# Appendix B: Mitigation Options to Achieve No Net Loss for New or Re-Development Activities

## B.1 General Mitigation Standards

A. Critical area impacts will be mitigated for per Section 19.400.115 and Title 24 TCC.

B. After mitigation sequencing is applied in accordance with Section 19.400.110(A), compensatory mitigation selection for shoreline vegetation buffers shall be guided by this appendix.

C. Some projects may result in multiple types of impacts to shoreline ecological functions, each of which may require compensatory mitigation.

D. Mitigation is not required for impacts outside of the Standard Buffer. Applicable critical area, stormwater, and site planning buffers, setbacks, and mitigation sequencing standards shall still apply. See Figure B.1-1.

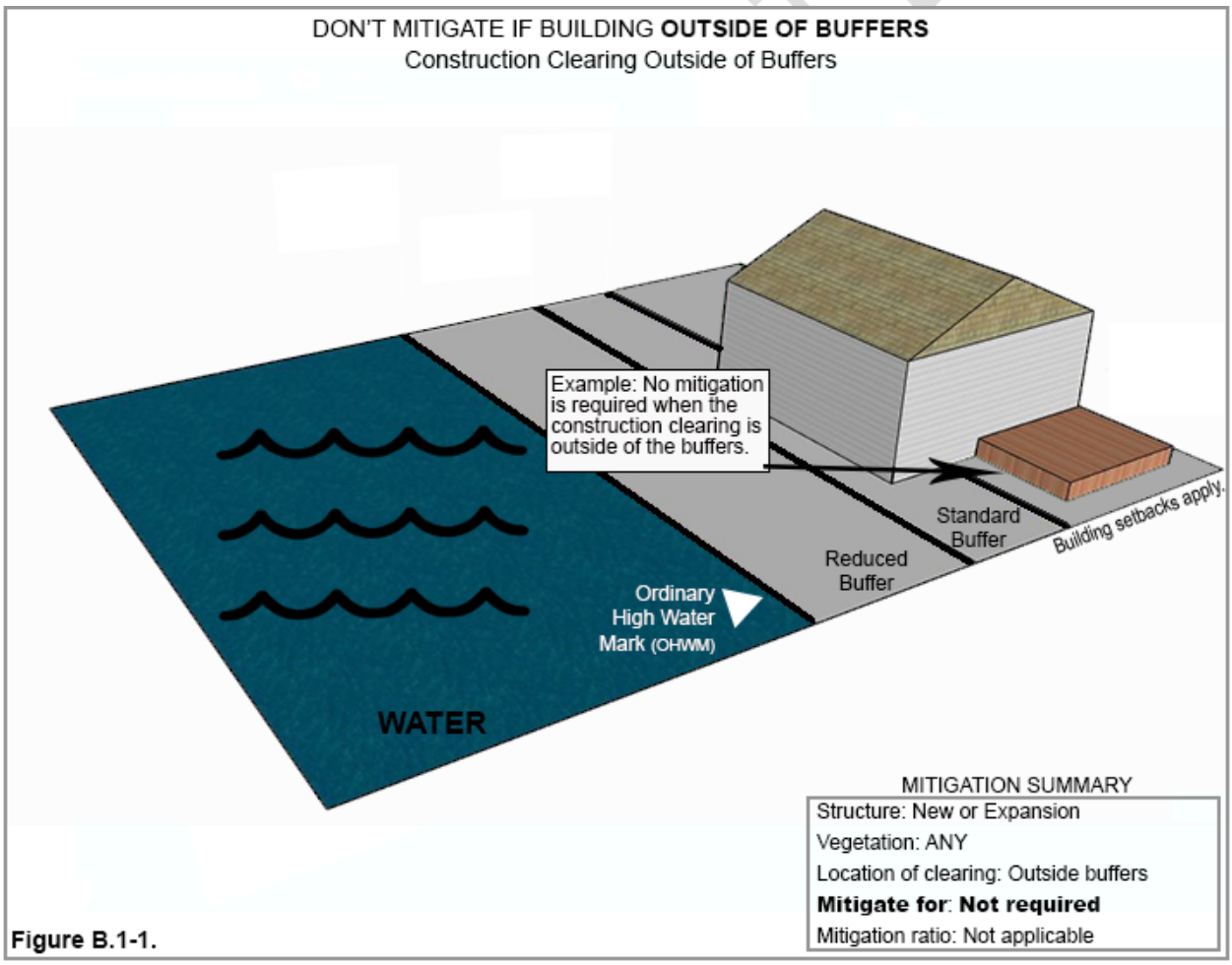



**Figure B.1-1. Clearing outside of Standard Buffer**

E. Unless otherwise specified during the agency review process, mitigation for new or re-development activity shall be ~~at a 1:1~~ based on a ratio discussed in B.2 below.

F. Where a site-specific Shoreline Mitigation Plan (see Section 19.700.140) can demonstrate no net loss of shoreline ecological functions, alternate mitigation ratios may be applied.

G. Shoreline Mitigation Plans (see Section 19.700.140) shall utilize applicable information from the *Thurston County Shoreline Inventory and Characterization* report, as supplemented with site-specific data.

H. Mitigation planting or other mitigation options shall occur adjacent and parallel to the OHWM of the shoreline as a first preference. Depending on site conditions, mitigation may be allowed away from the shoreline edge, if the actions are replacing in-kind functions and would achieve greater ecological benefit. Where demonstrated to be feasible through mitigation sequencing, this may include mitigation on adjoining upland parcels under the same ownership as the shoreline parcel requiring mitigation.

I. Based on required mitigation and mitigation sequencing in accordance with this Program, a combination of mitigation options may be utilized to achieve no net loss of shoreline ecological functions. In-kind measures are typically preferred over out-of-kind measures. See applicable sections below for preferred order of compensatory mitigation.

J. If public access is included in the development, mitigation may be reduced by up to one half, provided all other applicable provisions are met. Where this option is utilized to mitigate for impacts to ecological functions, public access projects shall incorporate measures to improve and protect ecological functions to the greatest extent feasible at the project location. This could include placement of a conservation easement on portions of the property to adequately protect ecological functions while allowing public access.

## B.2 Mitigation Standards for Specific Development Activities

A. Vegetation Clearing

| Existing Vegetation Being Removed | Mitigation Requirement Between the Standard and Reduced Standard Buffers | Mitigation Requirement Waterward of the Reduced Standard Buffer |
|---|---|---|
| Grass/Lawn (existed at least 5yrs prior to activity) | Replace ½ of the equivalent of the cleared area with native vegetation (see Figure B.2-1a) | Replace the equivalent of the cleared area with native vegetation (see Figure B.2-1d) |
| Non-Native Vegetation/Landscaping (groundcover other than lawn, shrubs, trees) | Replace the equivalent of the cleared area with native vegetation (see Figure B.2-1b) | Replace 2 times the equivalent of the cleared area with native vegetation |
| Native Vegetation (groundcover, shrubs, trees) | Replace 2 times the equivalent of the cleared area with native vegetation (see Figure B.2-1c) | Replace 4 times the equivalent of the cleared area with native vegetation |

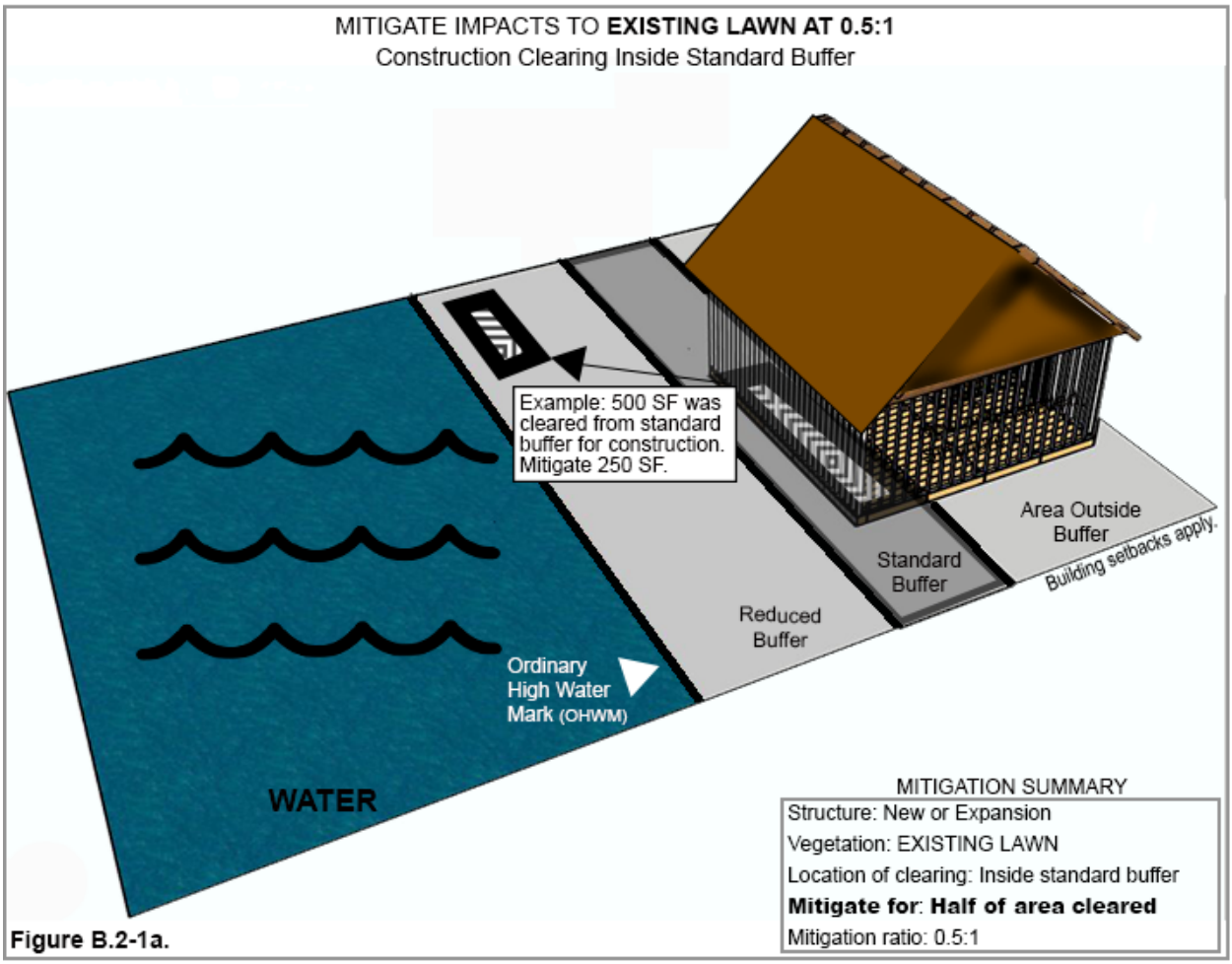



**Figure B.2-1a. Mitigation for clearing existing lawn within the Standard Buffer**

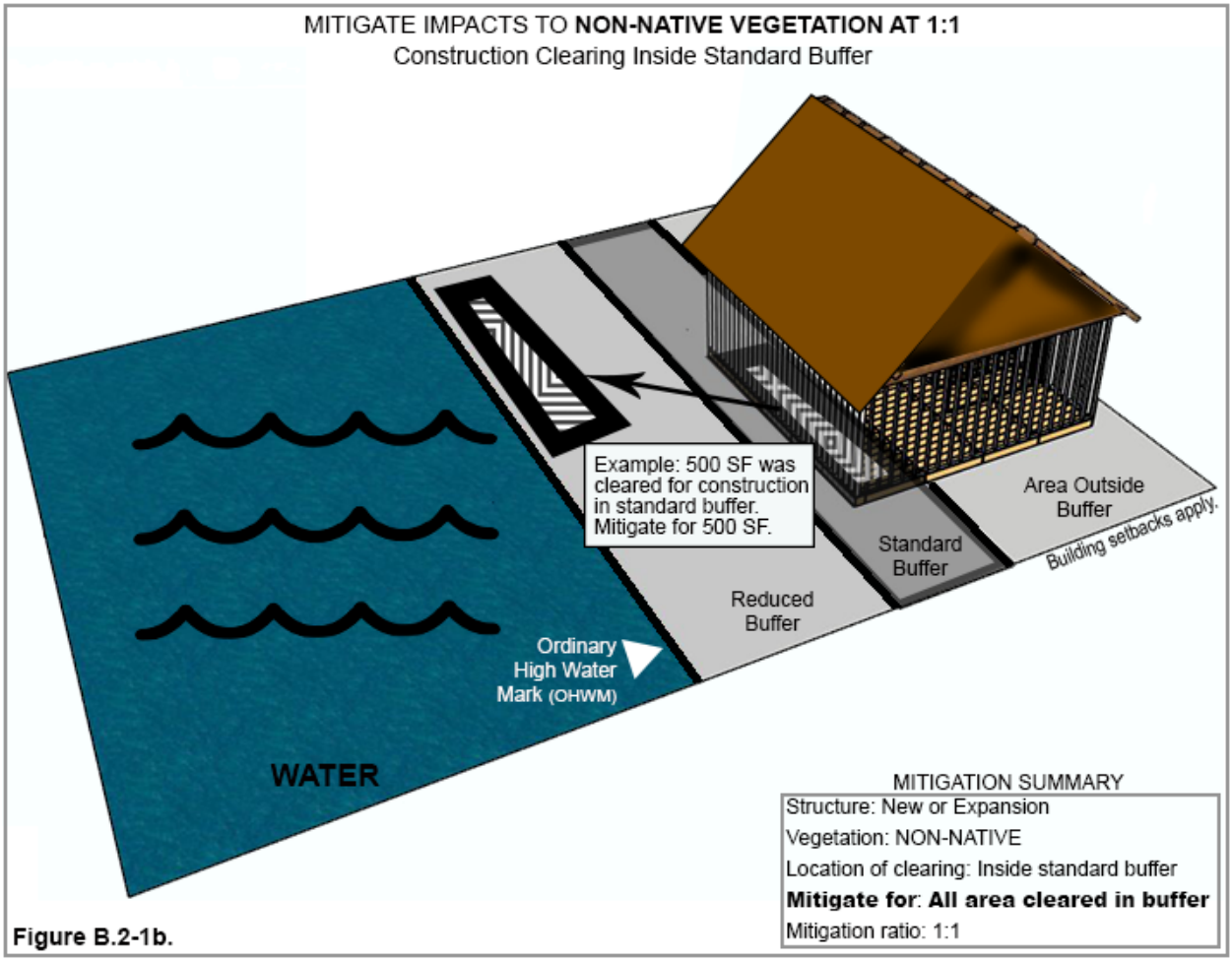



**Figure B.2-1b. Mitigation for clearing non-native vegetation within the Standard Buffer**

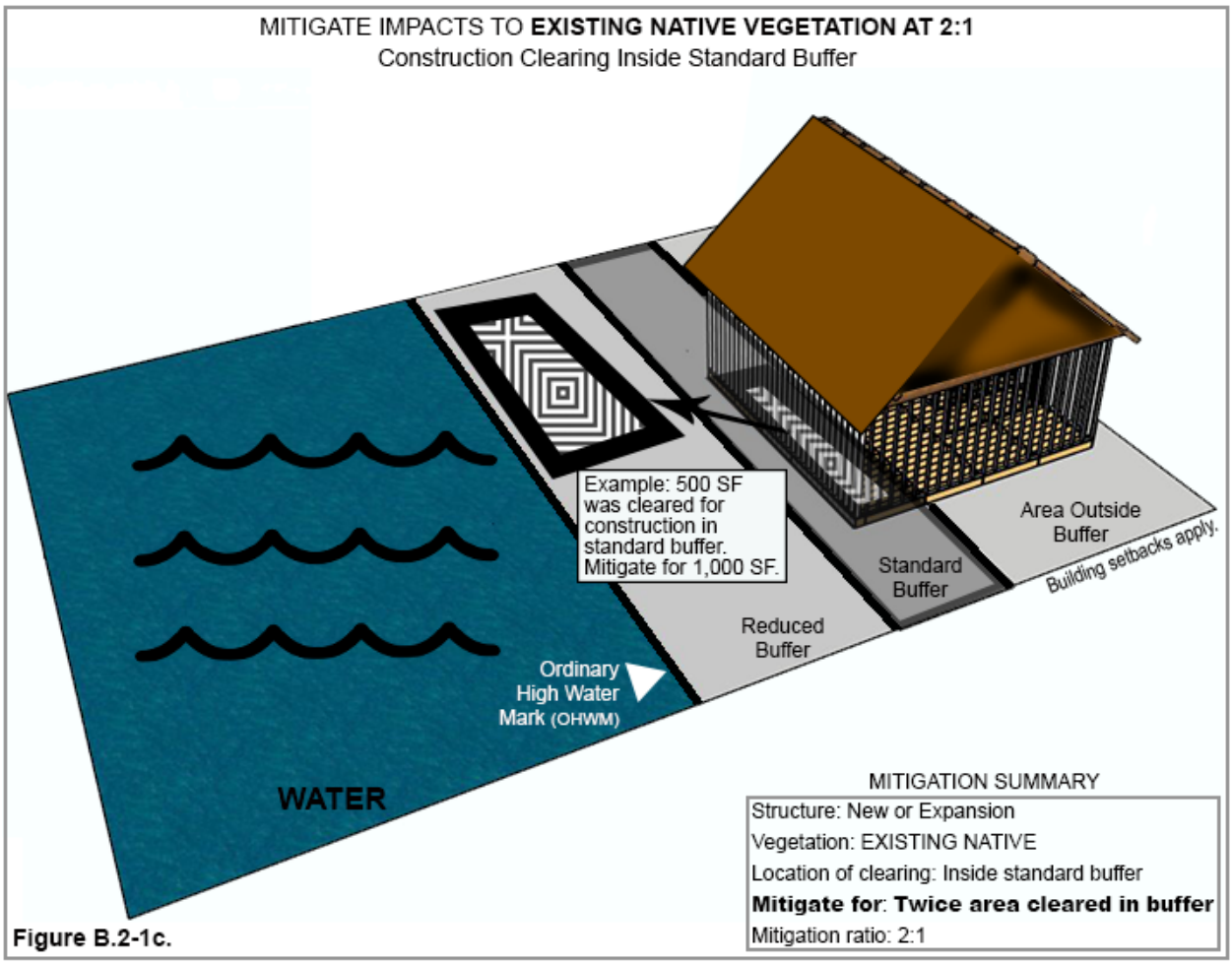
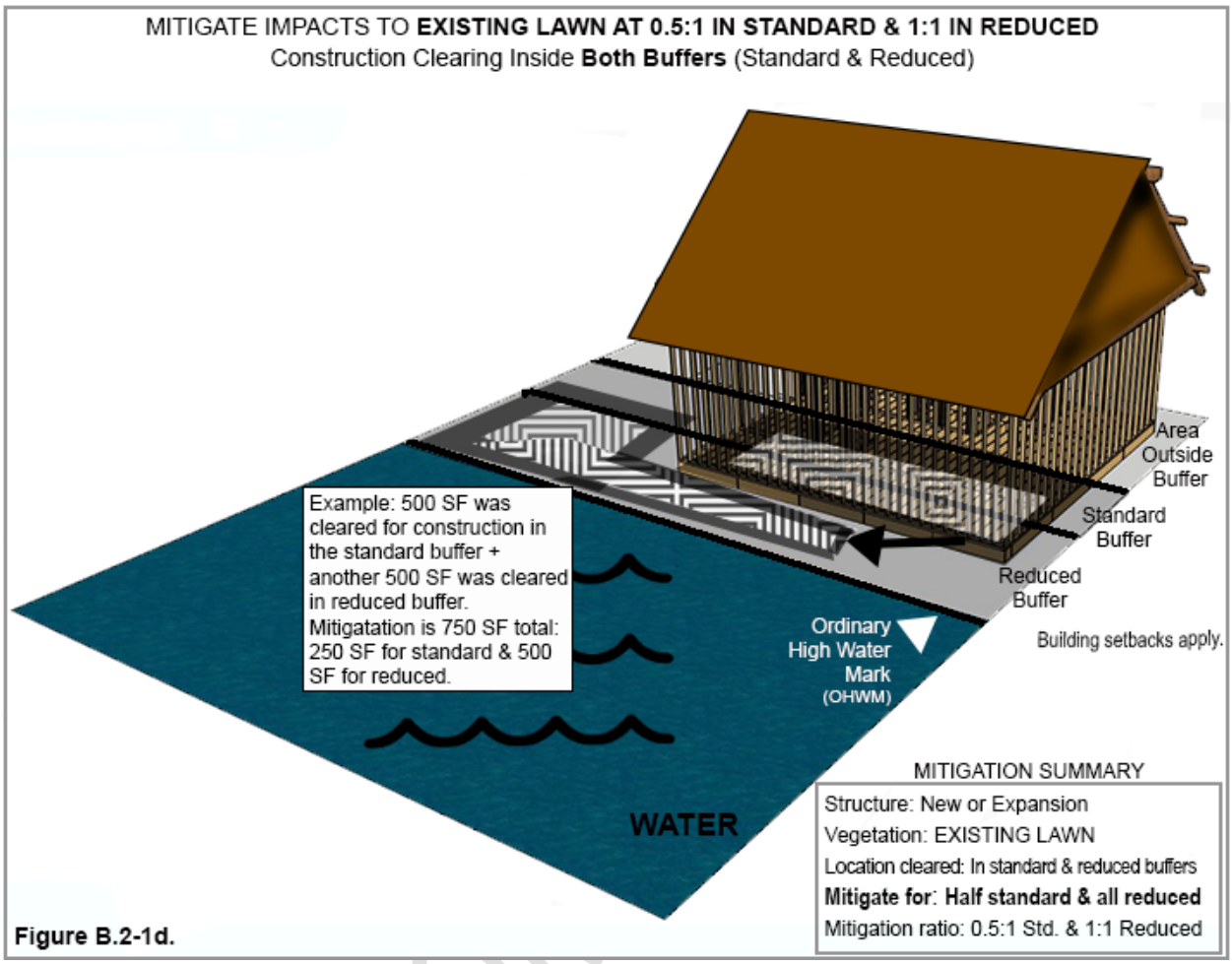



**Figure B.2-1c. Mitigation for clearing native vegetation within the Standard Buffer**




## Figure B.2-1d. Mitigation for clearing existing lawn within the Standard and Reduced Buffers

B. Alternative standards for vegetation clearing. Where it can be demonstrated that intact native vegetation outside of the required buffer provides greater ecological function than previously cleared or developed areas within the buffer, permanent retention of the intact native vegetation outside of the buffer may be allowed as an alternative, consistent with the vegetation replacement ratios listed above. Such areas may require a conservation easement and shall be recorded under a notice to title, and marked with standard buffer signage.

C. Alternative standards for impervious surface installation:

1. Decks and semi-pervious surfaces: for installation of pervious or semi-pervious surfaces such as non-solid (grated) surface decks in place of existing lawn or other non-native vegetation, pervious area may be subtracted from the above mitigation requirements.
2. Rain garden option: for new or expanded impervious surface that replaces grass, lawn or non-native landscaping, rain garden installation may be utilized in lieu of the above replanting specifications. Rain gardens shall generally be 75-100% of the new impervious surface size, depending on soil type. Rain gardens may not be appropriate in all locations due to soil type or slope. Staff shall be consulted prior to selecting this

option. For additional guidance, see *Rain Garden Handbook for Western Washington*, Washington State University Extension, 2013, now or as hereafter amended. https://fortress.wa.gov/ecy/publications/documents/1310027.pdf See Figure B.2-2.

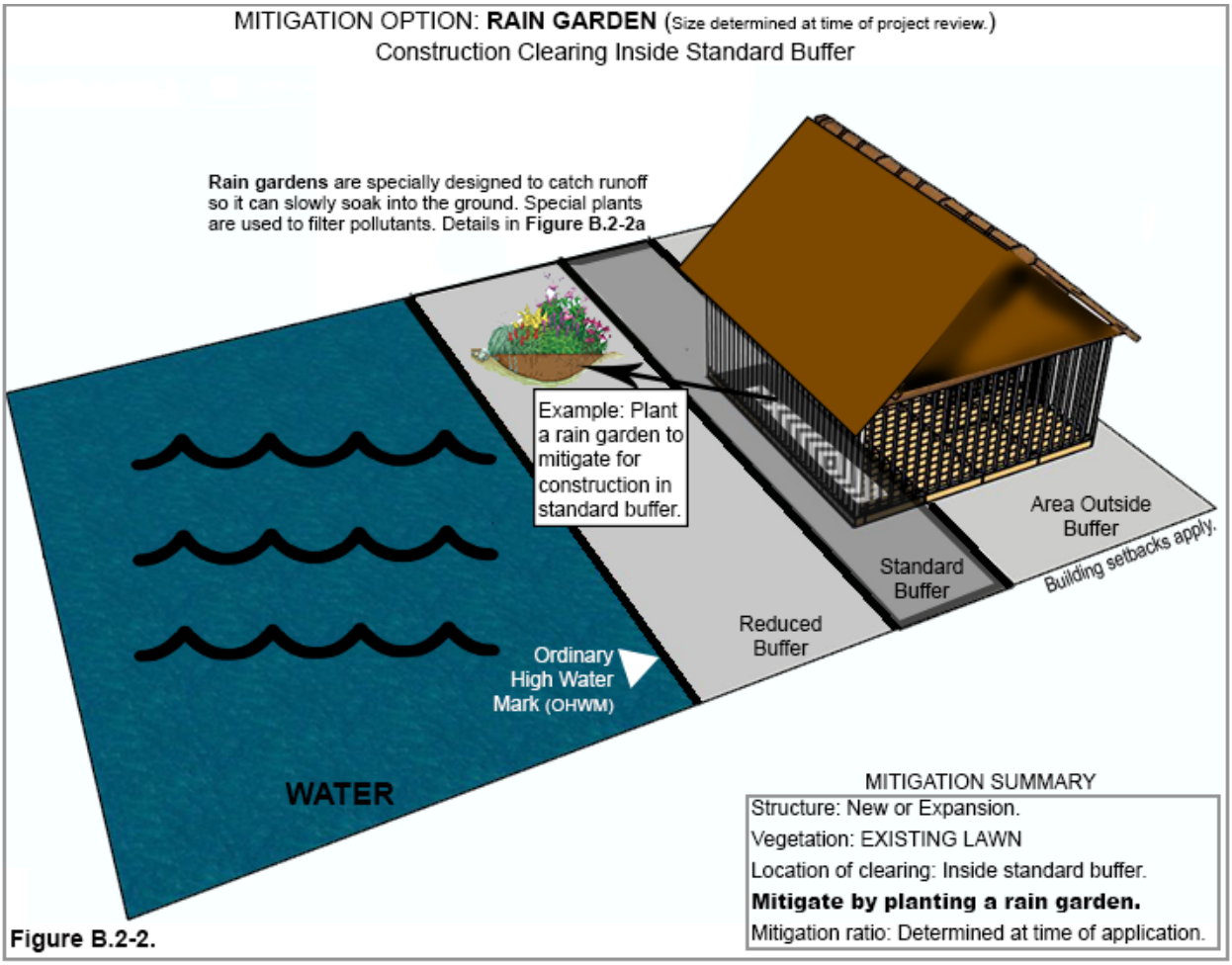



**Figure B.2-2. Mitigation using raingarden option for clearing in Standard Buffer.**

3. Impervious Surface Removal Credit: removal of impervious surface of an equivalent or greater area and replacement with vegetation may be utilized for mitigation credit at a 1:1 ratio, so long as the existing impervious surface to be removed is within the Standard or Reduced Standard Buffer. When such removal occurs outside of the Standard Buffer, a 0.5:1 ratio will be applied. See Figure B.2-3.

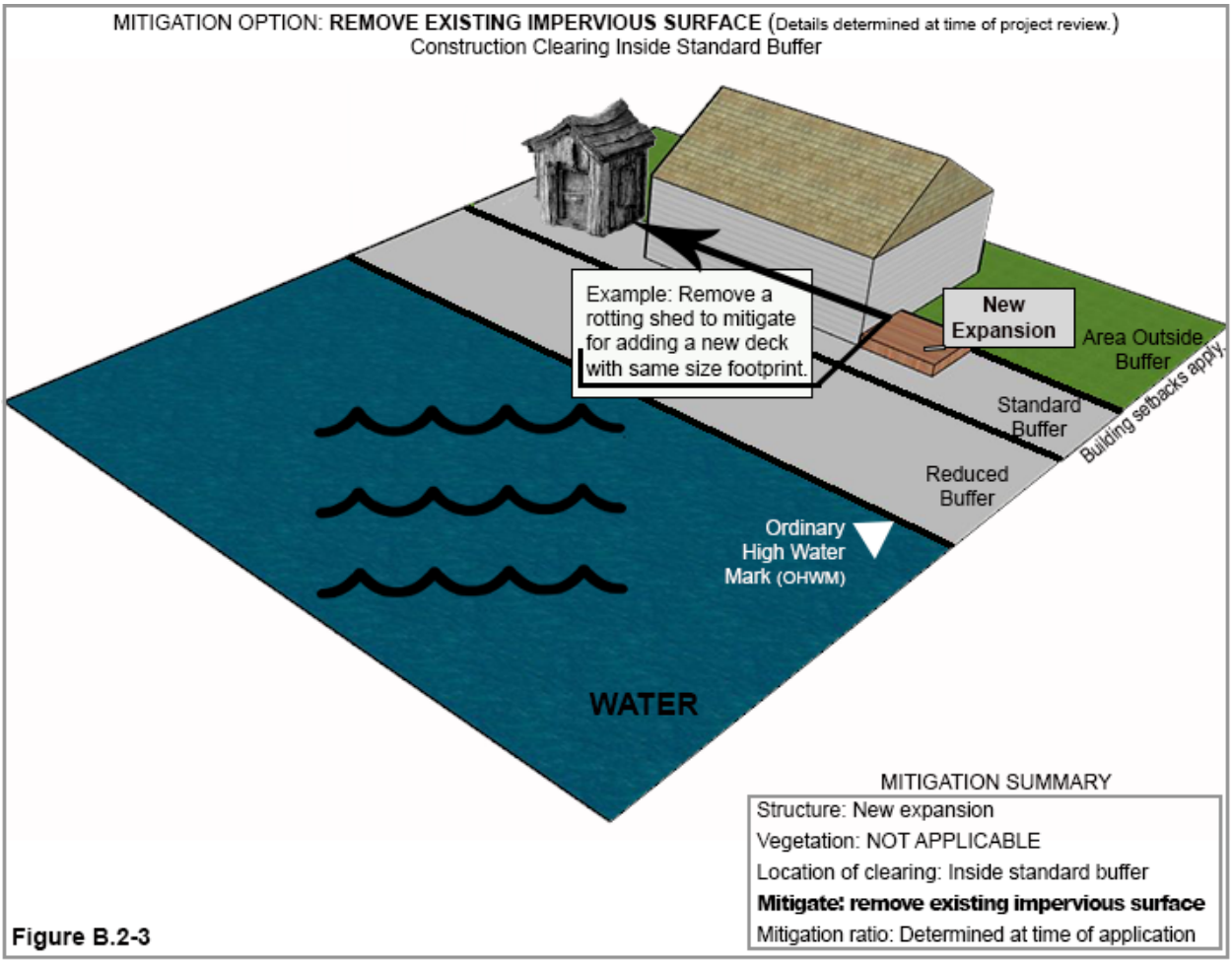



**Figure B.2-3. Mitigation using removal of impervious surface option for clearing in Standard Buffer**

4. Impervious surface installation in areas lacking vegetation: where new impervious surfaces are installed on surfaces generally lacking vegetation, such as existing parking or driving surfaces, mitigation may generally be achieved by implementing appropriate stormwater treatment methods for new impervious surface areas.

## B.3 New and Replacement Shoreline Armoring or Barrier Structures (in order of preference)

A. If new, removal of another barrier structure at a 1:1 ratio (length), or other opportunities identified in the *Thurston County Shoreline Inventory and Characterization Report*.

B. If replacement exceeds 50% of existing structure, use soft or hybrid alternative(s) such as adding logs or stumps.

C. For new or replacement:

1. Remove fill and move armoring landward.
2. Add a "pocket beach" to the design, where appropriate based on shoreline functions.
3. Add overhanging vegetation along the bulkhead edge or other portion of shoreline currently not providing such features, when other options are not available.
4. Add beach nourishment, where determined appropriate in consultation with agencies with jurisdiction and affected tribes.

## B.4 New and Replacement Overwater Structures (in order of preference)

A. For new development, remove any additional legally established existing over-water or in-water structures that are not the subject of the application and are not otherwise required to be removed because they are illegal or are the subject of a required clean-up effort.

B. For new or replacement, add site appropriate habitat features in consultation with agencies with jurisdiction.

C. For dock additions, partial dock replacements, or other modifications, replace areas of existing solid over-water cover with grated material or use grating on those altered portions of docks if they are not otherwise required to be grated.

D. Plant native vegetation along the shoreline immediately landward of the OHWM consisting of trees and/or shrubs native to Thurston County and typically found in undisturbed areas adjacent to the subject waterbody. When shoreline plantings are the only mitigation option for a given overwater proposal, the new or expanded footprint must be compensated for at a 1:1 planting area ratio with required trees planted on 10-foot centers and/or shrubs planted on 5-foot centers. Native groundcover can be supplemental to the planted shoreline area, but does not count toward the total square footage requirement.

E. Remove or ecologically improve hardened shoreline, including existing launch ramps or hard structural shoreline stabilization. Improvements may consist of softening the face and toe of the stabilization with soil, gravel and/or cobbles and incorporating vegetation or large woody debris.

F. Remove man-made debris waterward of the OHWM, such as car bodies, oil drums, concrete or asphalt debris, remnant docks, or other material detrimental to ecological functions and ecosystem-wide processes.

G. Place large woody debris if consistent with local, state and/or federal regulations.

H. Participate in an approved mitigation banking or in-lieu-fee program, after consideration of feasible, environmentally preferable on-site options.

## B.5 Alternative Mitigation Options

The following alternative mitigation options may be utilized where determined by the Director or their designee to be appropriate to achieve no net loss of ecological functions, either in combination with or in lieu of the options provided in Sections B.2 - B.4.

A. Transfer of Development Rights, if applicable (TCC 20.62)

B. Programmatic mitigation options such as mitigation banking or, in-lieu fee (if available). For Thurston County, the Thurston County In-Lieu Fee program shall be utilized.

C. Documented voluntary restoration activities which occur on the property after adoption of this Program and are not related to compensatory mitigation required by Thurston County. A mitigation report (see Chapter 19.700.110) documenting current conditions must be agreed upon by Thurston County permit reviewers before implementing the mitigation plan in order to establish baseline conditions. Mitigation credit for the voluntary restoration/enhancement activities shall be determined upon application for the proposal that requires mitigation.

D. Other options from Chapters 5-8 of the *Thurston County Shoreline Inventory and Characterization* report and Appendix C of this Program, where demonstrated that such options shall achieve no net loss of shoreline ecological functions for the proposed development activity. Such options may not be utilized if they have been specifically identified for use of public restoration funds, except where approved through a public-private partnership.

E. Other options commensurate with the level of proposed impact, as may be identified approved guidance principles for local jurisdictions that provide options to achieve no net loss of shoreline ecological functions.

# Appendix C. Shoreline Restoration Plan

## C.1 Introduction

This Restoration Plan (Plan) was prepared as an element of the Thurston County Shoreline Master Program (Program) update, as required in the Shoreline Management Act ("the Act") of 1971 and the State's Guidelines (Washington Administrative Code 173-26), adopted in 2003. This Master Program process will update Thurston County Code, Title 19 Shoreline Master Program.

This Program update contains goals, policies and regulations (development standards) that govern the use and development of the County's shorelines, including all marine waters, rivers (over 20 cfs), lakes (20 acres or greater) and their associated wetlands. The Program is designed to protect ecological functions, while accommodating appropriate uses and modifications along the shorelines. Per the State Guidelines, the Program must include a "plan for the restoration of the ecosystem-wide processes and individual ecological functions on a comprehensive basis over time."

This Plan, in conjunction with the required permit-level mitigation, will outline Thurston County's strategy for achieving no net loss of shoreline ecosystem-wide processes and functions. The restoration activities presented in this Plan include present and future regional recovery efforts and strategies which may be implemented by local, state, or federal governments; tribes; non-governmental organizations (NGOs); and private citizens.

Many of the restoration opportunities noted in this Plan may affect private property. *It is not the County's intention to require restoration on private property or to commit privately owned land for restoration purposes without the willing cooperation and participation of the affected landowners.* However, the County is eager to support and foster restoration actions on public and private lands and strongly encourages private landowners to help implement this Plan. In addition, private landowners who are required to provide mitigation for development-related impacts may wish to implement actions noted in this Plan to meet their mitigation obligations.

## C.2 Defining Restoration

A. Restoration - General

WAC 173-26-020(31) defines 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."

The State's Guidelines require that "provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program". These definitions emphasize the repair of past damage to natural resources and habitats, but not necessarily re-creating pristine or historic conditions. In addition, addressing the ecosystem processes and functions- not simply recreating the habitat or structure- is important for successful restoration.

Therefore, this Plan emphasizes restoring impaired processes and protecting those which are currently functioning. Restoration tends to go beyond maintaining the status quo; it takes steps to improve the existing conditions and resources of the shoreline.

Restoration, in the context of this plan, is non-regulatory, voluntary, and most often undertaken by public agencies, environmental stewardship groups, or local governments typically in partnership with private landowners. Protection / Preservation and Mitigation measures, while often considered under the general definition of Restoration, need to be defined separately for the purposes of this Plan and the Program.

B. Restoration and Protection

Protection / Preservation are achieved in the Program through a few avenues. First, the Environment Designations have identified the shorelines which retain, or have the potential to retain, significant ecological functions. The policies and development standards for those designations then provide increased protection of those processes and functions.

In addition to Protection / Preservation through regulatory measures, a number of voluntary actions and programs are available. These include Protection / Preservation through a private donation of a parcel or easement, and fee-simple acquisition or acquisition of a conservation easement by a land trust or government agency through various grant opportunities.

C. Restoration and Mitigation

Mitigation, in regards to the Program, is achieved primarily through the policies and development standards when followed for the individual permitted project. Mitigation is typically a required sequence of actions to offset ecological impacts by taking steps to avoid and minimize project impacts prior to compensating for them. In some cases, actions typically considered "restoration" may be an element of mitigation. However, it would not be categorized as voluntary restoration if it is a required action as part of permitted development.

D. Restoration and No Net Loss

WAC 173-26-186(8)(b) directs Shoreline Master Programs to "include policies and regulations designed to achieve no net loss of those ecological functions". Simply stated, no net loss means that, over time, the existing condition of the shoreline ecological functions should remain the same as they were when the Master Program update was implemented. This is achieved through two processes: regulatory compliance and restoration planning.

Through establishment of Environment Designations and implementation of Program policies and regulations that protect the shoreline, Thurston County should maintain shoreline ecological functions while allowing appropriate development.

However, regulation and mitigation alone may not be able to prevent all cumulative impacts to the shoreline environment. This is due primarily to on-going degradation from existing development or past actions. Unanticipated impacts from permitted or exempt activities may add to the cumulative impacts. Therefore, both protection and restoration through regulation and voluntary actions are needed to ensure that no net loss is achieved. This Plan will help identify and prioritize those voluntary actions to have the greatest benefit to shoreline ecological functions, and may also result in net improvement to those functions over time.

The Thurston County Cumulative Impacts Analysis and No Net Loss Report outlines how the Program policies, regulations and this Restoration Plan plans to achieve no net loss of shoreline ecosystem-wide processes and functions.

## C.3 Restoration Goals and Policies

The overall "Restoration and Enhancement" goal, as addressed in Chapter 19.300 (General Goals and Policies) of the Master Program, is to: "Re-establish, rehabilitate and/or otherwise improve impaired shoreline ecological functions and processes through voluntary and incentive-based public and private programs and actions that are consistent with the Shoreline Restoration Plan."

The Restoration and Enhancement section also contains the following General Polices:

A. Integrate and facilitate voluntary and incentive-based cooperative restoration and enhancement programs between local, state, and federal public agencies, tribes, non-profit organizations, and landowners to address shorelines with impaired ecological functions and/or processes.

B. Identify restoration opportunities through the *Thurston County Shoreline Inventory and Characterization Report* and authorize, coordinate and facilitate appropriate publicly and privately initiated restoration projects. This shall be accomplished through the Shoreline Restoration Plan, which addresses the following:

C. Identification of degraded areas and sites with potential for ecological restoration;

D. Restoration goals and priorities;

E. Existing and on-going projects and programs;

F. Additional projects and programs needed to achieve the restoration goals;

G. Identifying funding sources, timelines and benchmarks for implementation; and

H. Monitoring effectiveness of restoration projects.

I. Encourage and facilitate restoration and enhancement projects for PHS (WDFW, PHS Program).

J. Habitat protection and restoration project prioritization, location and design should utilize the most current, accurate and complete scientific and technical information to promote resiliency of habitats and species.

This Plan integrates the goals and policies of other, existing management efforts (see Section C.5, Existing Programs and Funding Sources) and attempts to categorize and prioritize them in a manner which will be useful to a variety of implementation or``ganizations.

## C.4 Identification of Degraded Sites with Restoration Potential

A. Resources for Identifying Potential Restoration and Protection Projects. The following resources have been, or could be, used to identify and prioritize future restoration projects.

1. Marine Project Sources. Primary sources which could be used to identify degraded areas and areas with restoration /protection potential for the marine and estuarine shoreline include:

a. *Management Measures for Protecting and Restoring the Puget Sound Nearshore" (Clancy et al., 2009)* Provides a systematic organizational framework for describing management measures that can be used to develop and

evaluate Puget Sound nearshore restoration alternatives composed of combinations of management measures applied at individual sites.

b. *Priority Habitats and Species* (PHS) (WDFW). This dataset is updated periodically to identify where important and unique habitats are located and where species of federal, state and local importance may be found. These areas should be restored and protected to the greatest extent feasible.

c. *Habitat Work Schedule* (HWS). Online database, organized according to Lead Entity Region (South Sound), which includes identified, proposed, and ongoing restoration and protection projects. Projects seeking salmon restoration funds will often first need to be identified in HWS. Projects on the Lead Entity's state-mandated Three-Year Work Plan, which are reviewed and scored by a Technical Advisory Group, are also listed in HWS.

d. *Thurston County Transportation Improvement Plan / Stormwater Improvement Plans*. These annually updated improvement plans identify and prioritize projects such as replacement or repair of undersized or fish-passage barrier culverts, and where to implement LID retrofits or restoration of floodplains for storage and habitat improvements. While the focus of the prioritization is on transportation or stormwater conveyance improvements, ecological restoration and whether or not the project has additional funding plays a role in project selection and prioritization.

e. *Puget Sound Nearshore Ecosystem Restoration Project* (PSNERP). Goal is to identify significant ecosystem problems, evaluate potential solutions, and restore and preserve critical nearshore habitat. PSNERP represents a partnership between the U.S. Army Corps of Engineers (Corps), state, local, and federal government organizations, tribes, industries, and environmental organizations. PSNERP has identified the top restoration projects for the region, some of which are in Thurston County.

2. Freshwater Project Sources. Primary sources which could be used to identify degraded areas and areas with restoration /protection potential for the freshwater shoreline include:

a. *PSNERP Puget Sound Watershed Characterization Project: Water Flow Processes* (Department of Ecology, 2010). This assessment produces a "watershed management" map showing where protection and restoration actions are more likely to succeed and will most benefit the water flow processes of the watershed. Habitat and other scored elements to follow.

b. *PHS* (WDFW). This dataset is updated periodically to identify where important and unique habitats are located and where species of federal, state and local importance may be found. These areas should be restored and protected to the greatest extent feasible.

c. *Habitat Limiting Factors Analyses* (Kerwin 1999, Haring & Konovsky 1999, Kittel 2002, and Smith & Wenger 2001). These reports, done for each Water Resource Inventory Area (WRIA), identified the current riparian conditions, health, biological attributes and the factors which are limiting the proper functioning of each mapped stream.

d. Habitat Work Schedule (*HWS).* Online database, organized according to Lead Entity Region (South Sound) which includes identified, proposed, and ongoing restoration and protection projects. Projects seeking salmon restoration funds will often need to be identified in HWS. Projects on the Lead Entity's mandatory Three-Year Work Plan, which are reviewed and scored by a Technical Advisory Group, are also listed in HWS.

e. *Thurston County Transportation Improvement Plan (TIP) / Stormwater Capital Improvement Project Plan (CIP).* These annually updated improvement plans identify and prioritize items such as replacement or repair of undersized or fish-passage barrier culverts, and where to implement LID retrofits or restoration of floodplains for storage and habitat improvements. While the focus of the prioritization is on transportation or stormwater conveyance improvements, ecological restoration and whether or not the project has additional funding plays a role in project selection and prioritization.

B. Identified Management Options for Restoration and Protection Projects.

Recommendations and options for managing marine and freshwater shorelines are provided in the following tables. The management options for managing the marine shoreline were taken from "Management Measures for Protecting and Restoring the Puget Sound Nearshore" (Clancy et al., 2009) as well as "Protecting Nearshore Habitat and Functions in Puget Sound" (EnviroVision, et al., 2010). The management options for the freshwater shorelines were taken from "Land Use Planning for Salmon, Steelhead, and Trout" (Knight, 2009) and from "Over-water Structures: Freshwater Issues" (Carrasquero, 2001). Many of the management options may be considered for more than one recommendation.

For each waterbody, readers should look at the general management recommendation outcome from the PSNERP Strategies for Nearshore Protection and Restoration in Puget Sound (Cereghino et al., 2012)(for marine waterbodies), or the Puget Sound Water Flow Characterization (Stanley et al., 2012) (for freshwater waterbodies) studies. If a general recommendation from these studies lists two categories of general recommendations, users should consider the management options for both recommendation categories. The management options listed for each general recommendation may or may not apply, depending on the specifics of each waterbody.

## Table C.4-1. General Management Recommendations and Options for Marine and Estuarine Shoreline Projects

| **General Recommendations** | **Management Options**<br>General management measures (shown with round bullets) are taken from PSNERP Technical Report 2009-01 "Management Measures for Protecting and Restoring the Puget Sound Nearshore" (Clancy et al. 2009). Definitions for these headings are provided in italics below each heading.<br>http://www.pugetsoundnearshore.org/technical_papers/mangement_measure.pdf<br><br>Specific policy options (shown with arrow bullets) are taken from "Protecting Nearshore Habitat and Functions in Puget Sound" (EnviroVision, et al. Revised 2010).<br>http://wdfw.wa.gov/publications/00047/wdfw00047.pdf<br><br>*The suggested management options listed below may also work in the other "Recommendations" categories. |
|---|---|
| **Protect**<br>Role: Protect existing resources, limit future impairment, influence human behaviors | Protect important nearshore areas for plants, animals, fish, and people<br>• Habitat Protection Policy and Regulation<br>*The long-term protection of habitats (and associated species) and habitat-forming processes through zoning, development regulations, incentive programs and other means.*<br>➢ Identify and designate critical habitat features such as forage fish spawning habitat, aquatic vegetation communities, nearshore salmon habitat, feeder bluffs, intact beaches, marine riparia-n areas, and all marine vegetation within intertidal and |

| | |
|---|---|
| | subtidal zones(including kelp, eelgrass, and wetland plants) and protect them (and their functions) under a Natural or other type of conservancy shoreline environmental designation and SMP regulations.<br>➢ Provide protected shallow water migration corridors, especially between estuaries and marine waters through shoreline designations<br>➢ Prohibit grounding of floats, rafts, docks and vessels<br>➢ Prohibit placement of overwater structures over marine vegetation<br>➢ Prohibit placing docks, piers, and mooring buoys in areas containing sensitive, unique, or high-value fish and shellfish habitat.<br>➢ Do not allow construction activity during egg deposition and incubation periods<br>• Property Acquisition and Conservation<br>*Transfer of land ownership or development rights to a conservation interest to protect and conserve resources, enable restoration or increase restoration effectiveness.*<br><br><u>Work together to ensure continued understanding and enjoyment of nearshore resources</u><br>• Public Education and Involvement<br>*Activities intended to increase public awareness of nearshore processes and threats, build support for and volunteer participation in protection and restoration efforts, and promote stewardship and responsible use of nearshore resources.* |
| **Restore**<br>Role: Exert long-lasting restorative effects on ecosystem processes, remove or prevent physical and chemical disturbances | <u>Remove debris and unneeded structures and protect the nearshore from harmful pollutants or use</u><br>• Contaminant Removal and Remediation<br>*Removal or remediation of unnatural or natural substances (e.g., heavy metals, organic compounds) harmful to the integrity or resilience of the nearshore. Pollution control, which is a source control measure, is a different measure.*<br>• Debris Removal<br>*The removal of solid waste (including wood waste) debris, and derelict or otherwise abandoned items from the nearshore.*<br>• Pollution Control<br>*Prevention, interception, collection, and/or treatment actions designed to prevent entry of pollutants into the nearshore ecosystem.*<br>• Physical exclusion<br>*Installation of exclusionary devices (fences, barriers, mooring buoys, or other devices) to direct or exclude human and/or animal use of a restoration site.*<br><br><u>Remove dikes, culverts, and fill to allow water to flow naturally to the nearshore</u><br>• Berm or Dike Removal or Modification<br>*Removal or modification of berms, dikes and other structures to restore tidal inundation to a site that was historically connected to tidal waters. Includes dike/berm breaching and complete dike/berm removal.*<br>• Groin Removal or Modification<br>*Removal or modification of groins and similar nearshore structures built on bluff-backed beaches or barrier beaches in Puget Sound.*<br>• Hydraulic Modification<br>*Modification of hydraulic conditions when existing conditions are not conducive to sustaining a more comprehensive restoration project. Hydraulic modification involves removing or modifying culverts and tide gates or creating other engineered openings in dikes, road fills, and causeways to influence salt marsh and lagoon habitat. This* |

*measure is used in managed tidal systems (as opposed to naturally maintained systems).*

- Channel Rehabilitation or Creation
  *Restoration or creation of channels in a restored tidal wetland to change water flow, provide habitat, and improve ecosystem function.*
- Topography Restoration
  *Dredging, excavation and /or filling to remove or add layers of surface material so that beaches, banks, tidal wetlands, or mudflats can be created.*

<u>Remove bulkheads from the nearshore</u>

- Armor Removal or Modification –
  *Removal, modification, or relocation of coastal erosion protection structures such as rock revetments, bulkheads, and concrete walls on bluff-backed beaches, barrier beaches, and other shorelines.*
  - Avoid and minimize shoreline armoring projects, and require proposed bulkhead rebuild projects to have a geotechnical assessment, reviewed by a qualified third party, to evaluate problems and analyze potential solutions, including the use of alternative designs (e.g., soft-shore approaches) as opposed to in-kind replacement
  - Avoid placement of shoreline armor or other structures near the beach, especially waterward of OHWM, that may result in downcutting of the beach, substrate change, or alteration of shoreline physical processes

<u>Remove or modify piers and docks</u>

- Overwater Structure Removal or Modification
  *Removal or modification of overwater structures such as piers, floats and docks to reduce shading and restore wave regimes.*
  - Avoid and minimize new over-water structures in areas inventoried as forage fish spawning
  - Require survey of intertidal and shallow subtidal areas prior to permitting any structures or activities that could impact existing beds
  - Show preference for the use of mooring buoys and shared facilities rather than individual private docks and piers
  - Minimize and limit over-water structures and require structure designs that improve light conditions (minimize shading) under these structures through design specifications (minimize width, use grating, orient north-south to minimize shading resulting from new and rebuilt structures) and minimize disturbance of the substrate including from prop wash
  - Minimize displacement of beach area by pilings or other structures by minimizing the footprint and number of pilings associated with overwater structures. Where such structures are unavoidably necessary, prohibit the use of treated wood in favor of concrete, steel, or recycled plastic
  - Eliminate grounding of boats and structures
  - Dock and piers should not be located on shallowly sloped beach areas because of the large footprint required to obtain adequate water depths for launching
  - Avoid placing docks or piers in tidal flats because these locations require very long structures
  - Place structures to perpendicularly span the shoreline spawning habitat zone

| | |
|---|---|
| | <u>Return native plants to the nearshore</u><br>• Revegetation<br>*Site preparation, planting, and maintenance to manipulate soils and vascular plant populations to supplement the natural development of native vegetation.*<br>➢ Require site surveys of existing conditions including vegetation function analysis<br>➢ Promote retaining or establishing marine riparian vegetation including large trees by requiring a vegetation conservation plan for activities impacting marine riparian vegetation<br>➢ Avoid and minimize area disturbed during nearshore construction activities by establishing standards for equipment use within riparian areas, and require replacement of native riparian or aquatic vegetation that is directly or indirectly lost through shoreline activities with native species, including long term maintenance provisions<br>➢ Require development of vegetation conservation plans, including replanting and maintenance standards focused on native species, for any project that impacts marine riparian vegetation<br>➢ Require enhancement and mitigation of marine riparian areas for expansions or redevelopment of developed areas<br><br><u>Restore important nearshore areas for plants, animals, fish, and people</u><br>• Property acquisition and Conservation<br>*Transfer of land ownership or development rights to a conservation interest to protect and conserve resources, enable restoration or increase restoration effectiveness.*<br>➢ Promote off-site mitigation to address cumulative impacts using the restoration component of the shoreline master program |
| **Enhance**<br>Role: Create/ promote structural elements (habitats) and/or mimic natural processes) | <u>Add sand and gravel to rebuild eroded beaches</u><br>• Beach Nourishment<br>*The intentional placement of sand and/or gravel on the upper portion of a beach where*<br>*historic supplies have been eliminated or reduced.*<br>• Substrate Modification<br>*The placement of materials to facilitate establishment of desired habitat features and improve ecosystem functions, structures, or processes.*<br><br><u>Create habitat for native plants and animals</u><br>• Large Wood Placement<br>*Installment of large, unmilled wood (large tree trunks with root wads, sometimes referred to as large woody debris) within the backshore or otherwise in contact with water to increase aquatic productivity and habitat complexity.*<br>• Species Habitat Enhancement<br>*Installation or creation of habitat features (sometimes specific structures) for the benefit of native species in the nearshore.*<br>➢ If tree removal is unavoidable, leave felled trees or create snags for wildlife habitat<br>➢ Require mitigation for lost habitat elements such as trees, logs, and boulders<br>• Channel Rehabilitation or Creation<br>*Restoration or creation of channels in a restored tidal wetland to change water flow, provide habitat, and improve ecosystem function.*<br><br><u>Remove nonnative plants and animals</u><br>• Invasive Species Control<br>*Eradication and control of nonnative invasive plants or animals occupying a restoration site and control measures to prevent introduction or establishment of such species after*<br>*construction is complete.* |

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| | Return native plants and animals to the nearshore<br>• Reintroduction of Native Animals<br>*Reestablishment of native animal species at a site where they existed or as replacement for lost habitat elsewhere.*<br>• Revegetation<br>*Site preparation, planting, and maintenance to manipulate soils and vascular plant populations to supplement the natural development of native vegetation.*<br>➢ Require site surveys of existing conditions including vegetation function analysis<br>➢ Promote retaining or establishing marine riparian vegetation including large trees by requiring a vegetation conservation plan for activities impacting marine riparian vegetation<br>➢ Avoid and minimize area disturbed during nearshore construction activities by establishing standards for equipment use within riparian areas, and require replacement of native riparian or aquatic vegetation that is directly or indirectly lost through shoreline activities with native species, including long term maintenance provisions<br>➢ Require development of vegetation conservation plans, including replanting and maintenance standards focused on native species, for any project that impacts marine riparian vegetation<br>➢ Require enhancement and mitigation of marine riparian areas for expansions or redevelopment of developed areas |

## TABLE C.4-2. GENERAL MANAGEMENT RECOMMENDATIONS AND OPTIONS FOR FRESHWATER SHORELINE PROJECTS

| General Recommendations | Management Options<br>*The suggested management options listed below may also work in the other "Recommendations" categories. |
|---|---|
| **Protection**<br>(High water process importance, low impairment areas)<br>• Extra care given to protecting /maintaining watershed processes | • Protect natural streambank conditions and functions, including vegetative cover, natural input of large woody debris and gravels by adopting riparian buffers (and associated building setbacks) and prohibiting bank hardening<br>• Allow no new or expanded channel stabilization projects or other river control structures in the channel migration zone, unless protecting essential facilities<br>• Retain large woody debris in streams and maintain long-term recruitment of large woody debris from riparian zones<br>• Prohibit removal, relocation, or modification of large woody debris in aquatic habitats and adjacent banks except when posing an immediate threat to public safety or critical facilities<br>• Restrict livestock access to streams and rivers to prevent streambank and vegetation degradation, channel widening and heating<br>• Prohibit new development in the 100-year floodplain<br>• Continued protection of critical areas within shoreline jurisdiction<br>• Maintain the natural sources, storage, delivery, and routing of surface water, groundwater, sediments, and nutrients<br>• Protect and promote healthy riparian areas, groundwater recharge areas, and natural storage areas<br>• Minimize nutrient and pathogen inputs to freshwater aquatic areas from animal/human waste and fertilizer<br>• Maintain septic systems<br>• Increase opportunities for land exchanges that retain or restore floodplain and delta habitats<br>• Maintain native riparian vegetation<br>• Prohibit new overwater structures<br>• Prohibit shoreline armoring |
| **Conservation**<br>(low water process importance, low impairment areas)<br>• Protect /maintain watershed processes | • Continued protection of critical areas within shoreline jurisdiction<br>• Protect natural streambank conditions and functions, including vegetative cover, natural input of large woody debris and gravels by adopting riparian buffers (and associated building setbacks) and avoiding bank hardening<br>• Allow no new or expanded channel stabilization projects or other river control structures in the channel migration zone, unless protecting essential facilities or increasing habitat through bioengineered restoration<br>• Discourage new dwelling units or expansion of existing structures within the CMZ<br>• Limit development and shoreline modifications that would result in interference with the process of channel migration that may result in a net loss of ecological functions associated with the rivers and streams<br>• Retain large woody debris in streams and maintain long-term recruitment of large woody debris from riparian zones<br>• Prohibit removal, relocation, or modification of large woody debris in aquatic habitats and adjacent banks except when posing an immediate threat to public safety or critical facilities<br>• Minimize nutrient and pathogen inputs to freshwater aquatic areas from animal/human waste and fertilizer |

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|---|---|
| | • Maintain septic systems<br>• Restrict livestock access to streams and rivers to prevent streambank and vegetation degradation, channel widening and heating<br>• Use the Low Impact Development (LID) approach and techniques to better manage stormwater for new development, redevelopment and retrofit projects. This includes: limit land clearing, retain and, where necessary, restore native vegetation and soils, minimize site disturbance and development footprints, limit impervious surfaces through use of permeable pavement or other techniques, create graded swales and rain gardens to disperse and infiltrate stormwater runoff on site, and utilize rainwater catchment for landscaping irrigation<br>• Prohibit new development in the 100-year floodplain<br>• Prohibit new dikes, levees, tide-gates, floodgates, pump stations, culverts, dams, water diversions, and other alterations to the floodplain, excepting habitat improvements such as a wider culvert for fish passage<br>• Avoid new road construction at stream and wetland crossings<br>• Maintain vegetation, limit disturbed areas, and control drainage on steep slopes.<br>• Identify opportunities for and encourage restoration of side channel habitat for salmonids as mitigation for modifying existing floodplain structures where feasible<br>• Increase opportunities for land exchanges that retain or restore floodplain and delta habitats<br>• Maintain or restore the natural sources, storage, delivery, and routing of surface water, groundwater, sediments, and nutrients<br>• Protect and promote healthy riparian areas, groundwater recharge areas, and natural storage areas<br>• Minimize and control runoff and soil erosion<br>• Maintain native riparian vegetation and encourage the restoration of riparian vegetation. When removal cannot be avoided, require mitigation that addresses cumulative impacts and requires replanting<br>• Remove or modify overwater structures such as piers and docks<br>• Show preference for the use of mooring buoys and shared facilities rather than individual private docks and piers<br>• Minimize and limit over-water structures and require structure designs that improve light conditions (minimize shading) under these structures through design specifications (minimize width, use grating, orient north-south to minimize shading resulting from new and rebuilt structures) and minimize disturbance of the substrate including from prop wash<br>• Minimize displacement of beach area by pilings or other structures by minimizing the footprint and number of pilings associated with overwater structures. Where such structures are unavoidably necessary, prohibit the use of treated wood in favor of concrete, steel, or recycled plastic<br>• Avoid and minimize shoreline armoring projects, and require proposed bulkhead rebuild projects to have a geotechnical assessment, reviewed by a qualified third party, to evaluate problems and analyze potential solutions, including the use of alternative designs (e.g., soft-shore approaches) as opposed to in-kind replacement. For retrofitting projects, bulkheads should be completely eliminated when possible or relocated shoreward of OHWM, and shorelines should be restored with emergent and riparian plant species<br>• Avoid placement of shoreline armor or other structures near the beach, especially waterward of OHWM, that may result in downcutting of the shoreline, substrate change, or alteration of shoreline physical processes<br>• |

| | |
|---|---|
| **Restoration**<br>(High water process importance, higher impairment areas)<br>• Restoration of watershed processes should be high priority | • Limit impervious areas<br>• Repair faulty septic systems<br>• Minimize nutrient and pathogen inputs to freshwater aquatic areas from animal/human waste and fertilizer<br>• Coordinate restoration plans with salmonid recovery and watershed management plans, water clean-up plans for TMDLs, stormwater management programs, and with stormwater basin plans where they have been developed<br>• Restore the natural sources, storage, delivery, and routing of surface water, groundwater, sediments, and nutrients<br>• Restore natural streambank conditions and functions, including vegetative cover, natural input of large woody debris and gravels by adopting riparian buffers (and associated building setbacks) and avoiding bank hardening<br>• Plan for and facilitate removal of artificial restrictions to natural channel migration, restoration of off channel hydrological connections and return river processes to a more natural state where feasible and appropriate<br>• Restore natural channel morphology<br>• Increase opportunities for land exchanges that retain or restore floodplain and delta habitats<br>• Encourage the removal or relocation of structures within the channel migration zone to facilitate the natural recovery of channel migration processes<br>• Remove human-made barriers to salmonid migration, such as blocking culverts and tide gates<br>• Identify opportunities for and encourage restoration of side channel habitat for salmonids as mitigation for modifying existing floodplain structures where feasible<br>• Support the removal and control of noxious weeds<br>• Maintain native riparian vegetation and encourage the restoration of degraded riparian vegetation. When removal cannot be avoided, require mitigation that addresses cumulative impacts and requires replanting.<br>• Close unnecessary roads<br>• Minimize and control runoff and soil erosion<br>• Use the Low Impact Development (LID) approach and techniques to better manage stormwater for new development, redevelopment and retrofit projects. This includes: limit land clearing, retain and, where necessary, restore native vegetation and soils, minimize site disturbance and development footprints, limit impervious surfaces through use of permeable pavement or other techniques, create graded swales and rain gardens to disperse and infiltrate stormwater runoff on site, and utilize rainwater catchment for landscaping irrigation |
| **Development**<br>(Low water process importance, higher impairment areas)<br>• Less impact to watershed processes if development occurs | • Use the Low Impact Development (LID) approach and techniques to better manage stormwater for new development, redevelopment and retrofit projects. This includes: limit land clearing, retain and, where necessary, restore native vegetation and soils, minimize site disturbance and development footprints, limit impervious surfaces through use of permeable pavement or other techniques, create graded swales and rain gardens to disperse and infiltrate stormwater runoff on site, and utilize rainwater catchment for landscaping irrigation. |

C. Voluntary Restoration on Private Lands

Most of the shoreline of Thurston County is owned by private individuals or organizations. Often private property owners can serve as the best stewards for their land. Public outreach and education on voluntary restoration options will be very important to the success of this Plan. As stated above, this Restoration Plan is a non-regulatory and voluntary program which all willing partners may draw from to improve habitat and existing conditions along the shoreline. Private property owners may also use the resources listed in Subsections C.4.A.1 and C.4.A.2 to identify what types of projects would likely be most successful and beneficial for their stretch of shoreline.

Voluntary actions may include:

Working with public agencies, private organizations or citizen groups to restore or enhance habitat in a public park or open space
Taking actions to improve habitat on ones' own property

It is important to note that these actions may range from very small in scale (replacing invasive blackberries with native shrubs) to the large scale which would require permits and engineering (replacement of a culvert on a private road). Many of the partners and funding sources listed in Section C.5 are willing to work with private property owners on shoreline habitat restoration projects. Below are some actions and additional links to resources to help the private property owner with voluntary restoration on private lands.

1. Actions:
   Remove unused or derelict structures, including sheds, floats, boat houses, and boat launches.
   Use pervious pavement or pavers for new or remodeled patios, walkways or driveways;
   Implement other Low Impact Development retrofits, including the installation of a rain garden;
   Remodel docks and piers consistent with Sections 19.600.125 (Boating Facilities) and 19.600.160 (Mooring Structures and Activities) of this Master Program;
   Removing shoreline armoring or replacing hard shoreline armoring with soft-shore alternative, if feasible;
   Remove invasive plants. Common on Thurston County's shorelines are: Himalayan blackberry, ivy, knotweed, butterfly bush, and scotch broom;
   Plant appropriate native vegetation. This will vary depending on the type of shore;
   Placing habitat enhancements for priority species, for example nests for purple martins;
   Participate in one of the citizen organizations listed in Section C.5 (Existing Programs and Funding Sources) of this Plan;
   Place a portion of the property in a conservation easement or consider future donation of the property to a land trust;
   Contact the Lead Entity, local Fisheries Enhancement Group, or Conservation District for grant opportunities to pay for restoration projects on private property.
2. Additional Resources:
   *Incentives to help Meet Priority Shoreline Restoration and Protection Objectives, 2014.*
   Washington Department of Ecology- Puget Sound Shorelines, Property Owner Guides, Green Shorelines
   WSU Thurston County Extension- Native plant and noxious weed advice

D. Programmatic Restoration and Protection Actions

Certain restoration actions should be broadly and comprehensively implemented on a programmatic basis to help achieve restoration goals. The following programmatic actions are recommended for shorelines within Thurston County as resources and funding permits. The County department(s) or other entities that will take the lead on these actions will be determined in the future, unless otherwise specified. The Department of Community Planning and Economic Development will continue to coordinate with other County departments and active partners on restoration and programmatic activities. The funding mechanisms for these actions are mostly existing, but some have not yet been identified.

1. Education and Incentives
   - Marine and watershed education in schools
   - Stewardship - WSU Beach Watchers and Stream Stewards
   - Workshops for professionals (realtors and engineers)
   - Natural yard care outreach and materials - WSU Master Gardeners
   - Farm Plans - Thurston Conservation District
   - Septic Repair/Replacement Loan Program(s)
2. Planning
   - Stream water typing for South Sound to assist in accurate management
   - Adopt Alternative Futures model to prioritize and select restoration and protection sites; use model to monitor how well priority conservation areas have been protected and if development densities are appropriate in priority development areas
   - Complete Regional Shoreline Restoration grant (federal Environmental Protection Agency (EPA)) to identify sediment source beaches with the highest priority and feasibility for removal of hard shoreline armoring and implement removal or replacement with soft-shore alternatives
   - Cooperatively review criteria and process of road and stormwater project selection process to better align with local and regional ecosystem protection and restoration priorities.
   - Continue coordination with cities, tribes and state agencies on permit process improvements and implement an adaptive management strategy
3. Infrastructure
   - Provide the Washington Department of Natural Resources with known locations of derelict gear, structures and pilings for removal
   - Surface and Stormwater Management (SSWM) Program elements: NPDES permit, LID retrofits, culvert replacements
   - Develop rain garden program that allows appropriate engineering review; identify barriers (current program may not get reviewed by the Department's Development Engineering Division. Rain gardens installed through Thurston Conservation District program for the purposes of mitigation under the Program may not have had proper review and may not be accepted)
   - Purple pipe prioritization and linking with environmental applications (wetland or stream enhancement, aquifer recharge)
   - Identify public infrastructure and major private structures at risk due to sea level rise/ climate change impacts

## C.5 Existing Programs and Funding Sources

There are many existing government and private NGO programs and funding sources which implement the Restoration and Enhancement goals and policies of this Shoreline Master Program update. Most restoration efforts are implemented because citizens, tribes, non-government entities and local, state and

federal resource agencies collaborate to solve problems and achieve shared goals. Continued collaboration at all levels is needed if the goals of this plan are to be achieved. This section outlines both government (including tribes) and NGO programs that may be potential partners in restoration, as well as potential funding sources, again for both government and NGOs. These partners and funding sources will likely change over time.

A. Government Programs

## Table C.5-1. Existing and Potential Restoration Partners and Roles

| Organization and Program | Mission and Scope | Role in Future Restoration Efforts | Examples of Past and On-Going Restoration Projects |
|---|---|---|---|
| Thurston Co. Dept. of Community Planning & Economic Development | To enable the development of quality, affordable, structurally safe and environmentally sound communities.<br>Environmental Programs Division combines permit review with long range, environmental planning and restoration grant administration. | Coordination and planning<br>Grant administration and implementation for planning and on-the-ground restoration and protection projects | Floodplain projects, buyout programs |
| Thurston Co. Dept. of Community Planning & Economic Development Stormwater Utility | Multi-agency effort to protect water quality and reduce flooding through implementation of a variety of fee-based programs<br>Phase II Municipal Stormwater Permit (NPDES)<br>Stormwater Improvement Plan (SIP) | Stormwater studies<br>Floodplain restoration<br>Project implementation<br>Stormwater retrofits | Culvert replacement for stormwater control / fish passage<br>Stormwater education programs (Mutt Mitts, car wash alternatives, etc.)<br>Basin Planning and watershed characterizations |
| Thurston Co. Public Works- | To provide the citizens of Thurston County with quality service in the planning, maintenance and operations of public works facilities<br>Repair/replace fish passage barrier and water-restricting culverts<br>Transportation Improvement Plan (TIP) | LID retrofits<br>Fish passage barrier removal | Partners in fish passage barrier projects<br>LID retrofits<br>TCPW has completed drafting prioritized lists of culverts, road segments and bridges that should be elevated above the 100-year floodplain. Upgrade of these structures will occur on a prioritized basis as funds become available. |
| Thurston County Emergency Management Department | *To save lives, prevent injury, and protect property and the environment by taking reasonable and affordable measures to mitigate, prepare for, respond to and recover from disasters* | Comprehensive Emergency Management Plan<br>Hazards Identification and Vulnerability Analysis<br>Natural Hazards Mitigation Plan<br>Flood Hazard Management Plan<br>Geologic Risks / Landslides | ongoing work to develop updated flood risk maps of the marine coastal areas, the Deschutes Watershed and the lower Chehalis Watershed<br>Thurston County has conducted floodplain analysis for all Puget Sound drainages including Henderson Inlet, Deschutes Watershed, Totten/Eld Inlets, and the Thurston County side of the Nisqually River. This information will be used to help identify high value restoration and flood storage project opportunities. |
| Thurston Co. Public Works- Solid Waste Division | To plan, develop, and implement solid waste management programs which conserve natural resources and minimize impacts to land, water, air and climate. .strive to provide environmentally sound | Continue and expand Clean Thurston Program<br>Expand yard/food waste disposal program | Solid Waste Management Plan<br>Hazardous waste disposal program<br>Education and outreach, including yard waste on the shoreline |

| Organization and Program | Mission and Scope | Role in Future Restoration Efforts | Examples of Past and On-Going Restoration Projects |
|---|---|---|---|
| | services in the most cost-effective manner possible. | | |
| Thurston Public Health District | Striving to make Thurston County the healthiest place on the planet to live, work and play<br>Environmental Health Division: identifies and prioritizes clean-up of surface water (marine and fresh)<br>PIC Program<br>Review of appropriate OSS placement<br>Stream, Lake, and Marine (shellfish) health monitoring and reports | Continue watershed restoration/ Pollution Identification and Correction (PIC) projects<br>Education and outreach on shoreline for onsite sewage system (OSS) | Henderson Inlet Restoration Project<br>Nisqually and Henderson Inlet Shellfish Protection District- partner |
| Thurston Conservation District | Farm Plans (BMPs)<br>Voluntary Stewardship Program (VSP)<br>Rain Garden Program<br>Backyard Habitat Grants (Stream and Shoreline restoration funds for communities and individuals)<br>Lead Entity for Salmon Recovery (WA State Recreation and Conservation Office (RCO))<br>3 yr. Work Plan for Salmon Recovery | Continue implementation of VSP and Farm Conservation Plans and assistance with rain gardens<br>Work with restoration partners to prioritize watersheds/shoreline reaches to receive Backyard Habitat Grant<br>Continued coordination of salmon and ecosystem recovery | Develop, plan and cost share for Farm Conservation Plans<br>Technical assistance with rain gardens<br>Invasive species removal; restoration of stream channels<br>Backyard Habitat Grant Implementation |
| Thurston Co. Parks and Recreation Department | Providing quality-of-life enhancing opportunities through the management of natural areas and specialized facilities, fostering community stewardship, and offering an outstanding service-oriented environment | Develop better coordination among CPED, Parks and land trust organizations to facilitate the planning, purchase and stewardship of lands for conservation<br>Continue to support the restoration and protection priorities on TC Parks lands | Partner on conservation acquisitions<br>Provided support for restoration projects on public lands, including demonstration sites for LID and bulkhead removal |
| Washington State Parks | To be premier destinations of uncommon quality, including state and regionally significant natural, cultural, historical and recreational resources that are outstanding for the experience, health, enjoyment and learning of all people. | Provide public lands as demonstration sites for LID, bulkhead removal or alternative restoration or mitigation techniques for overwater structures<br>Implement restoration and conservation measures as outlined in official Park Plans | Restoration demonstration projects on public lands |
| WSU Thurston Extension | Beach Watchers- work to *improve, maintain and protect a thriving Puget Sound ecosystem through education, community outreach, stewardship, and research*<br>Stream Stewards- training volunteers to work on upland and stream riparian restoration projects<br>Noxious Weed Control Program- to educate county residents, property owners and managers to be responsible stewards of the land and resources of Thurston County by protecting and preserving all | Partner with other entities working on restoration projects to provide public education and guidance<br>Provide an educated volunteer base for restoration project managers to draw from<br>Provide technical and professional expertise to entities conducting restoration projects for watersheds or drift cells | Beach Watchers-over 6,000 hrs. of volunteer service each year for shoreline education, outreach and research<br>Noxious Weed Program- prevention, education and technical assistance; grant implementation for Knotweed Removal<br>Stream Stewards- provided educational workshop, WaterCourses; Salmon Stewards<br>Forest Stewardship- Planning courses |

| Organization and Program | Mission and Scope | Role in Future Restoration Efforts | Examples of Past and On-Going Restoration Projects |
|---|---|---|---|
| | lands and natural resources of the county from the degrading impact of invasive noxious weeds.<br>Forest Stewardship- an educational program for private non-industrial forest land owners. Property owners with 5 acres or more of forested property are eligible to enroll their property with the Washington State Department of Natural Resources Forest Stewardship Program. | Utilize the forest stewardship program to approach priority forested shoreline reaches | |
| University of Washington Sea Grant | Research and Education | Assist with/ implement shoreline landowner and professional workshops and training | Interpretive signs<br>Workshops for the public and professionals<br>Aquatic Invasive Species outreach and research<br>Geoduck Aquaculture research |
| Alliance for a Healthy South Sound (AHSS) | To support the coordinated and collaborative decision-making aimed at restoring and protecting the ecological and socio-economic health of South Puget Sound. | The Alliance For A Healthy South Sound was created to focus on sustainability – including environmental, economic and community health, implementing a South Puget Sound workplan. The South Puget Sound workplan will identify organizational goals and measurable targets. The South Puget Sound Action Agenda profile produced by the Puget Sound Partnership is one tool that strives towards these objectives and, in addition, other tools may be developed and implemented by the organization. | Continue to implement Puget Sound Partnership Action Agenda and South Sound Strategy<br><br>http://www.healthysouthsound.org/south-sound-strategy/ |
| Washington Department of Fish and Wildlife (WDFW) | To preserve, protect and perpetuate fish, wildlife and ecosystems while providing sustainable fish and wildlife recreational and commercial opportunities. | Participate in coordination of stream-lining for restoration permitting<br>Project sponsor for restoration projects<br>Assist local governments in development of local Priority Species and Habitats | Maintains State Priority Habitats and Species List and Management Recommendations<br>Provides technical assistance to each Lead Entity<br>Project Planning and Assistance through the Aquatic Habitat Guidelines<br>HPA coordination<br>Partner in fish passage barrier and other restoration projects |
| Washington Department of Ecology (Ecology)- Shorelands and Environmental Assistance Program | Helps communities manage shorelands and wetlands<br>Primary focus is on state and local responsibilities for administering Washington state and federally-delegated laws. | Continued training for local government; support training program for realtors, geotechnical engineers for alternative armoring techniques, etc.<br>Support local watershed planning and restoration prioritization efforts | Planning grants; Coastal Wetland grants<br>Washington Conservation Corps<br>Coastal Training Program: education and training for planners<br>Public Education: Property owner guides, Green Shorelines, Puget Sound Shorelines (website) |

| Organization and Program | Mission and Scope | Role in Future Restoration Efforts | Examples of Past and On-Going Restoration Projects |
|---|---|---|---|
| | | Support permit monitoring and streamlining efforts for restoration | |
| Chehalis Tribe | Effectively manage the physical and cultural qualities of the air, water, earth, plants and wildlife, both on and off reservation, for the people of the Chehalis Tribes. | | Habitat restoration, salmon enhancement, water resources |
| Nisqually Tribe | The Nisqually people have traditionally lived off the land and rivers, sustaining our civilization through the respect and protection of our natural ecosystem. The Nisqually Department of Natural Resources maintains these pristine native lands and waterways important to the survival of fish, plants and wildlife, and in turn our cultural heritage.<br><br>… | | Habitat restoration, Salmon enhancement, shellfish management |
| Squaxin Island Tribe | To maintain a leadership role in perpetuating natural resources including water quality, fish, shellfish, wildlife, timber and plants, while promoting, preserving, protecting and restoring habitat. Mother Earth and her resources are the cultural foundation for the people of Squaxin Island. | The Squaxin Island Tribe is a historic steward and a conscientious co-manager and protector of natural resources, working in cooperation with numerous federal, state and county government agencies and organizations. | Habitat restoration, net pen wild-stock coho enhancement |

## Table C.5-2. Government Funding Sources

| Agency | Grant or Fee Name |
|---|---|
| Washington State Recreation and Conservation Office / WDFW | Estuary and Salmon Restoration Program (ESRP) Grants |
| Washington State Recreation and Conservation Office | Salmon Recovery Funding Board Grants |
| | Family Forest Fish Passage Program (FFFPP) |
| | Land and Water Conservation Fund (LWCF) |
| | Washington Wildlife Recreation Program |
| WA Dept. of Fish and Wildlife | Aquatic Lands Enhancement Account (ALEA) Grants |
| | Landowner Incentive Program |
| Thurston Conservation District/SSWM | Backyard Habitat Grants |
| | SSWM Fee |
| Washington Department of Ecology | Coastal Protection Fund / Terry Husseman Grants |
| | Community Litter Clean-up Program |
| | Coastal Wetland Grants |
| Nisqually & Henderson Inlet Shellfish Protection Districts | Shellfish Protection District Fee |
| Thurston County Public Works- Roads | Property Tax ~~(~13% to Roads)~~, and State Gas Tax |
| Environmental Protection Agency | Puget Sound Watershed Management Assistance Program |
| | Watershed Management Assistance Program Grants |
| | Targeted Watershed Grants |
| Various | Compensatory Mitigation or In-Lieu Fee (ILF) Program(s) |

B. Private and Non-Government Organization Programs

## Table C.5-3. Existing and Potential Restoration Partners and Roles

| Organization and Program | Mission and Scope | Role in Future Restoration Efforts | Examples of Restoration Projects |
|---|---|---|---|
| Capitol Land Trust | Our goal is to ensure that our region is a place with clean water to drink and clean air to breathe; a place with healthy populations of native fish and wildlife; a place where the economy is robust, sustainable, and stronger because people want to live and work here; a place where the natural environment inspires curiosity and hope for the people who live here;.<br>Conserve pristine shorelines, critical salmon streams, evergreen forests, and wildlife-rich wetlands throughout Thurston, Mason, and Pierce counties, Washington | Work with and educate communities in priority conservation and restoration watersheds<br>Restoration and protection sponsor<br>Partner in management of receiving sites for ILF or transfer of development right (TDR) programs | Conserved 71 properties<br>Over 6000 acres protected with conservation easements<br>Nearly 14 miles of Puget Sound shoreline protected<br>Streams and Estuaries Initiative |
| The Mountaineers | Outdoor club dedicated to the principles of preserving, protecting and enjoying the outdoors. | Create on outdoor environmental learning center (Rhododendron Learning Center)<br>Continue acquisition and preservation of the Chico Watershed | Salmon Safari (youth environmental education program) |
| South Sound Salmon Enhancement Group | Non-profit organization that works with communities to maximize self-sustaining salmon populations. In Pierce, Mason and Thurston Counties, they work cooperatively with private landowners, agencies, tribes and others to identify, design and implement projects that improve salmon habitat. | Project sponsor for on-the-ground restoration projects or project design within the South Sound Action Area<br>Partner in cooperative effort to stream-line restoration permitting and project monitoring efforts | JARPA sponsorships (permit streamlining assistance for qualified projects)<br>Smolt traps<br>Bank stabilization; in-stream habitat enhancement; floodplain reconnection; design |
| Wild Fish Conservancy-Northwest | Through science, education, and advocacy, Wild Fish Conservancy promotes technically and socially responsible habitat, fisheries, and hatchery management to better sustain the region's wild-fish heritage. | Continue water-type assessments for priority watersheds; Begin water-type assessments for Hood Canal<br>Potential partner for on-the-ground restoration projects | West Sound Water-Type Assessments<br>Floodplain and Estuary Restorations<br>Diversity and distribution studies<br>Fish passage projects |
| Washington State Parks Foundation | A private, nonprofit organization to gather financial support for state parks improvement projects and programs<br>Enriches our state parks by improving recreational and educational opportunities and protecting natural, cultural and historic resources. | Support local community efforts to improve or restore State Parks in Thurston County | Provides funding for habitat restoration and protection projects, including revegetation, interpretive signs, and habitat restoration |
| Local Schools (K-12) | To provide education to youth | Wild-stock salmon supplementation projects<br>Continue efforts on shoreline ecosystem education, volunteer clean-ups and advocacy | Various student clubs and organizations supply ideas and volunteer hours towards restoration planting and other efforts<br>Stream Adoption |

| Organization and Program | Mission and Scope | Role in Future Restoration Efforts | Examples of Restoration Projects |
|---|---|---|---|
| Various homeowners associations | Varies;<br>Neighborhoods with specific guidelines;<br>a corporation formed by a real-estate developer and transferred to the homebuyers | Discuss and brainstorm potential community restoration projects at meetings<br>Sponsor a project or partner with a local agency on a project (armoring removal, estuary restoration, etc.) | Have sponsored Mutt Mitts, community restoration grants, noxious weed removal, educational public beach walks, etc. |

## Table C.5-4. Private and NGO Funding Sources

| Agency | Grant Name or Type |
|---|---|
| Bullitt Foundation | Bullitt Foundation Environmental Grants: Aquatic Ecosystems |
| The Burning Foundation | Grants to protect threatened rivers and forests, native fish populations, open space |
| Charles A. and Anne Morrow Lindbergh Foundation | Grants for conservation of natural resources |
| The Field's Pond Foundation | Grants for community-based conservation organizations that serve to increase environmental awareness by involving local residents in conservation issues |
| FishAmerica Foundation | Grant for projects designed to enhance fish populations such as habitat enhancement and water quality improvement projects |
| The Konsgaard - Goldman Foundation | Grants for habitat protection and restoration formation of watershed councils, citizen involvement, public education and sustainable development |
| Mountaineers Foundation | Grant to support: (1) studies that will yield new data aimed at protecting Northwest wilderness and wildlife, (2) biologic, economic, legal, or policy studies, and (3) direct educational programs and materials related to environmental preservation. They also fund selected capital improvement projects (e.g., restoration and assistance in purchasing equipment/materials) |
| National Fish and Wildlife Foundation | Provides funding on a competitive basis to projects that sustain, restore and enhance the Nation's fish, wildlife, plants and their habitats through *Keystone Initiative Grants* and other *Special Grant Programs* (including the *Community Salmon Fund* and the *Pioneers in Conservation grant*) |
| The Northwest Fund for the Environment | Grants for environmental purposes, including grants for stewardship programs, action plans, strategic litigation, and capacity building for conservation organizations. It also gives grants for protection of wildlife habitats, water quality, sustainable forestry, and shoreline and wetland environments |
| Russell Foundation Grants | Focus on Puget Sound environmental education and green business practices |
| Wildlife Forever Challenge Grants | Targeted for habitat restoration and acquisition, research and management, and educational projects. Special emphasis is placed upon grassroots programs that involve local conservation, sportsmen's or outdoor recreation groups |
| Washington State Parks Foundation | Provides Small and Simple Grants, Individual Grants, and Program Support grants for restoration and education at Washington's State Parks |

## C.6 Implementation and Monitoring (Project and Program Effectiveness)

Based on the priorities identified in Section C.4.B of this Shoreline Restoration Plan, the following represent a best-estimate of near-term benchmarks by restoration indicator.

### Table C.6-1. Implementation Timeline

| Indicator | Near-Term Benchmarks (Up to 5 Yrs.) | Adaptive Management Options |
|---|---|---|
| Culverts Removed or Replaced | 8 | Larger projects with greatest habitat value or on Shorelines of the State should be considered when deciding if the "benchmark" was met |
| Regional Stormwater Retrofits / Drainage Improvements | 6 | |
| Riparian Area Protected (not including required buffers) | 45 acres | Includes public and private projects, excluding any riparian protection associated with mitigation used to offset permitted development |
| Riparian Area Restored, including reconnected floodplain | 45 acres | Included public and private projects, excluding any riparian restoration associated with mitigation used to offset permitted development |
| Shoreline armoring removed | 1,000 linear ft. | Or amount needed to meet "no net loss" for bulkhead installation, whichever is greater |
| 303(d) list removals | 2 | Benchmark as net-removals (3 removals, 1 added= 2 net removals) |
| Shellfish areas upgraded | 2 net upgrades (Based on Washington Dept. of Health goals) | Upgrade from "threatened" list included; benchmark as net-upgrades (4 upgrades, 2 downgrades= 2 net up-grades); upgrades for larger natural shellfish beds should be considered when deciding if the "benchmark" was met |
| Pilings / Creosote Logs Removed | 100 piles (Based on Washington Dept. of Natural Resources Creosote Removal Program numbers for Thurston 2004-2009) | Depends on coordination with the Creosote Removal Program, development of local program with similar functions, or private actions which remove a number beyond required mitigation as part of a permitted development |
| Variances Issued | N/A | Indicator only. Number and type issued to be monitored and regulations adapted to address at next update |

## C.7 Program and Funding Gaps

A. Obstacles and Challenges

1. Climate Change and Sea Level Rise. The net-sea level rise projections for South Puget Sound by-2100 range from 32"-68"( National Research Council 2012, Sea-level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future) . Such changes, coupled with more intense weather events and storm surges, are expected to bring about several challenges, including: loss of beach and marsh habitat, loss of beach access, and threats to existing structures and uses (Climate Impacts Group, 2009. The Washington Climate Change Impacts Assessment, University of Washington). As the County develops or has access to such threat analysis, steps should be taken to prioritize restoration efforts to mitigate for sea level rise impacts on ecological functions, both amongst similar projects and this Restoration Plan as a whole.
2. Permit Process for Nearshore Restoration. Currently, there is an expedited permitting process for watershed restoration activity occurring in streams and lakes. A similar expedited permit process to include restoration activity for the nearshore needs to be developed as an incentive to encourage restoration, but also to ease the work load for permit reviewers.

3. Liability. A common concern is that of liability. If a landowner agrees to a public-private cooperative restoration project or is trying a new method or technology, they often want some kind of assurance that if it fails there will be some compensation or guarantee to have it fixed. This is especially true with alternatives to bulkheads. Engineer stamps, if they are received, are often not enough reassurance.

B. Program Gaps

1. Marine Resources Committee (MRC). Many counties in Puget Sound have MRCs (RCW 36.125) to coordinate a variety of interests in order to restore and preserve our natural resources for ecological and economic reasons. Funding is often available for restoration projects entirely through MRCs. Thurston is not part of a MRC and is likely at a further disadvantage in restoration because of this.
2. Shoreline Armoring Removal and/or Funding for Alternatives. Similar to the septic loan programs available to private property owners, a program for removing unwanted or unnecessary shoreline structures is needed. Thurston County's EPA grant, Regional Shoreline Restoration Project, will provide a prioritization of sediment-source beaches and high biological function with an overlay of property owners interested in removing armoring on their property. The grant supplies funding for a very limited number of selected private properties, but no long-term solution to providing funding assistance exists. One solution to encourage alternatives to hard armoring may be to lower the property tax of the property owner for a set number of years to make up the difference in cost between hard and soft armoring methods. Another solution involves a type of bulkhead-specific in-lieu fee program. If and when on-site mitigation options are no longer beneficial, then a fee could be paid to fund bulkhead removal of a similar type, preferably in the same drift cell or on a shoreline with similar functions.
3. Parcel Advance Mitigation. A mitigation system for shorelines is lacking in general, but a system whereby if a property owner is able to demonstrate restoration on that property within 5 years prior to the proposed permit project, it may count towards mitigation for development, if the functions are similar enough. Note, however, that once the project is used towards mitigation, it ceases to be counted as restoration for the purposes of the Program.

C. Funding Gaps

1. See C.7.B Program Gaps
2. Monitoring and Enforcement. The current local funding situation does not provide for regular on-site monitoring for program effectiveness. This applies to both regulatory program effectiveness and restoration program structure. Most, if not all, restoration grants are limited in their timelines and scope. Due to this system, restoration projects either run out of funding or do not have enough time in the grant round to conduct meaningful project effectiveness monitoring.
3. Tax Incentives. Some landowners may be willing to sell the development rights to a land trust for at least a portion of their shoreline property if they could afford it. In addition to the existing Open Space Tax Incentive Program, one tax incentive may be to deduct the difference in assessed value and conservation easement sale price from the owner's property taxes a certain amount each year until the difference is made up, or in one lump sum the year the transfer occurs.

## C.8 Conclusions

The Thurston County Shoreline Restoration Plan builds on the goals and policies proposed in the Program. The Shoreline Restoration Plan provides an important non-regulatory component of the Program to ensure that shoreline functions are maintained or improved despite potential incremental losses that may occur in spite of Program regulations and mitigation actions.

The Shoreline Restoration Plan draws on multiple past planning efforts at various scales and distinct areas of focus. Site-specific projects, ongoing programs, and existing funding opportunities are identified. Many of the projects and strategies identified are focused on restoring shoreline processes where possible. The Shoreline Restoration Plan represents a long-term vision for restoration that will be implemented over time, resulting in ongoing improvement to the functions and processes in the County's marine and freshwater shorelines.

# Appendix D. Channel Migration Zone Maps

## D.1 Purpose

The Washington Department of Ecology Shorelines and Environmental Assistance Program is responsible for managing Shoreline Master Program (SMP) updates and providing technical and policy assistance to local communities. The Department of Ecology has provided the following maps of the general location of planning level channel migration zones (pCMZs) for Thurston County.

The CMZ delineations represent the "general location" because they relied on remote sensing data and did not include a detailed analysis of historic migration rates, nor did they include field verification or geotechnical assessments. These general CMZ files are intended to provide preliminary maps that comply with SMP guidelines, assist with planning, and indicate areas where additional data and analysis should be conducted to complete a more detailed delineation.

## D.2 Supplemental Information

Complete description of data and methods are available in a Department of Ecology report entitled *Draft Channel Migration Assessment, Thurston County, December 2011*.

Data in the geographic information system (GIS) files is compliant with the Draft Quality Assurance Project Plan available from the Department of Ecology.

## D.3 CMZ Draft Metadata

The following list captures the basic characteristics of the data:

Current coordinate system: NAD_1983_HARN_StatePlane_Washington_South_FIPS_4602_Feet
Projection: Lambert_Conformal_Conic
False_Easting: 1640416.666667
False_Northing: 0.000000
Central_Meridian: -120.500000
Standard_Parallel_1: 45.833333
Standard_Parallel_2: 47.333333
Latitude_Of_Origin: 45.333333
Linear Unit: Foot_US
GCS_North_American_1983_HARN
Datum: D_North_American_1983_HARN
Prime Meridian: Greenwich
Angular Unit: Degree

Planning-level channel migration zones are derived from remotely sensed data and are meant to be used for general planning purposes only. Delineating actual channel migration areas requires detailed on-site analysis and surveys that are beyond the scope of this data.

For more information, see WA Dept. of Ecology Publication #14-06-025, A Methodology for Delineating Planning-Level Channel Migration Zones.

## D.4 Shapefile Descriptions

| Shapefile | Abstract |
|---|---|
| **[Stream name]_2002_Channel** | This is the stream line traced from the Light Detection and Ranging (LiDAR) digital elevation model (DEM). |
| **[Stream name]_SMP_CMZ** | This file is part of the Washington Department of Ecology Shorelines and Environmental Assistance Program identification of channel migration zones (CMZ) in selected streams of Thurston County. The CMZ is the area along a river within which the channel(s) can be reasonably predicted to migrate over time as a result of natural and normally occurring hydrological and related processes when considered with the characteristics of the river and its surroundings [see WAC 173-26-020(7)]. The general CMZ includes the active channel corridor, the avulsion hazard areas, and the erosion hazard buffer.<br>The shapefile also includes polygons for the disconnected channel migration zone (DMA). This is the area located in the CMZ where publicly maintained man-made structures that are at least at the 100-year flood elevation restrict channel migration [see WAC 173-26-221(3)(b)]. |
| **[Stream name]_geoflag** | This file is part of the Washington Department of Ecology Shorelines and Environmental Assistance Program identification of CMZs in selected streams of Thurston County. This file describes the geotechnical setback buffer applied to CMZs where channel and terrace banks are at risk of mass wasting due to erosion of the toe of the slope. Geotechnical buffers were applied where there was an elevation difference of 25 feet between the water surface and the elevation of the CMZ. Geotechnical buffers indicate that an additional geotechnical review should be conducted in the field to determine the width of the geotechnical buffer. |
| **[Stream name]_landform** | This file is part of the Washington Department of Ecology Shorelines and Environmental Assistance Program identification of CMZ in selected streams of Thurston County. This file outlines alluvial fans, features deposited by a stream at the place where it issues from a narrow mountain or upland valley or where a tributary stream enters its junction with the main stream. An alluvial fan is a low, outspread mass of loose materials (sand, cobbles, boulders) with variable slope, shaped like an open fan or a segment of a cone. |
| **[Stream name]_features** | This file is part of the Washington Department of Ecology Shorelines and Environmental Assistance Program identification of CMZ in selected streams of Thurston County. This file includes explanation of geomorphic features and pertinent lines of evidence for the CMZ delineation. The file also includes potential inundation zones (PIZ), areas of the valley bottom that are at or below the approximate water surface elevation. These areas could be subject to inundation when there is an over-bank flood. |
| **Stream name]_reach_breaks** | This file is part of the Washington Department of Ecology Shorelines and Environmental Assistance Program identification of CMZ in selected streams of Thurston County. Streams were subdivided into geomorphic reaches for the channel migration assessment. Criteria considered when delineating reach breaks included changes in gradient, valley width, tributary inputs, channel type, land use, geology or substrate. |