Draft

CITY OF TACOMA
Shoreline Habitat Fee-in-Lieu Mitigation Program

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1.0 INTRODUCTION

As part of its comprehensive update of the Shoreline Master Program (SMP), the City of Tacoma Community and Economic Development Department is considering establishment of a shoreline mitigation program to allow for off-site mitigation of development impacts to shoreline riparian areas. This report was prepared to specifically address the city's need to explore off-site shoreline mitigation and the feasibility of a fee in-lieu (FIL) program for shoreline habitat.

In 2003, the Department of Ecology (DOE) issued guidelines to assist local governments in meeting the State requirement to conduct a comprehensive review of the City's SMP. The guidelines outline procedural steps and substantive requirements that must be met. The SMP must assure "no net loss" of shoreline ecological functions while providing for appropriate uses within shoreline areas. Tacoma's update to its Shoreline Master Program is a comprehensive update of its existing program requiring the City to re-evaluate all shoreline policies, designations and regulations. An inventory of existing conditions was conducted based upon scientific and technical information. The Tacoma SMP will amend goals, policies and development regulations for all shoreline areas including Commencement Bay and its waterways, the Hylebos Creek, the Puyallup River, Tacoma Narrows and Wapato Lake.

Currently, the Draft Tacoma SMP (TSMP) is in development. The Planning Commission will be overseeing the update of the program and is expected to make a recommendation to the City Council in late 2010. This project is closely coordinated with the Thea Foss Waterway Comprehensive Review, the Critical Areas Preservation Ordinance update, and the Open Space Habitat Management and Plan efforts.

The intent of this technical report is to explore options and alternatives to on-site mitigation for impacts to shoreline functions during development. The information in this report has been prepared to support the shoreline regulations and provide a mechanism for a potential fee in-lieu program for shoreline mitigation.

2.0 OVERVIEW

The Shoreline Management Act (SMA) provides a broad policy framework for protecting the natural resources and ecology of the shoreline environment. The SMP Guidelines adopted in 2003 by Ecology establish the standard of *no net loss* of shoreline ecological functions. The Washington State Administrative Code (WAC) 173-26-186 directs that master programs must "include policies and regulations designed to achieve *no net* loss of those ecological functions."

The *no net loss* standard set by the WAC is designed to halt the introduction of new impacts to shoreline ecological functions resulting from new development within the shoreline jurisdiction. Information related to this standard is provided on the Ecology web page in Chapter 4 of the new SMP Handbook. Chapter 4 of the Handbook is titled No Net Loss of Shoreline Ecological Functions and was last updated on December 16, 2009. Ecology staff are currently developing a list of potential indicators of *no net loss* in order to quantify parameters affecting shoreline functions. The list of indicators includes quantities such as length of shoreline armoring, acreage of riparian vegetation, acres of permanently protected area, etc.

The City of Tacoma seeks to assess the feasibility of a shoreline mitigation program that assists the City and applicant appropriately mitigate for shoreline impacts and achieve the regulatory requirements of *no net loss* during permit compliance.

In addition to mitigation, the State has directed local governments to develop SMP provisions "…to achieve overall improvements in shoreline ecological functions over time when compared to the status upon adoption of the master program." This overarching goal is accomplished by protection of existing shoreline functions through regulations, and through restoration of ecological functions, including mitigation.

The City of Tacoma has developed the following restoration goals in the Draft Shoreline Restoration Plan (2010a) in order to achieve net gain in shoreline habitat function:

- improve shoreline water quality;
- re-establish and restore natural shoreline processes;
- restore degraded and lost habitat; and
- improve connectivity of shoreline environments.

The Draft Restoration Plan further identifies restoration opportunities for the specific Shoreline Districts (S1 through S-15). Many of these opportunities involve reconnection of bluffs, wetlands, or upland forest to the shoreline. However, the space or location to capitalize on these restoration goals is limited by the existing development of the shoreline. Restoration opportunities, some associated with shoreline habitat, were identified during the development of the Tacoma Open Space Habitat and Recreation Element in the City Comprehensive Plan.

Provision for off-site mitigation would increase mitigation opportunities, and a fee in-lieu program would allow further flexibility and increased success in mitigating shoreline impacts.

A fee-in-lieu program involves the preservation, enhancement, or restoration of habitat and/or aquatic resources through funds paid to a sponsor to satisfy compensatory mitigation requirements; the responsibility for providing and maintaining mitigation is transferred to the program sponsor.

Shoreline habitat fee-in-lieu mitigation occurs when the applicant proposes an activity that impacts shoreline habitat, and on-site mitigation is precluded for reasons of site development or physical constraints. The applicant provides funds to the sponsor instead of completing project-specific mitigation. These funds would then be contributed to off-site mitigation projects.

3.0 LITERATURE SEARCH

Fee in-lieu (or in-lieu fee) programs have been developed for land use application in density transfer, wetlands impacts, and shoreline armoring.

In these programs, the regulating agency allows the permittee to substitute on-site mitigation of impacts through provision of a fee. The agency then applies the fee to mitigation of the impact.

Several examples that provide insight to a shoreline habitat fee in-lieu program are discussed below.

3.1 Federal 404 Mitigation and Fee-in-Lieu Guidance

Discussion of fee in-lieu mitigation for wetland impacts under Section 404 of the Clean Water Act was initiated in the 1990 Memorandum of Agreement between the Corps of Engineers (Corps) and the Environmental Protection Agency (EPA). The program was further defined in 1995, and in 2000, the Corps, EPA, United States Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Association (NOAA) provided additional guidance for fee in-lieu arrangements for mitigation. Fees-in-lieu are described as appropriate for 404 individual and general permits established under the mitigation banking guidance, but as a rule, are to be limited to instances where on-site mitigation is not available or practicable. The fees are to be transferred to the local natural resource management agency for implementation of mitigation. In-kind and in-watershed projects are preferred. The natural resource agency accepting the fees is encouraged to provide information on the identified restoration projects, the implementation schedule, and financial, legal, and technical mechanisms to ensure long-term success.

On April 10, 2008, the Department of the Army (Army) and U.S. Environmental Protection Agency (EPA) published a final rule for compensatory mitigation authorized by Corps permits issued under §404 of the Clean Water Act (33 U.S.C. 1344) and/or §§9 or 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 401, 403). Federal-related fee in-lieu programs are distinguished from mitigation banks and other forms of compensatory mitigation by having all of the following six elements:

- Fee in-lieu program instrument
- Review by interagency review team
- Geographic service area(s)
- Compensation planning framework
- Fee in-lieu program account
- Allocation of advance credits

The Environmental Law Institute has published: In Lieu Fee Mitigation: Model Instrument Language and Resources (December 2009) which provides detailed information and sample language on the Federal Section 404 and Section 10 fee-in-lieu process for wetland mitigation.

3.2 Washington State Department of Ecology

The Washington State Department of Ecology (Ecology) is working with the Corps and EPA in the development of a FIL program in Washington State for wetlands mitigation. The guidelines are similar to those described above under the federal program (Ecology, Corps, & EPA, March 2006).

3.3 Puget Sound Partnership

The Puget Sound Partnership (PSP) is establishing a pilot FIL program for compensatory mitigation; Thurston and Pierce Counties were chosen as the locations for the two pilot projects, and is accepting applications for those two programs through April 27, 2010 (PSP, January 2010).

3.4 King County Mitigation Reserves Program

King County is in the process of establishing a Fee In-Lieu Program for wetland and buffer impacts, as part of revisions to the King County Mitigation Reserves Program, established in 2005 (KCNRP, June 2009). The program will allow payment of a fee in-lieu of mitigation for wetlands impacts that cannot be mitigated on site. The fee is based upon a function-based debit and credit system that is in development (Murphy, Personal Communication. 2010.) Marine and estuarine wetlands will be included in the program, and the program will include shoreline buffer mitigation, if Ecology has a role in permitting (Murphy, Personal Communication. 2010). King County has proposed locations, termed "roster sites" in different watersheds where fees would be applied. The program is intended to be certified by the Corps and EPA, so that the fee-in-lieu mitigation will satisfy Section 404 and Section 10 permitting as well as county permits.

3.5 City of Seattle Shoreline Alternative Mitigation Plan

The draft City of Seattle Shoreline Alternative Mitigation Plan (SAMP) (May 2006) identifies a fee-in-lieu program to shoreline impacts to Lake Union and Lake Washington. The plan supports the use of shorelines in these areas for water-dependent uses, while providing mitigation for shoreline impacts that is predictable and effective to achieve no net loss. The framework for assessing impacts is viewed through the lens of impact to Chinook salmon habitat, which also provides habitat for other organisms. The SAMP bases it's evaluation of impacts on an On-Site Habitat Unit Equivalency. Habitat Suitability Index (HIS) curves quantify the changes in habitat quantity and quality as part of Habitat Evaluation Procedures (HEP) (Raleigh et. al, 1986). HIS values are typically multiplied by the area they represent to derive a set of weighted habitat areas that can be compared across alternatives (R2, 2006). The concept is that maintaining a comparable balance in habitat before and after project completion, resulting in no adverse impact to Chinook habitat. Use of fee-in-lieu is limited to projects with water-dependent uses (Seattle Municipal Code 23.60.944). Applicants will be required to provide 1.3:1 mitigation credits for off-site mitigation. (Seattle, 2006); this may be modified to higher ratios such as 2:1 (R2, 2006) based solely on a policy decision, not on scientific data, which is lacking. Fees will include the cost of mitigation design, establishment, maintenance, and contingency. The SAMP has identified potential restoration sites, which will be protected by conservation easements.

3.6 Fee In-lieu Programs in Other States

3.6.1 In-Lieu Fee Beach Sand Mitigation Program

An example fee in-lieu program is currently being used in San Diego County, California. This program allows fees to be transferred to offset impacts to beaches and beach sand habitat (California Coastal Commission, 1997).

Section 30235 of the California Coastal Act requires the Coastal Commission to approve seawalls, revetments, cliff retaining walls and other such construction that alters natural shoreline processes to protect existing structures, public beaches and coastal development in danger from erosion. Approved development is designed to eliminate or mitigate the adverse impacts on shoreline sand supply. In addition to avoidance and minimization, the mitigation definition includes: "Compensating for the impact by replacing or providing substitute resources or environments."

The FIL process in San Diego County has been used to mitigate for armoring of bluff and shoreline habitats, and mitigate for the loss of beach area and the loss of sand denied to the beach cell over the life of the structure. The fee is derived based upon the volume of sand lost, multiplied by the cost of transporting and depositing the sand on the beach in the project vicinity based upon site-specific conditions. The program developed a formula to quantify impacts and calculate fees. The review of a number of permitted projects also includes descriptions of alternatives to fee-in-lieu determined on a case-by-case basis, including, for example, design modifications, or provision of lateral access to the beach.

3.6.2 Virginia Aquatic Resources Trust Fund In-Lieu Fee Program

The Virginia Aquatic Resources Trust Fund In-Lieu Fee Program, established in 1995 and expanded in 2003, provides in-lieu fee mitigation for impacts to waters of the US and the state, including wetlands, streams, and associated buffers. Project-specific credits are determined based upon standard ratios for wetlands, and through the Unified Stream Methodology for streams, and include the expected costs for restoration, establishment, adaptive management, and preservation (VAR, 2003). In-lieu fee sites are designated by "Service Areas" associated with different watersheds. The Nature Conservancy manages the program with oversight from the Virginia Department of Environmental Quality and the Corps.

3.6.3 Virginia Marine Resources Commission Tidal Wetland Mitigation Bank

The Virginia Marine Resources Commission Tidal Wetland Mitigation Bank, established in 1998 and updated in November 2005, provides off-site mitigation for impacts to tidal wetlands. Although the Bank specifically excludes in-lieu fee arrangements, it states that they are some times appropriate, and are permitted on a case-by-case basis. This document includes a function-specific credit calculation methodology for assigning credits to tidal wetlands for the purpose of the bank.

4.0 PROGRAM CONCEPTS

The City of Tacoma has identified restoration goals and actions and potential restoration sites in the Draft Shoreline Restoration Plan (ESA Adolfson, September 2010a). This plan provides a description of existing plans and programs in the City of Tacoma that have identified needs for restoration, including those within the shoreline.

Ecological processes and functions of shoreline areas are identified as:

- Hydrology: Attenuation of wave energy; fresh to salt water transition, channel and floodplain connection, summer low-flow attenuation. Flood-flow retention,
- Sediment Generation and Transport: sediment delivery from coastal bluffs;
- Water quality: water contact-time with the soil; long-term storage of excess nutrients, pathogens, and toxins
- Habitat: maintenance of native plant community; source and delivery of large woody debris (LWD); removal of fish-blockages.

Each shoreline area contains identified restoration opportunities and locations (conceptual). Restoration actions include:

- Reconnection of bluffs to the shoreline
- Restoration of wetlands
- Provision of large woody debris (LWD)
- Removal of contaminated soils and trash
- Implementing Low Impact Development (LID) and water quality improvement measures
- Replace existing bulkheads with soft shoreline armoring
- Removal of structural barriers between feeder-bluffs and shoreline
- Removal of invasive plant species and enhancement of native vegetation
- Setting back levees (Hylebos Creek and Puyallup River)
- Removal of barriers between Lake Wapato and upland habitat

In many circumstances, potential impacts cannot be mitigated on site, due to the level of existing development, and/or the functionality of a small mitigation project in the context of the site.

The City of Tacoma could establish a fee in-lieu program for shoreline habitat impacts that cannot be mitigated on-site. The program could be modeled upon wetland fee in-lieu programs, where impacts are assessed based upon functional criteria and fees based upon those impacts are paid to the City for the performance of mitigation off site.

The program would have the following elements:

- Development of a fee in-lieu program instrument – the guidelines for the program including valuation and a vehicle for fee collection;
- Establishment of a review team which would review proposals on a case-by-case basis and monitor the performance of mitigation sites;
- Assignment of geographic service area, such as the Shoreline Districts identified in the Draft Shoreline Master Program (ESA Adolfson, 2010b) and potential restoration sites identified in the Draft Restoration Plan (ESA Adolfson, 2010a);

- Identification of performance standards; and
- Development of a fee in-lieu program account.

4.1 Program Instrument

The program instrument typically contains the following elements:

Objectives. The objective(s) of the program need to be clearly stated such as: to provide for off-site mitigation for shoreline habitat impacts when on-site compensation is not possible or practical. The fees will be applied to restoration projects identified in the *Shoreline Restoration Plan* (2010a) and located within the same Shoreline District when possible. The fee would be applied to in-kind mitigation when possible. For example, if the proposed impact is related to shoreline armoring, affecting wildlife habitat area, and sediment availability for transport, then mitigation could include both habitat connection and sediment delivery elements.

Need and Technical Feasibility. This section would describe the need for the program and the feasibility of the implementation. Need would be based upon a record of un-mitigated past shoreline impacts due to lack of on-site opportunity. Feasibility would be based upon the existence of opportunities for off-site mitigation and the ability of the City to manage the program.

Establishment and Operation. The program instrument would need to describe, in legal terms, how the fee in-lieu program will be established and operated, and describe the reporting protocols.

Proposed Service Area. The instrument will describe the proposed service area, in this case, the City of Tacoma regulated shoreline. Several mitigation site locations or "roster sites" could be identified based upon the Shoreline District where the impact occurs.

Ownership arrangements and long- term management strategy. The instrument would need to describe who would have ownership of the sites and how the sites would be maintained. The management strategy would need to describe both the financial management and the site-maintenance provided to ensure long-term success of the project. (Note: the City of Seattle specifies that the City would have an access agreement for the sites, though some would remain private). The City may decide that all mitigation would take place at city-owned properties.

Compensation planning framework. The instrument would include a description of the method for determining project-specific credits and fees. The method would be function-based where possible and will equal or exceed an area-based determination. Valuation of wetland impacts would be based upon ratios in the Critical Areas Preservation Ordinance; valuation of other impacts would need to be developed. A workshop on analysis of the City of Seattle Shoreline Alternative Mitigation Plan (documented by R2 Resources, 2006) resolved that there were linear measures of function (e.g. length of shoreline armoring) and areal measures (e.g. area of over-water coverage). These measures would be assessed separately when determining credits.

Areal measures can be valued based upon a 1:1 ratio (simplest) or a larger ratio, that is based upon general findings that mitigation is not always successful, so ratios should be greater than 1:1. Based

upon a review of scientific literature for riparian areas and strategies for management, a standard ratio of 2:1 mitigation is recommended to offset the temporal loss of function and loss of shoreline habitat area (National Research Council, 2003). Impact to wetlands, streams, and their specific buffers can be mitigated at ratios prescribed in the Critical Areas Code (TMC 13.11.350). Upland shoreline habitat loss, however, is hard to quantify, as the character and shape of the habitat, in addition to its acreage, influences its current use by wildlife and effect on water quality. For example, a long, narrow strip of forest extending from the shoreline to the bluff provides shoreline access to many more different species (e.g. urban-adapted) than a short, wide swath of forest would provide (perhaps providing habitat for interior forest species). Quantifying habitat in this case might require selecting a species on which to base habitat analysis, in the way that the City of Seattle has selected Chinook salmon for their Shoreline Alteration Mitigation Plan (2006). Applicants could apply the City of Seattle Shoreline Alternative Mitigation Plan (Seattle, May 2006) method as an alternative to a 2:1 standard replacement ratio. The Seattle method assigns habitat units per square foot to habitat lost: for example grass is valued at 0.27 habitat units per square foot while mature shrubs are valued at 2.77 habitat units per square foot, etc. According to the Seattle method, these habitat units are typically replaced on the receiving site at a 1.3:1 ratio.

Linear impacts related to infrastructure can be mitigated on a 1:1 ratio – one foot of armoring removed for every foot of new armoring proposed for example. Higher ratios would be based upon a policy decision to deter new bank-hardening, absent current scientific data availability.

Description of program account. The instrument will include a description of the financial accounting for the program.

4.2 Review Team

The City could convene a technical review team (TRT) to implement the program. Their duties would include implementing the valuation of impacts and mitigation described in the Instrument. The review team could include only City staff, or include staff from other agencies such as WDFW, Corp, Tacoma Green Partnership, or EPA members.

4.3 Geographic Service Areas

The Draft Tacoma Shoreline Master Program (ESA Adolfson, 2010b) includes the designation of 15 shoreline districts within the city. The FIL program would require that the mitigation for project impacts occur within the same shoreline district as the impact. If no site is available in that specific district, the mitigation site should be within one of five larger shoreline areas that encompasses the impact location. These areas would correspond approximately to 1) the Narrows; 2) Ruston Way; 3) Puyallup River; 4) the Port of Tacoma; and 5) Marine View Drive.

Restoration opportunities have been described for each shoreline district in the Draft *Shoreline Restoration Plan* (2010a), which identified restoration potential based upon information in the Shoreline Inventory and Characterization (2007), the Commencement Bay Natural Resource Restoration Plan (2007), and the Commencement Bay Aquatic Ecosystem Assessment (2000). Sites with high importance for restoration included:

- Functional connectivity;

- Location in existing critical area;
- Separation from sources of contamination;
- Cost-effectiveness; and
- Sustainability.

The Open Space and Recreation Element of the Tacoma Comprehensive Plan includes identification of habitat areas and proposed corridors, some of which are located in the City's shoreline jurisdiction (see Figure 2 of that document). During development of that plan, an inventory of open space included identification of potential sites for restoration based solely upon ecological characteristics, including presence of the target community (e.g. native conifer forest), extent of invasive plant species present, and presence of priority habitats and species. Thirty nine (39) sites were identified, several of which lie on or adjacent to the shoreline. These may provide initial sites for restoration funded by a fee-in-lieu program. Further in-depth analysis will be necessary to determine feasibility. The sites located on or adjacent to the shoreline include the following:

- Wapato Lake: Wapato Park includes lake, wetland, and upland habitats. The Shoreline Restoration Plan (2010a) has identified the restoration of wetlands associated with Wapato Lake as a beneficial action, improving water quality, mitigation flood flows, and providing wildlife habitat. The hydrology of these wetlands has been altered over time through dredging and filling; invasive plant species are present, and are dominant in some areas, and opportunities to improve habitat are many. This area was identified as a high restoration potential in the Draft Shoreline Restoration Plan (20010a).

- Puget Creek: This stream flows down a steep ravine, within Puget Park, although not all of the riparian corridor is publically-owned. Elements of forest habitat remain, but invasive plant species and erosion due to stormwater runoff have degraded habitat. This stream flows beneath roads and railway tracks prior to entering Commencement Bay and Puget Sound. An active community group supports restoration activities at this site. Improving the habitat quality and connections between upland forest, riparian habitat, and marine shoreline would prove valuable to wildlife. This area was identified as a moderate restoration potential in the Shoreline Restoration Plan (2010a).

- Marine View Drive: Bluffs fronting Marine View Drive on the northwest shore of Commencement Bay are substantially intact, due to gradient and slope instability. However, the bluffs have been separated from the shoreline by the roadway and the industrial development of the port/shoreline. Small areas of shoreline (e.g. Squally Beach) have been restored and re-connected to riparian habitat, although Marine View Drive itself impedes connection to the bluff sediments if not to wildlife that can cross the roadway (e.g. birds and small- to medium-sized mammals.) This area was identified as a moderate restoration potential in the Shoreline Restoration Plan (2010a).

4.4 Performance Standards

Performance standards would be developed based upon the habitat functions identified in the valuation process. As in wetlands mitigation projects, a time period would be defined for

mitigation projects to meet their specific goals. The time periods would be variable. For example, removal of shoreline armoring as mitigation for replacement of project shoreline armoring would be accomplished in a short time-frame, equal to the proposed project time-line. In contrast, establishment of a tidal wetland or of a forested connection to bluff areas would take years to mature. Performance standards would be tied to the specific function that was being impacted and replaced.

4.5 Fee-In-Lieu Program Account

A fee-in-lieu program account would be established to house funds collected through the program. The fees would be sufficient to establish mitigation projects and to provide for maintenance and monitoring in the future. The account would track funds accepted from permittees separately from those accepted from other entities and for other purposes (i.e., fees arising out of an enforcement action, "such as supplemental environmental projects," donations, and grants) (Corps and EPA, 2000). The King County Mitigation Reserve Program Prospectus states that King County will have such an account, and in addition to tracking the fees/credits by project, will also track projects by aquatic resource and jurisdictional authority (e.g. Corps).

The Tacoma Municipal Code does not specifically provide for a fee-in-lieu program for mitigation. Minor revisions to the CAPO would be required for use of the program when project impacts are unavoidable and mitigation cannot be provided on site.

4.6 Example Fee-In-Lieu Scenarios

For the purpose of illustration, two examples of projects that might need off-site mitigation for approval of a Shoreline Permit are described below. Note that these examples are purely theoretical and in-depth analysis would be necessary to determine both the amount of impact to habitat function and the amount and type of appropriate mitigation. Graphics representing these example scenarios are included as Figures 1 and 2.

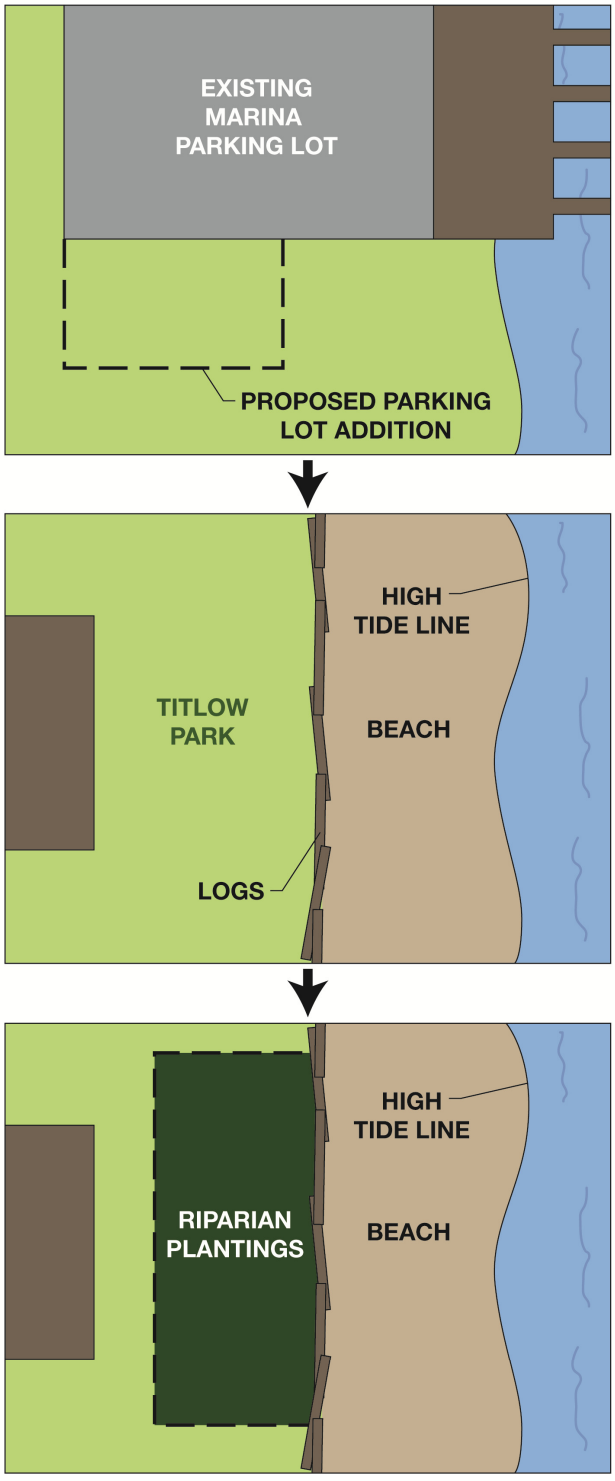
Example 1: Commercial Marina expansion along the Narrows. This commercial landowner would like to expand the marina parking lot to a grass area. Riparian habitat impacts would be determined on an areal basis as described under above. The receiving site (mitigation area) would be within the Geographic Service Area, in this case the Western Slope South Shoreline District, which could be in Titlow Park. Riparian vegetation could be enhanced through plantings of native grass, shrub and tree species and habitat improvements above the tide line in an area that is currently mowed grass edged with logs. Funds assessed for the project impact would be deposited into the fee-in-lieu program account, described above, and would be assigned to a particular location, and to on-going maintenance for attainment of the established Performance Standards.

Example 2: Redevelopment on East Foss Waterway. This landowner would like to redevelop an existing developed site within the shoreline district. "Riparian" habitat impacts would be determined on an areal basis, as described above.

The receiving site (mitigation area) within the Geographic Service Area, in this case the Port Industrial Shoreline District (S-10), could be at the Go-Le-Hi-Ti restoration site. Habitat

restoration activities have been identified for this site and are on-going. Funds assessed for the project impact would be deposited into the Fee-in-Lieu Program Account, described above, and would be assigned to a particular portion of the riparian habitat restoration and the associated on-going maintenance of the restoration in order to meet the established Performance Standards.

Figure 1. Commercial Marina Parking Expansion along the Narrows



Site Design

Marina proposes increasing marina parking lot to a grass area

Physical Impact

Riparian habitat impacts would be determined on an areal basis

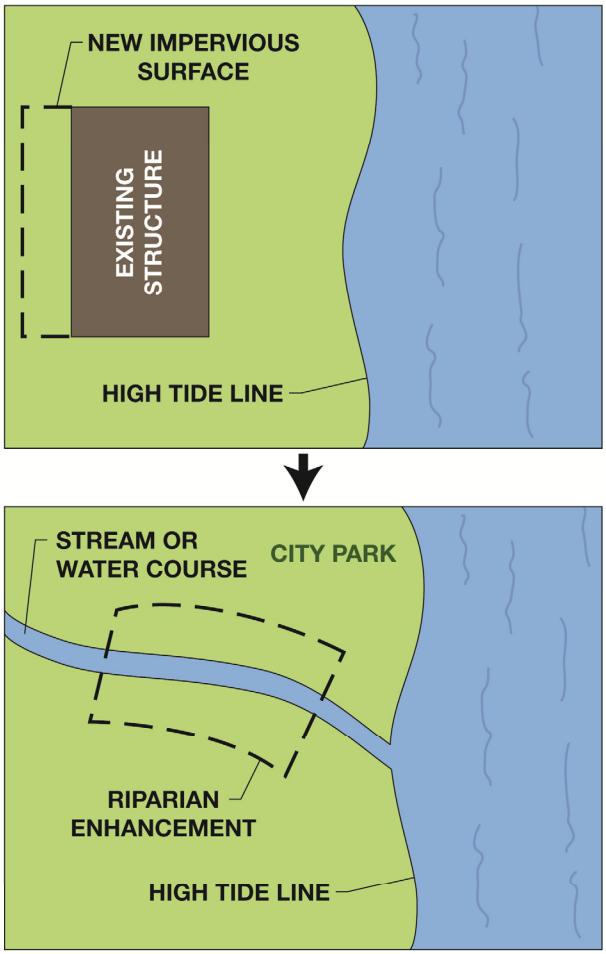
Functional Impact

Reduction of riparian habitat

Mitigation

Enhance riparian environment at 2:1 ratio to restore riparian vegetative community and wildlife habitat in Titlow Park

Figure 2. Redevelopment in Shoreline Riparian Area (No in-water work)



Site Design
Property owner proposes an expansion (square feet) within the shoreline zone with no direct impact to areas below high tide line

Physical Impact
Increase in impervious surface
Reduction in riparian habitat

Functional Impact
Reduction in water quality
Reduction in riparian habitat

Mitigation
Enhance riparian environment (square feet) within shoreline district at 2:1 ratio

4.7 Restoration Cost Estimates

The costs for performing restoration activities vary widely depending on the necessity for clearing and grading, the amount of vegetation removal or replanting, and the incorporation of habitat features such as dunes, snags, large woody debris, etc.

The following is a rough cost estimate of some restoration elements and actions. Estimated costs for restoration are based upon the King County Bond Quantity Worksheet and the RS Means Guide (2009). These costs are provided for planning purposes only and specific costs would need to be developed based upon a specific site in the City of Tacoma.

Table 1. Estimated Costs for Restoration of Shoreline Habitat

Restoration Element	Cost per Square Foot	Cost per Acre	Notes
Grading	$8 – 10	$348,500 – 435,600	Fine grading, with grader
Clearing (Mechanical)	-	$9,000 – 10,000	
Clearing (Hand Clearing Only)	$2 – 4	$87,000 – 174,000	
Upland Planting (Purchase, Installation & Establishment)	$3 - 7	$130,000 – 305,000	Highly variable; 1-5 gallon-plants
Upland Inter-planting (native elements remain)	$2 – 4	$87,000 – 174,000	Depends upon spacing
Beach Nourishment	$1 – 2	$43,500 – 87,000	Variable depending upon site
Dune Creation	$2 – 3	$87,000 – 130,000	Assumes dune height about 6 feet
Large Woody Debris (purchase and install)	-	-	$550 – 750 per piece
Snag (purchase and Installation)	-	-	$400 – 500 per piece

4.8 Conservation Easements

Following establishment of the receiving sites on City-owned properties, these areas would be protected from future development activities through conservation easements. Conservation easements are a legal agreement between a landowner and a land trust or government agency that restricts development in erosion-prone or habitat areas like shorelines. Unlike land acquisition, easements do not limit other land uses. An easement can be written to prohibit the future development of the receiving site and prohibit the removal or cutting of native vegetation. Easements are typically held in perpetuity and therefore offer future protection of the receiving area for the City's fee in-lieu program.

The City then would become the formal steward for the conservation easement areas and provide long-term maintenance and monitoring of these shoreline habitat areas. This concept is similar to the establishment of protective covenants as required for wetlands, streams and their buffers during site development.

5.0 NEXT STEPS

Based upon this review, the next steps for the establishment of a Shoreline Habitat Fee-in-Lieu Program in Tacoma would be to develop detailed habitat enhancement plans and planting plans for two or three targeted receiving sites. Once detailed plans are developed, implementation and actual construction costs can be accurately calculated for each site. Fees held in-lieu could then be applied by the City to specific phases of the habitat enhancement work based upon actual designs and planning documents for each site.

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