atlas (Ecology website, 2008) maps net-shore drift direction, or the prominent drift direction, including divergence zones and areas of "no appreciable drift" (which include highly modified, protected harbor shorelines). Based on the wave regime, extensive fetch, and coastal geomorphology the net drift direction of all the shoreline planning segments is south to north (Schwartz, 1991).

There are several geological hazard areas mapped along the City's shoreline. In the event of seismic activity, areas along Segments A, B, C, D and a portion of E have a high susceptibility of liquefaction (City of Shoreline, 2002). Landslide hazard areas are also documented at the extreme north and south portions of Segments B and C. Landslide hazard areas exist throughout all of Segments D and E (King County iMAP, 1991). Typically, the areas south of stream mouths and the marine shoreline below the ordinary high water mark (OHWM) are indicated as flood hazard areas.

2.4 Habitat and Species

The Puget Sound nearshore environment is a highly productive zone that provides habitat for a variety of aquatic and terrestrial species. The "nearshore" is generally considered to be an area extending from the top of bluffs across the beach and intertidal zone, to the point where light no longer penetrates the water. Important documented features of the nearshore that provide habitat include:

- Banks, bluffs, beaches and backshore (sediment sources, substrate, and storm berms);
- Tidal flats (intertidal or shallow subtidal areas used by juvenile salmonids, shorebirds, and shellfish);
- Eelgrass meadows and kelp forests (feeding and rearing habitat for wide variety of marine organisms);
- Streams (fish and wildlife corridors and source of fluvial sediment to nearshore)

Within the City of Shoreline, there are six streams that feed into the Puget Sound. Barnacle Creek is formed by the confluence of Upper Barnacle Creek and Lower Barnacle Creek and discharges to Puget Sound in Segment B. A palustrine forested wetland, less than one acre in size, is associated with Barnacle Creek. Storm Creek and Blue Heron Creek discharge to Puget Sound in Segment D. Coyote Creek, Boeing Creek, and Highlands Creek discharge to Puget Sound in Segment E. A scrub/shrub wetland is associated with Coyote Creek (Washington Department of Fish and Wildlife [WDFW], 2008).

Aquatic and terrestrial species found in or near the City of Shoreline that utilize the nearshore or deep waters of Puget Sound include:

- Shellfish (clams, mussels, and crab);
- Salmonids (including listed species such as Chinook and bull trout);
- Forage fish (surf smelt, sand lance, and Pacific herring); and
- Shorebirds and waterbirds.

2.5 Land Use and Public Access

The BNSF Railway right-of-way (ROW) extends in a north-south direction along the entire length of the City's shoreline planning area. It is the most dominant land use in the shoreline, occupying 48 percent of the total shoreline planning area (King County, 2007).

The remainder of the shoreline is dominated by residential land uses and Saltwater Park. Point Wells is the only industrial property located along the Puget Sound shoreline and occupies approximately 20 percent of the total shoreline planning area. The property is currently being used for petroleum products storage, processing and distribution. Soil and groundwater contamination are documented at the Point Wells facility and remediation is anticipated (Snohomish County, 2007).

Residential development in the Puget Sound shoreline planning area is characterized by single-family properties, which occupy approximately 19 percent of the total shoreline planning area (9% of the linear shoreline length). Several neighborhoods are located near the Puget Sound shoreline within the City. Neighborhoods include Richmond Beach (a portion of which is located immediately adjacent to the Puget Sound), Innis Arden, and the Highlands and Richmond Beach, (City of Shoreline, 2005a).

Public access opportunity is provided at Richmond Beach Saltwater Park in Segment C. It is a regional 40-acre park that provides active and passive uses including picnic areas, shelter buildings, a playground area, observation areas, trails, and Puget Sound shoreline access. Innis Arden Reserve is a 23-acre natural open space area/greenway passive-use park located in Segment E along the bluffs overlooking Puget Sound. Hiking/walking trails represent the main activity of this passive-use reserve. Although trails eventually lead to the shoreline, the public has to cross the BNSF railroad tracks and riprap to reach the Puget Sound shoreline. Blue Heron Reserve (Segment C) and Coyote Reserve (Segment D) are privately owned tracts that are associated with Blue Heron Creek and Coyote Creek, respectively. No public shoreline access is permitted along these tracts. Boeing Creek Reserve is a private 4-acre natural area associated with Boeing Creek located along the Puget Sound shoreline in Segment E. It is preserved as private open space. No public shoreline access is permitted from this reserve along the bluff (City of Shoreline, 2005b).

2.6 Altered Ecosystem Processes and Functions

Similar to other cities along the Puget Sound, existing development and infrastructure has affected the shoreline environment within the City of Shoreline. Ecosystem-wide processes and ecological functions that have been altered in the marine shoreline include sediment processes, large woody and organic debris recruitment and transport, habitat conditions, riparian vegetation and water quality.

Nearshore ecological processes in the City's shoreline planning area have been altered primarily by shoreline modifications. Shoreline modifications refer to structural alterations of the shoreline's natural bank, including riprap, bulkheads, docks, piers or other in-water / overwater structures. These modifications alter natural process dynamics, leading to beach narrowing, lowering, and decreased driftwood abundance (Johannessen and MacLennan, 2007).

Shoreline armoring typically impedes sediment supply to down-drift beaches and nearshore habitats. This sediment starvation can cause or heighten erosion along down-drift shores, and can lead to changes in nearshore substrate composition from sand or mud to coarse sand, gravel, and finally hardpan. This may, in turn, decrease eelgrass, increase kelp abundance and reduce or eliminate forage fish spawning areas. Construction of shoreline armoring may cover or destroy forage fish spawning areas and eelgrass meadows. Overwater structures may deprive eelgrass of light. Shore armoring that infringes on intertidal areas considerably can impede alongshore sediment transport on the up-drift side of the structure, resulting in reduced sediment transport (volume) along the down-drift shore. Bulkheads and piers may also affect fish life by diverting juvenile salmonids away from shallow shorelines into deeper water, thereby increasing their potential for predation (Nightingale et al, 2001).

Approximately 97 percent of the City's shoreline adjacent to Puget Sound is modified with riprap and bulkheads (WDNR, 2001). The majority of this armoring is associated with the BNSF railroad bed. As a result, sediment delivery is limited to several streams that deliver sediment via culverts under the railroad ROW. Forage fish spawning still occurs at these limited points of sediment input (Pentilla, 2001).

There are no docks, piers, or over-water structures along Puget Sound within the City limits. However, within the PAA, Point Wells contains a large industrial dock used for both import and export of materials to and from the facility.

Clearing of riparian vegetation along the marine shoreline for the BNSF Railway construction and maintenance, and other shoreline armoring has resulted in a lack of large woody and organic debris available for recruitment to the marine system. The lack of debris in turn affects the stability of the beaches as the presence of beach logs and debris can reduce erosion by dissipating wave energy and trapping sediment. Large woody debris also provides thermoregulation of sediment for spawning forage fish and detritus recruitment.

The Point Wells site is listed on the Department of Ecology's Suspected and Confirmed Contaminated Sites List for soil, groundwater and surface water contamination associated with previous petroleum production (Ecology website, 2008).

3.0 GOAL AND POLICY DEVELOPMENT

The City's current SMP is Title 25 of the King County Code adopted by reference when the City incorporated in 1995. Goals and policies that reflect the local conditions of the city were developed as part of the City's 1998 Comprehensive Plan update. Although not in effect, the goals and policies were included as an aid in the development of a shoreline master program update. Goals and policies that relate to protection and conservation of shoreline ecological functions and processes have been used here as a guide.

SMP goals and policies should be consistent with and integrated with the City's Comprehensive Plan. The language drafted below is simply a starting point for developing proposed goals and policies. It is generally focused around four key areas: 1) coordinating with other jurisdictions, tribes, and interested parties; 2) increasing the availability, viability and sustainability of shoreline habitats; 3) pursuing opportunities focused on potential redevelopment of Point Wells and public property along the shorelines; 4) encouraging voluntary or incentive based restoration opportunities on private property; and 5) providing public education opportunities. The content is organized to be generally consistent with the structure and organization of the City's Comprehensive Plan elements.

3.1 Shoreline Restoration Element

This element promotes and encourages restoration of shoreline functions and ecological processes that have been impaired as a result of past development activities.

Shoreline Restoration Goals

Goal SR I: Develop regional solutions with other jurisdictions, tribes and interested parties to resolve the challenge of protecting shoreline ecological functions while also protecting shoreline developments.

Goal SR II: Increase the availability, viability and sustainability of shoreline habitats for salmonids, shellfish, forage fish, shorebirds and upland birds, and other species;

Goal SR III: Pursue projects to restore and enhance shoreline habitats, functions and processes on publicly owned lands.

Goal SR IV: Encourage voluntary restoration and wave diffusion projects in degraded shoreline environments.

Goal SR V: Provide ample opportunity for the public to learn about the ecological aspects and community values of the City's shorelines.

Shoreline Restoration Policies

Work Towards Regional Solutions

SR1: Continue to work with the State, King County, Watershed Resource Inventory Area 8, and other governmental and non-governmental organizations to explore how local governments can contribute to the preservation of ecological processes and shoreline functions.

SR2: Work with the Burlington Northern Santa Fe Railroad, Corps of Engineers, Puget Sound Partnership, neighboring jurisdictions and other interested parties to restore the natural input of sediment and organics to Puget Sound, to implement a beach nourishment program, and to replace existing stream culverts with larger box culverts or other fish friendly structures.

Increase the Availability, Viability and Sustainability of Shoreline Habitats

SR3: Enhance, where practical, spawning areas for the rearing and protection of salmonids and other species of fish and aquatic marine life.

SR4: Promote restoration of critical saltwater habitats including kelp forests, eelgrass meadows, and tidal flats, and areas with which priority species have a primary association.

SR5: Promote the restoration of native vegetation, and the control of invasive weeds and nonnative species, to enhance marine riparian habitats using incentives and non-regulatory programs.

SR6: Shorelines that retain unaltered natural character and intact ecosystems should be considered for acquisition. Subsequent management of such areas should protect or enhance shoreline ecological functions.

Pursue Restoration Projects

SR7: Incorporate habitat restoration elements into the design and implementation of public infrastructure improvement projects.

SR8: Focus restoration and conservation activities on public parks and open space lands for public enjoyment.

SR9: Work with the public and other interested parties to prioritize restoration opportunities identified in the *Shoreline Inventory and Characterization Report*.

SR10: Develop a program to implement restoration projects, including funding strategies.

SR11: Monitor and adaptively manage restoration projects.

Encourage Voluntary Restoration Projects

SR12: Use this restoration framework to integrate mitigation projects into the broader restoration vision for the city.

SR13: Create incentives that will make it economically or otherwise attractive for development proposals to integrate shoreline ecological restoration into development projects. Incentives could include a streamlined permitting process, reduced permit fees, and technical assistance.

SR14: Promote bioengineering and/or soft engineering alternative design approaches to shoreline stabilization and provide technical guidance to shoreline landowners.

SR15: Develop and distribute public education materials to shoreline landowners on the benefits of native vegetation plantings.

SR16: Identify and pursue funding sources for shoreline restoration actions on private lands.

Public Education

SR17: Explore opportunities with other educational organizations and agencies to develop an on-going program of shoreline education for all ages. The program could include educating landowners on restoring native vegetation, alternative shoreline stabilization techniques, and effective stormwater management techniques. Example events could include: clean-up days, invasive species removal, native plantings, monitoring projects, and low impact development training.

SR18: Identify areas where kiosks and interpretative signs can enhance the educational experience of users of the shoreline.

4.0 EXISTING PLANS AND PROGRAMS

A number of regional and Puget Sound-wide planning efforts have been developed to address water resource management, water quality, and salmon habitat recovery. These existing plans and programs provide a framework of goals, policies, and in some cases, funding mechanisms. These plans and programs include both regional and local (county and city) plans and programs. The goals, policies, and actions identified in this restoration plan should coordinate and be consistent with this broader framework of conservation and restoration work in the Puget Sound region.

4.1 Puget Sound Partnership

In 2007, Governor Gregoire formed the Puget Sound Partnership to focus attention on the overall needs and health of Puget Sound and to promote public education and interagency coordination for clean up of the Sound. The vision of the Partnership is:

> *To ensure that the Puget Sound forever will be a thriving natural system, with clean marine and freshwaters, healthy and abundant native species, natural shorelines and places for public enjoyment, and a vibrant economy that prospers in productive harmony with a healthy Sound.*

At the direction of the Legislature, the Puget Sound Partnership developed and published the Puget Sound Action Agenda in December 2008. The Action Agenda is aimed at protecting and restoring the Puget Sound ecosystem by 2020. The plan represents a new way of approaching the management of the Sound by taking an ecosystem approach from the crest of the Cascades and Olympics to the waters of the Strait of Juan de Fuca and Hood Canal. The Action Agenda integrates scientific assessment with community priorities, and establishes a unified set of actions that are needed to protect and restore Puget Sound. The Action Agenda also serves as a statement of common purpose across the Sound and forms the basis for cooperation and collaboration among implementing partners. It will serve as a roadmap for local governments by providing direction on the priorities and types of projects that should be undertaken to restore Puget Sound.

The Partnership has developed short- and long-term funding strategies for implementing the Action Agenda. For the 2009-2011 biennium, $199 million in new funding, $222 million in ongoing capital expenditure, and continuation of $178 million in ongoing operating expenses has been identified. The estimate is primarily focused at the state level and includes state agency costs as well as the pass through of state dollars to assist local governments in implementing programs and projects identified in the Action Agenda. As allowed by statute (RCW.71.240), the Partnership will work with state and loan programs to establish criteria to prohibit funding

projects and activities not aligned with the Action Agenda and support the use of the Action Agenda priorities (Puget Sound Partnership, 2008).

4.2 Puget Sound Nearshore Partnership

In 2001, the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) was formally initiated as a General Investigation (GI) Feasibility Study through a cost-share agreement between the U.S. Army Corps of Engineers and the State of Washington, represented by the Washington Department of Fish and Wildlife. PSNERP goals are to identify significant ecosystem problems, evaluate potential solutions, and restore and preserve critical nearshore habitat.

The General Investigation Reconnaissance Study identified a direct link between healthy nearshore habitat and the physical condition of the shoreline. The study identified several actions that would be central in restoring nearshore processes to a more natural state:

- Providing marshes, mudflats, and beaches with essential sand and gravel materials;
- Removing, moving and modifying artificial structures (bulkheads, rip rap, dikes, tide gates, etc.) where they are not necessary to protect property from high energy systems;
- Using alternative measures to protect shorelines from erosion and flooding; and
- Restoring estuaries and nearshore habitat such as eelgrass beds and kelp beds.

In 2004, the Puget Sound Nearshore Partnership was assembled to build a stakeholder forum and expand the work of the GI into a regional restoration effort. The Nearshore Partnership is a coordinated group of local, state, tribal, and federal governments, nonprofit organizations, and others whose mission is to restore and protect the nearshore habitat of Puget Sound for the benefit of the biological resources and the integrity of the ecosystem, including the functions and natural processes of the Puget Sound basin. The Nearshore Partnership provides outreach and guidance materials related to nearshore ecosystem restoration principals, concepts, and methods of implementation. A number of technical reports, guidance documents and funding programs have been produced since 2004.

As an early action of the ecosystem restoration effort, the Nearshore Partnership established the Estuary and Salmon Restoration Program (ESRP). The ESRP is a protection and restoration funding opportunity or grant program to support the transition from opportunistic project funding to strategic and sustained nearshore ecosystem restoration in Puget Sound. The ESRP has funded a variety of dike removal and estuary restoration or protection projects across the Puget Sound.

4.3 Shared Strategy for Puget Sound: Draft Puget Sound Salmon Recovery Plan

Shared Strategy for Puget Sound (Shared Strategy) is a collaborative effort between local stakeholders and regional leaders to protect and restore salmon runs across Puget Sound. It was

initiated as a result of Endangered Species Act (ESA) listings of salmonid species in the Puget Sound region. Shared Strategy engages local citizens, tribes, technical experts and policy makers to build a practical, cost-effective recovery plan endorsed by the people living and working in the watersheds of Puget Sound.

Shared Strategy developed a salmon recovery plan (Shared Strategy, 2007) that provides a blueprint for salmon recovery strategies throughout Puget Sound and incorporates, by reference, local watershed plans for salmon recovery. Amongst other strategies described in the draft plan, Shared Strategy describes their "Top 10 Actions Needed for Salmon," many of which have additional benefits for humans.

4.4 Water Resource Inventory Area (WRIA) 8 Forum: Chinook Salmon Conservation Plan

The City is a participating local agency in WRIA 8 watershed planning. In 2005, after nearly five years of collaboration among citizens, scientists, community groups, businesses, environmental groups, public agencies and elected officials, 27 local governments ratified the Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan (WRIA 8, 2005). This plan, together with other plans prepared throughout the Puget Sound region, became part of the official Puget Sound Salmon Recovery Plan approved by National Oceanic and Atmospheric Administration (NOAA) Fisheries Service in 2007 (Shared Strategy, 2007).

Salmon recovery in WRIA 8 is organized around the needs of two distinct chinook populations - Cedar River and Sammamish River - as well as the migratory and rearing corridors used by those populations. While particular actions may differ among those recovery areas, certain themes hold true throughout the watershed. Some examples of watershed-wide priorities include: protecting forests, reducing impervious surfaces, managing stormwater flows, protecting and improving water quality, conserving water, and protecting and restoring vegetation along streambanks

The Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan contains over 1,200 recommendations for protecting and restoring salmon habitat, from general land-use recommendations applicable throughout the watershed to small, site-specific habitat restoration projects. The Plan is founded on the following ecosystem objectives:

- Protect and restore habitat for Chinook salmon use during all of the life stages that are spent in the WRIA 8 watershed, from egg to fry to smolt to adult.
- Protect and restore the natural processes that create this habitat, such as natural flow regimes and movement of sediments and spawning gravels.
- Maintain a well-dispersed network of high-quality habitat to serve as centers for the population.
- Provide safe connections between those habitat centers to allow for future expansion.

The highest-priority recommendations were gathered in Chapter 9 of the Plan to form the 10-year "Start List." To focus efforts even further, WRIA 8 annually updates a "Three-Year Work

Plan" of the most immediately pressing projects. This Three-Year Work Plan is used to help recommend how to disburse the limited county, state and federal funds available for protection and restoration actions in the watershed. The 2008 Three-Year Work Plan for WRIA 8 notes that: "the nearshore and estuary subareas are critical for migration and rearing of Chinook populations (as well as other species) from multiple WRIAs. While there are relatively greater uncertainties about nearshore habitat and Chinook use of that habitat, experimental approaches to the protection of functioning habitat and the restoration of ecosystem processes (particularly sediment supply) and habitats (particularly eelgrass beds and 'pocket' estuaries) should be implemented" (WRIA 8 Steering Committee and Forum, 2008).

4.5 Coastal Habitats in Puget Sound (CHIPS)

The Coastal Habitats in Puget Sound (CHIPS) group is an interdisciplinary collaboration to coordinate, integrate, and link United States Geological Survey (USGS) studies with the goals and objectives of the Puget Sound Nearshore Ecosystem Restoration Project (described in Section 4.2). Current studies have three themes: effects of urbanization on nearshore ecosystems; restoration of large river deltas; and recovery of nearshore ecosystems. The primary focus is developing information on the physical, chemical, and biological processes and human actions associated with the restoration or rehabilitation of the nearshore environment. USGS study results are distributed through databases, geospatial models and analyses, technical reports, and formal publications to provide the necessary scientific foundation for decision-makers.

4.6 Cascade Land Conservancy

The Cascade Land Conservancy (CLC) seeks to conserve urban and rural natural spaces within the Central Puget Sound region. Priority natural areas include lands along streams, rivers, other areas in the Cascade foothills, and estuary areas. The CLC conservation strategies have included securing lands through purchase and donation, conservation easements, and ownership agreements. Since 1989, the CLC has completed 163 projects that have conserved nearly 150,000 acres (CLC website, 2008). The shoreline landscapes in Shoreline may provide conservation opportunities for the CLC.

4.7 King Conservation District

The King Conservation District (KCD) is a natural resources assistance agency authorized by Washington State and guided by the Washington State Conservation Commission. Its mission is to promote the sustainable use of natural resources through responsible stewardship. The KCD educates landowners, schools, scientists, consultants and agencies; provides technical assistance; and promotes conservation through demonstration projects. Most cities and all of unincorporated King County are members of the KCD.

The KCD provides free information and technical assistance for water quality protection, wildlife habitat enhancement, farm management plans, soil and slope stability information, native plant products, manure exchange information, volunteer opportunities, stream

restoration/enhancement assistance and other natural resource topics (King Conservation District, 2009).

4.8 King County Noxious Weed Control Board

Washington State requires the control of noxious weeds through the Revised Code of Washington (RCW) Title 17, and Title 16 of the WAC. State law requires all landowners (private or agency) to manage weeds on their properties (RCW 17.10.140). To implement these requirements, the State established the Washington State Noxious Weed Control Board or WSNWCB (Chapter 16-750 WAC). The WSNWCB oversees the statewide management of noxious weeds in an effort to ultimately prevent establishment of invasive vegetation and preserve native species and habitat. The WSNWCB identifies and classifies weeds that are of concern in the state and maintains the state noxious weed list. The WSNWCB has determined that noxious weed control is best implemented at a local level due to the variation in ecosystems across the state. Therefore Chapter 17.10 RCW establishes Noxious Weed Control Boards for counties in the state.

The King County Noxious Weed Control Board enforces the state noxious weed control regulations and refines the state noxious weed list to include species present in King County. The Board provides guidance on methods of control, and has the authority to cite property owners for failing to comply with weed control requirements (KCNWCB, 2009).

4.9 Seattle Audubon

Seattle Audubon works for the protection, restoration and preservation of natural habitat for birds and other wildlife. Their volunteers and staff provide education programs, engage neighborhoods in citizen science projects, and work to protect birds and nature through conservation activities. Seattle Audubon works with other groups to educate Seattle area residents about urban habitats.

The Puget Sound Seabird Survey is a citizen-science survey organized by Seattle Audubon that uses volunteer birdwatchers to gather data on wintering seabird populations in Puget Sound. The goal of the survey is to develop long-term baseline, shore-based density estimates for seabirds in central and south Puget Sound. Nearly fifty sites in King, Pierce, Snohomish, and Thurston Counties are currently surveyed including Richmond Beach (Seattle Audubon Society, 2009).

4.10 People for Puget Sound

People for Puget Sound is a citizens' group established in 1991 to protect and restore the health of Puget Sound land and waters through education and action. The organization works to eliminate contamination of the Sound and Straits; stop the destruction of natural habitats and restore those habitats to health; and sustain the Sound and Straits as a healthy source of livelihood, enjoyment and renewal. People for Puget Sound provides public education and involves volunteers in restoration projects throughout the Sound (PPS, 2009).

4.11 Seattle Urban Nature

Seattle Urban Nature (SUN) is a local non-profit organization dedicated to enriching the quality of life in the Puget Sound region by engaging communities to improve urban forests. Its mission is to create tools to empower stewards for healthy urban ecosystems. SUN was founded in 1998 to survey and map the vegetation and wildlife habitat on Seattle's public land. As an extension of this work, SUN provides ecological and GIS services to non-profit, public sector, and private organizations in the Puget Sound region (SUN, 2009). SUN has been retained by the City of Shoreline to prepare a Vegetation Management Plan for Boeing Creek and Shoreview Parks.

4.12 King County Department of Natural Resources and Parks

The King County Department of Natural Resources and Parks has a mission to foster environmental stewardship and strengthen communities by providing regional parks, protecting the region's water, air, land and natural habitats, and reducing, safely disposing of and creating resources from wastewater and solid waste. The department's Water and Land Resources Division administers several grant programs that provide funds for aquatic restoration projects (King County WLRD, 2009).

4.13 City of Shoreline

The City of Shoreline has several programs that include or promote restoration (City of Shoreline website, 2009):

- The City's Surface Water and Environmental Services (SWES) division investigates environmental concerns and possible violations of water pollution ordinances; participates in long-term water quality monitoring sites on streams, lakes and wetlands throughout the City; participates in salmon recovery planning efforts locally and regionally; and provides environmental education to the public.
- The City's Environmental Mini-Grant program was established to help meet the City Council's goal to create an environmentally sustainable community. Grants up to $5,000 per application are awarded to individuals, community groups, and business owners on a first-come, first-served basis for projects on private or public property which provide a public benefit to the community. Each year the City awards four projects that address surface water quality and/or quantity issues, and three that improve the general environmental quality of life in the community (including education).
- The Shoreline Parks, Recreation and Cultural Services Department acts as steward of the City's 27 parks through maintenance, planning, and restoration. The department provides opportunities for volunteers to assist with restoration projects.

5.0 RESTORATION PRIORITIES AND OPPORTUNITIES

The following SMA concepts should guide identification, evaluation and prioritization of restoration opportunities:

1) Restoration or enhancement should support the overarching goal that local shoreline master programs "serve to improve the overall condition of habitat and resources within the shoreline area…"(WAC 173-26-201[2][c]); and
2) Restoration should be designed to address areas where shoreline ecological functions have been impaired as a result of past development activities.

In the City of Shoreline, both programmatic and site-specific opportunities for shoreline restoration or enhancement exist. Opportunities have been identified by regional plans (e.g., WRIA 8 Chinook Salmon Conservation Plan) and the City's *Shoreline Inventory and Characterization Report* (ESA Adolfson, 2008). This section outlines the programmatic and project-specific measures to accomplish shoreline restoration. It also identifies restoration projects currently under construction and projects included in the City's Capital Facilities Program as part of the Comprehensive Plan (City of Shoreline, 2005a).

Conservation of shorelines is also included in this restoration plan. Conservation refers to preserving existing shoreline areas that currently provide valuable functions. An important part of any good habitat protection plan is protecting priority ecological processes and habitats that have not been degraded or impaired. Conservation opportunities in the City's shoreline are primarily provided through WRIA 8 studies. Conservation of shorelines will also be addressed in the City's shoreline regulations.

5.1 Restoration Priorities

Consistent with the restoration framework described in Section 1.0, establishing priorities should be informed by and support regional efforts. In evaluating options, the City should consider the following priorities in its shoreline restoration efforts:

- Planting of native trees and shrubs within the City's shoreline riparian areas;
- Restoration of stream mouth estuaries;
- Restoration of the natural input of sediment and organics to Puget Sound;
- Replacement of existing stream culverts with larger box culverts or other fish-friendly structures;
- Implementation of projects with the most restoration potential and the least associated cost; and
- Restoration of publicly owned properties including parks and open spaces.

5.2 Programmatic Restoration Opportunities

The WRIA 8 salmon recovery planning process identified several general recommendations for nearshore areas that may be applicable to the City of Shoreline (WRIA 8, 2005):

1. Protect remaining feeder bluffs that supply sediment and support littoral habitat creation. The construction of the BNSF Railroad has armored almost all of the bluffs in Shoreline.
2. Develop pilot projects to open up certain slide-prone areas (through construction of railroad trestles for example), and investigate a beach nourishment program (adding sand and gravel material to the nearshore).
3. Reduce bank hardening, especially in areas where the armoring falls within the tidal zone and/or separates a sediment source from the nearshore environment. Such actions would help restore natural shoreline accretion and depletion processes and support littoral habitat creation.
4. For areas such as Richmond Beach where development has already occurred west of the railroad, prohibit new development at least in areas designated as Conservancy; reduce impacts to the nearshore during new development (e.g., through limiting additional riprap, revegetating riparian areas).
5. Protect remaining marine riparian vegetation to maintain overhanging cover and terrestrial inputs (e.g., leaf litter, invertebrates) for marine species and their prey through critical area and clearing ordinances.
6. Plant vegetation along the shoreline near the Mean Higher High Water line to provide overhanging cover and terrestrial inputs (e.g., leaf litter, invertebrates) for marine species and their prey.
7. Reduce number and coverage of overwater structures (e.g., docks, piers) in order to reduce segmentation of the shoreline and effects on both habitat forming processes and marine species behavior.
8. Protect or reconnect small stream mouths to create pocket estuaries.
9. Reconnect backshore areas (e.g., marshes, wetlands) to contribute to shoreline habitat diversity and terrestrial inputs.
10. Protect sediment and water quality, especially near commercial and industrial areas from fuel spills, discharge of pollutants, removal of septic systems, limiting fill and dredging, etc.

The City's *Shoreline Inventory and Characterization Report* (ESA Adolfson, 2008) identifies several programmatic restoration opportunities that would assist in restoring shoreline processes and are consistent with the WRIA 8 recommendations (Table 5-1).

Table 5-1. Programmatic Restoration Opportunities

Condition and Causes of Impairment	Scale of Alterations and Impairment	Shoreline Ecological Functions Affected	Programmatic Restoration Opportunities
Bulkheads on shoreline deflect wave action and disrupt natural coastal processes. Bulkheads disrupt natural delivery of sediment to the coastal areas, as well as increase beach scouring and wave deflection.	Watershed and Reach scale	Hydrologic Sediment transport and deposition	Potential redevelopment at Point Wells is an opportunity to replace hard-armoring with soft-shore.
Alteration to and development on feeder bluffs reduce the potential of these areas to provide sediment delivery to coastal zones, disrupting natural coastal beach accretion.	Watershed scale	Sediment delivery	No active feeder bluffs in City due to BNSF railroad. Culverts conveying surface water flow from streams continue to be an important source of sediment delivery. Replace stream culverts with larger box culverts or other fish-friendly structures.
Wetlands adjacent to the Puget Sound coast are altered due to development and land use and can no longer provide essential storage, recharge, or water quality functions.	Watershed and Reach scale	Hydrologic Hyporheic Water quality	Target local coastal wetland restoration and mitigation so they provide storage, detention, and water quality functions.
Riparian habitat along the coast has been impaired through land development and marine riparian vegetation is generally absent due to presence of the BNSF Railroad. Input of large wood from the bluffs is largely eliminated by BNSF railroad maintenance practices. The absence of a back beach significantly reduces accumulation of large wood on the beach.	Watershed and Reach scale	Riparian habitat structure	Protect and restore tributaries to the Puget Sound which provide riparian habitat and deliver woody debris and sediment, such as Boeing Creek.
Man-made debris and remnant structures in the coastal areas disrupt intertidal habitats and salmonid passage. Water quality in the nearshore environment is impaired due to remaining creosote pilings, runoff from creosote railroad ties, and other toxic debris and sewer outfalls. Sediment transport and accretion processes disrupted.	Watershed and Reach scale	Intertidal habitat Water quality	Target removal of abandoned man-made structures and dilapidated docks in Richmond Beach and Point Wells areas. Remove creosote pilings and debris at Point Wells, which harm intertidal habitats. Encourage BNSF to replace creosote railroad ties with non-toxic materials.

5.3 Site-specific Restoration and Conservation Opportunities

Table 5-2 summarizes site-specific opportunities for shoreline restoration, enhancement, and conservation. The restoration opportunities were developed through discussions with City staff, recommendations of the City's Planning Commission, and review of background documents, including:

- Lake Washington/ Cedar/ Sammamish Watershed Chinook Salmon Conservation Plan (WRIA 8, 2005);
- Aerial photos and GIS mapping of streams, wetlands, culverts, and wildlife habitats in Shoreline (City of Shoreline, 2002);
- City of Shoreline: Shoreline Inventory and Characterization Report (ESA Adolfson, 2008);
- City of Shoreline Stream Inventory and Assessment (Tetra Tech/KCM, 2004);
- Marine Riparian Vegetation Communities of Puget Sound (Brennan, 2007);
- Marine Forage Fishes in Puget Sound (Penttila, 2007);
- Beaches and Bluffs of Puget Sound (Johannessen, J.W. and A. MacLennan. 2007);
- Kelp and Eelgrass in Puget Sound (Mumford, 2007);
- Inventory and Assessment of Current and Historic Beach Feeding Sources/Erosion and Accretion Areas for the Marine Shorelines of Water Resource Inventory Areas 8 & 9 (Johannessen, et al., 2005); and
- Vegetation Management Plans for Boeing Creek and Richmond Beach Saltwater Parks (Brewster and Ewing, 2008; Seattle Urban Nature, 2008).

The last column of the table assigns priority levels based on the potential benefit to ecological functions that would result from each opportunity; the greater the potential benefit, the higher the priority level. When background documents assigned a priority level to a site-specific opportunity, the same priority level would be used in the table below. The priority levels do not account for other factors that may affect the feasibility of restoration, such as permitting, cost, or property ownership. For example, acquiring Richmond Beach residential properties from property owners willing to sell has a high restoration priority for salmon, but is low in terms of feasibility for the City. This is because property acquisition is expensive and is entirely dependent on property owners willing to sell their property for restoration purposes. Therefore, the City will not pursue such options and will concentrate efforts on more feasible opportunities for restoration. Replacement of culverts under the BNSF railroad is presented as a restoration opportunity for all of the streams in the shoreline planning area. For those streams that have a well vegetated riparian zone upslope, replacement of culverts was considered to have a high potential for improving functions because the upper reaches of these streams can provide fish habitat, sediment, and organic material to the nearshore if a functioning connection is restored.

The restoration opportunity sites are shown on Maps I and II and are identified by the map identification numbers in Table 5-2.

Table 5-2. Site-Specific Restoration Opportunities

Map ID Number	Opportunity Area	Restoration Opportunity	Shoreline Ecological Functions Affected	Priority Level
1	Point Wells Creosote Removal [1]	Remove creosote pilings and debris at Point Wells.	Water and sediment quality Intertidal fish and wildlife habitat	Medium
2	Point Wells Complete Site Restoration [1]	Restore the entire Point Wells 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.	Sediment transport and deposition Nearshore habitat forming processes Beach erosion and accretion of sediments and mineral particulate material Intertidal fish and wildlife habitat	High
3	South Point Wells Habitat Restoration [1]	Enhance the south shoreline by removing riprap dike, eliminating invasive plants, and reestablishing native riparian and backshore vegetation. 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.	Sediment transport and deposition Nearshore habitat forming processes Beach erosion and accretion of sediments and mineral particulate material Intertidal fish and wildlife habitat	High/Medium
4	South Point Wells Lagoon Creation [1]	Create a three acre intertidal lagoon at the south end of the Point Wells site that may have historically been a marsh (before it was filled). 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.	Nearshore habitat forming processes Intertidal fish and wildlife habitat	High/Medium
5	Lost Creek	Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows and allow opportunity for more sediment to reach the nearshore.	Nearshore habitat forming processes Intertidal fish and wildlife habitat	Low

Map ID Number	Opportunity Area	Restoration Opportunity	Shoreline Ecological Functions Affected	Priority Level
6	Upper and Lower Barnacle Creeks	Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows and allow opportunity for more sediment to reach the nearshore.	Nearshore habitat forming processes Intertidal fish and wildlife habitat	Low
7	Kayu Kayu Ac Park[1, 2]	Create tidally influenced wetland or restore wetland habitat on the east side of the BNSF railroad tracks NW of the pump station.	Nearshore habitat forming processes Intertidal fish and wildlife habitat Hydrologic, hyporheic and water quality improvement functions	Moderate/Low
8	Richmond Beach Residential Area Restoration	While residences are present, protect intertidal area by limiting additional traditional bulkheads or overwater structures. Reduce impact of shore armoring through replacement of existing traditional bulkheads with soft-shore alternatives, except where they are necessary to protect property from high energy systems.	Sediment transport and deposition Nearshore habitat forming processes Beach erosion and accretion of sediments and mineral particulate material Intertidal fish and wildlife habitat	Low
9	Richmond Beach Saltwater Park[1, 2]	Implement Vegetation Management Plan to remove non-native invasive plants and reestablish native plant communities within wetlands east of railroad and on beach area west of railroad.	Freshwater wetland and intertidal wildlife habitat Stabilization of beach substrates	High
10	Storm Creek	Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows and allow opportunity for more sediment to reach the nearshore.	Nearshore habitat forming processes Intertidal fish and wildlife habitat	Low
11	Blue Heron Creek	Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows and allow opportunity for more sediment to reach the nearshore.	Nearshore habitat forming processes Intertidal fish and wildlife habitat	Low

Map ID Number	Opportunity Area	Restoration Opportunity	Shoreline Ecological Functions Affected	Priority Level
12	Coyote Creek	Protect intact wetlands and their associated uplands adjacent to Puget Sound. Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows and allow opportunity for more sediment to reach the nearshore.	Nearshore habitat forming processes Hydrologic, hyporheic and water quality improvement functions Riparian habitat structure and function Fish and wildlife habitat	Moderate
13	Innis Arden Reserve [2]	Protect intact wetlands and their associated uplands adjacent to Puget Sound. Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows and allow opportunity for more sediment to reach the nearshore. Develop and implement a vegetation management plan.	Nearshore habitat forming processes Hydrologic, hyporheic and water quality improvement functions Riparian habitat structure and function Fish and wildlife habitat	Moderate
14	Boeing Creek [1, 2]	Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows. Reduce stormwater flow down steep slopes to stabilize banks and control sediment loading of the stream. Extend recommendations of Vegetation Management Plan for Boeing Creek Park to include entire stream corridor downslope to Puget Sound.	Exchange of aquatic organisms Sediment delivery to nearshore from fluvial sources Source of detritus and particulate organic matter Riparian habitat structure and function Freshwater input Fish and wildlife habitat	High
15	Boeing Creek Reserve	Protect intact uplands and native vegetation communities adjacent to Puget Sound.	Source of detritus and particulate organic matter Riparian habitat structure and function Fish and wildlife habitat	High

Map ID Number	Opportunity Area	Restoration Opportunity	Shoreline Ecological Functions Affected	Priority Level
16	Highlands Creek	Replace stream culvert with larger box culvert or other fish-friendly structure to allow fish access during low flows.	Source of detritus and particulate organic matter Riparian habitat structure and function Fish and wildlife habitat	Low
17	Forage Fish	Protect forage fish spawning, rearing, migration, and feeding areas. Known important areas include southern portion of Point Wells; area north of Barnacle Creek; Richmond Beach Saltwater Park; mouth of Boeing Creek.	Food web support Intertidal fish and wildlife habitat	High
18	Eelgrass and Kelp Beds	Protect eelgrass beds and kelp beds. Known eelgrass beds are located at Point Wells and at mouth of Boeing Creek. Sporadic kelp beds are known throughout most of the City's shoreline.	Food web support Intertidal fish and wildlife habitat	High
19	Feeder Bluffs	Explore potential to restore connection between feeder bluffs and nearshore areas. Bluffs most important for restoration as sediment sources are located south of Richmond Beach Saltwater Park to southern city limits.	Sediment delivery to nearshore	High

Notes:

[1] The City or King County has a project currently under construction at this site which includes or has the potential for shoreline restoration elements; see Section 5.4.

[2] Project included in the City's CIP; see Section 5.4.

Insert Map I

Insert Map II

5.4 Existing and Proposed Projects

5.4.1 Projects Currently Under Construction

The following projects currently under construction include restoration elements.

Richmond Beach Pump Station (Kayu Kayu Ac Park)

The City has designed a new two-acre park at the Richmond Beach Pump Station site located at Richmond Beach Drive and NW 198th Street. Construction is planned for 2009. The new park, named Kayu Kayu Ac after a common Native American term used to describe the area, would be located immediately east of the railroad tracks. The site plan includes a trail, picnic and play areas, an interpretive tower, parking and restrooms. Although the project does not currently include any restoration elements, there is an opportunity to enhance the wetland located northwest of the pump station, identified as Map ID #7 in Table 5-2 above. The project is being funded by mitigation funding from King County for the Brightwater treatment plant project (City of Shoreline, 2009).

Richmond Beach Saltwater Park Project

The City has completed construction of improvements at Richmond Beach Saltwater Park. The park entrance and road have been improved, along with construction of pedestrian sidewalks, stairs and trails; bridge access and safety; a new beach wash-down area; a new overlook parking area across from the caretaker's residence; a new mid-level terrace area with parking, picnic area and gathering space; and new entry, way-finding and interpretive educational signage. Habitat restoration is ongoing. The City retained ecologists to develop a Vegetation Management Plan (VMP) for the park (Brewster and Ewing, 2008). Vegetation management objectives for the beach include removing non-native invasive plants, replanting native vegetation, and creating a plan for trails to minimize impacts to restored habitats. Restoration of the wetlands located east of the railroad is also recommended.

Boeing Creek Park and Underground Storage Pipe Project

Boeing Creek Park is located upstream of the City's shoreline planning area. Activities within the park that influence the movement of water, organic material, and sediments through the watershed are likely to affect the shoreline areas downstream. In October 2007, King County completed construction of a new 500,000-gallon underground storage pipe in Boeing Creek Park to temporarily store wastewater during large storms and help reduce overflows to Puget Sound. At the request of the City of Shoreline, King County also graded the existing stormwater facility in Boeing Creek Park, increasing the capacity of the facility and stabilizing the area. The City then followed with their own park improvement project in 2008. Improvements to the park include new parking, ADA pathway improvements, new picnic areas, native plant landscaping, and trail improvements (City of Shoreline website, 2009).

The City also retained Seattle Urban Nature to prepare a Vegetation Management Plan (VMP) for Boeing Creek and Shoreview Parks (Seattle Urban Nature, 2008). The VMP recommended controlling invasive vegetation, increasing conifer trees, creating an official trail network and revegetating unnecessary informal trails, revegetating steep and eroding slopes, increasing shrub and tree cover, preserving large snags, and increasing coarse woody debris.

5.4.2 Capital Facilities Program Proposed Projects

The Capital Facilities Program is a 20-year program that provides a list of recommended projects helping to guide the development of the City's 6-year Capital Improvement Plan (CIP). Projects listed as top priority (priority level 1-A) are generally the most suited to being incorporated into the City's 6-year CIP, which is updated annually. City projects listed above in Section 5.4.1 were classified as top priority in the Capital Facilities Program and incorporated into the City's 6-year CIP. Table 5-3 below summarizes lower priority projects that are included in the Capital Facilities Program and excluded from the City's 6-year CIP. Funding has not been identified for these lower priority projects. Some projects incorporate restoration elements directly, while others may provide an opportunity for restoration coupled with the design and implementation of the primary capital improvement. The estimated cost for each project is provided in the Comprehensive Plan, Capital Facilities Element, Table CF-4 (City of Shoreline, 2007).

Table 5-3. Capital Facilities Program Projects with Restoration Potential

Project	Description	Priority
Puget Sound	Water trail	Level 1-B
King County Metro Pump Station Park	Pedestrian crossing over railroad tracks to Puget Sound beach	Level 2
Richmond Beach Saltwater Park	Multiple improvements including developing an underwater marine park, pier, and trail along Puget Sound that connects to Innis Arden Reserve, and beach and dune restoration.	Level 1-B
Richmond Beach Saltwater Park	Add playground and picnic facilities	Level 1-B
Richmond Beach Saltwater Park	Purchase property between the park and the city-owned Strandberg Preserve for better pedestrian access and to expand open space	Level 3
Innis Arden Reserve	Concept plan improvements including trail system, view overlooks, parking at north and south boundaries and on street, way finding signage, entry signage, access to Puget Sound, vegetation enhancements, installing benches, picnic tables, fencing bluff area for safety, and interpretive signage	Level 2
Innis Arden Reserve	Develop Innis Arden Reserve Master Plan	Level 1-B
Private Reserves	Acquire public easements between Boeing Creek and Innis Arden reserves	Level 3

Project	Description	Priority
Boeing Creek Reserve	Natural area and public beach access	Level 3
Richmond Beach Road	Aurora to Puget Sound planning study	Level 1-A
Boeing Creek Park	Habitat enhancements throughout Boeing Creek corridor	Level 2

Source: City of Shoreline, 2005b; City of Shoreline, 2007

6.0 IMPLEMENTATION STRATEGY

The implementation portion of restoration planning typically requires more detailed site-specific information than is available at this time, especially with regard to the timing of projects. Therefore, this implementation section is intended to provide information about the implementation approach consistent with guidance for SMP development (WAC 173-26-201[2][f][vi]).

6.1 Timelines and Benchmarks

In the context of the SMP update, restoration planning is a long-term effort. As stated earlier, the SMP guidelines include the general goal that local master programs "include planning elements that, when implemented, serve to improve the overall condition of habitat and resources within the shoreline area…" (WAC 173-26 -201[2][c]). As a long-range policy plan, it is difficult to establish meaningful timelines and measurable benchmarks in the SMP by which to evaluate the effectiveness of restoration planning or actions. Nonetheless, the legislature has provided an overall timeframe for future amendments to the SMP. In 2003, Substitute Senate Bill 6012 amended the Shoreline Management Act (RCW 90.58.080) to establish an amendment schedule for all jurisdictions in the state. Once the City of Shoreline amends its SMP (by June 2010), the City is required to review, and amend if necessary, its SMP once every seven years (RCW 90.58.080(4)). During this review period, specific timelines should be developed according to the general priorities described herein and emphasis should be given to areas with the greatest restoration potential. A suggested timeline for initiating implementation of this plan is as follows:

Within 2 years of adoption of this plan:

- Mail educational materials to all Puget Sound shoreline property owners.
- Initiate conversations with BNSF and at least one public agency regarding sediment delivery and stream culvert replacement.

- Identify at least 2 bio-stabilization projects.
- Identify with waterfront residents a wave deflection system that might be employed and tested.
- Initiate conversations with Highlands Homeowners Association regarding restoration easement or property acquisition of Boeing Creek Reserve.
- Integrate shoreline restoration program with the City's CIP.

Within 5 years of adoption of this plan (assuming funding is available):

- Identify at least 2 wetland enhancement projects.
- Implement elements of the Richmond Beach Saltwater Park vegetation management plan that restore nearshore ecological functions.
- Develop a vegetation management plan for Innis Arden Reserve.
- Implement recommendations from Boeing Creek Park vegetation management plan to include stream corridor downslope to Puget Sound.

Within 7 years of adoption of this plan (assuming funding is available):

- Implement Innis Arden Reserve vegetation management plan.
- Implement at least 1 bio-stabilization project.
- Implement at least 1 wetland enhancement project.

Over time restoration efforts must be evaluated against a set of benchmarks to determine if adequate progress is being made. One way to assess progress will be to track and report on the following general benchmarks:

- Acres of riparian enhancement
- Acres of nearshore enhancement
- Acres of wetland restored in the shoreline jurisdiction
- Linear feet of bio-stabilization
- Number of improved surface and storm water controls
- Number of culverts replaced
- Number of creosote structures/pilings removed in the nearshore environment
- Number of restoration actions implemented in conjunction with other project partners
- Number of public education workshops implemented
- Number of educational materials mailed to shoreline property owners

One mechanism to assist in tracking is developing a GIS-based database to document and track shoreline restoration projects. This would assist in future evaluations (once every seven years) of the SMP program in terms of meeting restoration and "no-net-loss" goals.

6.2 Funding and Partnership Opportunities

Implementing restoration activities identified in this plan will be a challenge given the economic situation of the Puget Sound area and the lack of a dedicated funding source. At present, shoreline restoration is almost entirely dependent on grant funding, which depends upon state and federal monies. The City's ability to devote any general funds to the implementation of this plan is uncertain, but potential internal funding sources do exist. One potential funding mechanism would be the establishment of a shoreline restoration program organized like or integrated with a capital improvement program (CIP). Similar to an infrastructure CIP, a shoreline restoration CIP would be evaluated and updated regularly. A restoration CIP could be focused on site-specific projects and could be funded through grants or City general funds. For example, funds could be dedicated to support beach cleanup and riparian enhancements in the shoreline jurisdiction. Further, existing CIP projects, such as stormwater facility and road improvements, could be evaluated to determine if their design could advance shoreline restoration goals.

A variety of outside funding sources are available for restoration projects in Puget Sound. Funding opportunities have generally increased since the implementation of Governor Gregoire's Puget Sound Initiative in 2005, though the process by which organizations are able to obtain funds is typically quite competitive. Sources listed here do not represent an exhaustive list of potential funding opportunities, but are meant to provide an overview of the types of opportunities available.

Interagency Committee for Outdoor Recreation
Washington Wildlife Recreation Program (WWRP)
1111 Washington St. SE
PO Box 40917
Olympia, WA 98504
360-902-3000, info@iac.wa.gov

The WWRP provides funds for the acquisition and development of recreation and conservation lands. WWRP funds are administered by account and category. The Habitat Conservation Account includes critical habitat, natural areas, and urban wildlife categories. The Outdoor Recreation Account includes local parks, state parks, trails, and water access categories. Letters of intent are usually due March 1. Applications are usually due May 1.

Washington State Department of Ecology
Post Office Box 47600
Olympia, Washington 98504-7600
jrus461@ecy.wa.gov
www.ecy.wa.gov/programs/wq/plants/grants/index.html

Grant programs administered by Washington State Department of Ecology are described below.

- *Aquatic Weeds Financial Assistance Program*: This program provides funding for technical assistance, public education and grants to help control aquatic weeds. Grant projects must address prevention and/or control of freshwater, invasive, non-native

aquatic plants. The types of activities funded include: Planning, education, monitoring, implementation, pilot/demonstration projects, surveillance and mapping projects. Grant applications are accepted from October 1 through November 1 of each year during a formal application process.

- *Water Quality Program*: The Department of Ecology's Water Quality Program administers three major funding programs that provide low-interest loans and grants for projects that protect and improve water quality in Washington State. Ecology acts in partnership with state agencies, local governments, and Indian tribes by providing financial and administrative support for their water quality efforts. As much as possible, Ecology manages the three programs as one; there is one funding cycle, application form, and offer list. The three programs are: The Centennial Clean Water Fund, The State Revolving Loan Fund (SRF), and The Section 319 Nonpoint Source Grants Program (Section 319). Local governments, Native American tribes, special purpose districts, and non-profit groups are eligible for funding. Grants and loans are available for point source and nonpoint source projects. This includes, but is not limited to, treatment facilities, stream and salmon habitat restoration, and water quality monitoring.
- *Coastal Protection Fund*: This account is funded primarily by oil spill penalties levied against responsible parties. Restoration efforts undertaken with these funds are diverse and include fish barrier removal, and environmental education projects.
- *Coastal Zone Management Administration/Implementation Awards*: This program assists states in implementing and enhancing Coastal Zone Management (CZM) programs that have been approved by the Secretary of Commerce. Funds are available for projects in areas such as coastal wetlands management and protection, natural hazards management, public access improvements, reduction of marine debris, assessment of impacts of coastal growth and development, special area management planning, regional management issues, and demonstration projects with potential to improve coastal zone management.

Washington Department of Fish & Wildlife (WDFW)
600 Capitol Way North
Olympia, WA 98501-1091
360-902-2806.
http://wdfw.wa.gov/volunter/vol-7.htm

Grant programs administered by WDFW are described below.

- *Aquatic Lands Enhancement Account (ALEA) Volunteer Cooperative Projects Program*: The WDFW accepts grant applications from individuals and volunteer groups conducting local projects to benefit fish and wildlife. Grants have ranged from $300 to $75,000 in past years to help volunteers pay for materials necessary for projects approved by the agency. Funding cannot be used for wages or benefits. Examples of past projects include habitat restoration, improving access to fish and wildlife areas for disabled people, fish and wildlife research, public education and fish-rearing projects that can benefit the public.

- *Landowner Incentive Program*: The Landowner Incentive Program (LIP) is a competitive grant program designed to provide financial assistance to private landowners for the protection, enhancement or restoration of habitat to benefit species at risk on privately owned lands. At risk species depend on specific ecosystems for survival. These ecosystems include riparian areas, wetlands, oak woodlands, prairies and grasslands, shrub steppe and nearshore environments. Through Washington's LIP, individual landowners are eligible to apply for up to $50,000 in assistance. In addition, $50,000 is typically set aside for small grants. Any individual applying for these small grant funds may apply for up to $5,000. A 25% non-federal contribution is required, which may include cash and/or in-kind (labor, machinery, materials) contribution.

National Fish and Wildlife Foundation
1120 Connecticut Avenue, NW, #900
Washington, DC 20036
Kathleen Pickering 202-857-0166
www.nfwf.org

Non-profit organizations, local, state or federal government agencies are eligible to apply for funds for community-based projects that improve and restore native salmon habitat, remove barriers to fish passage, or for the acquisition of land/conservation easements on private lands where the habitat is critical to salmon species. Specific grant programs are listed below.

- *Bring Back the Natives: A Public-Private Partnership for Restoring Populations of Native Aquatic Species*: The Bring Back the Natives (BBN) initiative funds on-the-ground efforts to restore native aquatic species to their historic range. Projects should involve partnerships between communities, agencies, private landowners, and organizations that seek to rehabilitate streamside and watershed habitats. Projects should focus on habitat needs of species such as fish, invertebrates, and amphibians that originally inhabited the waterways across the country. Twelve to fifteen grants averaging $60,000 are awarded annually.
- *Five-Star Restoration Matching Grants Program*: The Five-Star Restoration Program provides modest financial assistance on a competitive basis to support community-based wetland, riparian and coastal habitat restoration projects that build diverse partnerships and foster local natural resource stewardship through education, outreach and training activities.
- *Marine Debris Prevention and Removal Program*: The NOAA Marine Debris Program (NOAA MDP), codified by the Marine Debris Research, Prevention, and Reduction Act (33 U.S.C. 1951 et seq.) coordinates, strengthens, and enhances the awareness of marine debris efforts within the agency and works with external partners to support research, prevention, and reduction activities related to the issue of marine debris. The NOAA MDP mission is to support a national and international effort focused on preventing, identifying and removing the occurrence of marine debris and to protect and conserve our nation's natural resources, oceans, and coastal waterways from the impacts of marine debris.
- *Puget Sound Marine Conservation Fund*: In spring 2005, the United States charged an international shipping company with violating numerous federal pollution laws after

inspections and actions taken by the Washington Department of Ecology and the Coast Guard identified the violations. As part of the settlement, the courts ordered $2,000,000 in community service payments to be made to the National Fish and Wildlife Foundation (Foundation) to be invested in conservation projects in the area of environmental impact.

- *The Migratory Bird Conservancy*: The MBC will fund projects that directly address conservation of priority bird habitats in the Western Hemisphere. Acquisition, restoration, and improved management of habitats are program priorities. Education, research, and monitoring will be considered only as components of actual habitat conservation projects.

Salmon Recovery Funding Board (SRFB)
Lead Entity Coordinator: Mary Jorgensen
(206) 296-8067
mary.jorgensen@metrokc.gov

The Salmon Recovery Funding Board supports salmon recovery by funding habitat protection and restoration projects. It also supports related programs and activities that produce sustainable and measurable benefits for fish and their habitat. SRFB distributes funds through two grant programs: SRFB grants, and Family Forest Fish Passage Program grants. The grants from SRFB range from $10,000 to nearly $900,000. They have been awarded to organizations in 28 counties for work ranging from planting trees along streams to cool the water for salmon, to replacing culverts that prevent salmon from migrating to spawning habitat, to restoring entire floodplains.

Depending on the grant program, eligible applicants may include municipal subdivisions (cities, towns, counties, and special districts such as port, conservation, utility, park and recreation, and school), tribal governments, state agencies, nonprofit organizations, regional fisheries enhancement groups, and private landowners. To be considered for funding, projects must be operated and maintained in perpetuity for the purposes for which funding is sought. All projects require lead entity approval and must be a high priority in the lead entity strategy or regional recovery plan.

Grants are awarded by the Salmon Recovery Funding Board based on a public, competitive process that weighs the merits of proposed projects against established program criteria.

NOAA Restoration Center
Community-based Restoration Program
Northwest Region
Jennifer Steger, Director
Jennifer.Steger@noaa.gov
http://www.nmfs.noaa.gov/

The NOAA Community-based Restoration Program (CRP) is a financial and technical assistance program that helps communities implement restoration projects. Specific opportunities are listed below.

- *NOAA CRP 3-Year Partnership Grants*: These grants fund national and regional habitat restoration partnerships for up to 3 years that provide sub awards for individual grass-roots restoration projects. Typical awards range from $100,000 to $2,000,000.
- *NOAA CRP Project Grants*: These grants fund grass-roots marine and coastal habitat restoration projects that will benefit anadromous fish species, commercial and recreational resources, and endangered and threatened species. Typical awards range from $30,000 to $250,000.
- *American Sportfishing Association's FishAmerica Foundation Grants*: Since 1998, NOAA CRP has partnered with the FishAmerica Foundation to provide funding for fisheries habitat restoration projects nationwide. Grants will fund marine and anadromous fish habitat restoration projects that benefit recreationally fished species. Typical awards range from $5,000 to $50,000.
- *National Fish & Wildlife Foundation/National Association of Counties Coastal Counties Restoration Initiative*: In partnership with NOAA CRP, this grant program funds innovative, high quality county-led or supported projects that support wetland, riparian and coastal habitat restoration projects. Typical awards range from $25,000 to $100,000.

Washington State Department of Natural Resources (DNR)
Aquatic Lands Restoration Funding
Aquatic Resources Division
360-902-1100
Fax 360-902-1786
ard@dnr.wa.gov
http://www.dnr.wa.gov/ResearchScience/Topics/AquaticClean-UpRestoration/Pages/aqr_aquatic_clean_restoration.aspx.
DNR is encouraged that revitalizing the health of Puget Sound and other aquatic lands has become a high priority for the Governor and the people of the state. DNR provides funding for removal of creosote piles, removal of derelict vessels and other clean up in the nearshore environment. Funding typically awarded to restoration projects between 2004 and 2007 ranged from $8,000 to $35,000.

Puget Sound Nearshore Partnership
Estuary and Salmon Restoration Program
Washington Department of Fish and Wildlife
600 Capital Way N.
Olympia, WA 98501
ESRP@dfw.wa.gov

The Estuary and Salmon Restoration Program (ESRP) is a protection and restoration funding opportunity being developed by the Puget Sound Nearshore Partnership to support the transition from opportunistic project funding to strategic and sustained nearshore ecosystem restoration in Puget Sound. The ESRP uses state capital funds and NOAA Restoration Center resources to fund restoration and protection projects that benefit salmon and the nearshore environment in Puget Sound. Projects are selected for their ability to provide long-term protection or restoration of ecosystem processes. ESRP provides phased funding to incrementally support large and

complex projects. Projects that rank well through a regional competition are considered for annual funding.

Environmental Protection Agency (EPA)
Region 10: Pacific Northwest
Grants Administration Unit
Bob Phillips
phillips.bob@epa.gov
(206) 553-6367

The Environmental Protection Agency funds a variety of projects that aim to safeguard the natural environment and protect human health. Potential opportunities specific to watershed protection and restoration are listed below.

- *The Clean Water State Revolving Fund Program*: Under this program, EPA provides grants or "seed money" to all 50 states plus Puerto Rico to capitalize state loan funds. The states, in turn, make loans to communities, individuals, and others for high-priority water-quality activities. Projects funded by the low-interest loans may include wetlands protection and restoration, estuary management efforts – including wildlife habitat restoration – and development of streambank buffer zones.
- *Nonpoint Source Implementation Grant (319) Program*: Clean Water Act Section 319(h) funds are provided only to designated state and tribal agencies to implement their approved nonpoint source management programs. State and tribal nonpoint source programs include a variety of components, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and regulatory programs. Each year, EPA awards Section 319(h) funds to states in accordance with a state-by-state allocation formula that EPA has developed in consultation with the states.
- *Wetland Protection, Restoration, and Stewardship Discretionary Funding*: This program provides support for studies and activities related to implementation of Section 404 of the Clean Water Act for both wetlands and sediment management. Projects can support regulatory, planning, restoration or outreach issues. Typical grant awards range from $5,000 to $20,000.

U.S. Fish & Wildlife Service (USFWS)
Nell Fuller
911 NE 11th Avenue
Portland, OR 97232-4181
(503) 231-2014
Nell_Fuller@fws.gov

Grant programs administered by USFWS are described below.

- *Partners for Fish and Wildlife Program*: This program provides technical and financial assistance to private landowners and Tribes who are willing to work with USFWS and other partners on a voluntary basis to help meet the habitat needs of Federal Trust

Species. The Partners Program can assist with projects in all habitat types which conserve or restore native vegetation, hydrology, and soils associated with imperiled ecosystems such as longleaf pine, bottomland hardwoods, tropical forests, native prairies, marshes, rivers and streams, or ecosystems that otherwise provide an important habitat requisite for a rare, declining or protected species. The typical grant award is approximately $25,000.

- *Puget Sound Program*: The Puget Sound Program was established to protect, restore, and enhance the natural resources of Washington's coastal ecosystems. USFWS works closely with the U.S. Environmental Protection Agency's National Estuary Program, and their State partner, the Puget Sound Water Quality Action Team to conserve fish and wildlife and their habitats in Puget Sound, an "estuary of national significance." Partnerships with other agencies, Native American Tribes, citizens, and organizations are emphasized.
- *National Fish Passage Program*: Each year the Service solicits and inputs select fish passage projects into the Fisheries Operational Needs System database. Projects are prioritized and selected based upon the benefits to species and the geographical area. Typical projects include barrier culvert removal or replacement with a fish passable culvert or bridge, and re-opening oxbow and off channel habitats. Typical funding amounts range from $30,000 to $110,000 with a minimum 25% cost share requested.
- *Cooperative Endangered Species Conservation Fund*: Grants offered through the Cooperative Endangered Species Conservation Fund support participation in a wide array of voluntary conservation projects for candidate, proposed and listed species. These funds may in turn be awarded to private landowners and groups for conservation projects.
- *North American Wetlands Conservation Act Grants Program*: The North American Wetlands Conservation Act of 1989 provides matching grants to organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife. The Standard Grants Program supports projects in Canada, the United States, and Mexico that involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats. The Small Grants Program operates only in the United States; it supports the same type of projects and adheres to the same selection criteria and administrative guidelines as the U.S. Standard Grants Program. However, project activities are usually smaller in scope and involve fewer project dollars. Grant requests may not exceed $75,000, and funding priority is given to grantees or partners new to the Act's Grants Program.

U.S. Army Corps of Engineers
Section 206 Aquatic Ecosystem Restoration Projects
Mr. John R. Kennelly, Chief
Planning Branch
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

Under the authority provided by Section 206 of the Water Resources Development Act of 1996, the Corps may plan, design and build projects to restore aquatic ecosystems for fish and wildlife. The process for Section 206 projects begins after a non-federal sponsor requests Corps of Engineers assistance under the program. When funding is available, the Corps of Engineers prepares a Preliminary Restoration Plan (PRP) paid for by the federal government. The PRP is a 3 to 5 page document used to determine whether federal involvement is appropriate. It describes the project benefits and contains an initial schedule and budget. The Final PRP contains a letter from the non-federal sponsor indicating that they understand their obligations for cost sharing and obtaining any necessary real estate. If the sponsor agrees to move forward with the project, the Corps prepares a feasibility study, then plans and specifications. The Corps then manages construction of the project.

U.S. Army Corps of Engineers
Basinwide Restoration New Starts General Investigation
Bruce Sexauer
P.O. Box 3755
Seattle, WA 98134
(206) 764-6959

Funding for projects related to coastal ecosystems, fish and wildlife, flood management, land management and planning, outdoor recreation, general restoration, riparian areas, water quality, and wetlands is provided through this program at a 65:35 cost share. Studies on the same topics are funded at a 50:50 cost share.

Washington Department of Transportation (WSDOT)
City Fish Passage Grant Program
Cliff Hall
(360) 705-7499
hallcli@wsdot.wa.gov

The City Fish Passage Barrier Removal and Habitat Restoration Grant Program provides $2 million to be used towards City fish passage barrier removal projects, with complimenting habitat restoration and stormwater components. The intent of the City Fish Passage Barrier Removal and Habitat Restoration Grant program is to integrate clean water with salmon restoration efforts and compliments the WSDOT ESA response. Grant funding may vary from year to year; check with the Program Manager at WSDOT for more detailed information.

Washington Department of Natural Resources Small Forest Landowner Office (SFLO)
PO Box 47000
1111 Washington Street SE
Olympia, WA 98504-7000
(360) 902-1000

The Family Forest Fish Passage Program will pay qualified landowners up to 100% for replacing blocked culverts. The Forest Riparian Easement Program also pays qualified landowners 50 to 100% of the value of timber they leave in riparian zones in exchange for a 50-year easement.

Ducks Unlimited
Matching Aid to Restore State Habitat (MARSH)
(916) 852-2000
conserve@ducks.org

The MARSH program was instituted in 1985 to develop and protect waterfowl habitat in the United States. This reimbursement program provides matching funds for wetland acquisition and habitat restoration and enhancement in each state based on Ducks Unlimited (DU's) income within that state. Projects submitted for MARSH funding must significantly benefit waterfowl. Normally, all projects must be on land under the control of a public agency or private cooperator with which DU has an approved memorandum of understanding. Control must be through ownership, lease, easement, or management agreement. Control must be adequate for protection, maintenance, and use of the project throughout its projected life.

Trout Unlimited
Embrace-A-Stream (EAS)
406-543-1192
www.tu.org

EAS is the flagship grant program for funding Trout Unlimited's conservation efforts to conserve, protect, and restore coldwater fisheries and their watersheds. Trout Unlimited annually raises money from TU members, corporate and agency partners, and foundations to distribute as small grants to local TU projects. The goal of EAS is to conserve coldwater fisheries through innovative grassroots conservation projects. Successful projects are based on sound science, benefit the resource, strengthen the local TU chapter and council, and help build the constituency for protecting trout and salmon. TU volunteers are actively involved in project work and are expected to provide matching funds. An Embrace-A-Stream Committee comprised of TU volunteer representatives and scientific advisors evaluates all proposed projects.

Other Potential Sources

A number of private foundations, businesses, and other organizations administer grant programs with the intent of restoring habitat and ecosystems. Organizations with focal areas including Puget Sound, watershed protection, and habitat conservation include:

- The Russell Family Foundation (www.trff.org/home.asp);
- Northwest Fund for the Environment (www.nwfund.org/);
- The Bullitt Foundation (www.bullitt.org);
- The Compton Foundation (www.comptonfoundation.org);
- The Acorn Foundation (www.commoncounsel.org); and
- The Hugh and Jane Ferguson Foundation (http://www.foundationcenter.org/grantmaker/ferguson/).

6.3 Mechanisms and Strategies for Effectiveness

A great deal of attention and resources have been focused on Puget Sound restoration activity in recent years. These efforts stem from the listing of Puget Sound salmonid species as threatened and endangered, as well as a broader awareness and concern for the overall ecological health of Puget Sound. Within the Sound, the nearshore environment – where the land meets the water - is considered a critical element of the Puget Sound ecosystem. The Puget Sound Nearshore Partnership is a multi-agency regional entity whose mission is to protect and restore the functions and natural processes of the Puget Sound nearshore ecosystem. The Nearshore Partnership has developed strategic principles and concepts intended to guide ecosystem recovery (Fresh, et al, 2004). The principles and concepts are very briefly summarized below:

- **Purpose and Need.** Potential restoration projects should be consistent with overarching goals and objectives.
- **Restoration Principles.** Restoration planning should be strategic and restoration design should be based on carefully developed goals and objectives. Follow-through, or monitoring, should be employed, including development of performance criteria and use of adaptive management in project development.
- **Monitoring Principles.** Three types of monitoring are defined: 1) implementation monitoring to track which potential programs and projects are carried out; 2) effectiveness monitoring to determine if habitat objectives of the program or project have been achieved; and validation monitoring to confirm whether proposed restoration actions are achieving the overall objectives for restoration. Monitoring should be driven by specific questions, goals, and objectives and should be used as the basis for determining if restoration goals are being met. Monitoring should be long-term and interdisciplinary. Another component of monitoring is information management; data should be well documented and available to others.

- **Adaptive Management Principles.** Adaptive management is a process that uses research and monitoring to allow projects to proceed, despite inherent uncertainty and risk regarding its consequences. Adaptive management is best accomplished at a regional or watershed scale, but can be used at a project level to increase knowledge about ecosystems and how they respond to restoration actions.

6.4 Constraints to Implementation

Restoration opportunities which are located on private property can be more challenging to implement than opportunities located on public property. With the exception of Point Wells, property owners would need to be interested in working with the City since restoration is not a regulatory requirement but a voluntary action.

The presence of the BNSF railroad along the entire length of the Puget Sound shoreline within the city restricts the City's ability to pursue comprehensive restoration goals.

Restoration opportunities which are located in the PAA at Point Wells pose a challenge to the City since it has no jurisdiction with those properties. When pursuing a restoration project the City would need to coordinate with Snohomish County on the permitting process. Another option would be to wait until properties in the PAA are annexed into the city before implementing a project.

Designing, carrying out, and monitoring the success of restoration efforts can be an expensive undertaking, particularly at larger (e.g., watershed or reach) scales. In general, funding for restoration is limited and competition for funds extensive.

Obtaining necessary permits from local, state, and federal regulatory agencies can require substantial time and effort. Although encouraged and allowed by the SMP, complicated restoration projects may take a year or more to permit.

Rising temperatures and sea levels have the potential to dramatically alter the City's shoreline jurisdiction, processes, and functions over time. Depending on the scale of change and time period over which changes occur, restoration priorities could shift substantially within a relatively short period of time. Future restoration should be designed to consider sea level rise and future water elevations in shoreline areas of the City.

7.0 CONCLUSION

State guidelines require all jurisdictions to address shoreline restoration planning as part of the Shoreline Master Program update process (WAC 173-26-201[2][f]). This restoration plan presents an overall framework to allow the City of Shoreline to pursue the restoration of ecosystem functions and processes along the city's Puget Sound shoreline. Key findings and recommendations include:

- One of the largest issues affecting the nearshore environment is the modification with riprap and bulkheads of almost the entire length of the city's Puget Sound shoreline. The majority of this armoring is associated with the BNSF railroad bed. As a result, sediment delivery is limited to several streams that deliver sediment via culverts under the railroad right-of-way. Forage fish spawning still occurs at these limited points of sediment input (e.g. Boeing Creek). In the Richmond Beach neighborhood, sediment processes have been altered by armoring to protect residential development in several areas, but still provide important habitat and sediment functions.
- Construction of the BNSF Railroad resulted in extensive fill along the shoreline of Puget Sound. Streams that would have historically entered the Sound at natural deltas or estuaries are now conveyed via culverts through the railroad bed. The culverts were not originally designed to allow for fish passage, and many of these culverts limit fish movement into upstream areas.
- Clearing of riparian vegetation along the marine shoreline for the BNSF Railway construction and maintenance, and other shoreline armoring has resulted in a lack of large woody and organic debris available for recruitment to the system. The lack of debris in turn affects the stability of the beaches as the presence of beach logs and debris can reduce erosion by dissipating wave energy and trapping sediment.

Based on these findings, recommendations for an approach to meaningful shoreline restoration within the City of Shoreline include:

- Work with the State, King County, WRIA 8, and other governmental and non-governmental organizations to explore how the City of Shoreline can contribute to the preservation of ecological processes and shoreline functions.
- Identify projects that the City can lead. This may likely be smaller-scale habitat enhancement or restoration projects focused on revegetation of public parks and open spaces with native plantings, protection and enhancement of wetlands, and bioengineered bank stabilization.
- Work with BNSF, Corps of Engineers, Puget Sound Partnership, and other interested parties to restore the natural input of sediment and organics to Puget Sound and to replace existing stream culverts with larger box culverts or other fish friendly structures.

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