



Technical Memorandum for Proposed Kitsap County SMP Buffers

Introduction

Shoreline Master Program (SMP) updates are required to integrate critical area regulations for those critical areas within shoreline jurisdiction. SMPs must also consider Vegetation Conservation Buffers as a method to protect existing shoreline ecological functions. This memorandum will provide a review of critical area protection measures and proposed buffers for Kitsap County's draft SMP. A science summary of the various buffer functions considered is also included in this report.

Critical Area regulations, including shoreline buffer standards, are currently located in Kitsap County Code Title 19 (Critical Areas Ordinance or "CAO"), which was last updated in 2005 and amended in 2007. Upon review of the science utilized for the 2005 CAO update, it was determined that the following critical area chapters conform to "most current, accurate and complete scientific and technical information" and thus may be incorporated into the SMP without significant revisions:

- *Wetlands,*
- *Critical Aquifer Recharge Areas,*
- *Frequently Flooded Areas, and*
- *Geologically Hazardous Areas.*

It was also determined that the *Fish and Wildlife Habitat Conservation Areas* chapter required further review, specifically related to Critical Saltwater and Freshwater Habitats, and Vegetation Conservation Buffers. As a result, the Draft SMP includes provisions to address these features.

Critical Saltwater and Freshwater Habitat protection is addressed in each individual *Use and Modification* section of the Draft SMP. For example, new piers and docks must account for such habitats when considering appropriate location and design. *Appendix A* describes which regulations and development standards specifically address such habitats. In addition, the general requirement for "no net loss of shoreline ecological functions" further ensures habitat protection for all new development activities.

The remainder of this memorandum will address Vegetation Conservation Buffers, with a brief background on Shoreline Environment Designations.

Existing vs. New Shoreline Environment Designations

The Shoreline Environment Designations have changed in name and definition from those in the current SMP to those recommended in section 173-26-211 of the Washington Administrative Code (WAC). While Kitsap County had the option to retain the existing designation names, they would still need to be analyzed for compatibility with the intent of the new designations. As such, the County has chosen to utilize the recommended WAC designations.

While the existing and new designations share some similarities, comparing them directly is not recommended. However, the 'colors' on the existing and new Designation Maps are generally comparable. As an example, brown

shading on the current map indicates ‘Semi-Rural’ shorelines. Those same areas are likely to be brown on the revised map, but will typically have the new ‘Shoreline Residential’ designation instead. The definitions for ‘Semi-Rural’ (old map) and ‘Shoreline Residential’ (new map) are different, but similar enough to allow for very general comparisons between colors on the current and proposed maps.

Existing Buffers

Each Shoreline Environment Designation has an associated buffer for new development activity along the shorelines. The existing shoreline buffers were adopted in 2007 as a result of a Growth Board decision which determined that previously proposed smaller buffers for certain designations were not supported by “best available science”. As the Growth Board case focused solely on the Urban, Rural and Semi-Rural designations, the Conservancy and Natural Designations were not addressed at the time, resulting in a situation where the more heavily developed residential and urban settings had buffers equal to or greater than those in the more natural areas. An across the board review of shoreline buffers would need to wait for the SMP process that is currently underway.

Existing buffers are shown by designation in the table below:

Table 1 Existing Designations and Buffers

Existing Shoreline Environment Designation	Existing Buffer
Urban	50'
Semi-Rural	100'
Rural	100'
Conservancy	50'
Natural	100'

Average Setbacks for Existing Development

In an effort to determine existing development patterns along the shoreline, a GIS analysis was conducted to determine the current average distance from the shoreline to the primary structure in each Environment Designation. These numbers are approximate, but provide a reasonable comparison of existing development patterns to the proposed buffers in Table 5 below.

Table 2 Proposed Designations and Existing Primary Structure Distance from OHWM

Proposed Shoreline Environment Designation	Existing Primary Structure Distance from OHWM Averages and the Number in Each Designation
High-Intensity	108'*
Shoreline Residential	81'
Urban Conservancy	105'
Rural Conservancy	96'
Natural	141'

*The existing primary structure setback average for High-Intensity may not be a good measure due to the types of activities found on the shorelines in this Designation. For example, High-Intensity areas tend to be ferry terminals or industrial areas with primary structures set back much further to allow for the actual primary activity close to the shoreline.

Buffer Approach

As discussed above, an across the board review of current shoreline buffers was undertaken for this SMP update process. As a result of this review, Kitsap County is proposing a range of buffers intended to recognize site-specific shoreline functions, while still maintaining flexibility for appropriate shoreline development. Each individual Shoreline Environment Designation has been analyzed for the most appropriate buffers. Under this proposal, each Designation will have the following:

- *Standard Buffer*: the starting line from which most development activity should occur outside of; provides optimum buffer functions for the Environment Designation.
- *Reduced Standard Buffer*: development activity between the Standard Buffer and this line could occur with site-appropriate mitigation measures from the Mitigation Table (Appendix B);
- *Below Reduced Standard Buffer*: non-water dependent development activity below this line would require some form of variance.

Science Summary

This section includes a review of the science considered for the various buffer functions. Multiple buffer functions were considered to help facilitate meeting the ‘no net loss of shoreline ecological functions’ requirement under the WAC guidelines.

Some functions may not be as critical in certain designations due to existing conditions. For example, microclimate and corridors for some wildlife may not be obtainable in the High-Intensity or Shoreline Residential Designations due to existing structures and uses. However, functions such as sediment or nutrient filtration may be most important in those environments. Therefore, Kitsap County has strived to meet the highest level of function for the most buffer functions in each Designation.

Each of the documents in Table 3 below have been reviewed under the Kitsap County SMP Science Policy (Resolution 022-2010) and the guidelines at WAC 173-26-201(2)(a), and found to be consistent with both unless otherwise noted.

Table 3 Buffer Functions Categories, References and Recommendations

Buffer Function	References	Recommendation
Microclimate	Knutson and Naef, 1997	412'
	May, 2003	100-328'
Shade	Brennan, et al., 2009	56-125'
	May, 2003	98-262'
	FEMAT	121'
Sediment Filtration	Brennan, et al., 2009	92-299'
	May, 2003	100'
	FEMAT	82-197'
	Knutson and Naef, 1997	78'
	Neibling and Alberts, 1979*	7.9'
	Desbonnet, et al., 1994	82' (80%)
Pollutant Filtration	Brennan, et al. , 2009	16-1,968'
	May, 2003	66-196'
	Knutson and Naef, 1997	78'
	Desbonnet, et.al., 1994	148' ("adequate")

	Larsen, 1994*	2'
	Doyle, 1977*	13'
	Lim, 1998*	20'
	Strivastava, 1996*	10-20'
Large Woody Debris	Brennan, et al., 2009	33-328'
	May, 2003	164'
	FEMAT	131'
	Knutson and Naef, 1997	147'
Wildlife Habitat	Brennan, et al., 2009	240-902'
	May, 2003	100-328'
	Knutson and Naef, 1997	287'
	Desbonnet, et.al., 1994	49' (min. for wildlife + 60% pollutant removal)
All Functions	Desbonnet, et.al., 1994	16.4'(min. for densely developed areas); 49' (min. for moderately developed areas); 164' (undeveloped areas) 82' (min. general wildlife and 70% pollut. removal)
	Castelle, 2000	16-82'

*This reference may not be as applicable to Kitsap County shorelines as others listed here due to the location and type of environment analyzed.

Table 4 Buffer Function Average and Median Widths from the Literature

Buffer Function	Average Buffer	Average minus outliers	Median Buffers	Range (Lowest/Highest)
Microclimate	280'	100'	100'	100'-412'
Shade	132'	115'	121'	56'-262'
Sediment Filtration	117' [133']	105' [111']	87' [100']	7.9'-299' [78'-299']
Pollutant Filtration	231' [412']	63' [122']	20' [113']	2'-1,968' [16'-1,968']
Large Woody Debris	161'	147'	147'	33'-328'
Wildlife Habitat	318'	239'	264'	49'-902'
TOTAL	197' [211']	157' [172']	100' (Lower=49' [80']; Upper=196' [257'])	

Numbers in brackets indicate the results when (*) documents were not considered based on their applicability to Kitsap County shorelines.

Analysis of Proposed Buffers

In general, the Shoreline Environment Designations below are listed in order from those with the least sensitive to the most sensitive shoreline habitat and functions. Proposed buffer widths are also summarized in Table 5 below.

High Intensity

The proposed Standard Buffer is **50'**, with no Reduced Standard Buffer for this designation. This buffer width represents the minimum recommended for basic wildlife functions with 60% pollution removal, is within the range of recommended values for sediment filtration and large woody debris functions, but is not quite to the minimum

recommendation for shade functions. It is also the lower-median for all buffer function widths recommended in the documents listed in Table 3.

Shoreline Residential

The proposed Standard Buffer is **85'**. This buffer width represents the median buffer recommended for sediment filtration, is inclusive of the median recommended buffer for pollutant filtration, and is inclusive of the minimum recommendations for all buffer functions except microclimate. The average setback for existing primary structures located within this Designation is approximately 81'.

The proposed Reduced Standard Buffer is **50'** (see explanation for High-Intensity). To reduce the full 35', the applicant would need to choose three mitigation options from the Mitigation Standards Table or complete a site-specific Shoreline Mitigation Plan.

Urban Conservancy

The proposed Standard Buffer is **100'**. This buffer represents the median recommended buffer width for all functions, and is the average or median buffer width for microclimate, sediment filtration, and pollutant filtration. The average setback for existing primary structures located within this Designation is 105'.

The proposed Reduced Standard Buffer is **85'** (see explanation for Shoreline Residential).

Rural Conservancy

The proposed Standard Buffer is **130'**. This buffer represents the approximate average and median buffer recommendation for shade cover functions. It is also inclusive of microclimate, sediment filtration, and pollutant filtration functions, and meets the Forest Ecosystem Management Assessment Team (FEMAT) recommendation for large woody debris input.

The proposed Reduced Standard Buffer is **100'** (see explanation for Urban Conservancy). The approximate average setback for existing primary structures located within this Designation is 96'.

Natural

The proposed Standard Buffer is **200'**. This buffer represents the total average (197') and upper median (196') recommended buffer width for all functions. Had the full recommended average for wildlife habitat been required, the buffer would have been beyond the 200' SMP jurisdiction. However, 200' does provide protection for the greatest number of functions while ensuring that 'no net loss' is being achieved within the shoreline jurisdiction.

The proposed Reduced Standard Buffer is **150'**. This buffer still captures the total average and median recommended buffers for all functions (minus outliers). The average setback of existing primary structures located within this Designation is 141'. A 50' buffer reduction would require the applicant to choose three mitigation options from the Mitigation Standards Table, or complete a site-specific Shoreline Mitigation Plan.

Table 5 Proposed Buffer Widths by Designation

Shoreline Environment Designation	Proposed Standard Buffer	Proposed Reduced Standard Buffer
High-Intensity	50'	50' (no reduction)
Shoreline Residential	85'	50'
Urban Conservancy	100'	85'
Rural Conservancy	130'	100'
Natural	200'	150'

Bibliography – Specific Buffer Recommendations

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Castelle, A. J. and A. W. Johnson. 2000. Riparian vegetation effectiveness. National Council for Air and Stream Improvement, Technical Bulletin 799, Research Triangle Park, NC.

Desbonnet, A., P. Poque, V.Lee, and N. Wolff. 1994. Vegetated Buffers in the Coastal Zone- A Summary Review and Bibliography. Coastal Resources Center Technical Report No. 2004. University of Rhode Island Graduate School of Oceanography, Narragansett, RI 02882. 72pp.

Doyle, R.C., G.C.Stanton and D.C Wolf. 1977. Effectiveness of Forest and Grass Buffer Strips in Improving the Water Quality of Manure Polluted Runoff. American Society of Agricultural Engineers Paper No. 77-2501.

Knutson, K.L. and V.L. Naef. 1997. Management Recommendations for Washington's Priority Habitats: Riparian. Washington Dept. of Fish and Wildlife, Olympia. 181pp.

Larsen, R.E., J.R. Minor, J.C. Bockhouse and J.A. Moore. 1994. Water-Quality Benefits of Having Cattle Manure Deposited Away from Streams. Bioresource Technology. 48: 113-118.

Lim, T.T., D.R. Edwards, S.R. Workman, B.T. Larson and L. Dunn. 1998. Vegetated Filter Strip Removal of Cattle Manure Constituents in Runoff. Transactions of the American Society of Agricultural Engineers. 41(5): 1375-1381.

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Neibling, W.H. and E.E. Alberts. 1979. Composition and Yield of Soil Particles Transported Through Sod Strips. ASAE paper 79-2065.

Strivastava, P., D.R. Edwards, T.C. Daniel, P.A. Moore Jr. and T.A. Costello. 1996. Performance of Vegetative Filter Strips with Varying Pollutant Source and Filter Strip Lengths. Transactions of the American Society of Agricultural Engineering. 39(6): 2231-2239.

Bibliography - General Buffer References

In addition to the references above which provide specific buffer width recommendations, the following references provided general guidance on the functions and applicability of vegetated buffers.

Brennan, J. and Culverwell, H. 2004. Marine Riparian: An Assessment of Riparian Functions in Marine Ecosystems. Published by Washington Sea Grant Program. Copyright 2005, UW Board of Regents, Seattle, WA. 34p.

Brennan, J.S. 2007. Marine Riparian Vegetation Communities of Puget Sound. Puget Sound Nearshore Partnership Report No. 2007-02. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.

EnviroVision, Herrera Environmental and Aquatic Habitat Guidelines Program. 2007, revised 2010. Protecting Nearshore Habitat and Functions in Puget Sound: An Interim Guide.

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Stanley, S., Brown, J., Grigsby, S., Hruby, T. 2008. Protecting Aquatic Ecosystems by Understanding Watershed Processes: A Guide for Planners. Washington Department of Ecology, Publication # 05-06-027.

APPENDIX A

How Critical Saltwater Habitats and Critical Freshwater Habitats are Addressed in the Draft SMP Update

These are a summary of some of the regulations which are specific to critical habitats. Other regulations may be protective of such habitats, but are more general to meet the “no net loss” requirement.

Agriculture

- Lot wastes and manure solids are not to be stored with the SMP jurisdiction, including floodways and floodplains.

Aquaculture

- Must be located and designed to avoid, minimize, etc. impacts to critical habitats
- Non-structural methods preferred over structural methods
- Species which have not been previously cultivated in Washington must receive approval from WDFW and WDOH and comment from applicable tribes.
- Predator exclusion order of preference and standards

Barrier Structures

- Prohibited in Natural Designations, CUP in all others, and SDP only for restoration purposes

Boating Facilities

- CUP where adjacent to the Natural Designation
- Dredging which modifies the littoral drift of sediment are required to supply beach nourishment
- Same location and design mitigation sequencing as Mooring Structures

Commercial Development

- Prohibited in the Aquatic Designation, except for water-dependent appurtenances to commercial development

Dredging

- Prohibited in Natural Designation, CUP in all others
- Allowed only for the safety of existing uses and is restricted to previously dredged channels

Filling

- Prohibited in Natural, except for restoration; CUP in other Designations, SDP for restoration

Forest Practices

- CUP in the Natural Designation
- “30% rule” on shorelines of statewide significance

Industrial Development

- Prohibited in the Natural and Rural Conservancy designations, CUP if water-oriented in the Urban Conservancy and Shoreline Residential designations.
- Prohibited in the Aquatic designation unless water-dependent and allowed in the upland designation, and then with a CUP
- Located and designed according to mitigation sequencing

Mining

- Prohibited water-ward of the ordinary high water mark.

Mooring Structures

- Prohibited in the Natural Designation for single-use; CUP for joint-use or public access
- Existing covered moorage associated with single family residences must be removed at the end of the life of the structure, or relocated away from CSH when greater than 50% of the structure is repaired.
- Non-motorized uses shall provide the greater of 25’ horizontal buffer from eelgrass, a horizontal buffer equal to the distance of the shadow cast by the structure and vessel, or a 4’ vertical buffer from relevant aquatic

vegetation. Motorized uses also have the option of a buffer equal to the 3.5X the turning radius of the longest vessel to use the structure.

- Areas documented, or potential habitat for, forage fish shall either be surveyed over a period of two years to show no forage fish presence, or develop the structure with the standards required for forage fish habitat; Work-window restrictions and buffers.
- Double the piling spacing (40') for structures built in forage fish habitat or with aquatic vegetation.
- Buoys must have helical anchors with a mid-line float and located in deep waters to avoid impacts to aquatic vegetation
- No over-water structures allowed within 100' of a stream mouth, in either lakes or marine shoreline.

Recreation

- Located and designed according to mitigation sequencing

Residential Development

- New overwater residences prohibited
- New residential development must be located to not need future shoreline stabilization

Shoreline Stabilization

- If demonstrated necessary, CUP required in all designations for hard shoreline stabilization
- Soft shoreline stabilization permitted with a SDP (SFRs may be exempt from SDP)
- If the ordinary high water mark has been reestablished, the replacement structure will need to be relocated accordingly
- Habitat surveys required
- Junk materials or those with certain chemical treatments may not be used

Transportation

- Bridges and culverts must be large enough to pass the 100 yr. flood waters and consideration for associated debris flows.

Utilities

- Sewage treatment plants should be located where the treated effluent will have the least impact on critical habitats, including recreational shellfish beds.

APPENDIX B

[Refer to Mitigation Standards Table]