Chapter 11
Vegetation Conservation, Buffers and Setbacks

Phase 3, Task 3.4
Shoreline Master Program Planning Process

Introduction

Vegetation along the shoreline provides a myriad of benefits for the water body, the upland area and shoreline residents and users. Vegetation helps to stabilize soils, which filter pollutants and fine sediments, contributing to improved water quality. Trees and shrubs provide habitat for many species and provide food for aquatic species. More stable banks reduce occurrences of landslides, damage to structures and threats to life safety.

Conserving shoreline vegetation is important to retaining these benefits. The most effective ways to conserve vegetation are shoreline buffers and setbacks. They protect shoreline ecological

Figure 11-1: Trees and vegetation along the shoreline were retained when this house was built in Kitsap County and provide a buffer between the house and the water. (Hugh Shipman photo.)

functions and help local governments achieve the no net loss standard and other requirements of Shoreline Master Program (SMP) comprehensive updates.

Buffers and setbacks with vegetation conservation support a main tenet of the Shoreline Management Act (SMA) -- "protecting against adverse effects to the public health, the land and its vegetation and wildlife, and the waters of the state and their aquatic life." The SMP Guidelines require master programs to protect the functions provided by shoreline vegetation. Vegetation conservation standards, including buffers and setbacks, should be based on local shoreline conditions. Ecology will want to see the rationale that supports your decisions. It's important to keep good records. See the SMP Handbook Chapter 18, "Integration of Critical Areas Ordinances," for information on record keeping.

This chapter briefly discusses the sensitive nature of vegetation conservation, including buffers and setbacks, for SMP updates. This chapter also covers SMP Guidelines requirements regarding vegetation conservation and the protection and restoration of buffers and setbacks from the ordinary high water mark, reviews the benefits of buffers, discusses buffer and setback widths and their relationship to local shoreline conditions, offers alternatives to standard buffers and setbacks, and recommends a process for determining buffer and setback widths.

See Ecology's Wetlands pages for information about wetlands, wetlands buffers and the wetlands ratings system.

Distinguishing between buffers and setbacks

The terms "buffers" and "setbacks" are often used interchangeably in shoreline documents, including Shoreline Master Programs. Ecology prefers to distinguish between the two, as described below.

Shoreline buffers typically are naturally vegetated areas adjacent to water bodies that protect the ecological functions of the shoreline and help to reduce the impacts of land uses on the water body, as described in the scientific literature. Buffers provide a transition between the aquatic and upland areas.

Buffers are generally recognized as a "separation zone" between a water body and a land use activity (e.g., timber harvest, commercial or residential development) to protect ecological processes, structures, and functions and mitigate the threat of a coastal hazard on human infrastructures (National Wildlife Federation 2007, referenced in *Protection of Marine Riparian Functions in Puget Sound, Washington*, June 2009.)

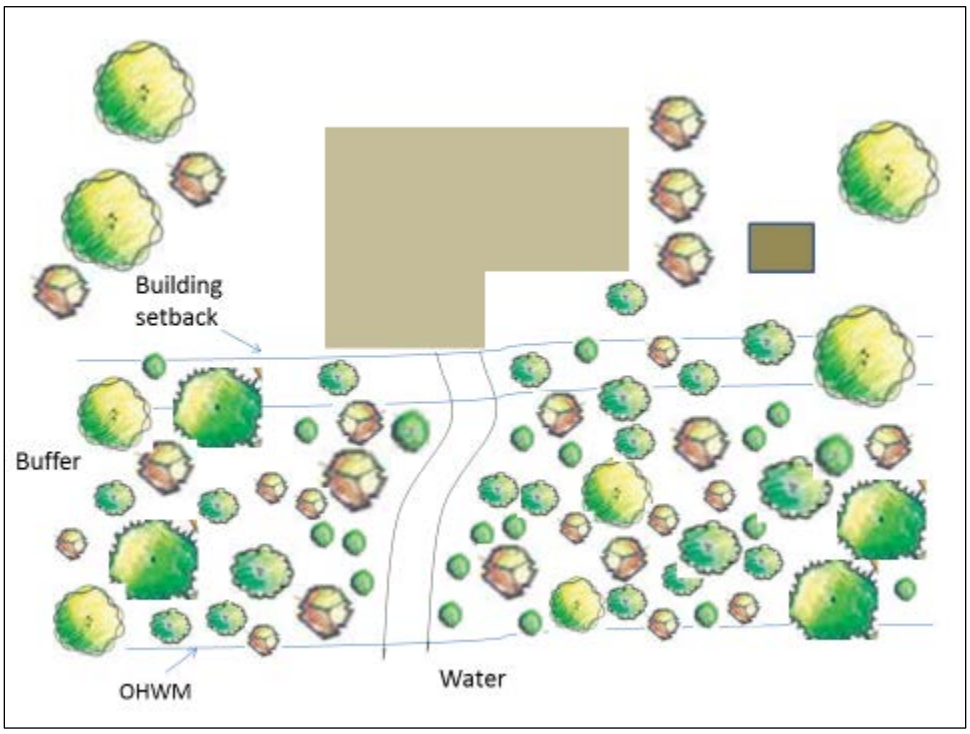

Figure 11-2: This graphic illustrates the concept of buffers and setbacks on a shoreline. The setback separates the structure from the buffer. Buffers should have a mix of trees, shrubs and groundcovers. Buffers and setbacks are measured landward from the Ordinary High Water Mark. (Items in the graphic are not to scale.)

Shoreline buffers can help to protect structures from hazards such as erosion, landslides, floods, and storm damage associated with a water body. Ideally, shoreline buffers are relatively undisturbed; uses are limited, and there are no substantial structures. A typical use is a trail leading to the water or a stairway leading down to a dock or the beach.

Shoreline setbacks are the distances separating two features such as a structure and the water, or a structure and the buffer. Natural native vegetation may or may not exist within a setback. A setback from a buffer protects the buffer from the impacts related to use of the structure, such as maintenance of a house.

Setbacks also help to assure that development is located a safe distance from bluffs, river banks, and other natural features, including buffers. Setbacks help to protect views by requiring nearby residences to be a certain distance from the water. Setbacks are measured from the landward edge of a shoreline buffer or the OHWM, or in certain circumstances, from the top of a steep bank or unstable slope. Major structures cannot be built, but some uses such as gardens or sheds may be allowed within the setback.

Some local governments with intensely developed shorelines have established only setbacks from the OHWM. Vegetation conservation is required, and planting new vegetation, replacing noxious weeds and invasive plants with native plants, and other habitat improvements are required for new or expanded development. These measures meet the requirements of the SMP Guidelines to protect ecological functions, as buffers do.

Together, buffers and setbacks protect shoreline ecological functions, provide aesthetic qualities, including views of the land from the water, and protect structures from hazards. Buffers and setbacks also provide space between development and natural shoreline processes, helping to protect structures over the long term from hazards such as wave action, flooding, erosion, and bank sloughing, lessening the need for shoreline stabilization such as bulkheads.

Critical areas ordinances will not apply

After the SMP update is approved by Ecology, the Critical Areas Ordinance (CAO) established under the Growth Management Act (GMA) will not apply within shoreline jurisdiction. Critical areas within shoreline jurisdiction still must be protected, and will be regulated by the SMP, as directed by the GMA [RCW 36.70A.480(3)(b)], with an exception discussed below. The State Legislature clarified this issue in 2010.

Therefore, you will not be able to rely on the CAO for shoreline buffers. Shoreline buffers must be established in the SMP, or the SMP must incorporate provisions of the CAO. Buffers for critical areas such as wetlands that are within shoreline jurisdiction also must be protected through the SMP. See Ecology's guidance in Chapter 18, "Integration of Critical Areas Ordinances."

Some local governments set critical areas buffers along their SMA water bodies after determining the water bodies are Fish and Wildlife Habitat Conservation Areas, which are critical areas under the GMA. These buffers developed for the CAO are a starting point but may not be adequate or appropriate shoreline buffers under the SMA for several reasons:

- Shoreline buffers must be based on shoreline ecological functions, development patterns and anticipated preferred uses discussed in the SMP and supporting documents. For example, the broader perspective of shoreline management planning of critical freshwater habitats calls for "Regulating uses and development within the stream channel, associated channel migration zone, wetlands, and the floodplain, to the extent such areas are in the shoreline jurisdictional area, as necessary to assure no net loss of ecological functions associated with the river or stream corridors, including the associated hyporheric zone, results from new development" [WAC 173-26-221(2)(C)(iv) (B)(II)]. This comprehensive approach anticipates an integration of master program provisions "to protect human health and safety and to protect and restore the corridor's ecological functions and eco-system-wide processes."

- New scientific studies conducted after the CAO was adopted may establish the need for different-sized buffers than included in the CAO. The SMP Guidelines require "the most current, accurate and complete scientific and technical information available" to be used

for development of SMPs [WAC 173-26-201(2)(a)].

- New information about the presence of critical habitats, such as kelp beds, fish spawning or holding areas, and channel migration zones, for example, must be considered when establishing buffers.

The CAO exception referred to above concerns "land necessary for buffers" that extends outside of typical shoreline jurisdiction. Local governments have statutory authority to extend shoreline jurisdiction beyond the typical 200-foot area to include "land necessary for buffers." This issue, part of the SMA-GMA interaction and an important local decision regarding shoreline jurisdiction, is discussed in depth in SMP Handbook Chapter 5, "Shoreline Jurisdiction."

Sensitive topic for SMP Updates

Establishing buffers and setbacks can be a contentious issue during SMP updates, even though setbacks, and to a lesser extent, buffers, have been included in SMPs since the 1970s. Some SMP updates have been stymied over this decision. Major issues are discussed below.

How are existing structures affected?

Establishing new buffers and setbacks may result in some existing structures being located partly or entirely within the buffer or setback. Home owners have been particularly concerned about buffers and setbacks that encompass or affect existing single family residences.

The State Legislature addressed this issue for residential structures in 2011 with an amendment to the SMA. SMPs approved by Ecology after September 1, 2011 may consider existing residential structures and their appurtenances as conforming in regard to setbacks, buffers, yards, area, bulk, height and density. This does not apply to bulkheads, shoreline modifications and overwater structures. Ecology's guidance in SMP Handbook Chapter 14, "Legally Existing Uses and Development," discusses how SMPs should address the potential for expansion and redevelopment for properties within buffers and setbacks as well as throughout shoreline jurisdiction.

Can existing structures expand?

Some property owners are concerned that updated SMPs may limit or prohibit redevelopment and expansion of structures within shoreline buffers and setbacks and discourage any new uses. The SMP Guidelines do not strictly prohibit redevelopment and expansion within buffers and setbacks. The Guidelines do require SMPs to include policies and regulations, including regulations for setbacks, buffers and vegetation conservation, that assure no net loss of ecological functions will result from development.

The SMP will regulate whether an addition to an existing house may be built, where it can be built, and what mitigation measures will be required. Mitigation measures will be required in order to offset impacts of new development and achieve the no net loss standard. Most SMPs approved by Ecology to date allow some expansion of existing houses within buffers, usually to

Figure 11-3: This Lake Sammamish shoreline in the City of Bellevue has residences close to the water's edge. Setbacks with vegetation conservation have been a contentious issue. (Washington Coastal Atlas Photo.)

the side or back, not waterward, of the existing house. A shoreline variance is usually required for building closer to the water when the existing structure is closer than the standard buffer or setback.

Are gardens and sheds "grandfathered?"

New SMP regulations are not retroactive, so legally existing uses and structures can remain in place; i.e., they are "grandfathered." Residents of some communities have said they are concerned that gardens, lawns, or sheds will have to be removed or modified if these features are within a buffer or setback.

Are existing setbacks good enough?

Many SMPs adopted in the 1970s have 25-foot to 35-foot setbacks. Residents of some cities want to know why these existing setbacks aren't good enough now. For example, in some urban areas, homes are set back an average of 80 feet or more from the ordinary high water mark, although the official setback is much less. Why not leave the setback at 25 feet, as homes are built further back from the water? Here's why the narrow setback isn't adequate:

- An SMP setback of 25 feet means that structures can be built 25 feet from the ordinary high water mark. That will not protect the existing shoreline functions where the homes are now 80 feet or more from the water. Since the 1970s when these setbacks were established, our understanding of how vegetative buffers function to protect shoreline resources such as water quality and fish and wildlife habitat has increased. For example,

the pervious surface that now exists helps to filter water, improving water quality.

- When SMPs were first adopted in the 1970s, setbacks were established largely to protect structures from erosion and effects of wind and water and to prevent new houses from blocking views. Some consideration was given to habitat, as in Conservancy environments with bigger setbacks than in Urban environments. We now know more about the value of buffers in regard to ecological functions. Recent scientific studies show that 25-foot setbacks do not protect most ecological functions and will not meet the no net loss standard of the SMP Guidelines.

- If the average setback in a residential area is 80 feet, and a new house is built only 25 feet from the water, that house will impact the buffer functions provided by the existing pervious soil and vegetation, as well as the views from houses further back. The new house may not be far enough back to be protected from erosion and storms.

Are buffers and setbacks legal?

Legal questions have also arisen during recent SMP updates. There have been some statements that a state law, RCW 82.02.020, is applicable to SMPs, and that buffers are a form of taxation. The Washington Supreme Court, in *Citizens for Rational Shoreline Planning v. Whatcom County*, ruled in 2011 that SMPs are the result of state action "and are not subject to RCW 82.02.020."

Some attorneys have also contended that buffers must be justified under the nexus and proportionality tests adopted by the U.S. Supreme Court. These tests were developed by the Court in cases involving public access easements. The tests require that a public access easement bear a direct relationship to the impacts of the project and the easement must be roughly proportional to those impacts. Since a buffer is not the same as a public access easement, Ecology's position is that these tests do not apply to buffers. However, the courts have not directly ruled on this issue.

Buffers have been established through Critical Areas Ordinances under the Growth Management Act and have been generally upheld in the courts.

SMP Guidelines

The Shoreline Master Program Guidelines [WAC 173-26] address shoreline buffers and setbacks and vegetation conservation in several sections – steps in developing a master program, environment designations, shoreline vegetation conservation and residential development. This section reviews the Guidelines requirements and provides links to the specific WAC sections.

Inventory

The Guidelines require local governments to collect information about shoreline vegetation for the shoreline inventory. This inventory information will be important for identifying existing buffer functions. See box at right.

> WAC 173-26-201(3)(c): "Local government shall, at a minimum, and to the extent such information is relevant and reasonably available, collect the following information:
>
> (i) Shoreline and adjacent land use patterns and transportation and utility facilities, including the extent of existing structures, impervious surfaces, vegetation and shoreline modifications in shoreline jurisdiction. Special attention should be paid to identification of ecologically intact blocks of upland vegetation, developed areas with largely intact riparian vegetation, water-oriented uses and related navigation, transportation and utility facilities." (Underline added.)

Ecosystem processes

The ecological functions of shoreline vegetation for streams are listed in WAC 173-26-201(3)(d)(i)(C) as including "Maintaining temperature; removing excessive nutrients and toxic compound, sediment removal and stabilization; attenuation of high stream flow energy; and provision of woody debris and other organic matter." For lakes and marine waters, the function, "attenuating wave energy," is added and "attenuation of high stream flow energy" is not listed.

Shoreline vegetation

Vegetation conservation is discussed in Section 201(3)(d)(viii), where local governments are directed to "Identify how existing shoreline vegetation provides ecological functions and determine methods to ensure protection of those functions. Identify important ecological functions that have been degraded through loss of vegetation. Consider the amount of vegetated shoreline area necessary to achieve ecological objectives."

The Guidelines acknowledge the importance of vegetation in urban areas. "…The importance of this vegetation, in terms of the ecological functions it provides, is often as great or even greater than in rural areas due to its scarcity."

Environment designations

Management policies for three of the recommended environment designations direct SMPs to address vegetation conservation:

- In the High Intensity environment, a management policy calls for maintaining natural vegetative buffers and other methods to implement aesthetic objectives [WAC 173-26-211(5)(d)].

- In the Shoreline Residential environment, a management policy requires standards including setbacks, buffers, and vegetation conservation, among others, to assure no net

loss of shoreline ecological functions [WAC 173-26-211(5)(f)].

- In the Natural environment, a management policy states that vegetation removal "that would reduce the capability of vegetation to perform normal ecological functions should not be allowed."[WAC 173-26-211(5)(a)(G)].

Vegetation conservation

The shoreline vegetation conservation section defines vegetation conservation as "activities to protect and restore vegetation along or near marine and freshwater shorelines that contribute to the ecological functions of shoreline areas" [WAC 173-26-221(5)]. These activities include "the prevention or restriction of plant clearing and earth grading, vegetation restoration, and the control of invasive weeds and nonnative species." Vegetation conservation can protect ecological functions, plant and animal species and their habitats, as well as protect human safety and property, increase the stability of river banks and coastal bluffs, reduce the need for shoreline stabilization, improve visual and aesthetic qualities of the shoreline and enhance shoreline uses.

Local governments should identify the ecological processes and functions that are important to the local shoreline, both upland and aquatic, and conserve vegetation needed to maintain those functions. The Guidelines require master programs to include policies and regulations that address vegetation conservation and restoration. Measures may include clearing and grading regulations, setbacks and buffers, critical area regulations, conditional use requirements, mitigation requirements, incentives and nonregulatory programs.

Residential development

The residential development section under Shoreline Uses directs master programs to include provisions that assure no net loss of shoreline ecological functions from residential developments [WAC 173-26-241(3)(j)]. These provisions should include regulations for setbacks and buffers and vegetation conservation requirements, among others. The Guidelines also require residential development and appurtenances to be set back from steep slopes and shorelines vulnerable to erosion so that structural improvements are not required to protect them.

Benefits of shoreline buffers

Shoreline buffers offer a variety of benefits to the natural and human-built environments. In general, buffers benefit the natural environment by protecting or improving water quality, providing habitat for wildlife, and attenuating water flow, reducing the chances of flooding and erosion.

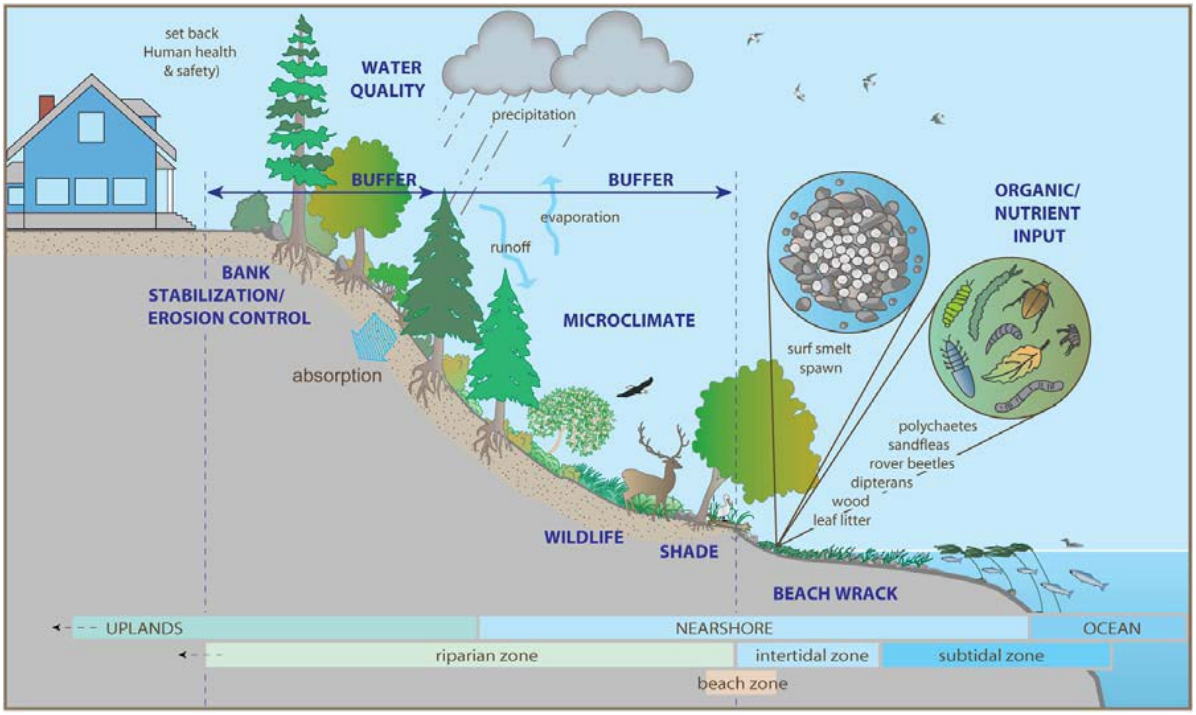

Figure 11-5. The graphic provides a conceptual model of marine riparian functions. Shoreline buffers are measured landward from the ordinary high water mark. In this graphic, the OHWM is not shown. (King County Department of Natural Resources and Parks graphic for Brennan and Culverwell, 2004.)

For the human-built environment, buffers and setbacks protect structures from damage by assuring they are a safe distance from erosive bluffs, channel migration zones, flooding, wave action and storms. Buffers and setbacks also can help protect views of the water from structures by assuring that nearby structures are adequately set back. Protecting native vegetation along the shoreline enhances property values by stabilizing slopes, screening adjacent development from view, providing attractive landscaping and habitat and blocking noise and glare from adjacent properties.

The SMP Guidelines describe the most commonly recognized functions of shoreline vegetation at WAC 173-26-221(5)(b). Setbacks and buffers are among measures that can protect ecological functions and ecosystem processes provided by vegetation along shorelines.

> In the Pacific Northwest, aquatic environments, as well as their associated upland vegetation and wetlands, provide significant habitat for a myriad of fish and wildlife species. Healthy environments for aquatic species are inseparably linked with the ecological integrity of the surrounding terrestrial ecosystem. For example, a nearly

continuous corridor of mature forest characterizes the natural riparian conditions of the Pacific Northwest. Riparian corridors along marine shorelines provide many of the same functions as their freshwater counterparts. The most commonly recognized functions of the shoreline vegetation include, but are not limited to:

• Providing shade necessary to maintain the cool temperatures required by salmonids, spawning forage fish, and other aquatic biota.

• Providing organic inputs critical for aquatic life.

• Providing food in the form of various insects and other benthic macroinvertebrates.

• Stabilizing banks, minimizing erosion, and reducing the occurrence of landslides. The roots of trees and other riparian vegetation provide the bulk of this function.

• Reducing fine sediment input into the aquatic environment through storm water retention and vegetative filtering.

• Filtering and vegetative uptake of nutrients and pollutants from ground water and surface runoff.

• Providing a source of large woody debris into the aquatic system. Large woody debris is the primary structural element that functions as a hydraulic roughness element to moderate flows. Large woody debris also serves a pool-forming function, providing critical salmonid rearing and refuge habitat. Abundant large woody debris increases aquatic diversity and stabilization.

• Regulation of microclimate in the stream-riparian and intertidal corridors.

• Providing critical wildlife habitat, including migration corridors and feeding, watering, rearing, and refugia areas.

Sustaining different individual functions requires different widths, compositions and densities of vegetation. The importance of the different functions, in turn, varies with the type of shoreline setting. For example, in forested shoreline settings, periodic recruitment of fallen trees, especially conifers, into the stream channel is an important attribute, critical to natural stream channel maintenance. Therefore, vegetated areas along streams which once supported or could in the future support mature trees should be wide enough to accomplish this periodic recruitment process.

Woody vegetation normally classed as trees may not be a natural component of plant communities in some environments, such as in arid climates and on coastal dunes. In these instances, the width of a vegetated area necessary to achieve the full suite of vegetation-related shoreline functions may not be related to vegetation height.

Figure 11-4: At Cama Beach State Park on Camano Island, shoreline vegetation provides ecological functions such as wildlife habitat, organic inputs and stabilization. (Hugh Shipman photo.)

Research on freshwater and marine areas

Research on freshwater riparian areas is relevant to marine riparian areas and vice versa. A panel of 14 scientists with expertise related to riparian ecosystems generally agreed that "findings from studies of freshwater riparian areas are transferable to marine riparian areas, although some processes and functions are unique to marine riparian areas." (*Protection of Marine Riparian Functions in Puget Sound, Washington*, Appendix H, 2009.) This document also concludes that "riparian areas provide ecological functions regardless of whether they are adjacent to freshwater or marine water bodies" (Section 1).

The functions of marine riparian and freshwater riparian areas can vary. For example, marine riparian areas and freshwater riparian areas have different relative contributions to Puget Sound water quality. "However, the marine riparian area is limited in spatial extent; that is, it constitutes a small fraction of the Puget Sound drainage basin. Most contaminants reach Puget Sound via streams or drainage networks discharging into the Puget Sound Basin, or pathways that concentrate rainfall and snowmelt from impervious surfaces associated with human residential and commercial development and transportation infrastructure." (*Protection of Marine Riparian Functions in Puget Sound, Washington*, pages 8-9.)

The Marine Riparian paper also notes differences related to shade. While shade is important to organisms in the upper intertidal area during low tide, shade is "potentially less important in moderating water temperature than shade in freshwater systems" (page 15). Marine riparian areas likely cover only a small fraction of the intertidal area. Marine riparian areas are not likely to have much effect on water temperatures of Puget Sound.

Resources on the benefits of buffers

The ecological benefits of buffers are discussed extensively in the following documents, which are briefly reviewed below. The first three documents were developed by the Aquatic Habitat Guidelines program, a partnership of state agencies, which conducted extensive reviews of the scientific literature for these documents. Ecology has participated in the development of the Aquatic Habitat Guidelines documents. The fourth document in the list was developed by the Washington Department of Fish and Wildlife.

- *Protection of Marine Riparian Functions in Puget Sound*, Washington, 2009.
- *Protecting Nearshore Habitat and Functions in Puget Sound*, 2007, revised 2010.
- *White Paper - Ecological Issues in Floodplains and Riparian Corridors*, 2001.
- *Management Recommendations for Washington's Priority Habitats: Riparian*, 1997.

Protection of Marine Riparian Functions in Puget Sound, Washington focuses on the benefits of riparian areas for seven riparian functions along marine waters: water quality, fine sediment control, shade/microclimate, large woody debris, litter fall/organic matter inputs, hydrology/slope stability and wildlife. "This document was developed to provide shoreline planners and managers with a summary of current science and management recommendations to inform protection of ecological functions of marine riparian areas… Specifically, we summarize the range of marine riparian buffer widths (Appendix G) needed to meet particular levels of ecosystem function based on a literature review and input from an expert panel workshop," according to an overview of the document available at http://wdfw.wa.gov/publications/pub.php?id=00693.

> Because much of the literature was related to freshwater riparian systems, we assembled an interdisciplinary science panel to inform the process of adapting fresh water studies to marine nearshore environments (Marine Riparian Workshop Proceedings 2008; Appendix H). (Page 4 of the document.)

Protecting Nearshore Habitat and Functions in Puget Sound provides "a synthesis of current science on several important nearshore habitats and processes, and directions for where to find data and specific recommendations for moving through the mitigation sequence; from avoidance of new activities and reducing impacts from approved activities, to mitigating for cumulative impacts. In addition to helping local planners prepare SMP updates, this document will also assist Ecology in their review to ensure that SMP updates are based on good science," according to an introduction available at http://wdfw.wa.gov/publications/pub.php?id=00047.

White Paper - Ecological Issues in Floodplains and Riparian Corridors "examines and synthesizes the literature pertaining to the current state of knowledge on the physical and biological effects of alluvial river channelization, channel confinement, and various channel and floodplain modifications. It also examines and summarizes literature on the mitigation, rehabilitation and restoration of rivers affected by these human modifications. Data gaps in our current understanding of physical and biological process, the effects of human modifications, and appropriate rehabilitation or restoration techniques are also reviewed," according to the executive summary available at http://wdfw.wa.gov/publications/pub.php?id=00058.

Management Recommendations for Washington's Priority Habitat: Riparian offers information on the riparian habitat adjacent to streams, seeps and springs and recommends Riparian Habitat Area widths for areas with typed and non-typed streams. "Riparian areas contain elements of both aquatic and terrestrial ecosystems which mutually influence each other and occur as transitions between aquatic and upland habitats, according to the Executive Summary found at http://wdfw.wa.gov/publications/pub.php?id=00029. The report states that about 85 percent of Washington's terrestrial species use riparian habitat, with the density of wildlife in riparian areas "comparatively high."

Buffer width in the scientific literature

According to the scientific literature, the buffer widths to protect shoreline ecological functions vary according to the parameter observed and the site conditions of the study. Scientific studies typically include observations of **undisturbed areas** when considering the effectiveness of buffers and report a specific distance to protect function or percentage of a function. For example, studies report a 102-foot stream buffer width for 40% contaminant removal or 167-foot stream buffer width for 84% contaminant removal. Applying the scientific information to local shoreline conditions is discussed in the next section.

The *Marine Riparian Functions* document provides buffer widths for general shorelines for the seven functions reviewed in Appendix G. The document reviews buffer width ranges, including the smallest and largest buffers needed to achieve 80% effectiveness. Effectiveness indicates how much of the particular function would be preserved. The document uses 80% effectiveness because most of the studies can be summarized at this level.

Appendix G also provides an average buffer width needed to achieve 80% effectiveness, based on the literature reviewed. Finally, the appendix also provides minimum buffer widths to achieve greater than or equal to 80% effectiveness, according to curves developed by FEMAT, the Forest Ecosystem Management Assessment Team. The effectiveness curves were first developed in 1993 to depict the relationship between ecological functions and the width of mature riparian forests along a generalized shorelines. The science panel working on the *Marine Riparian Functions* document adapted the FEMAT style curves for the marine environment.
For example, for water quality, the buffer widths that would achieve greater than or equal to 80% effectiveness are:

- Buffer width range of 16 feet to 1,920 feet for 80% removal, depending on the water quality parameters.
- Average of all literature – 358 feet to achieve greater than or equal to 80% effectiveness.
- FEMAT curve minimum buffer width to achieve 80% effectiveness – 82 feet for sediment and 197 feet for nitrogen.

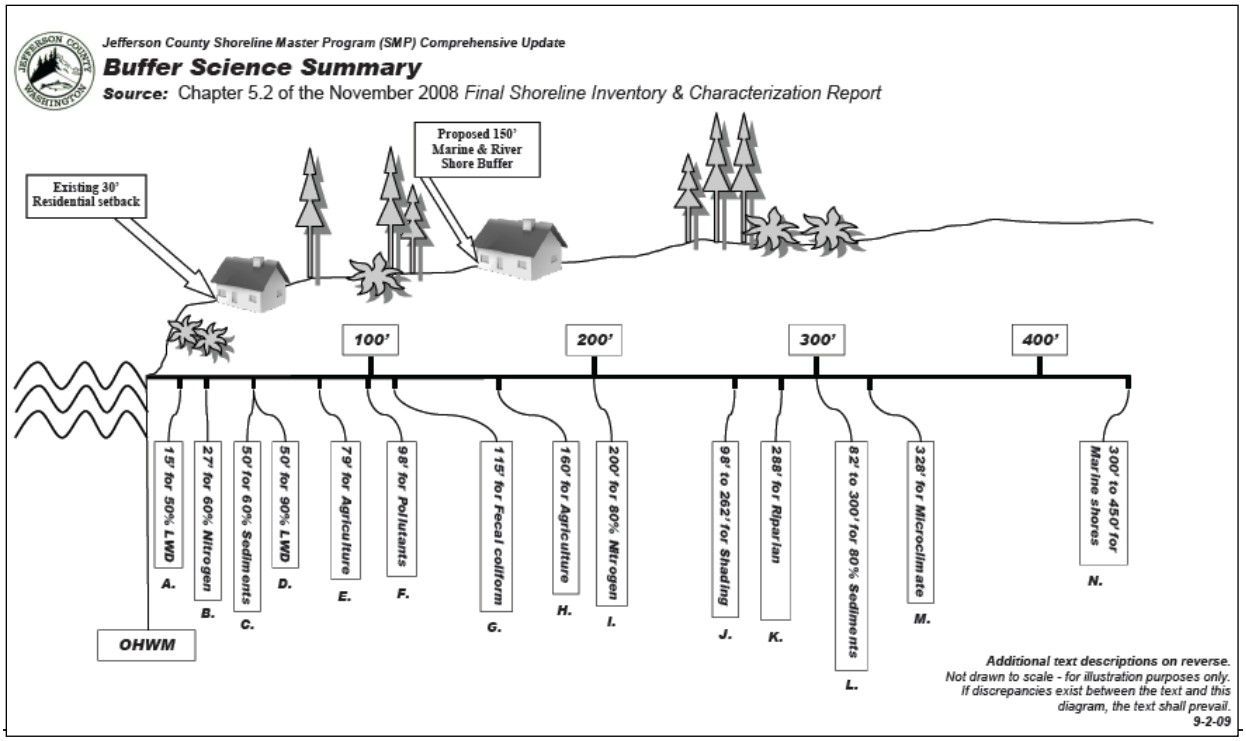

Figure 11-6: This graphic from the Jefferson County SMP update displays the locations on the landscape needed for specific buffer functions. The letters (A, B, C) are keyed to descriptions of the scientific literature on the back of the original handout. The descriptions are included at the end of this chapter

For wildlife, the buffer widths needed to achieve greater than or equal to 80% effectiveness are:

- Buffer width range of 240 feet to achieve 90% of hibernation and nesting to 902 feet to achieve 100% of hibernation and nesting.
- Average of all literature – 571 feet to achieve greater than or equal to 80% effectiveness.
- FEMAT curves do not address wildlife function.

These examples show the range of buffer widths needed for these functions to continue to be effective in undisturbed areas. The SMP Guidelines do not require a return to pre-European settlement conditions. The buffer widths are summarized in Appendix G of the marine riparian guidance, available in the document at http://wdfw.wa.gov/publications/pub.php?id=00693.

Management Recommendations for Washington's Priority Habitats – Riparian suggests a Riparian Habitat Area width of 250 feet for Types 1 and 2 streams, Shorelines of the State, and Shorelines of Statewide Significance.

Consider risk to ecological functions

Consider the risk of disturbance to the shoreline ecological functions in the riparian area if buffers or setbacks are not required and development is allowed. Ecology's wetlands guidance includes an extensive discussion of the characterization of risk from land use actions to wetland functions. This discussion is relevant to shoreline buffers.

"In a characterization of risks, local jurisdictions should consider whether the plans, policies, and regulations they are developing will minimize the risk of cumulative impacts to the functions and values of natural resources including wetlands." (*Wetlands in Washington State Volume 2 – Protecting and Managing Wetlands,* page 10-2.)

"Whether planning is done at the scale of the management area or the site itself, the risks can be characterized by answering a series of questions about the actions being proposed:

- What disturbances or benefits will result from a proposed action (e.g., change in land use through zoning, regulations that affect how land is used, restoration plan, etc.)?
- What risks do these disturbances pose to the functions and values of wetlands?
- What measures are proposed to minimize the risks or replace the resource at risk?" (page 10-4)

Therefore, when determining shoreline buffer width, you should consider the potential risk to the ecological functions. If ecological functions would be negatively affected, consider what measures would offset the impact to ecological functions. If mitigation measures and restrictions on land use would not offset the impacts from a smaller buffer, larger buffers are necessary to achieve no net loss of shoreline ecological functions. (The SMA provides local governments the option to include critical areas buffers that extend outside the minimum shoreline jurisdiction within shoreline jurisdiction [RCW 90.58.030 (2)(d)(ii)]).

Determining buffer width

Figure 11-7: Whatcom County marine shorelines have a 150-ft buffer, shown by the red line. The yellow line indicates the 10-ft setback, and the green arrow points to an unstable slope stripped of vegetation. (Whatcom County photo.)

How do you apply these buffer widths from the scientific literature to your local shorelines? Much of Washington's shorelines are developed, unlike the undeveloped shorelines discussed in much of the scientific literature.

Those land uses include industry, commercial uses, houses, multi-family dwellings, parks, trails, marinas, bulkheads, parking lots, and fishing piers, among others. Some upland areas are intensely developed, and others are more sparsely developed. Some of our waters are heavily used for ports, industry, marinas and recreational piers. Many Washington lakes are intensely developed with houses on the upland and piers and docks in the water, while others remain undeveloped.

Tailor buffers to local conditions

Determining buffers and setbacks is a challenge. The buffers and setbacks for marine and freshwater shorelines should be tailored to local conditions including existing shoreline functions and existing and planned land use and public access. Buffers and setbacks likely will vary within a local government's boundaries to reflect different shoreline conditions and functions. The inventory and characterization report should provide a complete analysis of shoreline functions. See SMP Handbook Chapter 7, "Shoreline Inventory and Characterization."

The Aquatic Habitat Guidelines document, *Protecting Nearshore Habitat and Functions in Puget Sound,* offers some general guidance in determining buffer width. These general recommendations are also applicable to freshwater rivers and lakes.

> In applying buffers as part of a marine riparian habitat protection strategy, shoreline managers should consider what functions need protection in their shoreline areas (based on existing or anticipated threats), what level of protection is appropriate for those functions, how the protective goals of using a buffer can actually be achieved on the land given existing and planned development, and what functions will not be protected by choosing particular buffer widths. The science summarized in Table III.7 provides the information and context for these decisions. It does not dictate a single approach (page III-38).

With this general guidance in mind, consider the following:

- What shoreline ecological functions continue to exist and need protection or restoration? What species of wildlife live along the shoreline, and what buffer width will protect them? Would smaller buffers increase nitrogen and phosphorous levels in local waters? How would removal of riparian vegetation affect slope stability and hydrology?
- Will future growth include new or expanded water-oriented uses?
- For developed shorelines, is redevelopment likely?
- Is development projected on vacant parcels?

Most developed shorelines with remaining vegetation still provide some ecological functions. For example, trees are often located near houses that are built within shoreline jurisdiction. Trees provide habitat, stabilize the soil and reduce erosion. Naturally vegetated areas help to filter surface water runoff.

People ask why their local shorelines have buffers or setbacks that are different than those in nearby areas. The answer is that the buffers reflect the local conditions including shoreline ecological functions and existing development -- these are not the same everywhere, so different buffers or setbacks are required. In all cases, however, buffers and setbacks should be designed, in combination with SMP regulations, to assure no net loss of shoreline ecological functions.

WAC 173-26-2(c)]. “Nearly all shoreline areas, even substantially developed or degraded areas, retain important ecological functions. For example, an intensely developed harbor area may also serve as a fish migration corridor and feeding area critical to species survival. Also, ecosystems are interconnected. For example, the life cycle of anadromous fish depends upon the viability of freshwater, marine, and terrestrial shoreline ecosystems, and many wildlife species associated with the shoreline depend on the health of both terrestrial and aquatic environments. Therefore, the policies for protecting and restoring ecological functions generally apply to all shoreline areas, not just those that remain relatively unaltered.”

Some approved SMPs establish specific buffers or setbacks for every environment designation. Some SMPs establish buffers or setbacks for water bodies, based on shoreline conditions. Some environment designations have varying buffer widths for different shoreline uses – industrial, commercial, residential and recreation. For example, Whatcom County’s buffers are set for marine, stream and lake shorelines, while Douglas County buffers are set for environment

designations. In the City of Kent, a shoreline with High Intensity designation has a 100-foot setback for industrial uses and 70-foot setback for commercial uses.

Rural shorelines

Figure 11-8: This Columbia River shoreline near Rock Island in Douglas County has a Rural Conservancy designation with a 100-foot buffer. (Washington Coastal Atlas photo.)

Rural shorelines in Washington typically include large residential lots; parks with undeveloped areas and shorelines with boat launches, docks and other amenities; and scattered other uses such as restaurants or industry. The degree of development is less intense overall than in urban areas. Steep slopes are common although not universal. The amount and type of vegetation varies, depending on the degree of development and location within the state. It's generally fair to say that more native vegetation exists in rural areas compared with urban areas.

The shoreline ecological functions in these less developed areas should be protected with adequate buffers or setbacks and vegetation conservation. Environment designations should establish low densities with large lot sizes, as appropriate. Other measures to protect ecological functions may include large minimum lot width at the shoreline, vegetation conservation and replacement standards, and incentives to encourage voluntary restoration and bulkhead removal.

Urban shorelines

Establishing buffers for intensely developed urban shorelines seems to be more challenging than doing so for less developed rural or undeveloped shorelines, as Ecology has seen over the past few years. Questions arise regarding the likelihood of ecological functions on small lots developed with houses and garages or at waterfront industrial areas.

Again, some ecological functions likely exist in the upland area, and protecting these helps to protect the remaining aquatic functions. Some cities with highly developed shorelines have established buffers or setbacks that reflect local conditions, require mitigation for redevelopment, and offer incentives as an opportunity for shoreline improvements.

For example, the city of Kirkland has a range of setback standards to address the diversity of its highly developed shoreline, where redevelopment is more likely than new development.

In its R-L (Residential – Low) shoreline environment, which has a wide variety of parcel depths, the setback is 30 percent of the average parcel depth, with a 30-foot minimum setback and 60-foot maximum setback.

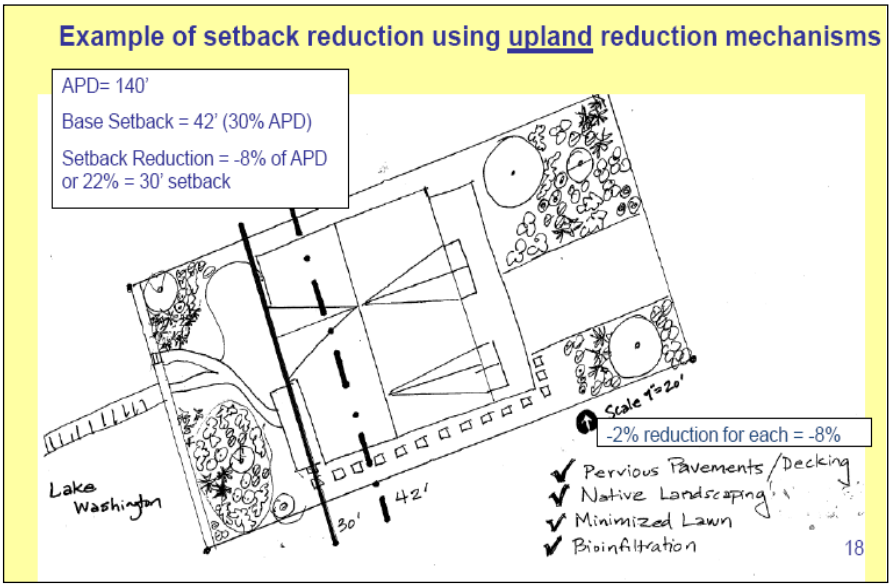

Figure 11-9: The City of Kirkland SMP includes administrative setback reductions in return for shoreline improvements. The figure shows the base setback for an average parcel depth (APD) of 142 feet and a 2 percent reduction for upland improvements

In the UM (Urban Mixed) environment, which has less variation in parcel depth, the setback is 15 percent of the average parcel depth, with a 25-foot minimum. The new SMP setbacks are within range of the current, on-the-ground setbacks for existing shoreline development.

These standards are flexible. The setback can potentially be reduced to the minimum setback in exchange for improvements such as replacing hard armoring with soft shore protection, building a shoreline cove, or moving the bulkhead away from the water. Figure 11-9 provides examples of setback reductions. Setbacks less than the minimum would require a shoreline variance.

The City of Seattle's guidebook, *Green Shorelines: Bulkhead Alternatives for a Healthier Lake Washington*, available at http://www.govlink.org/watersheds/8/action/greenshorelines/, includes discussion of vegetated buffers on small lots on pages 14-15. The guidebook states that vegetated buffers add visual interest to property and contribute to aquatic habitat. The guidebook offers various options for "greening" the shoreline by removing or setting back bulkheads, building coves, planting vegetation, among others. Although the guidebook is directed to property owners on Lake Washington, the techniques discussed will apply along other shorelines.

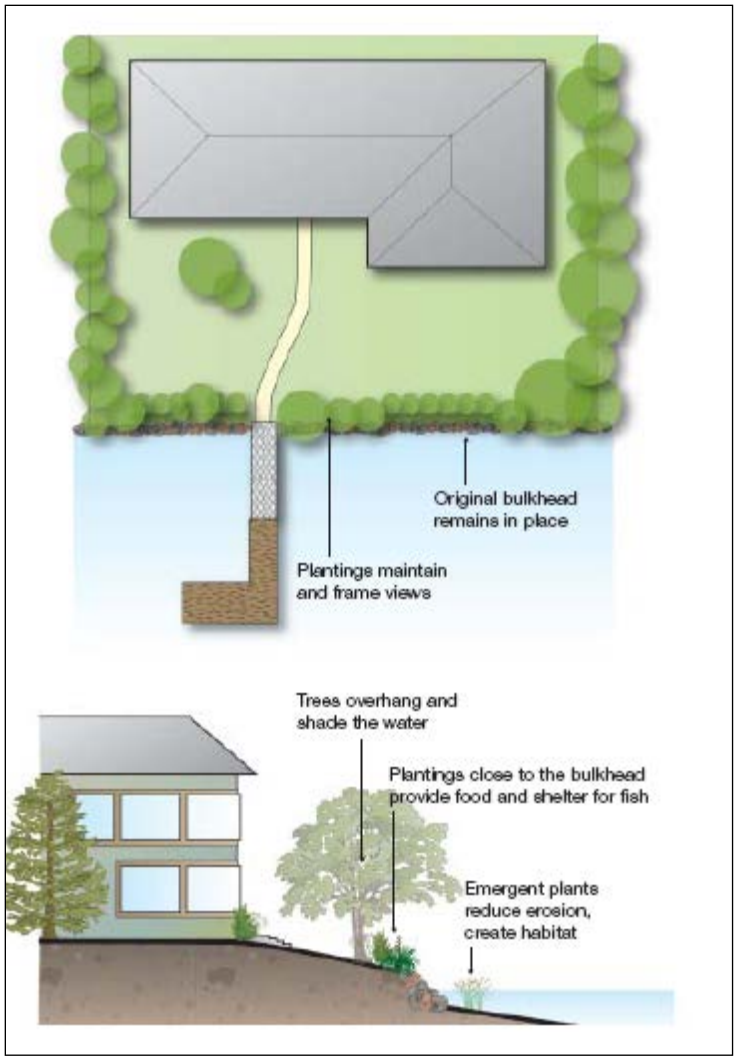

Figure 11-10: This graphic from *Green Shorelines- Bulkhead Alternatives for a Healthier Lake Washington,* shows a narrow strip of vegetation at water's edge.

Alternatives

Alternatives to a strict buffer or setback with vegetation conservation may be acceptable if they protect shoreline functions. Local governments must show how their shoreline regulations, including buffers, setbacks and development regulations, will achieve no net loss of shoreline ecological functions. Possible alternatives are discussed below.

Several zones with varying intensities of vegetation and development are being used to protect water bodies in various locations around the country and may be appropriate for developed shorelines. For example, in a residential area, the zones might look like the following:

- Zone 1: Native vegetation buffer. Along water's edge, between water and area of most development. This zone should be comprised of native vegetation, with limited uses only. A path to the water or access to dock would be allowed. Shoreline areas currently planted with native vegetation should be preserved. If native vegetation areas don't exist, they can be created over time through mitigation measures connected with redevelopment,

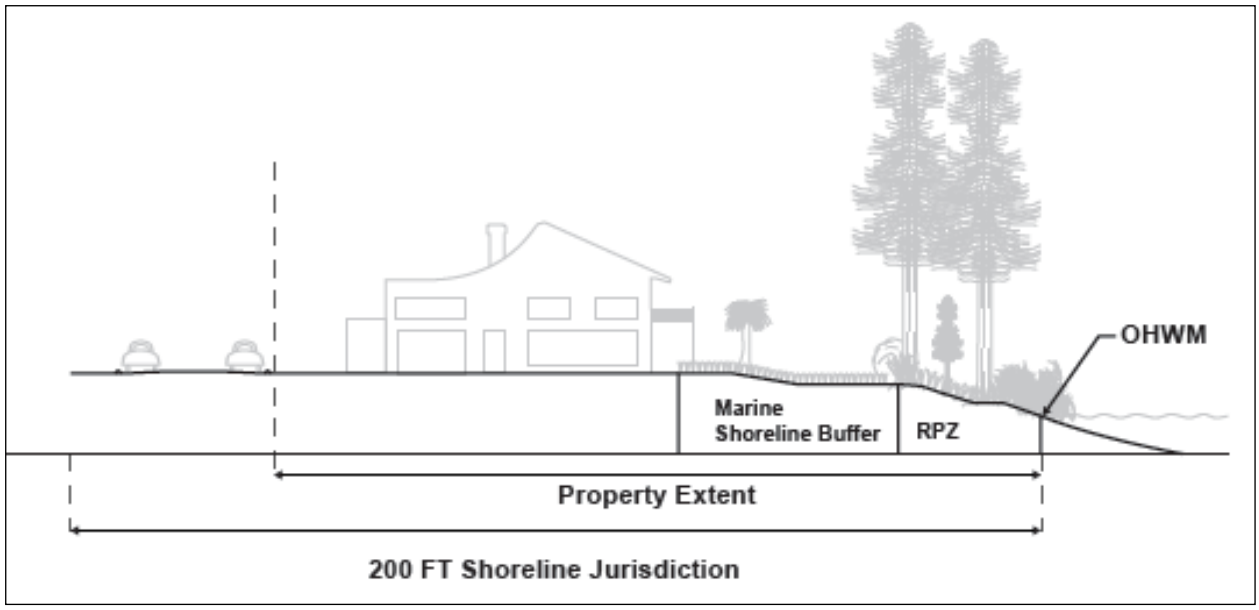

Figure 11-11: A 2011 memo to Bainbridge Island staff from Herrera Environmental Consultants, Inc., suggests a two-zone buffer system. A Riparian Protection zone is adjacent to the marine nearshore, and a Marine Shoreline Buffer is between the riparian zone and development. The SMP includes a two-zone system as described on the previous page, although the suggested terms are not part of the city code.

incentives to property owners, or restoration activities conducted by various organizations.

- Zone 2: No buffer. Area of most development and activities. This area includes the house and garage, driveway, deck, and lawn area near house. These uses would continue. Some redevelopment and expansion would be allowed. Mitigation measures would enhance Zone 1.

- Zone 3: Vegetation conservation area. Between house and upland edge of property, away from water. This area would be a vegetation conservation zone. Require permits or administrative review before cutting trees or making major vegetation changes. Only limited development in this area would be allowed and must be mitigated.

Another potential alternative is a parallel environment. Parallel environment designations can be established in the SMP to serve as buffers and setbacks. The environment designation closer to the water could be Natural, with most uses prohibited. The next landward environment designation would reflect the development pattern, such as shoreline residential, urban or rural conservancy, and high intensity.

The City of Bainbridge Island SMP shoreline buffer consists of two zones. Zone 1 extends from the ordinary high water mark a minimum of 30 feet, or to the limit of existing native vegetation, whichever is greater. The native vegetation area is determined through a site-specific analysis. Zone 2 is landward of Zone 1 and extends no further than the depth of the shoreline buffer.

Some local governments are using terms other than buffers. Gig Harbor's SMP defines a vegetation conservation strip, an undisturbed area of native vegetation. The width of the vegetation conservation strip varies among water bodies. A building setback from the conservation strip is also required.

Use a logical process

Ecology suggests you use a logical process to determine buffer width. Steps in the process include:

1. Use the inventory & characterization report. The inventory and characterization should provide information about shoreline functions, current uses and development, and potential future development. The standard of no net loss of shoreline ecological functions starts with the current conditions discussed in the inventory and characterization. These ecological functions must be protected. What buffer width is necessary to protect them? For example:

   - Trees provide shade and woody debris and stabilize banks.
   - Vegetation intercepts nutrients and fine sediments, boosting water quality.
   - Birds and animals feed and breed in the shrubs and trees that are within shoreline jurisdiction.
   - Vegetation shades the water, helping to keep streams and the intertidal area cool.

   If the inventory and characterization lacks sufficient information to support these decisions, the SMP regulations should be more protective. "As a general rule, the less known about existing resources, the more protective shoreline master program provisions should be to avoid unanticipated impacts to shoreline resources" [WAC 173-26-201(3)(g)].

2. Review the scientific literature regarding buffers, particularly the documents referenced earlier, to gain an understanding of the value of buffers and the size of buffers needed to maintain ecological functions. How would the recommended buffer widths apply to your shorelines?

3. Consider the CAO as a starting point. It may not address all the requirements of shoreline management such as the SMA preference for water-dependent uses.

   - Do the buffers reflect recent scientific literature?
   - If Ecology provided comments on the proposed CAO, review the comment letter and see if Ecology supported the CAO for protecting ecological functions.
   - Are the CAO buffers consistent with the requirements to provide for preferred uses?

4. Analyze the current development patterns. A majority of our developed shorelines are residential areas. Some are large-lot, rural residential, with limited disturbance of native vegetation and high quality ecological functions. Other areas are highly developed with a large percentage of the shoreline in impervious surfaces. What size buffers or setbacks

and other vegetation conservation regulations are needed to protect the remaining ecological functions?

5. Realize that you need to include measures in the SMP to continue to protect these functions and these will likely include buffers, possibly setbacks with vegetation conservation, and mitigation requirements. It's important to discuss this requirement within the framework of the SMA and SMP Guidelines with advisory groups, elected officials and the public.

6. During public participation and community visioning events, get the public's perspective on shoreline aesthetics. Property vegetated with trees, shrubs and groundcover generally is more pleasing to the eye (for most people) than property where the vegetation has been scraped from the ground. Property that is attractive generally has more monetary value than similar property that is not attractive. Buffers and setbacks can help to preserve views. Buildings set closer to the water are likely to block views from buildings set further back. Common line setbacks measured from buildings on adjacent parcels can be part of the buffer and setback equation.

Consider that buffers and setbacks, in addition to protecting ecological functions, also provide safety and aesthetic benefits. Setting buildings back from the water and from the edge of the bluff and retaining native vegetation, or planting native vegetation if it is lacking, can help to reduce erosion and landslides and the chances of damage to buildings. Buildings that are set back adequately should not need to be protected by bulkheads. Communities on marine waters should consider sea level rise projections when determining structural setbacks for safety.

Example

The City of Spokane used a logical process to establish its shoreline buffers for the Spokane River and Latah Creek. The City's "Draft Shoreline Buffer Mapping Methodology" outlines the process.

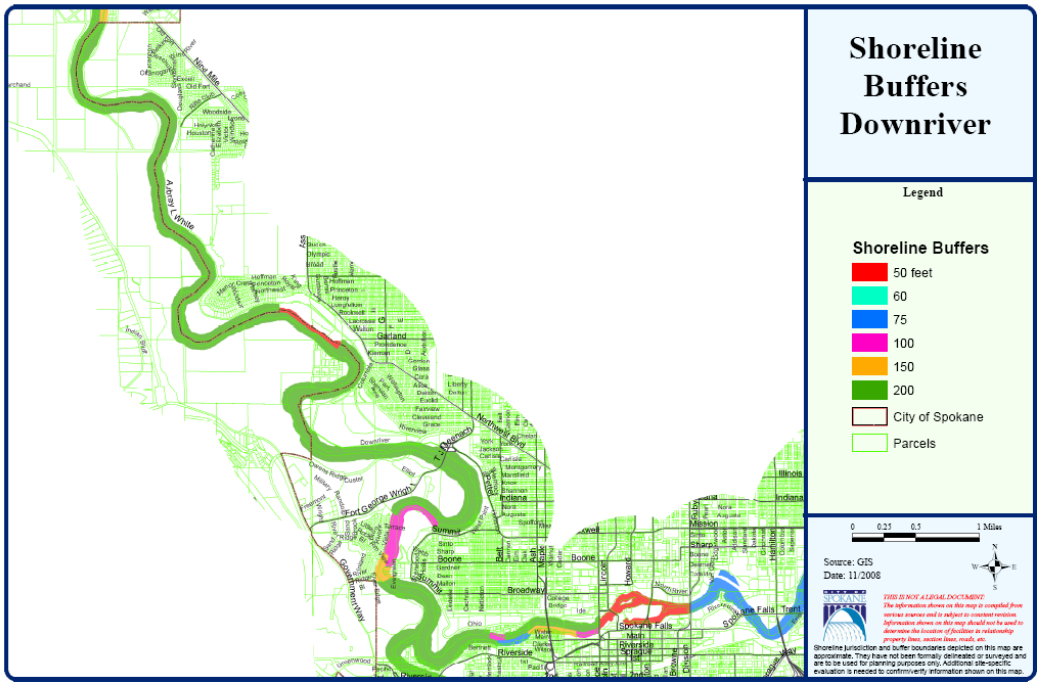

Figure 11-12: The majority of shoreline buffers on the western part of the Spokane River in the city of Spokane are 200 feet. The eastern part of the Spokane River has buffer widths of 50, 75, 150 and 200-feet. Most of the Latah Creek shoreline has 200-foot buffers to protect the channel migration zone.

The City set the following objectives:

- Ensure no further degradation of the shoreline.
- Set buffer distances to achieve a "no net loss" of shoreline ecological functions.
- Set buffer distances, where possible, to increase the potential for future shoreline restoration.
- Critical areas regulations layers and buffers provided a strong basis for the shoreline buffer determination.

The City considered the shoreline inventory information, looked at natural features and reviewed historic and current aerial photography and literature on stream buffers. The City reviewed the existing shoreline condition and potential for restoration as well as existing regulations, including the CAO.

GIS layers included land use and development patterns, critical areas inventories and buffers, orthophotos showing ground and vegetation conditions, and historic orthophotos for vegetation and land use.

The City then set general buffer widths at 50, 60, 75, 100, 150 and 200 feet from OHWM to fit existing constraints such as development patterns. Natural environment designation was generally given a 200-foot buffer, Intensive Urban a 50-foot buffer, and the Wastewater Treatment environment a 50-foot buffer

Example

The City of Kirkland SMP establishes setbacks with vegetation conservation and enhancement rather than buffers for its intensely developed shorelines. The inventory and characterization shows that wetlands areas have high ecological functions, but other areas generally have low functions. Key issues included addressing a heavily armored shoreline, numerous overwater structures including piers and docks and some overwater residences. One goal was to find the balance between creating a minimum number of new nonconforming structures and meeting the no net loss requirement. Its process to determine its shoreline setbacks included a number of steps.

First, the City developed a good understanding of existing land use conditions by measuring average parcel depths and existing setbacks using aerial photos. City staff looked for patterns of existing setbacks and lot depths and then overlaid current setbacks on maps to see how many existing nonconforming structures existed.

Next, the City looked at assessor's information to determine the potential for redevelopment. This included the number of vacant parcels and parcels that could be subdivided, zoning for both categories, and the number of parcels with low improvement values and likely to redevelop.

The City considered several setback options, taking into account the number of potential new nonconforming structures, the total open space that would be gained or lost for redevelopable lots, and the total gain in native vegetation. (Kirkland developed its SMP update prior to the legislative change to the SMA that allows SMPs to include residential structures as conforming structures with regard to buffers, setbacks and some other standards.) Flexible setback standards, discussed earlier, will result in shoreline improvements such as increases in native vegetation, biofiltration, reduction in bulkheads, etc. Small additions to structures will require an equal amount of native vegetation as mitigation.

The City then prepared its cumulative impact analysis to determine whether the likely future development and development standards addressing native vegetation, lighting, pervious materials, and tree retention would meet the no net loss requirement.

Ecology's review of proposed buffers and setbacks

The SMP Guidelines require vegetation conservation standards in SMPs, with buffers and setbacks specifically required for residential development. Ecology expects that most SMPs will include buffers (or setbacks with vegetation conservation requirements) to protect the existing ecological functions of the shoreline. If buffers or setbacks with vegetation conservation are not included in the SMP, local governments should describe the alternatives being used and how they will protect existing ecological functions.

The SMP may allow some development within the buffer in order to allow for private property rights consistent with the public interest and allow water-dependent, preferred uses and public access. Any development must be mitigated to assure no net loss of shoreline ecological functions.

Buffer sizes, setbacks and development regulations will vary among jurisdictions because they are tailored to local conditions and the shoreline ecological functions that are present. A buffer that is appropriate for one shoreline is not appropriate for all shorelines.

In the past few years, Ecology has approved updated shoreline master programs that will regulate the following shorelines. Note that environment designations, permitted uses and development regulations, as well as buffers and setbacks, are part of the SMP package.

- Low density, rural residential areas in Whatcom and Jefferson counties. Marine shoreline buffers are 150 feet.
- Densely developed, small lot residential shorelines in the city of Kirkland. Setbacks are based on average parcel depth, with setbacks to 25 feet and 30 feet possible with shoreline improvements.
- Agricultural areas in Douglas County. Agricultural land within the Rural Conservancy environment has a 100-foot buffer.
- Historic downtown development in Port Townsend. The buffer for the Historic Waterfront designation is 25 feet.
- Lakes with residential development in numerous cities. For example, in Kent, the Shoreline Residential setback for houses is 75 feet.
- Latah Creek in the City of Spokane. The 200-foot buffer in most areas protects the channel migration zone.

When analyzing proposed buffers and setbacks in SMPs, Ecology reviews the documents listed under the "logical process" section on pages 24-25, as well as draft SMP regulations and the cumulative impacts analysis. Ecology expects that mitigation measures will be included in the SMP in order to achieve no net loss of shoreline ecological functions. Mitigation measures may include but are not limited to reducing the lawn area or impervious area and planting native plants, enhancing or expanding existing stands of native vegetation, using stormwater infiltration techniques, removing bulkheads, requiring no use of synthetic herbicides, requiring low impact development techniques, or providing beach nourishment.

Ecology has rejected some proposed shoreline buffers because the buffers were not supported by scientific studies that showed the buffers were adequate to protect existing shoreline ecological functions or based on SMP documents such as the inventory and characterization report.

The SMP Guidelines require SMPs to include policies and regulations designed to achieve no net loss of shoreline ecological functions [WAC 173-26-186(8)(b)]. Therefore, for developed areas, small buffers or setbacks that would allow new development or re-development to be built closer to the OHWM than existing development and would not protect existing shoreline ecological functions are not acceptable. For undeveloped areas, buffers that do not protect existing shoreline ecological functions are not acceptable
:

General recommendations for buffer width

Following are general recommendations for buffers, based on Ecology's approval of several dozen SMPs.

- Undeveloped shorelines with largely intact ecological functions should be protected with buffers of 150 feet to 200 feet. Shorelines with extensive critical areas, or within channel migration zones or floodplains, also will need protective buffers to protect life and property during flooding.

- Rural residential development, where houses and appurtenances such as garages and sheds cover about 25 – 35 percent of the ground, some area is landscaped, and the rest is in native vegetation, would likely need buffers of 150 feet to protect existing functions.

- Small-lot residential development in highly developed areas provides some ecological functions. Buffers or setbacks with vegetation conservation requirements of roughly 30 to 60 feet may be appropriate. If these areas include critical areas, larger buffers likely will be needed.

- Heavily developed waterfront areas with port facilities, water-dependent industry, overwater structures such as docks for containerized shipping or other intensely developed areas may have limited ecological functions. In these areas, buffers or setbacks may not be appropriate. Regulations should address retention of any existing vegetation and encourage restoration where it is appropriate. Busy waterways still harbor fish and other species.

In most cases, a "one-size" buffer applied throughout shoreline jurisdiction will not reflect shoreline ecological functions and local shoreline conditions. Shoreline conditions and ecological functions likely vary enough for most shorelines within local government boundaries that more than one buffer or setback with vegetation conservation will be needed to protect ecological functions.

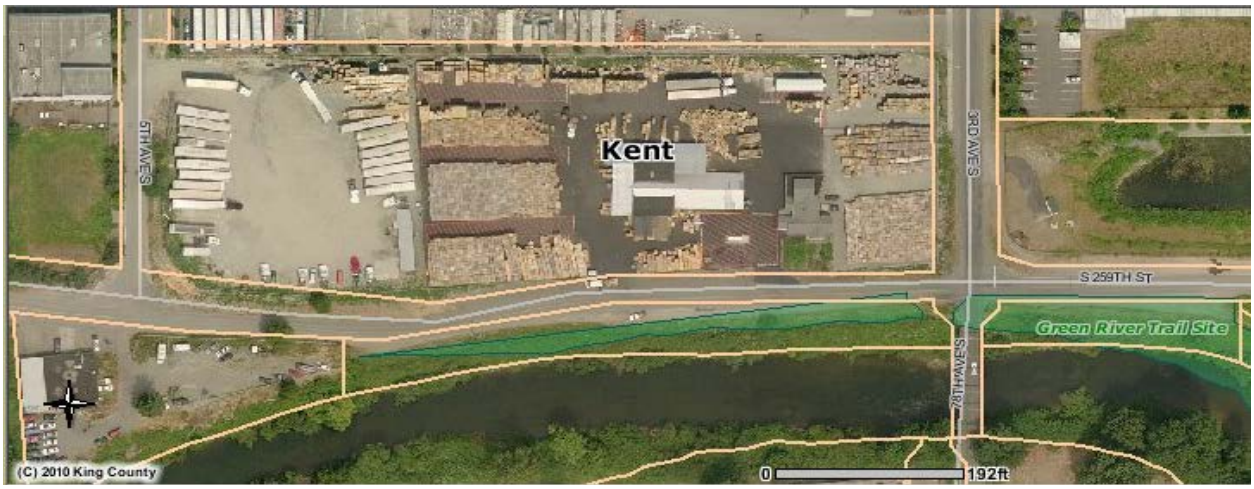

Figure 11-13: In the City of Kent, this High Intensity environment requires a 100- foot setback for industrial uses. A commercial use would need a 70-foot setback

Show your work

Ecology recommends that local governments show their work regarding decisions on buffers and setbacks. Keep a record of the inventory and characterization information that's used to support decisions about buffers and setbacks. What is the rationale for the decision?

Avoid the following when making decisions about buffers and setbacks:

- No rationale for the buffer or setback decision.
- Last minute changes lacking support in record.
- Uniform buffers that ignore the detailed information provided in the shoreline characterization.
- Lack of a good record supporting the decision.

Managing buffers and setbacks

An SMP that includes buffers and setbacks also must include policies and regulations to protect them. The SMP guidelines include "the prevention or restriction of plant clearing and earth grading, vegetation restoration, and the control of invasive weeds and nonnative species" as activities to protect and restore vegetation [WAC 173-26-221(5)].

SMPs should include regulations that address preservation of vegetation, pruning for safety and views, removal of invasive plants and noxious weeds, removal of hazardous trees, clearing limitations, removal of trees that are fire hazards, planting requirements and other activities related to vegetation conservation and restoration. Determine when vegetation management plans will be required, and how long vegetation must be monitored. See the "Sample Regulations" section below for recommended language from Washington Department of Fish and Wildlife on hazard trees removal and viewshed clearing.

Property owners are sometimes concerned that requirements to plant vegetation means that required trees will become tall and potentially hazardous or block views. Regulations for new vegetation in buffers can include height limits for trees, as cities often require for areas under power lines.

SMPs can define public view corridors as part of the public access section of the SMP. Procedures to retain public views can address removal of hazardous trees or trees that block the shoreline view from a public view corridor. Mitigation measures should be included to offset any potential loss of ecological functions.

Allowing for flexibility

The SMP may allow some flexibility, including buffer averaging, common line setbacks and administrative buffer reductions, as described below. If these types of buffer reductions are allowed in the SMP, the cumulative impacts analysis should take them into account and determine whether they would cause cumulative impacts on shoreline ecological functions. These buffer reduction options should not be available where there are safety or health hazards such as floodways, unstable or steep slopes, or significant potential fish or wildlife impacts.

Buffer averaging

Buffer averaging can potentially be applied on one parcel or multiple parcels. The object of buffer averaging should be to allow flexibility in project design while increasing the protection of the most valuable buffer functions and values.

For example, on a single-family lot, a house could be built within the buffer (closer to the water) on an existing, low-functioning grassy area, and the buffer would extend deeper into the parcel into a highly-functioning, wooded ravine within the side yards. The total buffer area would be the same if the standard buffer is enforced or averaging is allowed. On multiple parcels, the buffer could potentially vary on the lots, with the average buffer meeting the same size requirements overall as the adopted buffer. In both cases, a strict limit to a reduced buffer depth should be set in the SMP. Typically, this limit is no more than a 25% reduction and may not go below a set minimum buffer.

Administrative buffer reductions

For administrative reductions, the SMP sets a process and parameters, including mitigation, for specific limited buffer reductions that may be approved by a planning or other administrator. Administrative approval eliminates requirements for a local public hearing or decision by a hearing examiner, saving time and money for both the applicant and the local jurisdiction. Again, a strict limit (typically 25%) to a reduced buffer depth should be set in the SMP may not go below a set minimum buffer. Allowing a buffer reduction should provide additional flexibility in project design while increasing the protection of the most valuable buffer functions and values over a standard buffer application. Incentive programs providing enhanced buffer vegetation or features such as beach restoration are sometimes linked to the buffer reduction criteria. Buffer reductions and alternative designs should be set up as shoreline Conditional Use Permits that would require approval by Ecology.

Common line setbacks

Common line setbacks apply to small, undeveloped lots in areas where most lots are developed and vacant parcels are adjacent to and interspersed among developed lots. When a development is proposed for the vacant parcel, the required setback is measured from prescribed places on buildings on adjoining lots -- typically the foundation corners of the buildings, but not decks, patios or porches that protrude waterward. Regardless of the common line setback, a minimum setback or buffer distance must also be set up in the SMP.

Criteria should take into account variations in shore contours, topography, geology, soils, vegetation and other physical characteristics on a case-by-case basis to ensure equitable treatment for the property owner while providing the optimum buffer functions considering the circumstances. The SMP should state that providing equitable treatment for the property owner does not mean necessarily providing an equal or equivalent view. Enhanced buffer vegetation or features e.g. beach restoration, etc are also sometimes linked to the buffer reduction criteria associated with a common line setback.

SMP language

Language in the SMP should be clear. Be sure to address the width of buffers and setbacks and allowed uses. If reductions in setbacks and buffers, common line setbacks, or other provisions are allowed, make sure the SMP language is clear and to the point. Consider the following when writing SMP regulations:

- Are you establishing buffers, setbacks, or both? How wide are the buffers from the ordinary high water mark? How far back from the upland edge of the buffers are the setbacks? For example, the buffer is 100 feet from the OHWM, and the setback is 15 feet from the upland edge of the buffer. Or, the setbacks include the buffers – i.e. a 100-foot setback that includes a 65-foot buffer.

- Are buffers and setbacks established per environment designation, for specific water bodies (Meandering River, Frog Lake), for types of water bodies (lakes, streams, marine) or for shoreline reaches?

- What uses are allowed within the buffers and setbacks? Uses in buffers should be minimal, because preserving shoreline functions is paramount. Trails to the water are typical uses within buffers. Gardens and sheds are typical uses in setbacks. If a buffer or setback is established for parks, the SMP should be specific about what uses are allowed within the buffer or setback. Perhaps a trail, boat launch and upland portion of a dock could be built within the buffer, and other park facilities located upland of the buffer.

- Do the buffers include existing structures? Some local governments include the area around single family houses, but not the houses, within the buffers.

- For new development, will buffers and setbacks be recorded on the deed?

- How will the buffers and setbacks regulations be enforced? Can you document existing conditions with photos?

- Will residential structures within buffers be conforming or nonconforming structures?

Sample regulations

This section includes examples of regulations from approved Shoreline Master Programs and recommended language on viewshed clearing and hazard tree removal from Washington Department of Fish and Wildlife.

City of Anacortes

Natural Environment
Setbacks
DR-5.7.4 Unless otherwise specified herein, permanent structures, storage, and hard surfaces are prohibited.

Conservancy Environment
DR-5.8.3 Unless otherwise specified herein or in Table 5.2, permanent structures, storage, and hard surfaces shall be set back a minimum of one hundred (100) feet from the ordinary high water mark. Setbacks are measured landward, on a horizontal plane, perpendicular to the ordinary high water mark.

Shoreline Residential Environment
DR-5.9.6 Exceptions from the Shoreline Residential setback may be granted through an administrative approval. Any restrictions or conditions which are tied to the parcel through this exception process shall be recorded on a revised Notice on Title. Such exceptions include:
a. For areas with a setback of 60 feet, reductions of up to twenty five (25) percent of the standard setback, may be approved if the applicant demonstrates that either:

> i. enhancing the setback (by removing invasive plants, planting native vegetation, installing habitat features such as downed logs or snags, or other means) will result in a reduced setback that functions at a higher level than the existing standard setback; or
> ii. conditions (existing uses or developments) exist within the site's shoreline setback, which substantially prevent or impair delivery of most riparian functions.

City of Des Moines

6.1.1 Building height, marine buffers, and building setbacks.
2. Pursuant to Section 6.1.3 of this Chapter, buffers for designated critical areas physically located in shoreline jurisdiction shall apply to uses and development located in shoreline jurisdiction. A minimum buffer of 115 feet from the marine ordinary high water mark (OHWM) shall be maintained in designated Urban Conservancy and Shoreline Residential environments.

3. A minimum building setback of 10 feet from the landward edge of buffer must be maintained in all shoreline environments.

Douglas County

4.3 Vegetation Conservation

Regulations
2. Where impacts to buffers are permitted under Section 4.1, Ecological Protection and Critical Areas, new developments shall be required to develop and implement a management and mitigation plan. When required, management and mitigation plans shall be prepared by a qualified biologist and shall be consistent with the requirements in Appendix H. Management and mitigation plans shall describe actions that will ensure no net loss of ecological functions. Vegetation shall be maintained over the life of the use and/or development by means of a conservation easement or similar legal instrument recorded with the County Auditor.

3. Pruning of native trees for safety and view protection may be permitted if consistent with the provisions of Section 4.1, Ecological Protection and Critical Areas.

5. Removal of noxious weeds and/or invasive species shall be incorporated in management and mitigation plans, as necessary, to facilitate establishment of a stable community of native plants.

8. With the exception of hand removal or spot spraying of noxious weeds, the determination of whether non-native vegetation removal may be permitted must be evaluated in conformance with Section 4.1 Ecological Protection and Critical Areas.

5.1.3 Shoreline bulk and dimensional standards
7. Common line buffer/setback:

A common line wetland or riparian buffer/setback may be utilized for the development of a single family dwelling on an undeveloped lot, where the lot is a legal lot of record in place at the time of adoption of this Program and is located adjacent to existing residential dwelling units on both adjacent shoreline lots. The common line buffer/setback shall be determined by; averaging the buffers/setback, as measured landward from the delineated wetland or riparian boundary, for each of the adjacent residential dwelling units on the shoreline.

Common line buffers/setbacks shall apply when:

(1) The width of the undeveloped lot is less than 150 feet;

(2) The lot is located within an Urban Growth Area, Planned Development, Rural Service Center or Rural Recreation zoning districts, or is a cluster lot.

b. Common line buffers/setbacks shall not apply when:

(1) The elevation of adjacent structures on adjacent lots are 15’ higher or lower from the natural grade on the vacant center lot.

(2) One of the adjacent lots is undeveloped.

(3) Either of the adjacent lots has been developed since the date of adoption of this Program.

(4) Greater than 250 cubic yards of grade or fill needs to occur in order to accommodate utilizing the common line buffer/setback.

A management and mitigation plan prepared by a qualified professional biologist shall be submitted and approved which demonstrates no net loss of ecological functions for the site in conformance with the applicable appendices of the jurisdiction in Appendix H.

8 Definitions
124. "Hazard tree" means any tree that is susceptible to immediate fall due to its condition (damaged, diseased, or dead) or other factors, and which because of its location is at risk of damaging permanent physical improvements to property or causing personal injury.

City of Port Townsend

Conservancy environment, management policy
Policy 5.8.5 *Subdivisions* - Protect natural vegetation and shoreline ecological functions by prohibiting the subdivision of property in a configuration that, to achieve its intended purpose, will require significant vegetation removal or shoreline modification that adversely impacts ecological functions. Each new parcel should be able to support its intended development without significant ecological impacts to the shoreline ecological functions.

Shoreline Residential environment, development regulation
DR-5.9.14 A minimum of fifteen percent (15%) of the total lot area shall be retained or replanted in native vegetation. Areas to be retained shall include the largest contiguous, and/or most waterward blocks of native vegetation located on site. If no areas of native vegetation remain, the vegetation retention area shall be replanted with species native to shoreline areas of the Quimper Peninsula. For additions and expansions of existing developments, replanting shall be commensurate with the degree of impact resulting from the new development.

View Protection/Aesthetics
DR-6.4.17 The protection of public views of the shoreline is an important shoreline management objective. View protection can include preventing view blockage through height limitations or requiring aesthetic enhancement with landscaping. View protection does not justify the excessive removal of vegetation to create views or enhance partial existing views. Retaining vegetation and "windowing" or other pruning techniques should always be preferred options over vegetation removal. Please refer to Chapter 9, Section 9.3, Alteration of Natural Landscape – Clearing, Grading and Vegetation Removal Chapter 7, Public Access.

City of Rock Island

Shoreline Critical Areas Regulations
View Corridors
b. Applications for view corridors must also be consistent with the following standards:

i. Native vegetation removal shall be prohibited.

ii. Pruning of native vegetation shall not exceed 30% of a tree's limbs, and shrubs shall not be pruned to a height less than 6'. No tree topping shall occur. Pruning of vegetation waterward of the ordinary high water mark is prohibited.

iii. Non-native vegetation within a view corridor may be removed when the mitigation and management plan can demonstrate a net gain in site functions, and where impacts are mitigated at a ratio of 2:1.

iv. Whenever possible, view corridors shall be located in areas dominated with non-native vegetation and invasive species.

v. Pruning shall be done in a manner that shall ensure the continued survival of vegetation.

vi. The applicant's biologist shall clearly establish that fragmentation of fish and wildlife habitat will not occur, and that there is not a net loss of site ecological functions. .

vii. View corridors are not permitted in the Natural Environment Designation.

Whatcom County

23.90.06 Vegetation Conservation
23.90.06.B Regulations
2. Where compliance with SMP 23.90.06.B.1 is not feasible or required, new developments shall be required to develop and implement a vegetation management plan. When required, vegetation management plans shall be prepared by a qualified professional and shall be consistent with the requirements in WCC 16.16.260.B and .C, provided that the Administrator may establish prescriptive standards for vegetation conservation and management as an alternative to requiring a specific plan for a development. Vegetation management plans shall describe actions that will be implemented to ensure that buffer areas provide ecological functions equivalent to a dense native vegetation community to the extent possible given the area that is feasibly available. Required vegetation shall be maintained over the life of the use and/or development by means of a conservation easement or similar legal instrument recorded with the Whatcom County Auditor.

5. Removal of noxious weeds and/or invasive species shall be incorporated in vegetation management plans, as necessary, to facilitate establishment of a stable community of native plants.

7. Selective vegetation clearing and pruning may be allowed in landslide hazard areas and/or riverine and coastal erosion hazard areas and/or their buffers pursuant to an approved vegetation management plan designed to improve overall slope or bank stability. The plan shall be prepared by a qualified professional and reviewed by a licensed geologist or geotechnical engineer.

16.16.740 Standards – Habitat conservation area buffers

The technical administrator shall have the authority to reduce buffer widths on a case-by-case basis; provided, that the general standards for avoidance and minimization per WCC 16.16.260(A)(1)(a) and (b) shall apply, and when the applicant demonstrates to the satisfaction of the technical administrator that all of the following criteria are met:
1. The buffer reduction shall not adversely affect the habitat functions and values of the adjacent habitat conservation area or other critical area.
2. The buffer shall not be reduced to less than 75 percent of the standard buffer as defined in subsection C of this section.
3. The slopes adjacent to the habitat conservation area within the buffer area are stable and the gradient does not exceed 30 percent.

E. The technical administrator shall have the authority to average buffer widths on a case-by-case basis; provided, that the general standards for avoidance and minimization per WCC 16.16.260(A)(1)(a) and (b) shall apply, and when the applicant demonstrates to the satisfaction of the technical administrator that all of the following criteria are met:
1. The total area contained in the buffer area after averaging is no less than that which would be contained within the standard buffer and all increases in buffer dimension are parallel to the habitat conservation area.
2. The buffer averaging does not reduce the functions or values of the habitat conservation area or riparian habitat, or the buffer averaging, in conjunction with vegetation enhancement, increases the habitat function.
3. The buffer averaging is necessary due to site constraints caused by existing physical characteristics such as slope, soils, or vegetation.
4. The buffer width is not reduced to less than 75 percent of the standard width as defined in subsection C of this section.
5. The slopes adjacent to the habitat conservation area within the buffer area are stable and the gradient does not exceed 30 percent.
6. Buffer averaging shall not be allowed if habitat conservation area buffers are reduced pursuant to subsection D of this section.

16.16.640 Standards – Wetland buffer reductions
(These may be revised to apply to buffers for lakes, marine waters and streams within shoreline jurisdiction.)

D. The applicant implements all reasonable measures to reduce the adverse effects of adjacent land uses and ensure no net loss of buffer functions and values. The specific measures that shall be implemented include, but are not limited to, the following:
1. Direct lights away from the wetland and buffer.
2. Locate facilities that generate substantial noise (such as some manufacturing, industrial and recreational facilities) away from the wetland and buffer.
3. Establish covenants limiting use of pesticides within 150 feet of wetland.
4. Implement integrated pest management programs.
5. Infiltrate or treat, detain and disperse runoff into buffer.
6. Post signs at the outer edge of the critical area or buffer to clearly indicate the location of the critical area according to the direction of the county.

7. Plant buffer with native vegetation appropriate for the region to create screens or barriers to noise, light, human intrusion and discourage domestic animal intrusion.
8. Use low impact development where appropriate.
9. Establish a permanent conservation easement to protect the wetland and the associated buffer.

City of Woodinville

6.3 Vegetation Conservation

1. Required buffers shall be considered vegetation conservation areas. Existing native shoreline vegetation shall be preserved to the maximum extent feasible within the vegetation conservation area consistent with safe construction practices, and other provisions of this section. Native trees and shrubs shall be preserved to maintain and provide shoreline ecological functions such as habitat, shade, and slope stabilization.

2. Within the vegetation conservation area, no more than 15 percent of the area with native shoreline vegetation shall be cleared. All native trees in the vegetation conservation area over 4 inches in diameter at breast height shall be retained. Trees determined by the City to be hazardous or diseased may be removed.

3. The Shoreline Administrator may allow removal of vegetation exceeding that described above where an applicant agrees to replacement plantings that are demonstrated to provide greater benefit to shoreline ecological functions than would be provided by strict application of this section.

Yakima County Regional Shoreline Master Program

16D.03.05 Minor Activities Allowed without a Permit or Exemption.
1) The following activities are included under 16D.01.05(1) (Applicability) and are allowed
without a permit or exemption: (partial list)
a) Maintenance of existing, lawfully established areas of crop vegetation, landscaping (including paths and trails) or gardens within a regulated critical area or its buffer. Examples include, harvesting or changing crops, mowing lawns, weeding, harvesting and replanting of garden crops, pruning, and planting of non-invasive ornamental vegetation or indigenous native species to maintain the general condition and extent of such areas. Cutting down trees and shrubs within a buffer is not covered under this provision. Excavation, filling, and construction of new landscaping features, such as concrete work, berms and walls, are not covered in this provision and are subject to review;

g) Noxious weed control within vegetative buffers, if the criteria listed below are met. Control methods not meeting these criteria may still apply for a restoration exemption, or
other authorization as applicable:
- i) Hand removal/spraying of individual plants only;
- ii) No area wide vegetation removal/grubbing.

Washington Department of Fish and Wildlife

Viewshed clearing

Recommendations from "*Land Use Planning for Salmon, Steelhead and Trout, p. 47):*

"Require a habitat management plan, prepared by a qualified professional, for vegetation clearing in a buffer. Clearing of native vegetation is only permitted if no net loss to fish and wildlife habitat conservation areas can be shown or clearing of native vegetation is necessary to mitigate hazardous trees. Consideration should also be given to assessing the temporal loss of function(s) from such clearing. Although functions recover over time, interim measures to enhance recovery times and trajectories should be implemented. Preferably, some measures (e.g., replacement plantings) should be conducted prior to or concurrent with clearing activities to minimize overall temporal losses. A qualified professional must prepare the report (e.g., arborist)."

> Example Policy: *Limited and selective clearing for views may be allowed when slope stability and ecological functions are not compromised, but landowners should not assume that an unobstructed view is guaranteed. Maintaining well-vegetated riparian areas is preferred over clearing vegetation to create views.* (Jefferson County SMP)
>
> Example Regulation: *Limbing or crown thinning shall comply with National Arborist Association pruning standards, unless the tree is a hazard tree as defined by this ordinance. No more than 25% of the limbs of any single tree may be removed and no more than 20% of the canopy cover in any single stand of trees may be removed for view preservation. Mitigation requirements for removal of vegetation shall be made after review of a habitat management plan prepared by a qualified professional that assesses the cumulative impacts associated with removing riparian vegetation for view enhancement.*

Hazard tree removal

Key evaluation questions
How is a hazard/danger tree **defined**?

- Is there a **permit or review process** for removing a hazard/danger tree?
- Are there blanket **exemptions** for removal?
- Does a **qualified professional** (forester, arborist) need to review/make a report in order to take out a tree?
- Is **mitigation** required?

Recommended definition: *"Danger tree" means a tree with a high probability of falling due to a debilitating disease, a structural defect, a root ball more than fifty percent exposed, or having been exposed to wind throw within the past ten years, and where there is a residence or residential accessory structure within a tree length of the base of the trunk, or where the top of a bluff or steep slope is endangered. Where not immediately apparent to the review authority, the*

danger tree determination shall be made after review of a report prepared by an arborist or forester.

Recommendations from *"Land Use Planning for Salmon, Steelhead and Trout", p. 59:*

"Require department review and professional assessment for hazard tree removal to determine if a tree poses a "direct threat to property and life." A habitat management report prepared by a qualified arborist must be submitted that includes a description of existing habitat conditions, explores alternatives to outright removal (such as limbing or crown thinning), assesses tree health for recruiting to the channel, and on-site replanting provisions to mitigate removal impacts. Hazard tree removal within a stream requires a Hydraulic Project Approval permit under Chapter 77.55 RCW from the Washington Department of Fish and Wildlife."

Regulatory Example (Hazardous Trees): (1) In a critical area or critical area buffer, removal of hazardous, diseased or dead trees and vegetation by the landowner may be permitted when necessary to: (a) Control fire; or (b) Halt the spread of disease or damaging insects consistent with the State Forest Practices Act, RCW 76.09; or (c) Avoid a hazard such as landslides; or (d) Avoid a threat to existing structures or above-ground utility lines. (2) Before hazardous, diseased or dead trees and vegetation may be removed by the landowner pursuant to subsection (1): (a) Unless there is an emergency pursuant to SCC 14.24.070(1), the landowner shall obtain written approval from Planning and Development Services. This consent shall be processed promptly and may not be unreasonably withheld. If the Administrative Official fails to respond to a hazard tree removal request within 10 business days, the landowner's request shall be conclusively allowed; and (b) The removed tree or vegetation should be left within the critical areas or buffer unless the Administrative Official, or a qualified professional, warrants its removal to avoid spreading the disease or pests; and (c) Any removed tree or vegetation shall be replaced with an appropriate native species in appropriate size. Replacement shall be performed consistent with accepted restoration standard for critical areas within one (1) calendar year. (d) For 14.24.130 only, a qualified professional shall mean a certified arborist, certified forester or landscape architect. Skagit County Critical Areas Ordinance, 14.24.130 Hazard Tree Removal.

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Jefferson County Shoreline Master Program (SMP) Comprehensive Update

Buffer Science Summary - page 2

Source: Chapter 5.2 of the November 2008 *Final Shoreline Inventory & Characterization Report*

Excerpted Text Descriptions

A. **Large Woody Debris (LWD):** In riverine environments, more than half of all large woody debris is recruited from within 15 feet of streams.
B. **Nitrogen:** According to the literature, buffer widths as small as 27 feet could reduce nitrogen by as much as 60 percent, while widths up to 200 feet would be required to reduce nitrogen by 80 percent (Desbonnet et al., 1994, in Pentec, 2001).
C. **Sediment:** In general, a 50-foot buffer is estimated to be approximately 60 percent effective at removing sediments, while an 82- to 300-foot buffer would remove approximately 80 percent of sediment load (Brennan and Culverwell, 2004; Pentec 2001).
D. **LWD:** About 90 percent of all large woody debris comes from trees growing within about 50 feet of streams (Herrera, 2005).
E. **Agriculture:** Minimum buffer recommendations for controlling agricultural runoff are 79 feet for 20 percent slopes with slight erosion, and 160 feet for 30 percent slopes with severe erosion (Brennan and Culverwell, 2004).
F. **Pollutants:** Although sediment carried into nearshore marine environments will seldom be of a magnitude to significantly compromise water clarity, the minimum recommended buffer width for sediment control and pollutant removal is 98 feet (30 meters) (May, 2003).
G. **Fecal Coliform:** Control of fecal coliform inputs from agriculture or septic systems to acceptable levels for primary contact recreational use could be achieved by a 115 feet buffer (Young et al., 1980, in Pentec, 2001).
H. **Agriculture:** See 'E' above.
I. **Nitrogen:** See 'B' above.
J. **Shading:** Buffer recommendations range from 98 to 262 feet for natural temperature regulation and shading, or providing equivalent shading as a mature forest (May, 2003).
K. **Riparian Habitat:** For Washington State, the average width reported to retain riparian function for wildlife habitat is 288 feet (Knutson and Naef, 1997).
L. **Sediment:** See 'C' above.
M. **Microclimate:** The minimum recommended buffer for microclimate protection is 328 feet (May, 2003).
N. **Marine Shores:** Levings and Jamieson (2001) cite findings from the Canadian Ministry of Forestry in British Columbia recommending buffers of 300 to 450 feet for marine shores depending on the type of shore, wind conditions, and other factors.

Buffers protect shoreline ecological functions and processes, water quality and habitat:

- Nutrient cycling
- Groundwater recharge
- Soil stability
- Erosion
- Siltation
- Soil-bound contaminants
- Particulate nutrients, metals, organic chemicals
- Fecal coliform bacteria
- Feeding/foraging
- Perch/refuge
- Breeding & Nesting
- Microclimate for plant growth/ decomposition
- Prey production
- Migration/travel corridor
- Habitat structure
- LWD = large woody debris